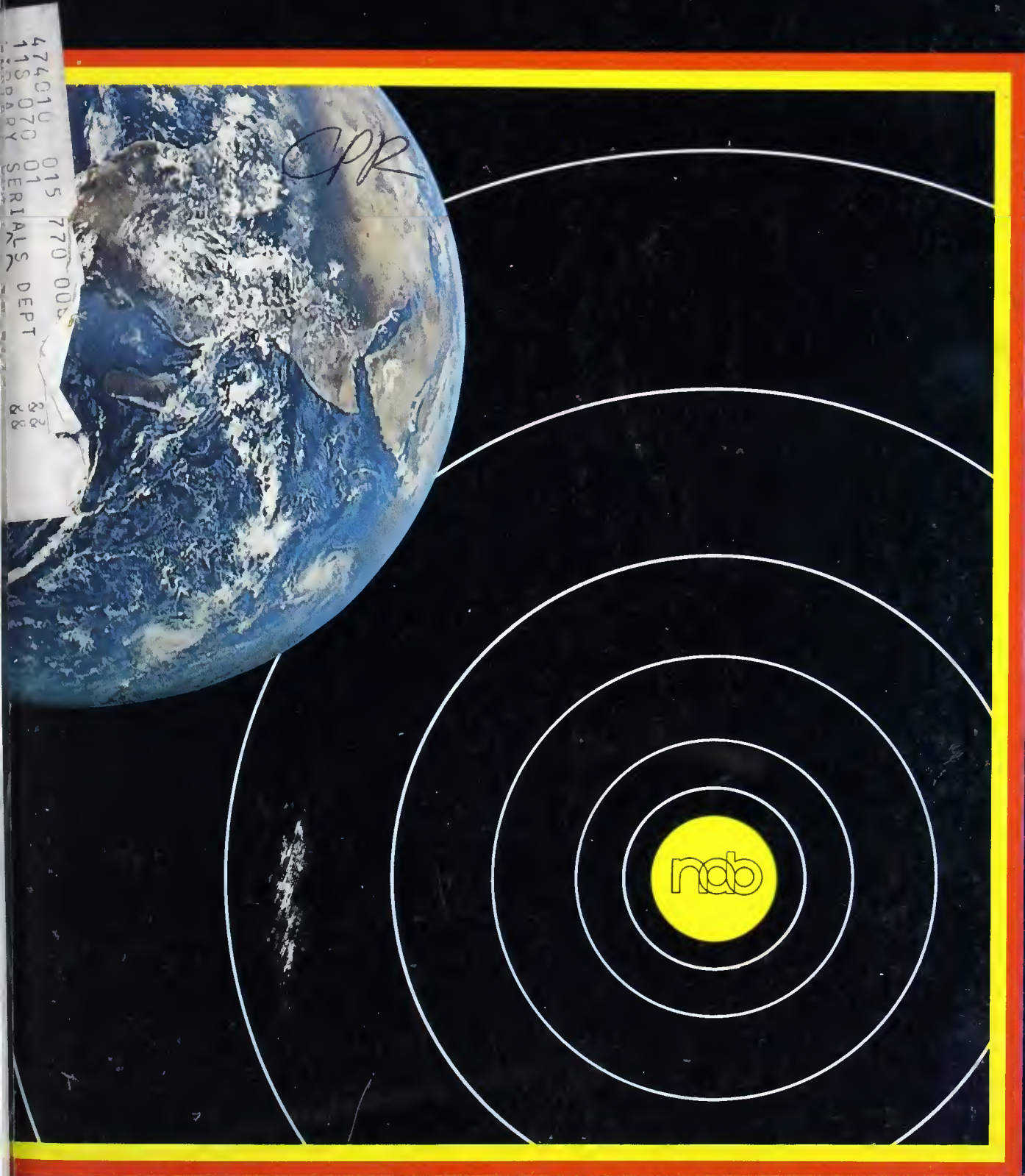


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BROADCAST[®] ENGINEERING

The journal of the broadcast-communications industry

March, 1979 □ Volume 21 □ No. 3

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March 1979 \$2.00



NAB Convention Special

THE COVER

Continuing the theme of the NAB Convention to be held this month in Dallas, the cover is modeled after the NAB promotional brochure covering their 57th Annual Convention and International Exposition. The NAB artwork was copied and reproduced here with permission from the NAB. It was designed by Steve Quine, graphic designer for Sparkman & Bartholomew Associates of Washington, DC.

The earth photo inserted in the corner is reproduced with permission of and by courtesy of NASA.

NAB CONVENTION GUIDE

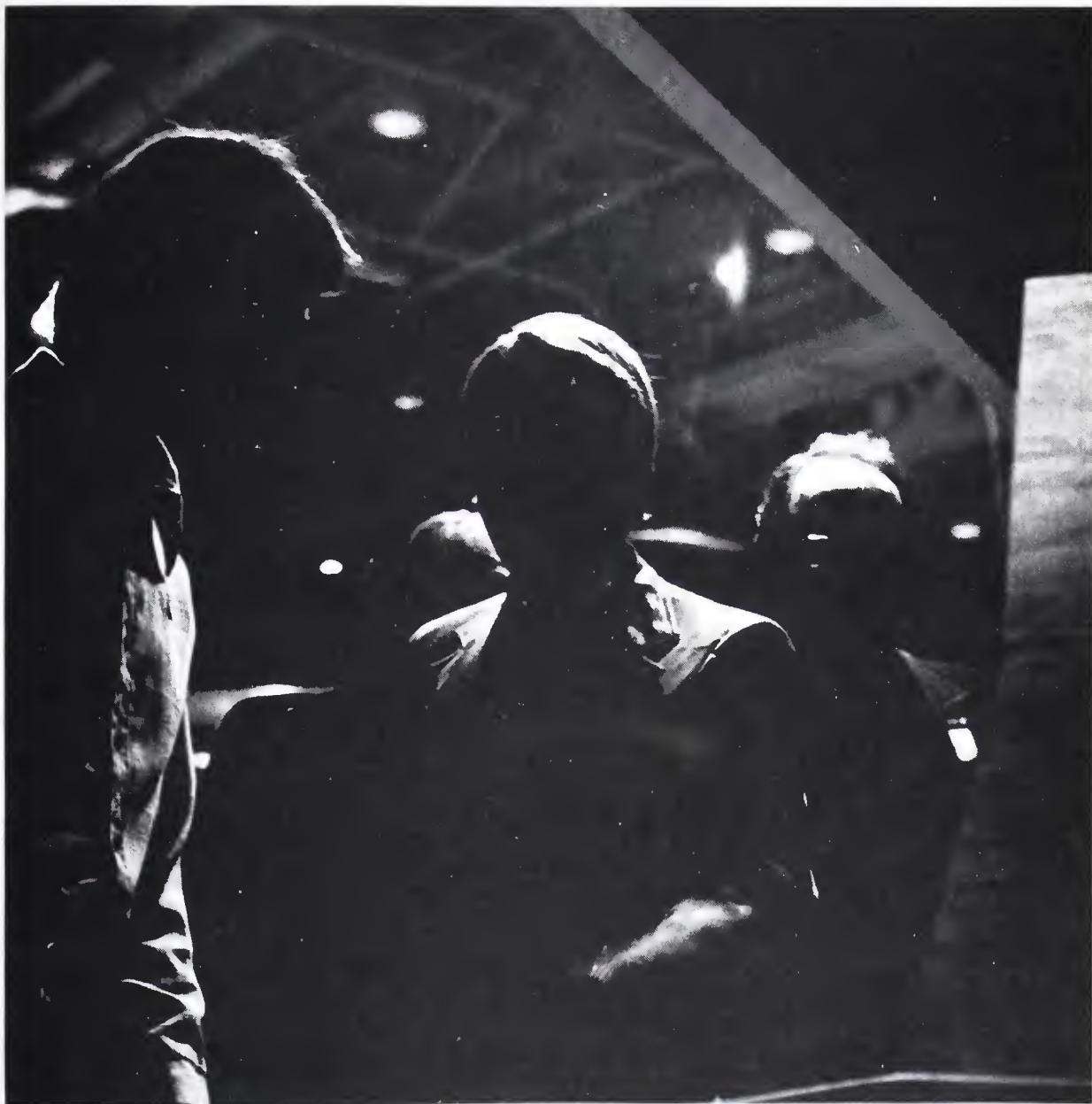
See page 95 for an introduction and overview of this year's big NAB Convention in Dallas. Our extensive pre-NAB coverage of this event is indexed on the left of this page.

APRIL ISSUE

- Directional antenna review
- Vector analysis of directional arrays
- STL equipment roundup

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BROADCAST ENGINEERING (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212.

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

SUBSCRIPTIONS: BROADCAST ENGINEERING is mailed free to qualified persons in occupations described above. Non-qualified persons may subscribe at the following rates: U.S., one year, \$20; all other countries, one year, \$26. Back issue rates, \$3, except for the September Buyers' Guide issue, which is \$10. Rates include postage. Adjustments necessitated by subscription termination at single copy rate. Allow 8-8 weeks for new subscriptions or for change of address. Controlled circulation postage paid at Kansas City, MO.

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FCC update



March, 1979/By Howard T. Head, A.D. Ring & Associates

Each year at NAB Convention time, we go into our annual trances and take both a backward and a forward look at the hot topics where either something good or bad may or may not happen. This year is no exception and so between gazes out of your window at beautiful downtown Dallas, welcome to our 1979

POMPOUS PREDICTIONS.

More AM and FM radio stations

Nowadays the big push at the FCC, as well as at many other federal agencies, is for diversity which in the case of radio and television stations means more opportunities for women and minorities. Of several approaches being pushed to increase the number of AM and FM radio stations is a reduction in spacings between carriers. The FCC will shortly ask for contract proposals to study the effect of frequency reductions from 10 kHz spacing to 9 kHz spacing in the AM band and from 200 kHz spacing to either 150 kHz spacing or 100 kHz spacing in the FM band. Reports of the results of both of these contracts will be delivered to the FCC and made public within the next year.

And at VHF-TV, too

The now defunct White House Office of Telecommunications Policy (OTP) was responsible for a massive push to add additional VHF channel assignments, in this case by simply reducing co-channel and adjacent-channel mileage separation requirements since any tampering with the channel width would lead to complete chaos. An OTP official first said in a news conference that 100 short-spaced VHF drop-ins were technically feasible. A later report cut this number down to 88 (and subsequent corrections to many less) and finally the commission proposed making five short-spaced VHF-TV drop-ins. The commission's Broadcast Bureau recommended against all of these in December, but the proposal was sent back to the bureau for further study. Look for a further push by the commission to once again study a much larger number, perhaps near the original 100. If this is done during the next year it won't go past the proposal stage at this time, but with today's political climate, final action is really uncertain.

there must be 1,001 reasons to

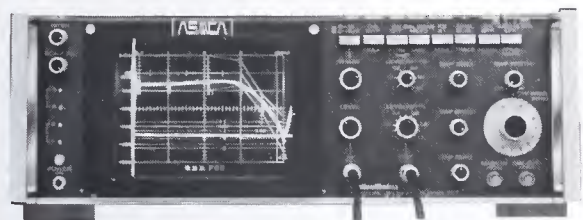
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ACC-2000 Portable Color Camera—TV camera hand-held on remote or tri-pod held in studio. Center of gravity conforms to human head, shoulder, arm and hand. Fights fatigue.



ASW-100 Portable Switcher—See No. 1 at right.



201-1 Envelope Delay Measuring Instrument—Used by network stations in U.S.A. and Canada. Priced several thousand dollars below competition.



925-C Video Noise Meter—Measures radio noise voltage generated in TV transmission equipment, TV cameras, VTRs, video disc units, digital image processors and the like.

At the NAB Show, see products by Asaca so new the competition is still on the drawing board. See innovations that have captured the fancy of networks and manufacturers.

- 1. ASW-100 Portable Switcher**—New! Designed for ENG and EFP cameras. Small. Light. Hand carry. Great for field production. 3 VBS switching, VBS mixing, Automatic phase control. Optional, built-in special effect control. Works off 12-volt car battery.
- 2. 1130 Camera Registration Meter**—New! Camera comparison made ultra-easy by digital read-outs. Discrepancies are nil. Readings in TV line percent or chroma level via micro-computer.
- 3. 875-B Jitter Meter**—New! Measures VTR jitter. Read tape speed as well as jitter. Permits long periods of VTR use because pen method of recording gives visible track.
- 4. TG-7 Test Signal Generator**—New! Modular construction. Add-on modules for other functions as needed. Choice of 4 test signal generator modules. Gen-lock function.
- 5. 1100 Programmable Distortion Meter**—New! Can be computer-controlled. Easy-to-read automatic measuring via computer programming.
- 6. ACC-2000 Portable Color Camera**—C-mount. Excellent sensitivity. Shoulder-holster for field use; tri-pod for studio. Favored by stations' news departments.
- 7. 201 Envelope Delay Measuring Set**—Compact. 1-piece. Measures group delay. Built-in sync and blanking circuit. Preferred by major networks. Point-by-point sweep measurement delay.
- 8. 925 Color Noise Meter**—Measures *both* luminance and chrominance noise plus AM and PM components of chroma noise. Used by networks and manufacturers' laboratories.
- 9. 205 Video Sweep Generator**—Adjusts and maintains frequency of U-matic VTR and 2-inch VTR. Built-in sync, color burst switch. Easy-read digital meter. Function generator enhances accuracy.
- 10. 588 Digital Pattern Generator**—No distortion. All-point quality control of TV receivers. Indispensible to manufacturers. Great for maintenance at TV stations.
- 11. CMM-10 & CMM-20 Color Monitors**—Compact, broadcast quality monitors. Operate on DC also, making them ideal for on-location shooting as well as in studio. Popular with production houses.

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1979 World Administrative Radio Conference (WARC '79)

WARC 1979 will start on schedule in Geneva in September and the US will find itself locked in combat with delegates from 153 other nations. The US never comes out first in these conferences and this one will be no exception. Frequency allocations will be given up and the US will find itself unable to resist demands from other delegates for sharing. One probable outcome is the expansion of the AM broadcast band in Region 2 (the Americas) upward to 1700 kHz or 1800 kHz.

Automatic transmission systems

Instead of writing something new on this subject, we could simply repeat our confident predictions from either of the past two years, that commission action on ATS for all broadcast transmitters is just around the corner. They said the same thing about prosperity in 1932, and so we are not going to back off an inch. ATS this year, as in past years, is just around the corner.

Teletext services

In regular Teletext services, alphanumeric and graphic material is broadcast to special decoders, using digital transmission in the television vertical interval. In Europe, CEEFAX and ORACLE in Britain and ANTIOPE in France are readily available to viewers. A sudden push has developed in the US, sparked to a very considerable extent by pioneer work at KSL-TV, Salt Lake City. CBS and NBC have announced plans to commence experiments and demonstrations shortly. EIA has formed a high level committee to push forward with planning and testing. No standardizations at the government level will take place during the coming year but a lot of progress will be made. These services will become considerably closer to reality.

UHF television improvements

There has been a big push to improve UHF television reception at both the transmitting and receiving ends of the system sparked largely by the Council for UHF Broadcasting (CUB), a loose coalition of several Broadcasting organizations having a stake in UHF success. CUB was responsible for the FCC ruling effective last August requiring affixed receiving antennas to include all-channel capability and a reduction in the receiver UHF noise figure from 18 dB to 14 dB effective this October. (The figure goes down to 12 dB three years later.) CUB has kept plugging away at the FCC and as a result of this and congressional pressure, the commission now has five separate proceedings pending--all aimed in one way or another at UHF improvements. Work in all of these areas is already under way and although there are unlikely to be any reports or orders from the commission in the year to come, considerable progress will be made.

AM stereo/FM quad

Systems for both AM stereo and FM quadrasonic sound have been tested and retested, all of the information necessary to reach a decision on standardization essentially has been accumulated and the commission will shortly be in a position to act. Our best judgment is that action in both areas will occur sometime this year and that rules will be adopted in time for some stations to be on the air with AM stereo and FM quad by the end of the year. □

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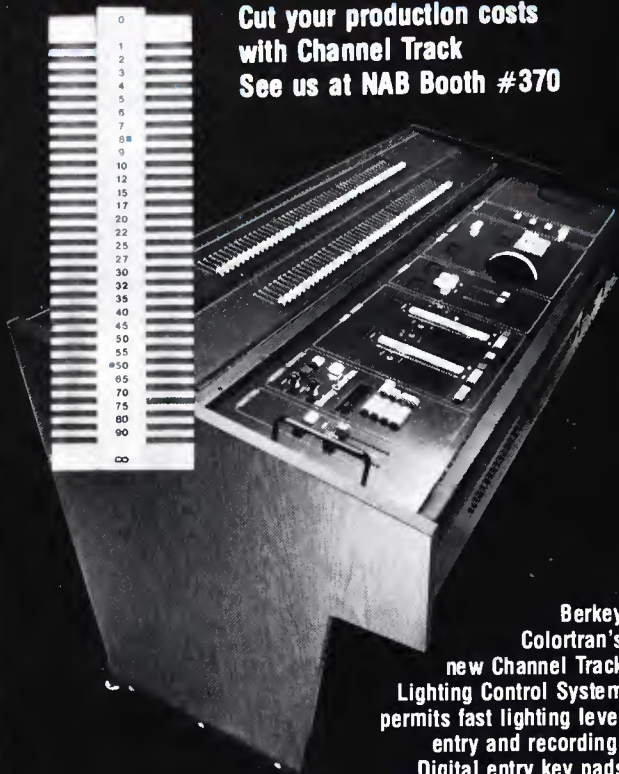
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industry news

NTIA petitions to reduce AM spacing

The National Telecommunications and Information Administration (NTIA) filed a Petition for Rulemaking with the FCC on January 10 for reduction of the required spacing between AM radio channels from the present 10 kHz to 9 kHz. NTIA pointed out that the reduced spacing would allow for 12 to 14 more channels in the current AM band with a hopeful addition of several hundred more AM stations. NTIA also suggested that the reduction could be accompanied by a deregulation of AM radio, at least with respect to the public trustee concept.

Henry Geller, assistant secretary of commerce for communications and information, agrees with NTIA. In a recent address before the International Radio and Television Society, Geller said he feels it is time to deregulate broadcast radio and to make the regulation of broadcast television more objective. Geller did emphasize that his conception of radio deregulation would leave intact some regulatory provisions including multiple ownership rules, EEO requirements and bans on rigged quizzes and on obscene or indecent programming.

Broadcast stations on increase

The FCC recently released figures for the total number of broadcast stations on the air as of December, 1978. AM radio stations increased from 4529 last July to 4547 (less than 1%) while the number of FM radio stations increased 1% since last July from 3049 to 3092. FM educational radio stations showed a 5% increase for the 6-month period, increasing its total from 933 to 982. Commercial UHF television increased its total to 212 compared to 207 last July, while commercial VHF television, educational UHF and VHF all remained the same with 516, 102 and 102 stations respectively.

RCA engineer speaks at seminar

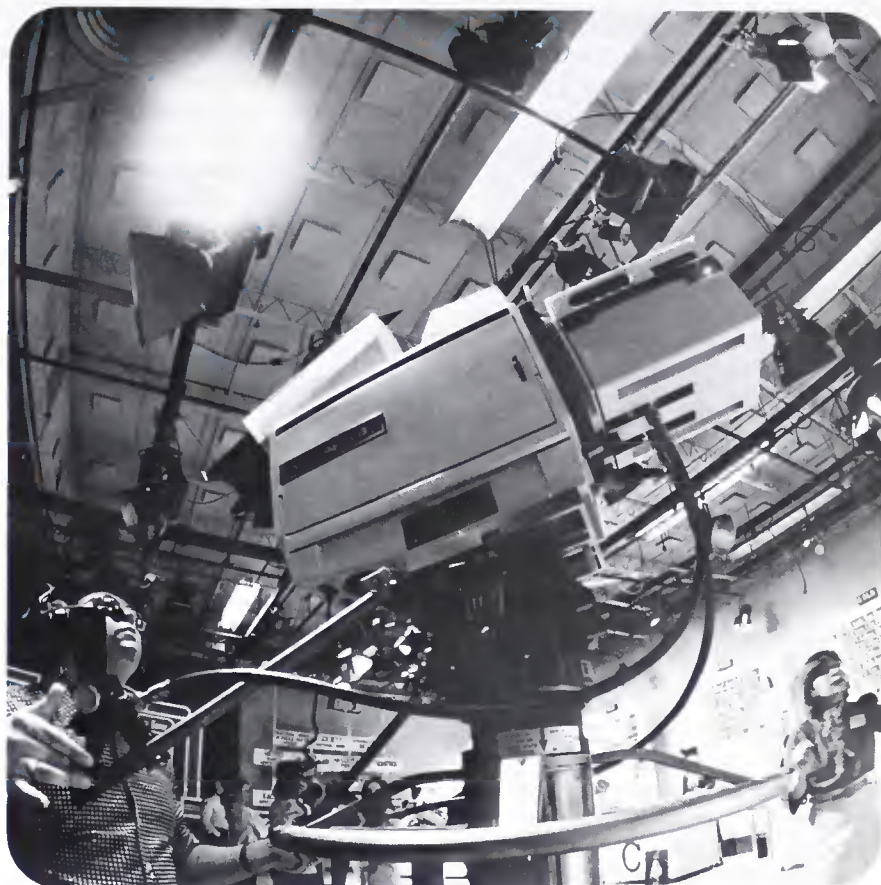
R. Neuhauser, broadcast camera tube engineer at RCA Electro Optics, was the featured speaker at the Saticon Seminar II. The seminar, jointly conducted by RCA and State Labs, was held January 22 at 5:30 PM at NBC studio 8G in Rockefeller Center. Neuhauser discussed the various features of the Saticon camera tube such as higher resolution and high sensitivity. Guests included engineers of television stations and production studios from New York, New Jersey, Connecticut and Pennsylvania.

FCC submits UHF/VHF report

The FCC has submitted a report to Congress on proposals for reaching comparability between UHF and VHF TV. The action came in response to a congressional directive which directed the FCC to

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March 1979 *Broadcast Engineering* 11

"devise a plan for UHF to reach comparability with VHF in as short a time as possible," and approved a \$750,000 appropriation for the improvement of UHF TV reception.

A UHF Comparability task force will initiate inquiries to consider:

- The many possibilities for improved UHF television service;
- The most economical way to improve television reception and increase the use of the radio spectrum; and
- The need for incorporating television receiver standards into FCC rules.

Improvements under consideration have the potential for providing better reception of existing UHF television signals and may permit reduction of UHF "taboos" (areas where UHF television assignments are restricted because of interference problems).

ABC builds news bureau

ABC has begun construction on a new 10-story Washington DC news

bureau located at 1711 De Sales Street, with completion scheduled for the fall of 1980. George Watson, vice president and bureau chief, will be in charge of all facets of the bureau's operations including radio and TV production facilities for *World News Tonight*, *Good Morning America*, *Issues and Answers* and associated support facilities.

Besides the daily news origination, the bureau also routes ABC-TV network programming from New York to the southeast region of the country.

Sun powers railroad microwave VHF system

The sun will power the microwave communication system for Australian National Railways' new Tarcoola-Alice Springs line. Solar Power Corporation has won the half-million dollar contract to provide solar cell modules for the integrated microwave-VHF radio system.

Australian National Railways'

(ANR) general manager, V.H. Dyason, said the solar cell modules would recharge batteries providing power for the line communications equipment. Each microwave repeater station will have its own solar power unit with an output of 1280 W. The total solar generating capacity will be more than 30 kW.

"We believe solar power will eliminate costly diesel fueling and maintenance procedures on the new lines," Dyason said.

Initially, the system will use only 25 of the available 75 channels. It will span 850 km and will include 24 solar-powered repeater stations at intervals of about 35 km. Terminal stations will be located at Tarcoola and Alice Springs, linking the system to the existing ANR open-wire communications network at Tarcoola, Port Augusta and Alice Springs. The control center will be located at Port Augusta.

Each site installation will comprise a weather-resistant building housing communications equipment, a 70 m tower for the microwave link (seven are completed), antennas for

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- Virtually foolproof servo-control system.
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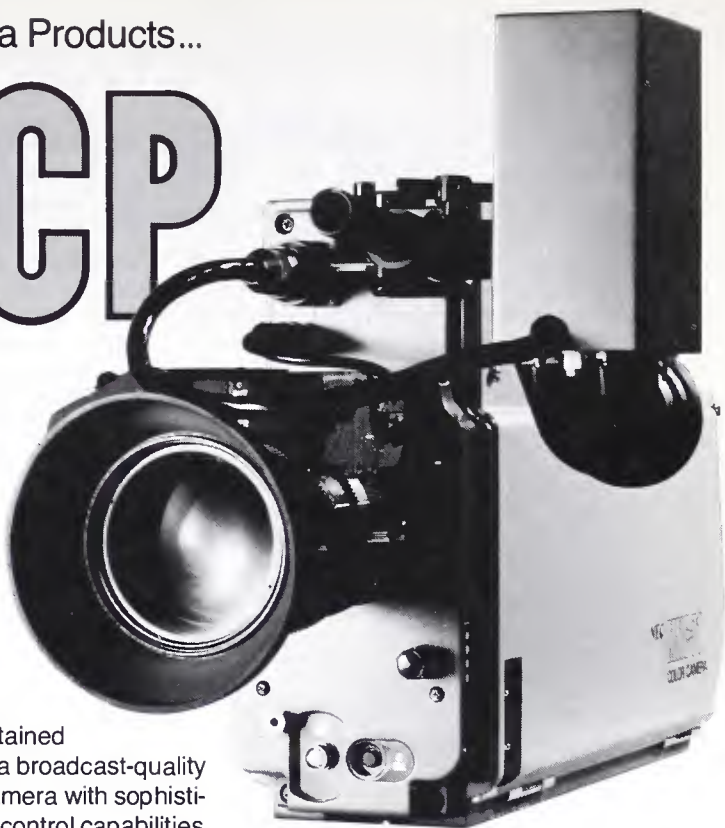
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There's no need to repackage the camera in a bulky outer shell for studio operation. Just add the optional 5" viewfinder and the portable production CCU (with cable compensation up to 155 feet), or the rack-mounted teleproduction CCU (with cable compensation for more than 1000 feet)... and your MNC-71CP readily converts into an MNC-710CP studio/field configuration. Ideal for multi-camera shoots on location and in the studio.

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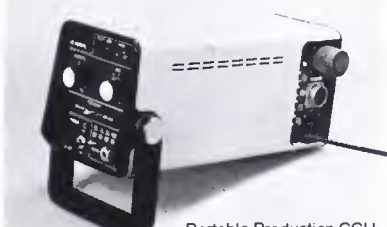
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Industry news

VHF 2-way radio system, and the solar power unit. Each solar array is being assembled at its site.

The system will provide VHF radio communication with a moving train at any point on the line. Train crews and track maintenance gangs will have continuous radio communication with train control and with each other.

Dyason said the microwave communication system was new to Australian National Railways. The integrated microwave VHF radio system would replace the previous railway practice of providing open-wire telephone lines for use on railways.

Total cost of the communication system for the new railway (slated for completion in early April) will be approximately \$5 million.

FCC cracking down on blanking problem

Changes related to television transmitter characteristics to comply with horizontal and vertical

blanking standards could enhance or obviate improvement in TV sets. The commission will issue Advisory Notices up until July 1 when horizontal blanking is detected in excess of 11.44 μ s, up to 12 μ s, and when vertical blanking of 22 or 23 lines is detected. A Notice of Violation will be issued to stations with horizontal blanking in excess of 12 μ s, and vertical blanking of more than 23 lines.

Copies of the report to Congress are available for examination in the FCC Office of Information, Room 202, 1919 M St., NW, Washington, DC.

Chief engineer is now chief scientist

The Office of Chief Engineer has been redesignated the Office of Science and Technology by the FCC. The title of chief engineer has been changed to chief scientist, effective May 1. The commission says it recognizes that present and future developments in communications require intensive study of applied and

basic science and technology and the new office will help promote supportive efforts in the fields of physical science, engineering and electronics.

The office will be responsible for planning and conducting the FCC's technical, engineering and scientific studies and programs aimed at improving telecommunications.

Kansas rules on licensing payments

A ruling by the Kansas Department of Revenue states that payments made under licensing agreements give the licensee both the right to broadcast copyrighted material and the right to temporarily use the tangible personal property (the film, tape, record or transcription). A compensating tax is imposed upon the separate charge or value of the tangible personal property where the licensor has separated that portion of the licensing agreement from those charges which are for services rendered or the value



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Alleged Crime - Robbery! By selling silver plated **brass** bullets, this hombre has been creating hot spots & heat traps robbing you of longevity performance and reliability. We're not sure he wears a black mask or rides a white horse, but he has been causing millions of dollars in replacement costs and thousands of hours in down-time.

When medium or high power RF energy is transmitted through a coax line, the by-product is heat, and silver plated **brass** connectors conduct this heat poorly. As a result, these silver bullets are usually the point of failure.

Mfg.	Basic Connector Material	Thermal Conductivity
All Other	Brass	67 BTU / sq. ft. / ft. / hr. / °F. @ 68 F.
SWR INC.	TE Copper	212 BTU / sq. ft. / ft. / hr. / °F. @ 68 F.

Solution: SWR's new **Cool "K" Line** transmission line has built-in to our present **TE copper** connector a **new thermo-coupler** device that out-performs every silver plated connector in the industry. The new **C-"K"** connector has a heat flow rate as high as **2 to 1** in some line sizes compared to the most popular silver plated wrist band connector.

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reliability!



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AUDIO GENERATOR	Combined With Analyzer	Combined With Analyzer	Separate Unit
Intermodulation test signal	No	Option	Yes
Wow & Flutter test signal	No	No	Yes
Simultaneous L&R Outputs	No	No	Yes
600 ohms and 150 ohms Source	No	Yes	Yes
Stereo Matrix Switch (L,R, L+R, L-R)	No	No	Yes
Switch to remove signal and terminate line for S+N/N	No	Yes	Yes
10 dB, 1.0 dB, 0.1 dB Step Attenuators	No	Yes	Yes

	Combined with Generator	Combined with Generator	Separate Unit
AUDIO ANALYZER			
Harmonic Distortion Mode	Yes	Yes	Yes
Automatic Nulling	Yes	Yes	Yes
Automatic Set Level	Yes*	Option*	Yes
Intermodulation Distortion Mode	No	Option	Yes
AC Voltmeter Mode	Yes	Yes	Yes
Stereo Phase Meter Mode	No	No	Yes
L/R Amplitude Ratio Mode	No	No	Yes
Wow & Flutter Meter Mode	No	No	Yes

PRICE	\$1,900.00	\$3,695.00 ¹	\$2,295.00 ²
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* Limited to 10 dB capture range.

¹ Price includes options listed.

² Total price for Generator and Analyzer including protective covers and 4 test cables.



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Industry news

of the intangible copyright. If the licensor has not done this, then the tangible personal property portion must be determined on a case by case basis.

Public complaining less

The FCC reported that public complaints received in November numbered 9670, representing a decrease of 3242 from October. Other comments and inquiries for the month totaled 1906, a decrease of 168 from the previous month. The commission sent 1369 letters of response.

Exams not required for some radio operations

A deregulatory move which became effective February 9 no longer requires individuals who want to perform technical operations at AM and FM broadcast stations to take FCC examinations.

The move is an amendment to Part 13 and states that anyone holding any class of commercial radio operator license, including the Restricted Radiotelephone Operator Permit, would be allowed to perform routine technical operations at a FM and virtually all AM stations.

Replies to comments due on AM stereo proposal

Standards for AM stereophonic broadcasting have been proposed by the FCC following a June 22, 1977 notice of inquiry on the subject to determine the interest in and the need for such a service. The commission noted that comments included technical descriptions of five different systems which warranted further consideration, and proposed alternative rules governing each of the systems.

Responses expressed the view that FM stereophonic radio service was inadequate in automobiles and at fairly long distances from broadcast stations and that many small communities had only AM stations and thus were lacking local stereophonic radio service.

Replies to comments on the proposal are due March 30 which will consider, among other things, the

1964 WIRELESS MICROPHONE
 1968 HANDHELD WIRELESS MIC
 1969 TRANSISTORIZED SYSTEM
 1971 CRYSTAL CONTROLLED RECEIVER
 1972 PORTABLE RECEIVER
 1974 HELICAL FRONT END RECEIVER
 1976 DIVERSITY SYSTEM
 1978 PORTABLE DIVERSITY RECEIVER

1979

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today's Vega systems are designed with the latest in high-technology electronics and sophisticated audio engineering. Besides offering you the finest systems available, Vega is constantly working with the industry to further the art of audio processing. One example is Vega's F.C.C. petition which resulted in obtaining clear wireless channels for broadcasters and filmmakers last year.

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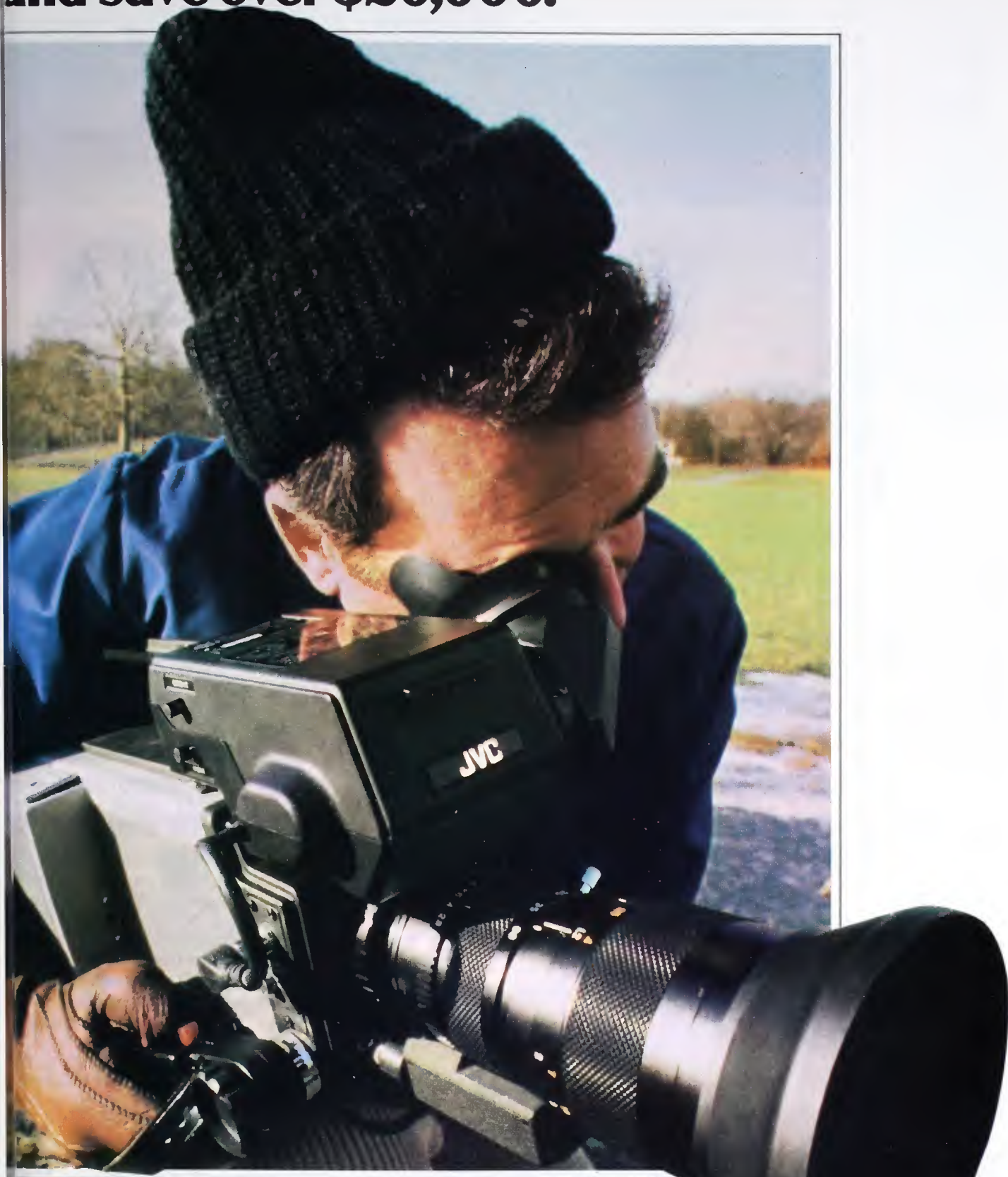
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It may well set the standard for the rest of the cameras in the category."

Behind that performance are high sensitivity and S/N ratio (50 dB), 500-line resolution. Sensitivity doubling (6 or 12dB), Auto white balance. And horizontal and vertical contour correction.

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The CY-8800U even has some features that the high-priced camera doesn't have. Such as level control compensation for hot spots. Internal lapse meter which indicates tape life. Plus a moistureproof, rugged, sleek case that you can rest on your knee or the ground.

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March 1979 *Broadcast Engineering* 19

Industry news

effect of an AM stereo signal on adjacent channel protection ratios, skywave service, out-of-band emissions, directional antenna operation and the compatibility of AM stereo signals with existing monophonic receivers.

In regard to FM quadrasonic, further notice of inquiry on establishing standards for FM quadra-

phonic sound transmissions comments are due April 16 and replies May 16. Based on comments received thus far, the commission stated that quadrasonic systems could be accommodated within the present frequency assignment plan without objectionable degradation to monophonic and stereophonic radio service.

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NTIA publishes reports on satellite systems

The National Telecommunications and Information Administration (NTIA) has published two reports dealing with satellite communications. In *Current Activities in Small Earth Terminal Satellite Domestic Telecommunications*, Paul Wells, a NTIA engineer, discusses present and planned domestic satellite systems. A description of domestic satellite technical characteristics and channel capacity as well as multiple access in satellite communications is also considered.

The second publication, *Fixed-Satellite and Broadcasting-Satellite Service Considerations for 1979 GWRARC Planning*, discusses technical and economic aspects related to the fixed-satellite and broadcasting-satellite services. The issues associated with the spectrum-use and orbit-use planning for services in the 2500 and 2960 MHz band and in the bands between 11.7 and 14.5 GHz are examined.

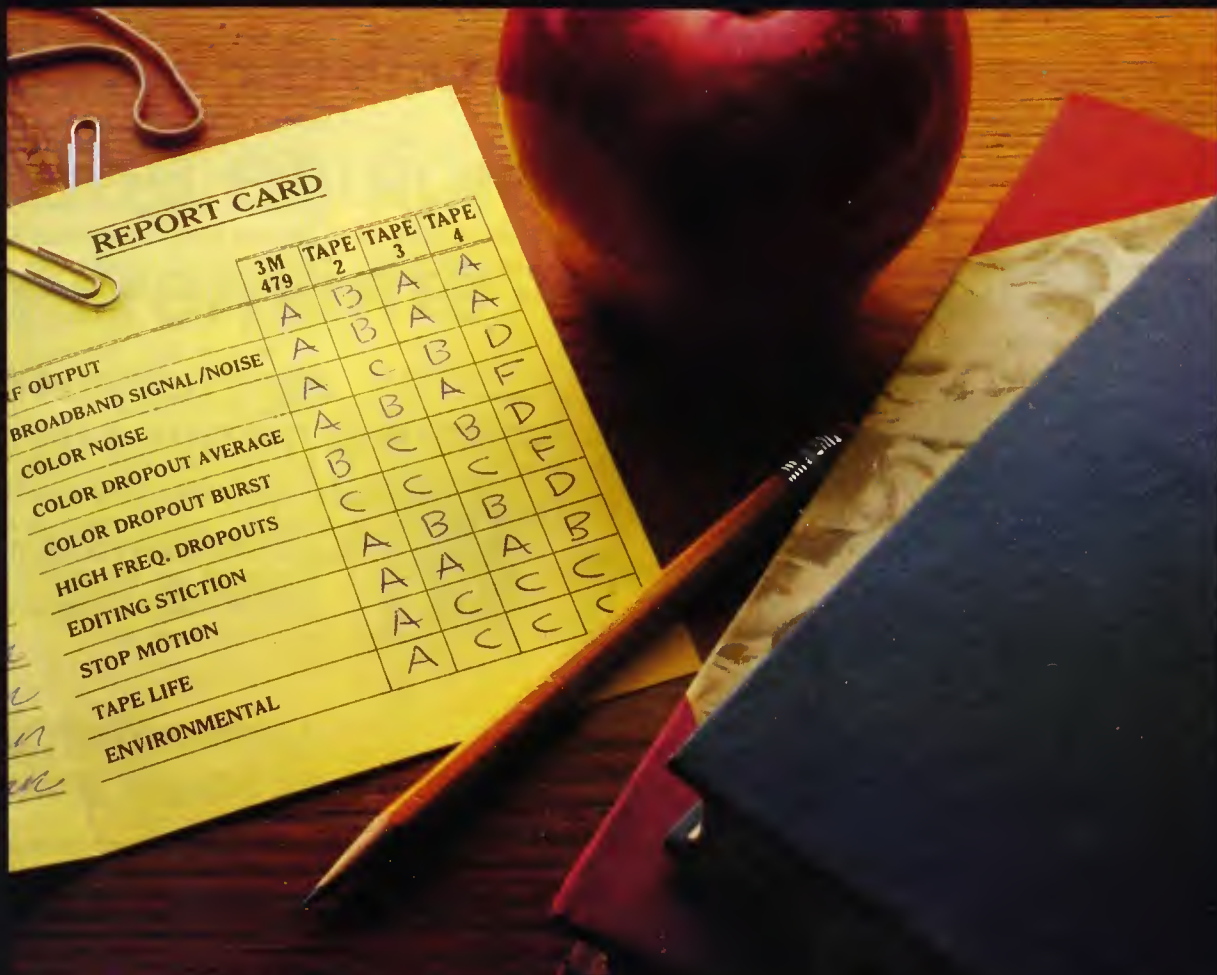
The reports are available from the National Technical Information Service, Dept. BE, 5285 Port Royal Road, Springfield, VA 22161.

Intelsat incorporates management & operation

In a move effective January 1 of this year, Intelsat took over all of its own management and operational activities. It is the first time that it has incorporated all of its own executive functions, both administrative and technical. Comsat which was handling the management function, will continue to perform some technical services for Intelsat under two technical services contracts and a laboratory service contract.

Community service: New programming category?

The FCC has begun an inquiry to consider broadening the program definitions for commercial broadcast stations to include a new community service category. The category noncommercial programs, would include programs produced by or in conjunction with nonprofit organiza-



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Industry news

tions of local, national and international public affairs produced on a noncommercial basis by nonprofit organizations.

Parties have been invited to comment on whether a community service category should be added to the program definitions and, if so, should it be necessary that such programs be presented on a sustaining basis and be supplied by or

produced in conjunction with a nonprofit organization having significant membership in the service area.

NRB files in license suit

An amicus curiae brief (friend of the court) has been filed with the Supreme Court of the US by the

National Religious Broadcasters concerning two consolidated cases involving music licenses for broadcasters. The association's brief notes state that its members' interests are parallel to the interests of CBS, the respondent in the two music licensing cases. The petitioners are BMI (Broadcast Music, Inc.) and ASCAP (American Society of Composers and Publishers). The court's ruling will determine whether or not the issuance of blanket licenses by BMI and ASCAP constitutes price-fixing.

Dr. Ben Armstrong, executive director of NRB, said, "Religious station owners are willing to pay fees for music which is suitable for their audiences. However, currently they must pay for all types of music, such as rock and roll, whether they ever use it or not."

Reimbursement approved for citizens' groups

Reimbursement provisions contained in six licensee-citizens' group settlement agreements have been approved by the FCC. The Citizens Communications Center (CCC) made the request since the IRS had ruled that it may not accept reimbursement of expenses paid voluntarily by a licensee without jeopardizing its tax-exempt status unless the FCC approves.

Educational public radio linked by satellite

Construction has been authorized by the FCC of domestic satellite earth station facilities as a part of a system to interconnect about 192 noncommercial educational radio stations throughout the United States, Puerto Rico and the Virgin Islands.

Western Union was authorized to establish the necessary channels of satellite communication to provide this service by means of its WESTAR domestic satellite system. The domestic earth stations will be licensed to the individual station operators with the exception of the main origination terminal in Fairfax, VA, which is licensed to the Public Broadcasting Service.

Initially, each earth station will be equipped to receive four audio program channels of 15 kHz band

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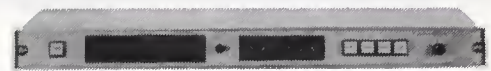
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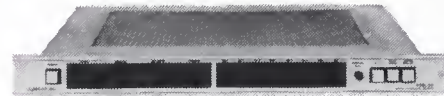
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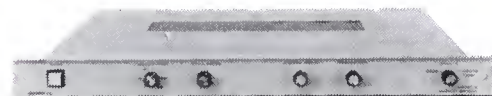
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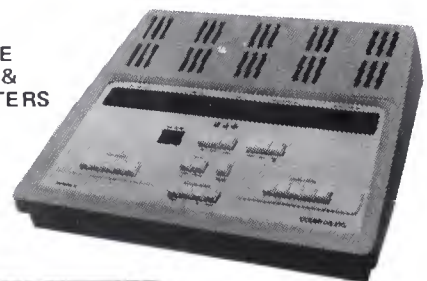


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Industry news

width, a pair of which can be made to distribute stereophonic channels. The system will have the capacity to distribute 12 audio channels simultaneously.

Rules waiver for cable TV

Capitol Cablevision, an operator of cable television systems in Char-

leston, SC and Dunbar, WV, has been granted a waiver of the rules by the FCC so it does not have to give network program nonduplication protection to either of the ABC affiliates carried on its systems: WOAY-TV and WOWK-TV.

The commission also denied Gateway Communications, licensee of WOWK-TV, special relief to require Capitol to provide nonduplication

protection against WOAY-TV on these systems.

EIA reports increase in '78 TV receiver sales

According to figures compiled by the marketing services department of the Electronic Industries Association, 1978 monochrome TV sales to dealers reached 6,064,404 units, representing a 7.1% increase over the 1977 sales figure of 5,664,191. Sale of color television receivers were the highest ever with 10,236,319 units sold, a 12.4% increase over 1977.

FCC okays finance plan for minority broadcasters

The FCC has ruled that a plan by Storer Broadcasting Company in which the company would make \$1 million available to minority broadcasters would cause no violation of the FCC's multiple ownership rules.

Storer, a licensee of seven TV, four AM, three FM stations and several cable television systems, would make the money available to a Minority Enterprise Small Business Investment Company (MESBIC) which it would create and which would secure additional funds under the Small Business Administration regulations for loans to minority entrepreneurs who are unable to supply funds for station sale prices.

Revised report forms available to broadcasters

Recently revised forms for broadcast applications and reports with the FCC are now available for use and include:

- Form 303-A Annual Programming Report (October 1978);
- Form 323-E Ownership Report for Noncommercial Educational Broadcast Station (January 1978. March 1976 edition may also be used);
- Form 324 Annual Financial Report of Networks and Licensees of Broadcast Stations (November 1978, Report and Instructions); and
- Form 324-A Annual Financial Report of Broadcast Networks (November 1978).

FCC Form 395, the Annual En



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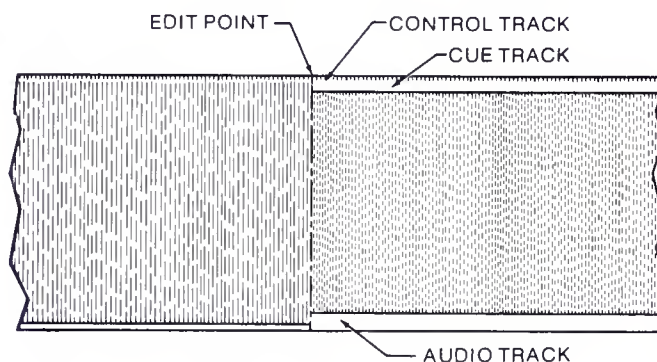
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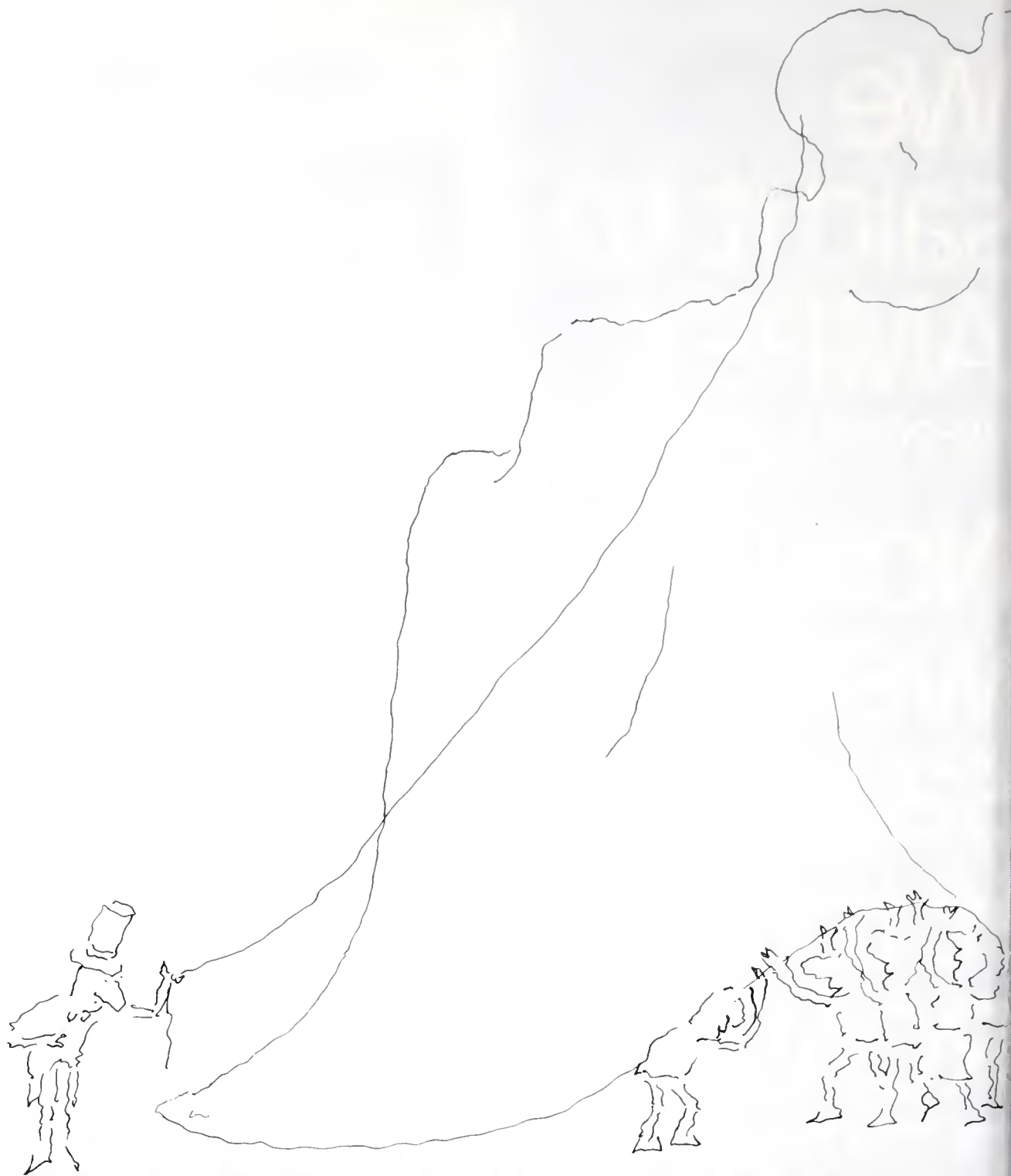
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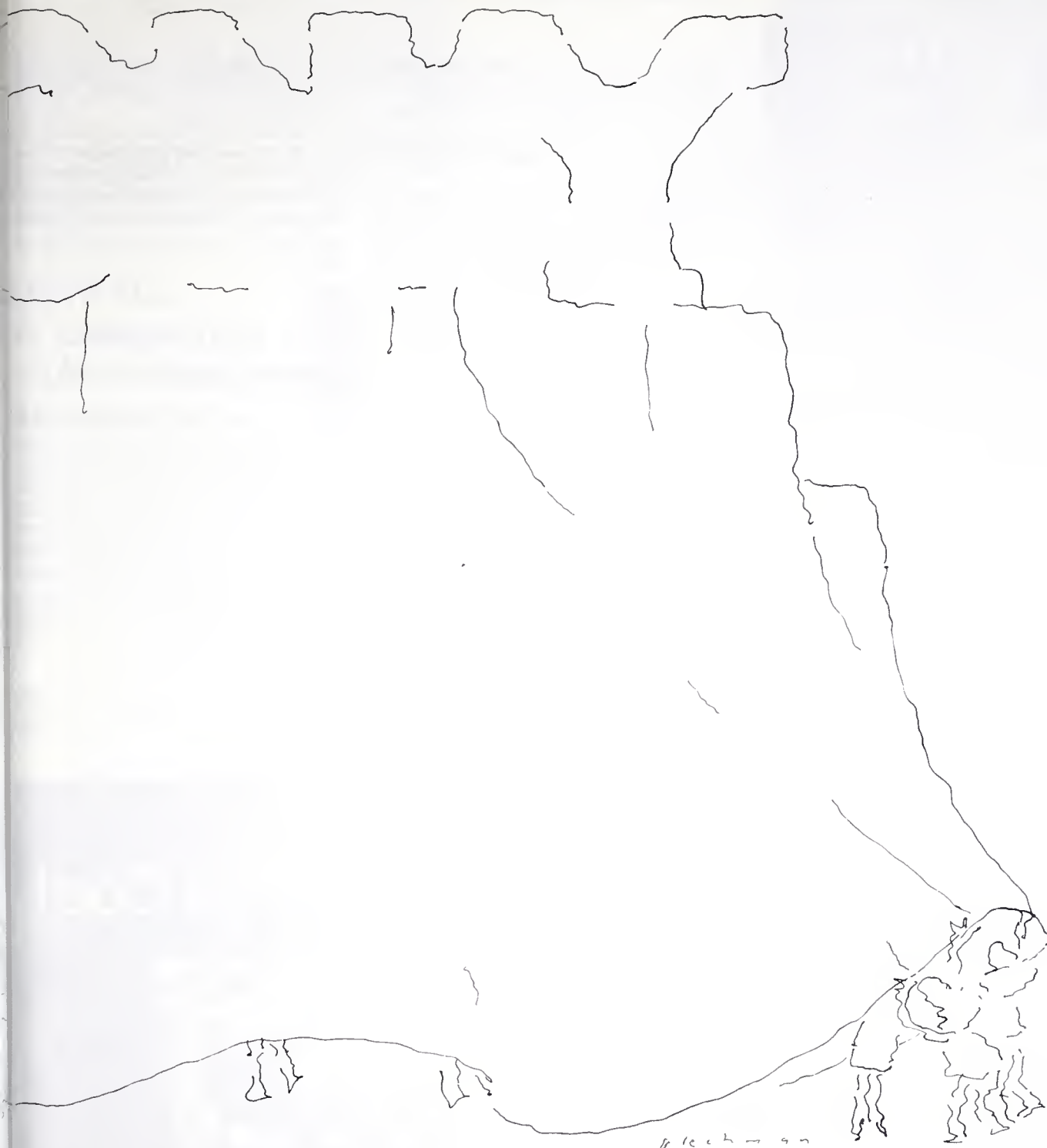
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This year at NAB, for example, we'll be introducing our improved C 1" VTR: the BVH-1100. A state-of-the-art recorder incorpora-

ting everything from Sony "confidence" heads for monitoring off the tape during recording, to a dynamic tracking option that makes noise-free "on air" transmissions possible from 1/4 speed in reverse to double speed in forward.

The NAB show will also mark the introduction of our new digital time base corrector, the BVT-2000, plus a new dynamic tracking remote control unit, a new mid-range editor, and some things so advanced they weren't finished in time to talk about here. Sony is a registered trademark of the Sony Corp. of America, 9 West 57th St., N.Y., N.Y. 10019.

And, you'll also be able to examine the Sony computer editing unit, and the complete range of portable ENG/EFP cameras, recorders and monitors that have already proven Sony's leadership in 1" technology.

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Industry news

ployment Report, has been amended by the commission as it pertains to broadcast licensees and permittees in order to obtain a more accurate picture of the status of minorities and women.

The commission amended the instructions to Form 395 to make them easier to follow and more specific to broadcasting and changed the race and ethnic terminology of Form 395 (and FCC rules and other forms) to the following categories: American Indian or Alaska Native; Asian or Pacific Islander; black, not of Hispanic origin; Hispanic; and white, not of Hispanic origin.

Canada re-introduces Telecommunications Act

Jeanne Sauve, minister of communications of Canada, re-introduced communications legislation in hopes of making federal regulation

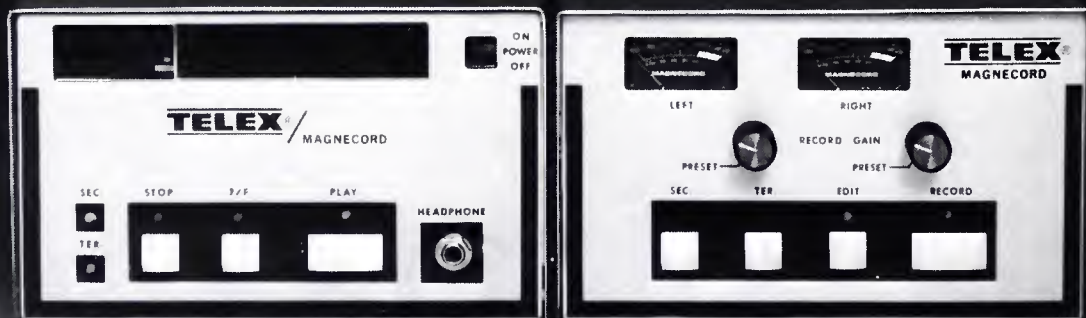
of communications more responsive to technological change and to provincial concerns.

The bill, the Telecommunications Act, is the second phase of a 2-step legislative process. The act contains provisions by which policy and delegation agreements with provincial governments can be implemented.

ITNA seeks improved satellite transmission

The Independent Television News Association (ITNA), the only national daily video news network which uses satellite transmissions, has retained Rosner Television System (RTS) to consult on improved signal transmission techniques for the satellite network. ITNA of New York provides daily video news feed to 10 independent television stations throughout the US.

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The above, primarily assists the technical operators and the VP of Finance. How about the engineer charged with the duty of color balancing (matching) say, all 3 cameras? Here's where the MATCHBOX *strikes* again. First, get the cameras matched as close as you can with the normal set-up procedure, then utilize the A-B and A-C feature of the MATCHBOX, and make a perfect match. Simply put, the A source is inverted with respect to B and C, and then the cancellation or nulling technique is employed to effect a perfect match. So, when you get a straight line on the face of the WM you've "gotta match."

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association news

National Association of Broadcasters

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NAB studies reel-to-reel tape recording standards

A committee has been organized to revise and update the NAB reel-to-reel magnetic recording standard manual which was issued in April 1965. The NAB committee is chaired by Richard T. Schumeyer of Capital City Communications. Members include engineers from networks, stations, equipment manufacturers and syndicated recording facilities.

Several meetings have been held, the most recent on January 16 and

17 in San Francisco. The next meeting will be held on March 7 and 8, 1979 in Chicago. Technical input to the committee and participation by interested persons is solicited and welcomed. Contact Dick Schumeyer, Capital City Communications, 4100 City Line Avenue Philadelphia, PA 19131. The upcoming meeting in Chicago will be at the O'Hara Motor Inn, 3939 North Manneheim Rd., Schiller Park, IL 60176.

Association registers support for radio deregulation

The NAB and its committees have issued statements recently concerning broadcasting deregulation. In January, the NAB Television Board of Directors passed a resolution to continue seeking broadcasting deregulation.

In the resolution, the board recognized that the government favors greater deregulation of radio than TV; therefore, it resolved that NAB should continue to seek maximum deregulation of broadcasting with particular emphasis on radio deregulation.

In response, the NAB Radio Board of Directors passed their own resolution. Thanking the TV board for its support, they resolved to work for radio's deregulation and emphasized NAB's role as both a radio and TV association. The board said that "as federally regulated and licensed broadcasters, the radio and television members of our industry have many similar problems, responsibilities and opportunities..."

NAB president Vincent T. Wasilewski expressed a similar opinion in an address to the California Broadcasting Association. He said

that it is just a matter of time until TV will be deregulated in the same manner radio is headed towards.

For the first time since the inception of federal regulation, he said, radio appears to be on the brink of proving that the best service occurs in a "free and open marketplace." In a short while, the FCC will see that this is the ultimate regulator and will begin deregulating TV, he said.

Washington rally

The steering committee for the Broadcasters' Rally Against Over Regulation has urged the American broadcasters to ask government to reverse the decisions of regulation and return to the broadcasters the responsibility of making their own decisions.

The rally, held in Washington DC, on February 28, signified the unity of broadcasters throughout the nation pushing for deregulation of broadcasting beginning with radio. The committee stated this was "a all-industry effort with participating organizations completely burying any philosophical differences for the good of all broadcasters."

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camera set-up and maintenance instructions, to help you keep your SK-80A making its excellent pictures. Beyond this, our seven Hitachi regional offices are all staffed with qualified engineers and fully stocked with parts. They stand ready to back up our vast national network of servicing dealers.

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March 1979 *Broadcast Engineering* 31

Engineering lab approved

An engineering laboratory, unanimously authorized January 19 by the NAB board members, will be used in developing solutions to engineering problems facing the industry and in evaluating innovations which are proposed in FCC actions and filings. The laboratory will be located at NAB's headquarters.

Other actions taken by the board during the semi-annual meeting in Maui, HI, include the adoption of a resolution which authorizes the executive committee to initiate action deemed necessary for the NAB to protect First Amendment rights. Also the board voted to continue holding broadcast town meetings in various cities.

Fee schedule opposed

NAB has filed an objection to the FCC proposed fee schedule for broadcasters on anything other than application processing costs. They

agreed with Margita White, FCC commissioner, that the new fee proposal is "a first step into a regulatory swamp." Also, the FCC recommendation that Congress impose a spectrum use tax was opposed. NAB said that the spectrum fee is a discriminatory tax imposed on a single industry.

Translator development

The NAB has filed with the FCC a statement saying the FCC should encourage the development of television translators. They also called for the elimination of separate treatment of UHF and VHF translators and uniform application of other rules.

Translators improve program diversity by bringing additional broadcast services to underserved areas but should be authorized only to insure that for each market size category the level of commercial television broadcast service is provided.

Also the NAB said that translators should be authorized to re-broadcast only the closest station or stations of the types permitted under the limitations.

Radio allocations policy

At its semi-annual meeting, NAB Board of Directors adopted a resolution with respect to radio allocations.

It urged the FCC to adopt an overall radio allocations policy prior to the 1979 World Administrative Radio Conference.

According to the resolution, all broadcast stations should be authorized to provide fulltime service and urged the conversion of existing daytime AM stations into unlimited time facilities. The national allocations goal could be accomplished without significantly diminishing service by other classes of stations, according to the NAB.

The board also instructed its staff to petition the FCC to appoint a joint

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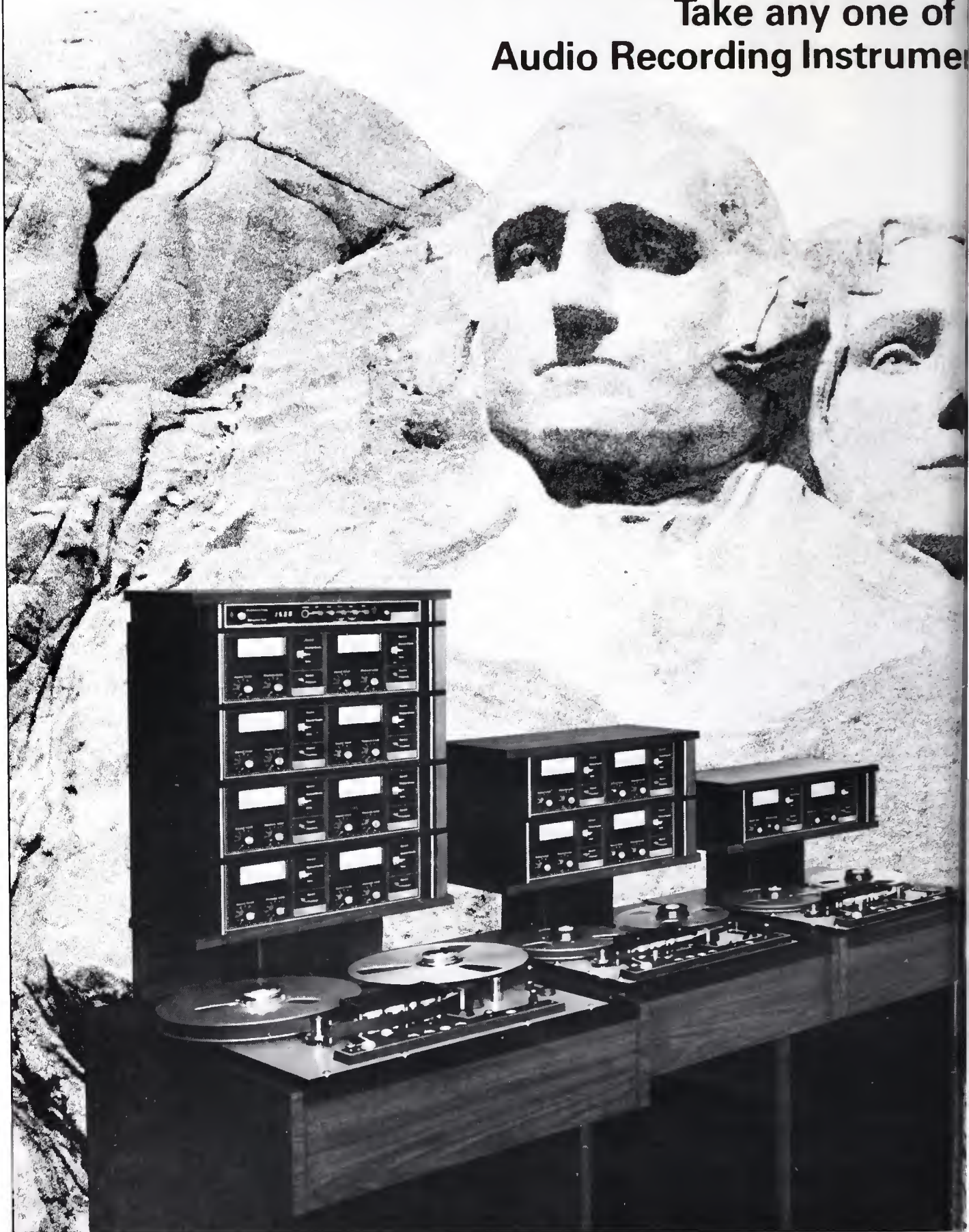
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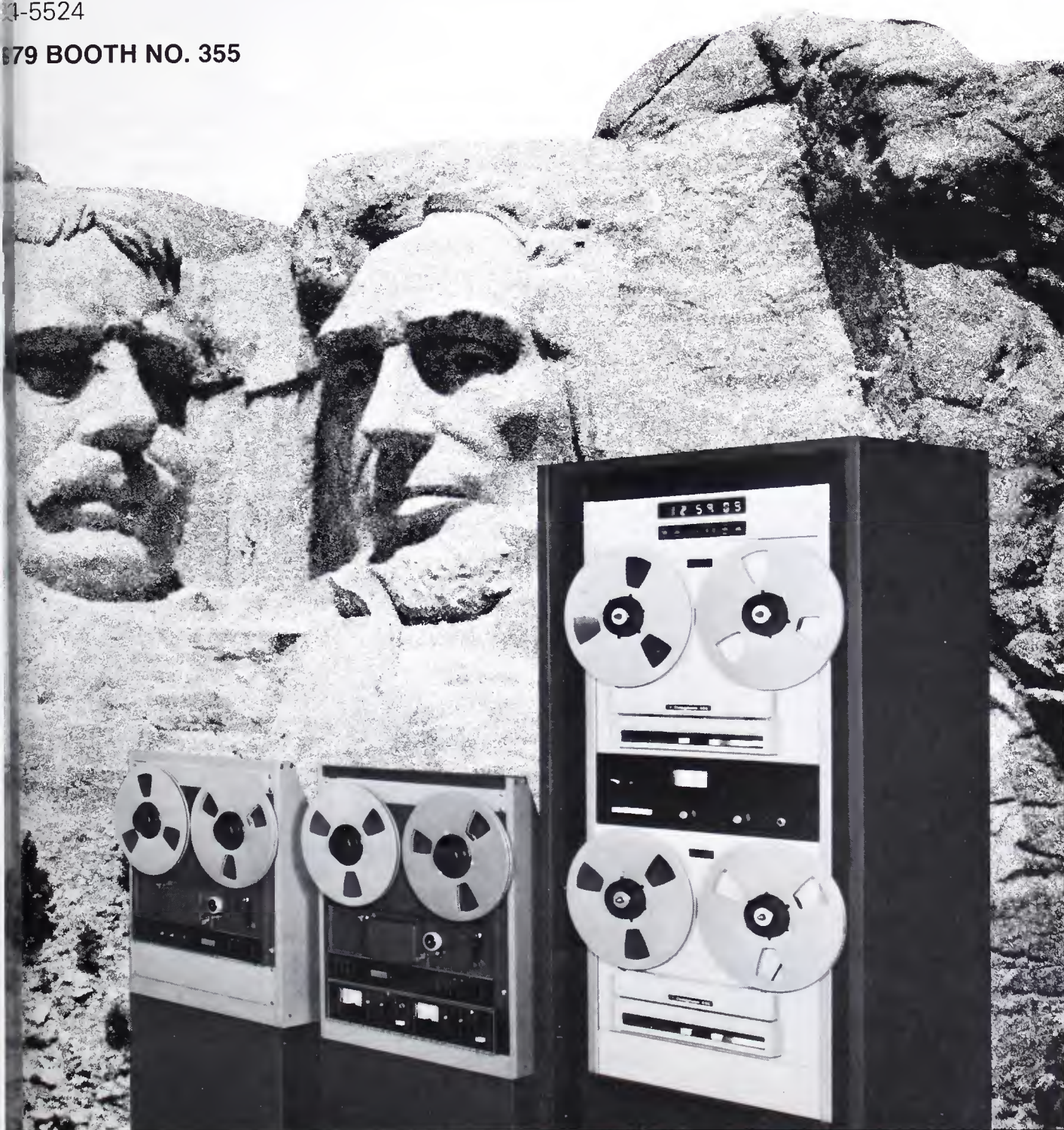
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36 *Broadcast Engineering* March 1979

NAB news

government/industry advisory committee to prepare studies of the advantages and disadvantages of various methods to obtain the national allocations goal.

Frequencies requested

The NAB has asked the FCC to return frequencies in the 947-952 MHz portion of the spectrum to broadcasters. The frequencies were assigned previously to broadcasters for auxiliary service and now are assigned for land mobile use.

NAB noted that there will be a demand for STL (studio-to-transmitters) channels if AM stereo is authorized. The frequencies would help satisfy the anticipated demand which looks hopeless under any channeling plan.

Moseley Associates petitioned the FCC to permit broadcast aural STL and aural intercity relay stations to operate in unassigned UHF TV channels on a secondary, non-interfering basis when desired frequencies are unavailable. According to the NAB this solution should not be used until all other solutions have been exhausted.

30-minute rule opposed

The NAB has asked the FCC not to adopt any general exception to its network nonduplication rules for TV programs of short duration. In reply to the NCTA's recommendation that the rule be changed so as programs 30 min or less can be duplicated, the NAB pointed out that the FCC did not intend to eliminate protection for 30-minute programs or even for 30-minute segments consisting of more than one network program.

NAB said that it is the length of the program, not the program to be broadcast by the station which determines whether or not protection would have to be provided.

In other cable business, the NAB said that ARTEC and NATC haven't shown that the FCC would reverse its waiver standards for importation of distant television signal by cable systems.

NAB said that this revision and the repeal of its distant signal rules

are contrary to the explicit requirements of the Administrative Procedure Act.

Investigation applauded

The NAB has commended the FCC for deciding to examine the noncommercial educational broadcast stations which tend to be commercial in nature.

The NAB is concerned that some public broadcasters have exceeded the terms set by the FCC on the noncommercial nature of educational broadcasting. The NAB claims the activities such as underwriting credits, over-the-air promotions and announcement of promoting the sale of products and services are clearly commercial activities.

TV receiver grading

The NAB has asked the FCC to modify the system of grading television receivers. The NAB said the inquiry consisted of a very narrow series of questions concerning antennas, transmission lines and noise figures as they relate to UHF fringe area reception and not an overall examination of television receiver grading.

NAB suggested that if the primary concern is UHF parity the FCC should issue an amended notice so the public will not misunderstand that the FCC is concerned with television reception problems.

Viewer study submitted

The NAB submitted a study to the FCC in December supporting the theory that the number of viewers is proportional to a television station's revenue.

The study conducted by Charles River Associates, Boston, also showed that:

- The closer the audience is to the station's signal, the greater the gain or loss in revenue;
- UHF network affiliates and independent stations are affected more than VHF stations; and
- a small UHF independent will suffer a greater loss.

**Coverage of the NAB 57th Annual Convention
& International Exposition begins on page 95.**



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association news

NRBA

National Radio Broadcasters' Association

1705 De Sales Street, NW
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Association questions deregulation proposals

The NRBA said in December that it found the speech made by FCC commissioner Tyrone Brown to the Southern California Broadcasters Association (see February **BE**, page 10) gratifying because it reflects a change in the FCC's attitude. In comments filed in January with the FCC, however, it questioned the value of the deregulation proposals which Brown outlined.

The NRBA also asked the FCC to institute a rulemaking proceeding as requested by the NAB to solicit additional comments from licensees, broadcast organizations and the public on the proposals by the commission.

The NRBA says it favors "deregulation, not reregulation introduced

in the guise of a commission reduction or elimination of certain regulatory requirements." The association expressed fear that piecemeal efforts to deregulate radio may undermine the impetus for deregulation.

In related news, NRBA president Jim Gabbert commended the NAB for recognizing that radio and television should be regulated separately. In the speech to the Utah Broadcasters Association, he did, however, offer a word of caution.

He said that the FCC, under its present legislative mandate, does not have the authority to completely deregulate radio. "We must look to Congress for true liberation," he said.

Rally against broadcast over-regulation held

The Broadcasters' Rally Against Over-Regulation was held February 28 at the Quality Inn Capitol Hill in Washington, DC. Broadcasters asked their elected officials to support the beginning deregulatory steps outlined by FCC commissioner Tyrone Brown. Sponsors of the rally included Community Broadcasters Association, Daytime Broadcasters Association, National Association of Broadcasters, National Radio Broadcasters Association and Radio-Television News Directors Association.

The day began with an 8:30 AM "Kick-Off" continental breakfast which included a briefing for attendees. After the briefing, broadcasters proceeded to the offices of their respective congressmen or senators for talks with them on deregulation of broadcasting.

They assembled once more at a buffet luncheon held at the Quality Inn which included FCC commissioners and staff personnel in addition to the broadcasters.

FTC's PSA proposal:

'Intrusion into...1st Amendment rights'

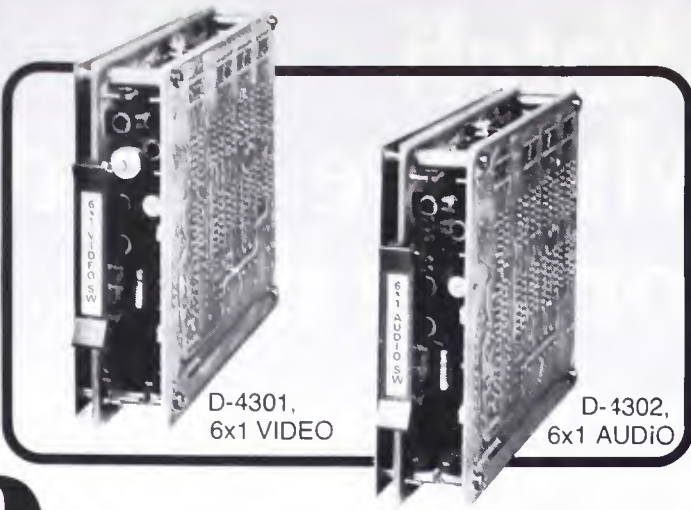
The NRBA says the proposal by the Federal Trade Commission (FTC) regarding public service announcements (PSAs) is "a radical intrusion into broadcasters' First Amendment Rights." The proposal requested that the FCC require broadcasters to air a minimum number of PSAs

and to establish standards leading to matching the content of the announcements with the audience likely to be watching or listening at the time they are aired.

The NRBA opposes the proposal because it would increase the regulatory burden already imposed

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NRBA news

upon licensees. Abe Voron, NRBA executive vice president/government affairs, stated that, "Yet another regulation by a government agency to impose a Washington regulator's conception of what 'should' be in the 'public interest' is simply not needed."

More women in radio

Results of a study by the Radio Television News Directors Association show that twice as many women were employed in broadcast news in 1977 than in 1972, making up close to one quarter of radio and television news staffs.

Black women made the most impressive gains, however, male minorities "barely held their own in TV news and actually lost ground in radio." Minority employment was highest in the south, almost three times higher than in midwest stations.

Multi-ownership rules

In reply comments filed by the NRBA with the FCC regarding the proposed changes in the commission's multiple ownership rules, the NRBA noted that the diversity of voting trust arrangements makes clear-cut categorization difficult.

The FCC has been considering extending the definition of what constitutes a cognizable interest to include trust arrangements where voting stock in a corporate licensee is held by a trustee.

The NRBA maintains that these changes "would not provide the commission with any actual knowledge as to the identity of those in control and appear to be a step backward which would impose artificial inaccurate guidelines."

Personal attack rules

The NRBA is supporting the FCC's proposal to exempt licensees from Fairness Doctrine requirements and personal attack rules resulting from uses by legally qualified political candidates. NRBA justified its stance by maintaining that enforcement of the personal attack rule impose "substantial and difficult burden upon broadcasters and upon the FCC." Also licensees lack control over political broadcasts, therefore they should have no obligations due to material.

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March 1979 *Broadcast Engineering* 41

WGBH engineers talk about the Ikegami HK-312



WGBH covers Boston Pops Orchestra concerts
with Ikegami HK-312 cameras from Symphony
Hall, Boston.

Eight Ikegami HK-312 studio color cameras are in service at WGBH, Boston, some dating back to October 1977 — long enough for intelligence on their performance. From recent interviews with key WGBH people, read these excerpts.

Pops without noise

Tom Keller, Director of Engineering:

“The HK-312s have such high sensitivity that we were able to reduce significantly our light levels at the Boston Pops and Symphony telecasts. Yet, despite the major light reduction, we experienced no visible noise with the HK-312s . . . With their remarkable reliability record, we can depend on 6 cameras for 6-camera coverage, and not 7 for 6 as in the past. After all, you can't stop a live orchestra performance for a retake if you've lost a camera.”

2 IRE, but a complaint

Ken Hori, Senior Engineer for Advanced Development:

“We tested several camera makes for RFI within a quarter-mile of a 50 KW radio transmitter. The HK-312 measured 2 IRE, whereas most others were in the 5 to 7 IRE area, and some as high as 20 IRE . . . For symphony remotes we'd need 2 to 5 hours for warm-up, but nowadays we're set up in less than an hour . . . We like its straightforward design — example, its truly high signal-to-noise ratio as compared to other cameras that resort to reduced bandwidth to attain a comparable ratio but wind up delivering noise too . . .”

We did get one complaint from the maintenance crew. They said that because they rarely found the problem of a down HK-312, they would never get to know the HK-312 well enough to fix it.

Washouts and dropouts

*Bill Fairweather,
Video Control Engineer:*

“During a lighting seminar staged here by Imero Fiorentino Associates, an actor in a normally lighted scene held up a sheet of white paper with printing on

it to show loss of detail in the case of more than 60 percent tv white reflectance. The HK-312, however, was able to retain enough detail for the printing to be readable on the monitor.

Next came a demonstration of the dangers of too much or too little light on a chroma-key background. The HK-312 held the key to such a low light level on the blank background that the lecturer grinned and said, “I guess WGBH has pretty good cameras!” and went on to the next subject.”

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Adapters for triax cable, using digital techniques, make their cameras remote-usable at nearly a mile from base stations, yet easily revertible to multi-core cable whenever needed.

In daily use, their HK-312s and HL-53s are interfaced with microprocessor-computer control units that automatically cycle them through all set-up adjustments, including black-and-white balance, flare and gamma correction, video gain, and eight registration functions, then recheck all those adjustments — all within 45 seconds. The cameras can also operate independently of the set-up computers, a feature that is an Ikegami exclusive.

If all of this suggests that the HK-312 is probably the best studio/field color camera in the industry, consider this: camera, set-up computer, and triax adaptor are not only operational, they are deliverable. For details or a demonstration, contact **Ikegami Electronics (USA) Inc.**, 37 Brook Ave., Maywood, NJ 07607, (201) 368-9171 / West Coast: 19164 Van Ness Ave., Torrance, CA 90501, (213) 328-2814 / Southwest: 330 North Belt East, Houston TX 77060, (713) 445-0100.

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Ikegami HK-312

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TELEVISION CAMERAMEN, INC.

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Billy Fox, our member at KCST in San Diego, rises to new heights on a Chapman crane. (Billy's the one minus the beard.)

Take 1: Trained help wanted

(ASTVC Editor's note: This is the first article in a projected series dealing with the problems of finding sufficient numbers of properly trained personnel for the operations areas of the TV broadcast industry.)

A letter to ASTVC offices back in February of 1975 read as follows: "From time to time we have received inquiries regarding training for TV cameramen. Our cameramen are trained on the job and we know of no specific training sources for cameramen. Perhaps your organization could furnish us with the names of schools or training sources for TV cameramen. We would appreciate any information you might be able to furnish us as many of our inquiries are from high school counselors and students...(signed) W. Henry White, director of engineering, WSB Television."

This letter is typical of those we

receive from station management, industry personnel reps and vocational counselors in the various schools of learning. In this first article, we are going to address ourselves to future broadcasters by printing a letter which we send out to those schools providing TV related courses or departments. For the young aspirant currently enrolled in a TV-related program or about to choose courses or a school, we believe these words of advice may prove extremely helpful. In succeeding articles, we will follow-up with some case histories, including the experiences of some of TV's top cameramen and others in the related operating areas.

The letter from ASTVC's then-director of schools liaison section follows.

Take 2: The letter

"Graduating seniors in the broadcasting field are finding that jobs are in short supply. Production oriented grads are confronted with personnel staffers who are deluged by an endless stream of equally qualified applicants for the same position. Let's face it, broadcasting has always been a tough nut to crack, and it's becoming increasingly difficult every day.

"Part of the problem has been the lack of a national organization (except perhaps the IEEE) that can aid the grad in getting that well-

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known "foot in the door," or supply information that would be useful to the undergraduate. Unlike other big corporations, networks and local stations do not send headhunters to technical schools or universities.

"Things are happily changing. Our organization, The American Society of Television Cameramen, has been formed as a "Professional-Fraternal organization . . . to bring together . . . members of the industry with similar occupational interests and experiences . . . and to promote the standards of professionalism within this segment of the TV industry . . ."

"Although we are known as the American Society of Television Cameramen, we are not all cameramen. Our membership is open to all individuals in the operational areas of broadcasting, and most importantly here, broadcasting students.

"In offering student memberships, the society, and I as director of the Schools Liaison Group, hope to give the future broadcaster an insight into the industry, appraise them of the most current techniques and equipment, help them to get the best out of job interviews, and hopefully in the not-too-distant future, make available a nationwide job information center.

"As the society grows, we'll be sending out newsletters containing information on the achievements of members, notes on the innovative and dates of upcoming meetings and seminars which are open to students. Also, as we open chapters in every state and/or city that has a television station, members of the society will become available for lectures, advice, or just plain "raping" with students about the day-by-day workings of the medium.

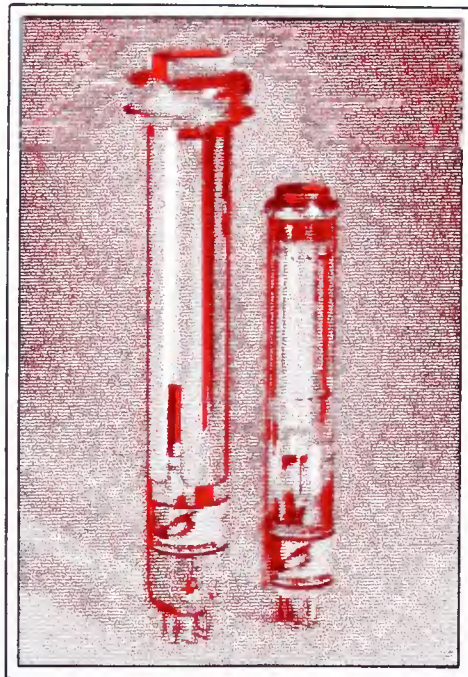
"We look forward to welcoming broadcasting students from all areas of the country, and from all types of learning institutions into our non-profit society. If you feel that the ASTVC can be a useful tool for your students, kindly pass along to them the enclosed information sheets.

"It is my sincerest wish, and that of the board of directors, that those of us actively engaged in television can open up a new and lasting dialogue with our future broadcasters for our mutual benefit and ultimately the enrichment of the medium."

The letter is signed by Kay Kaessler, then director of school liaison for the ASTVC.

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Rep network completed

The Professional Audio Products Division of Sony Industries has appointed four sales representatives, completing its national network.

The four firms are 2001 Enterprises, Denver, CO; Kramerson-Randall Sales, North Syracuse, NY; Norpac Marketing, Bellevue, WA; and Ferman-Goldman & Assoc., Hollywood, FL.

Sony Professional Audio Products representatives sell Sony professional and semi-pro mics, mixers and headphones.

Hot line installed

L-W International has installed a 24-hour hot line. Customers may contact L-W for service, parts or sales information at any time seven days a week at (213) 348-8614. L-W



ABC Sports used 2 Ampex VPR-2 VTRs for instant replay/slow motion during a recent Monday night football game. It was network TV's first use of Type C for slow motion and of the SMC-60 slow motion controller.

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The TCU-1 is the newest digital time control unit from PWH Electronics.

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Features include two time bases with automatic switching, power supply backup, and a time event generator for controlling up to

four time events every 24 hours. In addition, options are available to increase capacity to six events per day, to allow multiple switching of each event every day, and to program activations on seven day cycles.

The TCU-1 is completely compatible with other PWH units. It can be used as a master clock for driving any number of Cenchron

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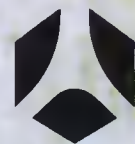


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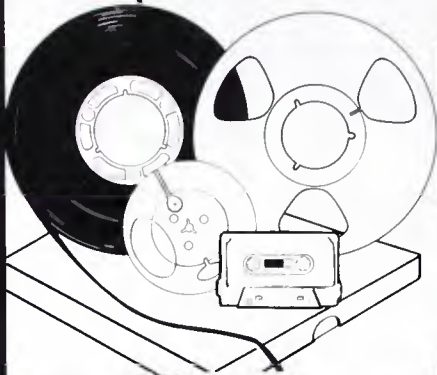


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Business news

International manufactures stop-motion, slow motion analytical and telecine projectors, film viewers and analyzers and markets a 16mm cine-pulse data recording camera.

Companies merge

Chyron Corporation and its subsidiary, Systems Resources Corporation, have merged. The name of the merged organization will be Chyron Corporation. The merger took effect January 2.

Service award debuts

Dynair Electronics has established an award to be presented to active members of the television industry with 15 or more years of service. The Order of the Iron Test Pattern award, a medallion and credential, will be presented to all qualified applicants.

Applications are available from Phyllis Lynch, Herald, Order of the Iron Test Pattern, Dynair Electronics, Dept. BE, 5275 Market Street, San Diego, CA.

New facility begun

Oak Industries of Crystal Lake, IL, has begun work on a \$4.5 million corporate headquarters in the Rancho Bernardo Industrial Park, San Diego, CA. The complex also will house a corporate research center and Oak Communications.

The colonial Spanish style structure is expected to be completed by the end of this year.

CVS reduces prices

CVS has announced price reductions of 8-20% on three of the company's digital time base correctors. The new prices apply to the CVS 520, CVS 516 and the CVS 517.

According to William Miller, director of marketing, the reductions resulted from lower component costs and manufacturing efficiencies made possible by high sales volume.

All orders received after January 3, 1979, will be delivered at the new prices. Detailed price lists and information about volume purchase can be obtained from the CVS.

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Business news

Marketing Department, Dept. BE, 1255 E. Arques Ave., Sunnyvale, CA 94086.

No growth predicted

Robert Garbutt, manager of the professional products department of Sharp Electronics, forecast a little or no growth in 1979 of the A/V cassette sales for the industry as a

whole but predicted an increase by as much as 15-20% for Sharp's A/V cassette sales.

Garbutt based his predictions on the effects of President Carter's anti-inflation campaign and California Amendment 13's mini-tax revolt. Because of these, funds for training and education will be cut, thus stopping the growth in sales of equipment.

In 1978, Sharp's A/V tape record-

er sales were over 25% of their 1977 level. Sharp has new A/V products to be introduced throughout the year, therefore, Garbutt is convinced that Sharp won't follow the industry's trend.

Ampex

Ampex will supply the National Broadcasting Company with broadcast video equipment and support services for NBC's coverage of the 1980 Moscow Olympics. The contract, valued at approximately \$4 million, calls for Ampex to deliver 41 VPR-2 helical scan videotape recorder/reproducers, 41 TBC-2 digital time base correctors, nine SMC-60 slow motion controllers, six VPR-20 portable VTRs and 17 HPE-1 helical editing systems.

Deliveries to NBC in New York will start in May with deliveries to Moscow commencing in January 1980.

The Iraqi Ministry of Information ordered 12 Ampex AVR-3 quadruplex videotape recorder/reproducers and supporting equipment for regional television stations in Mosul, Basrah and Kirkuk. Ampex will also provide installation training for engineers.

Victor Duncan

The Video Division of Victor Duncan announced the sale of three MNC-71CP color video cameras to ABC affiliates, KVII in Amarillo and KVIA, El Paso, TX. The cameras will be used to upgrade both news and production departments of these stations.

Bosch-Fernseh

Bosch-Fernseh will deliver two outside broadcast cars to the Soviet Union for live transmission and recording of news and sports events during the Moscow Olympics. The two Mercedes 250s will be equipped with two KCA hand-held color cameras, audio system, radio link and portable VTRs. The vehicle will provide active cameras while in motion, one on a roof turret and the other in a trailer.

Companies move

Microband Corporation of America and Microband National System have moved their corporate office

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Business news

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Satellite service organizes

Since the signing of the International Maritime Satellite Organization (INMARSAT) Operating Agreement on January 10, COMSAT has called for an early establishment of INMARSAT. INMARSAT will re-

place the MARISAT system after the expiration of its services in the early 1980s. MARISAT provides communications satellite services to the US Navy and to commercial shipping and off-shore industries through three multi-frequency satellites. INMARSAT would provide commercial global maritime communications services.

Dr. Joseph Charyk, president of COMSAT, said that COMSAT will

accept an initial investment share of 35%. At least 95% of the shares must be accepted before INMARSAT can come into existence. If the 95% of the shares have not been accepted by May 15 COMSAT is prepared to commit the deficiency to insure that INMARSAT will come into existence 60 days thereafter, said Charyk.

INMARSAT would be patterned along the lines of INTELSAT, through which COMSAT provides international communications satellite services.

Test extended

The FCC extended the special AM stereophonic test authorizations. Station WSM in Nashville was permitted to continue operation through February 27 and station WGAR in Cleveland through February 28. The terms of the extended authorizations are the same as those contained in the original authorizations.

Retrofitting BVH-1000s

The recently adopted SMPTE Type C helical-scan format has given 1-inch non-segmented videotape recorders a shot in the arm. With standardization, tapes made on the machine of one manufacturer can be played back on those of others which conform to the Type C criteria. As a result, much confusion has been eliminated and the format has been strengthened.

To help those who purchased 1-inch units before standardization, Sony, as one of the participants and supporters of the agreement, instituted a retrofit program for all machines sold before the Type C standardization.

This major undertaking, originally planned to be completed by the end of 1978, is now nearing completion as **BE** goes to press.

"To meet this tough schedule," said Arnold Taylor, vice president, Sony Broadcast Division, "the company has had to focus many resources and draw on engineering talent from throughout the US and Japan. To change an original BVH-1000 to meet the SMPTE Type C standard requires several modifications, including the installation of a whole new head drum assembly.

Retrofit program

As soon as the Type C format was adopted by the SMPTE, Sony Broad-

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And to take advantage of all that accuracy, Technics has a low-mass S-shaped universal tonearm that's so accurate, friction is down to 7 mg. (vertical and horizontal).

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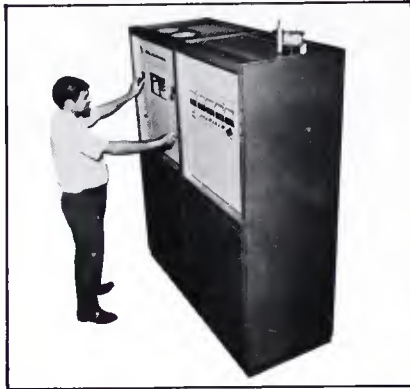
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Business news

cast's R&D department began developing the necessary engineering preparations for retrofit. In the US, engineers designed a retrofit line to optimize the efficiency of the modification process at facilities in Long Island City, NY, and Compton, CA. "As nearly as possible," noted Carlo Severo, broadcast engineering and service manager of the Eastern Region, "the machines were recalled in the same order in which they'd been purchased: first sold, first retrofitted. Sony provided crates when necessary and shared the cost of shipping. The cost of the modifications to Sony customers was set at a nominal sum of \$1000."

Assembly line

Each machine runs through a streamlined "assembly line" where different stages in the retrofit process are performed. The engineers, technicians and support personnel who work on the retrofit line are carefully selected, rotated every few weeks and come from all parts of the world. "We choose our best engineers to work in the retrofit program," said Severo, "but it's still important to match their particular



Using assembly-line techniques, Sony is retrofitting BVH-1000s sold before the SMPTE Type C agreement to conform to the new standards. He technicians at Sony Broadcast's Long Island facility install new head drum assemblies in BVH-1000s.

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It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it has features that, before, you'd find only in TBCs costing up to twice as much.

Correction of chroma/luminance delay problems, a chroma noise reduction of 3 dB, velocity compensation and color dropout compensation are all standard. So are a broadcast stable, gen-lock sync generator and a built-in, completely adjustable processing amplifier.

The 516 also includes circuitry to closely control FCC blanking problems. For example, it combines exclusive CVS Gyrocomp memory organization with a 16 line (or optional 16 line) memory, automatic VTR advanced sync and available H and V blanking adjustments. The result is complete control of output blanking.

Simple operation is another plus. Front panel con-

trols give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise, and significantly improves subjective resolution.

The CVS 516 weighs only 35 pounds, stands just 3½ inches high and uses only 175 watts—major advantages with today's increased emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516.

For full details and/or a demonstration, contact your Authorized CVS Distributor, or CVS, today. Also, be sure to ask for our popular booklet about the basics of digital time base correction, and a reprint of the article "TBCs, Blanking and the FCC."

CVS Consolidated
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Business news

talents with the right job. Some engineers are particularly good at video measurements, others at audio and so on."

The retrofit path

Sony's retrofit process takes place in the following steps:

- Each machine is first inspected for optimum performance.
- The tape path alignment is checked to assure that the new head drum lays down the video track precisely as required by the SMPTE Type C format.
- In the next two steps, audio and video alignment, the relevant circuit boards are electronically aligned.
- Reassembly and final check.

Sony reports that the retrofit program has progressed smoothly with a minimum of difficulties and that the program is expected to be completed by the end of January, 1979.

Equipment order

ABC-TV has placed an order with Ikegami Electronics for approximately \$4 million worth of HK-312D studio color broadcast television cameras. The announcement was made recently by Julius Barnathan, ABC vice-president for broadcast operations and engineering, and Nick Nishi, vice-president of Ike-

RCA

RCA has announced its sales of studio and transmitting equipment since the new year.

Combined Communications has purchased RCA equipment valued at approximately \$1.5 million for upgrading the technical facilities of its seven group television stations. Fourteen TK-76B ENG cameras and three TK-46 studio cameras are included in the sale.

Competitive Edge Productions is adding three RCA color TV cameras to expand its commercial teleproduction capabilities. The company is installing two TKP-46 studio-quality portable production cameras and a TKP-76B lightweight portable unit.

Unitel Production Services is expanding its New York City facilities with RCA videotape systems. Two TR-600 quadruplex videotape recorders have been added.

gami.

The network already has 32 of the cameras in operation in its stations and affiliates in New York, Chicago, Los Angeles and elsewhere. Seventeen of the first units will be equipped with triaxial cable adapters that allow operation up to a mile from their base station. □



ABC president for Broadcast Operations and Engineering Julius Barnathan, left, shakes the hand of Nick Nishi, vice president of Ikegami Electronics, at the SMPTE show.

announce that these studios have already chosen the new Studer A800 multitrack tape recorder.

Studio	Location	Qty	Model
Air Studios	London	4	A 800
Bayrischer RDF	Germany	1	A 800
CBS Sony	Tokyo	4	A 800
Canyon Records	Tokyo	4	A 800
EMI	London	2	A 800
Easy Sound	Copenhagen	1	A 800
Fuji TV	Tokyo	1	A 800
Filtrosen	Montreal	1	A 800
Hessischer RDF	Germany	2	A 800
Kitty Records	Tokyo	1	A 800
Life Records	Hong Kong	2	A 800
London Weekend	London	2	A 800
Marcus Studios	London	5	A 800
NTV	Tokyo	1	A 800
Philips	Netherland	1	A 800
Rockfield Studios	Wales	2	A 800
Sierra Audio	Burbank	4	A 800
TBS	Tokyo	1	A 800
Trident Studios	London	2	A 800
Wessex Studios	London	2	A 800
Eastern Sound	London	1	A 800
CSSR	Toronto	3	A 800
Radio Transamerica	Prague	2	A 800
Studio 55	Rio De Janeiro	1	A 800
Dawnbreaker Studios	Los Angeles	1	A 800
PAC-3	San Fernando	1	A 800
Paragon Recording	Detroit	1	A 800
Sterling Sound	Chicago	1	A 800
Suntreader Studios	New York	1	A 800
Glixman Productions	Sharon, VT	1	A 800
	Atlanta	1	A 800

STUDER

Studer A-800



When performance is
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than price

...demanding recording engineers and studio managers

choose Studer. And when the requirement is multi-track, their choice is likely to be the new Studer A-800 with 14" reel capability, 1/2 horsepower spooling motors and microprocessor controlled deck functions for the smoothest, fastest tape motion you've ever seen. It also includes new phase compensated amplifiers, a self-contained Autolocator function and numerous other convenience and quality features that make Studer's slightly higher purchase price less costly in the long run. For complete information on the Studer A-800-16 and A-800-24, please write to us.

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The \$1950 V-blanking alternative



CVS AVA and your TBC

AVA is short for Automatic VTR Advance, a stand alone, 1 $\frac{3}{4}$ " high, 19" wide unit that works with your existing broadcast TBC to greatly reduce the possibility of excessive vertical blanking errors.

Connection of the CVS AVA to most brands of digital TBCs is fast and easy, and operation is straightforward. AVA continuously monitors off-tape vertical sync and compares it to the TBC vertical. It then generates an advanced comp sync signal which steers the VTR output and keeps it centered within the TBC window, thus reducing the possibility of excessive vertical blanking errors. If you want, you can override automatic operation and use a front panel control to set the VTR sync phase manually.

So before you go out and spend a lot of money on new equipment, just to prevent excess V-blanking, consider the AVA alternative. It may be all you need to do the job, for a fraction of what you expected to spend.

To ensure timely delivery of your AVA, order today from your Authorized CVS Distributor, or from CVS in Sunnyvale, California.

Price stated is F.O.B. Sunnyvale, CA.



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62 *Broadcast Engineering* March 1979

meetings, events & seminars

See the NAB preview coverage
beginning on page 95

March 24-28—The fourth European conference on electrotechnics, Eurocon '80 will be held in Stuttgart, Germany. It will review recent significant developments, trends and applications in the field of microelectronics.

For more information, contact: Dr. W. E. Proebster, IBM Deutschland GmbH, Dept. BE, Postfach 80 08 80 D-7000 Stuttgart 80, Germany.

April 6—The NRBA Sales Management Seminar is a 14-hour program divided into two parts. Part 1 deals with recruiting and screening new personnel and then leading them to successful sales. Part 2 outlines new concepts in managing and motivating the veteran staff.

The seminars will be conducted in Tulsa, OK, with Jim Williams and Larry Elwell of the Welsh Company and station owner/consultant Jay Smith conducting. Total cost of the seminar is \$195.

Other seminar dates are May 18, June 15, July 20, August 17, September 14, October 26 and November 16.

For further information, contact: NRBA, Dept. BE, 1705 De Sales Street NW, Washington, DC 20036.

April 16—Abstracts for papers for presentation at the 12th Annual Connector Symposium are due. Abstracts should contain a minimum of 200 words plus the author's name, full company address and work phone number. Final manuscripts are due on August 13.

Papers will be published in the Symposium Proceedings to be presented at the 1979 symposium, October 17-18.

For more information, contact: Paper Chairman, 12th Annual Connector Symposium, Dept. BE, P.O. Box 1428, Camden, NJ 08101.

April 17-19—The 11th Annual Video Forum sponsored by the Video Systems Division of Peirce-Phelps will be held in Philadelphia. A second forum will be held in Washington, DC on April 24-26.

There will be an exhibit of new state-of-the-art video and audio equipment with particular stress on equipment introduced at NAB.

For more information, contact: Darlene Zultewio, Peirce-Phelps, Dept. BE, 2000 Block North 59th Street, Philadelphia, PA 19131.

April 23-26—Audio-Visual '79 will be held at the Wembley Conference Center, London. Audio-visual equipment, projectors, wallboards, microprocessors and show programming techniques will be exhibited.

For more information, contact: Maclaron Exhibitions Limited, Davis House, Dept. BE, P.O. Box 109, 69 High Street, Croydon, Surrey CR91QH.



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O'Connor Model-50. A fluid head with 378 combinations.

NEW, ADJUSTABLE BALANCE, QUICK RELEASE PLATFORM.

The Model 50-D Fluid Head can be ordered with one of six different forms. Each has its special features and purposes, but our newest is the ultimate.

First, it has a unique camera mounting plate which can be attached to your camera in one of eight different positions. This is used to balance your camera on the head, greatly improving the head's performance. Besides an adjustable camera mounting plate, the entire platform (with camera atop) can be shifted



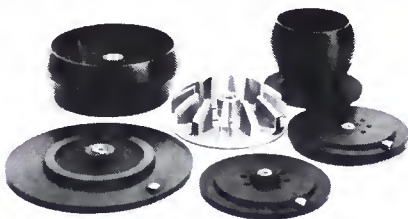
back and forth on the head so that you can find the precise center of gravity for whatever particular gear you're using at any given moment, such as heavy lenses, large magazines, etc.

It takes only a second to release your entire camera with O'Connor's new quick release option. To prevent accidental releases, it has a built-in safety feature.

WITH BASES, WE'RE LOADED.

The Model 50 can be ordered with one of six bases. Besides two Pro types, Mitchell, Arri 16 and

Arri 35, we also offer the O'Connor Claw Ball Base with the "ultra positive grip." The distinctive aluminum ridges

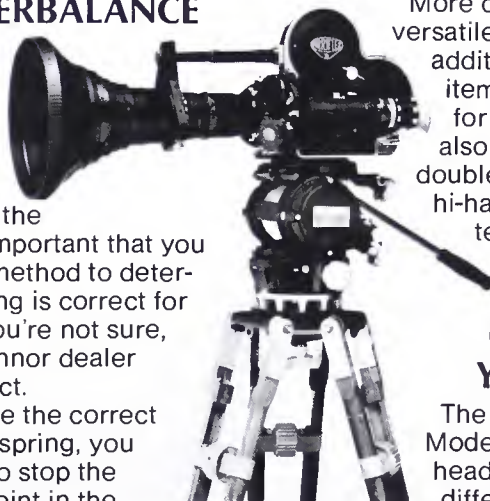


dramatically increase the holding power with far less effort needed to secure it in position. This Claw Ball design can also be adjusted $\pm 15^\circ$ to the horizontal plane within the top casting of the tripod to correct or alter your panning plane.

O'CONNOR COUNTERBALANCE DEFIES GRAVITY.

Three counterbalance spring options are available for the Model 50. It is important that you use the proper method to determine which spring is correct for your needs. If you're not sure, consult an O'Connor dealer or talk to us direct.

When you have the correct counterbalance spring, you should be able to stop the camera at any point in the normal tilting range and release the handle without the camera moving.



And it should take no more effort to tilt it upward than it does to tilt it downward. We specifically design counterbalance into all our heads to correct this natural act of gravity so that your "tilts" are as steady as your "pans."

MORE CONTROLS FOR MORE CONTROL.

Like all O'Connor heads, the Model 50 is designed to provide maximum versatility. Separate controls for the pan drag, pan lock, tilt drag lock—all improve the flexibility and repeatability of camera movement.

O'CONNOR HAS MORE OPTIONS.

More options mean a more versatile system for you. In addition to some of the items already mentioned for the Model 50, we also have adjustable double video handles, hi-hats, cases, adapters, teak tripods and the ever amazing Hydro-ped.

ORDER IT YOUR WAY.

The basic O'Connor Model 50 fluid camera head can be ordered 378 different ways. If you're not sure how you want yours, maybe you should send for our brochure and price list to help you pick the equipment that's perfect for your needs.

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FLUID CAMERA HEADS

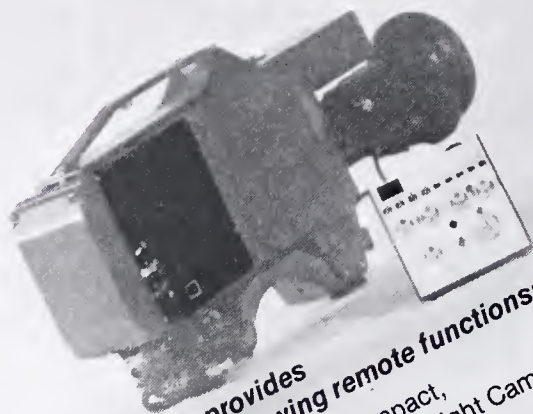
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March 1979 *Broadcast Engineering* 63

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Compact,
Lightweight Camera
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(Encoder not shown)

innovation that works . . .

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See The SWICHEGAMI D.C.U.
At NAB Dallas, Booth 412

NEW PRODUCT

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Meetings, events & seminars

May 22-24—A seminar, *Telecommunications: trends and directions*, will be held at Dunfey's Hyannis Resort at Hyannis, MA. The program sponsored by the Communications Division of the Electronic Industries Association, is designed to provide an in-depth briefing on the status of the telecommunications industry for members of the financial community.

The formal sessions consist of 3½ days of panels covering a wide range of telecommunications functions, including manufacturing and operations.

For more information, contact: Peter Bennett, EIA Dept. BE, 2001 Eye Street NW, Washington, DC 20006

May 31—Abstracts for papers to be presented at the first annual *Gallium Arsenide Integrated Circuits Symposium* are due. The papers should cover topics related to Gallium Arsenide Integrated Circuits including linear integrated circuit applications, digital integrated circuit applications, processing technology and packaging and testing. The seminar will be held at Lake Tahoe in September.

For more information, contact: Dr. D. Howard Phillips, Symposium Chairman, Lockheed Microelectronics Center, Space Systems Division, Dept. 62-23 Bldg. 151, Lockheed Missiles & Space Company, P.O. Box 504, Sunnyvale, CA 94086.

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INSTALLATION CONFIGURATION	Back-to-wall mounting. All servicing from front of transmitter.	Middle-of-floor mounting. Servicing front & rear.	Large, rambling cabinetry. Servicing front & rear.
SPACE REQUIRED FOR KLYSTRON CHANGE	4 ft. in front of cabinetry.	8 ft. in rear of cabinetry.	8 ft. in front of cabinetry.
KLYSTRON TUNING	From front control panel.	From rear of transmitter.	From front of transmitter.
CONTROL CIRCUITRY	Plug-in octal relays mounted on front panel. Spares avail. from several mfrs.	Solid state. Spares avail. only from original mfr.	Hand wired relays of many types buried in transmitter. Spares only from orig. mfr.
METERING	Complete metering of all important circuits. No meter switches.	Lacks several meters used by Townsend.	Lacks several meters used by Townsend.
BEAM POWER SUPPLIES	One for each amplifier.	One for entire transmitter.	One for entire transmitter.
HIGH VOLTAGE CONTACTOR	Vacuum type.	Vacuum type.	Air type.
COOLING	Avail. with vapor or water Klystrons to suit customer requirements.	Avail. only with vapor cooled Klystrons.	Avail. only with vapor cooled Klystrons.
MODULATOR	I.F. modulated, solid state.	I.F. modulated, solid state.	I.F. modulated, solid state.



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**WE STILL
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The more customers we earn, the more we learn and the more we improve on our quality line of AM, FM and TV frequency and modulation monitors. It's this close attention to our user's needs and desires that has put TFT on top of the heap and continues, year after year, to make TFT the standard of the industry.

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Meetings, events & seminars

May 31—All summaries for papers to be presented at the *IEEE Engineering Management Conference* will be due. Papers will be accepted based on the content of the summary submitted.

Suggested topics range from administrative experts to technology forecasting. Accepted summaries will be printed in a conference digest distributed at registration.

The 1979 Annual conference will be held in October.

For more information, contact: Dr. Edward A. Wolff, Dept. BE, 1021 Cresthaven Dr., Silver Spring, MD 20903.

June 5-7—The 26th Annual *Cleveland Electronics Conference and Exposition* will be held at the Cleveland Convention Center Mall. Technical meetings and workshops are designed for decisionmaking personnel in the electrical/electronic field.

For more information, contact: Mike Lapine, conference director, Dept. BE, 2728 Euclid Avenue, Cleveland, OH 44115.

June 19-21—A call for papers has been issued for the *International Microcomputers Minicomputers Microprocessors '79 Conference* to be held at the Palais des Expositions in Geneva, Switzerland. The subject matter includes microcomputer technology, software development systems and tools, advances in software technology, peripherals for minicomputers and microcomputers and instrumentation applications of microcomputers.

For more information, contact: Dr. Fred L. Morritz, Industrial and Scientific Conference Management, Dept. BE, 20, rue Hamelin, F 75116 Paris, France.

June 20-22—*APRS-International Exhibition of Professional Recording Equipment* will be held at the Connaught Rooms, Great Queen Street, Kingsway, London. Professional sound recording equipment will be on display.

For more information, contact: Association of Professional Recording Studios, Dept. BE, 23 Chestnut Avenue, Chorleywood, Hertfordshire WD34HA.

July 2-6—Motion picture, television, sound and audiovisual equipment will be exhibited at the *Film-International Technology Conference and Exhibition*. The conference will be held at the Royal Lancaster Hotel, London.

For more information, contact: British Kinematograph, Sound and Television Society, Dept. BE, 110-112 Victoria House, Vernon Place, London WC1B4DJ.

July 17-20—The 2nd Joint *INTERMAG-Magnetism and Magnetic Materials Conference* will be held at the Statler-Hilton Hotel, in New York City. This will be the only meeting of either of these major conferences during 1979. The joint conference is co-sponsored by the Magnetics Society of the Institute of Electrical and Electronics Engineers and by the American Institute of Physics.

For more information, contact: Dr. E. F. Luborsky, conference chairman, Dept. BE, General Electric Research and Development Center, P.O. Box 8, Schenectady, NY 12301.

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NEC

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NEC America, Inc.

Broadcast Equipment Division

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Radio/Television

John A. Lack has been appointed to the position of executive vice president, programming and marketing for Warner Cable, a subsidiary of Warner Communications. Lack, who joins Warner from CBS where he was vice president of the CBS radio division and general manager of WCBS radio, New York, will be responsible for all programming services provided by Warner to its subscribers and the cable TV industry.

Roy Martin-Harris, former senior producer for the BBC, has been named executive producer of the Christian Broadcasting Network's internationally syndicated "700 Club" telecast. Martin-Harris plans to expand the program by going out on location more often and "to be creative and exciting."

Randall H. Brown has been appointed as a staff producer/director in the industrial-commercial video production department of Video Concepts. Brown was most recently field producer for the NBC affiliate in Columbus, OH, WCMH-TV.

The new chief engineer at 99X is **Ed Knapp** who has been maintenance supervisor at the station since December of 1977.

Jack E. McKain has been appointed director of engineering for KCMO-TV and Meredith Video Productions, Kansas City. McKain has served as assistant director of engineering at KCMO-TV since 1976.

Ralph Thompson has been appointed director of engineering at WIVB-TV, Buffalo, where he will supervise the station's entire technical facility, including studio switching and camera control equipment, videotape, film and master control areas, live ENG equipment, a color weather radar unit and a satellite earth station. Thompson comes to the station from WDVM-TV, Washington, DC, where he was chief engineer and director of engineering for the Post-Newsweek stations.

Austin Walsh, who is director of sales at WRKO radio, Boston, has been named chairman of the Boston Creative Screening Panel for the 19th annual International Broadcasting Awards sponsored by the Hollywood Radio and Television Society. Walsh will be responsible for naming a panel of seven to 10 members selected from the advertising and broadcasting industries who will select the award winners.

Chuck Goldmark, former general sales manager at WXLO, New York, has been appointed general manager of WRKO, Boston.

The Massachusetts Broadcasters Association recently has appointed **Rodger Allan**, news director of WRKO radio in Boston, to the board of directors. Allan has been with WRKO for 18 years. He also teaches

broadcasting at Emerson College and the Leland Powers School and is an assistant professor of communications at Curry College in Milton.

Manufacturers/Distributors

John Dale has been promoted to vice president and general manager of the magnetic tape division of Fuji Film. Dale joined the firm in 1974 most recently serving as general manager of the division.

Robert W. Maier has been named vice president of marketing at EAO Switch and will be responsible for marketing all of the firm's products in the US. Maier joins EAO Switch from Unimax Switch where he served as marketing manager for lighted products.



Dale



Maier



Park

The broadcast division of Sony has named **Bill Park** as the operations manager responsible for managing and directing the daily operation of the division. Before coming to Sony, Park was with Ampex in engineering and marketing positions.

Bill Gillen has been appointed to the position of general manager at Electronics Arts Intermix. Gillen's responsibilities will include expansion of existing programs, development of new programs and new outlets for programs.

The newly formed measurements and control system group of Analogic has appointed **Dr. Pierre Dogan** as manager. Dogan's latest position was as corporate development manager at C. S. Draper.

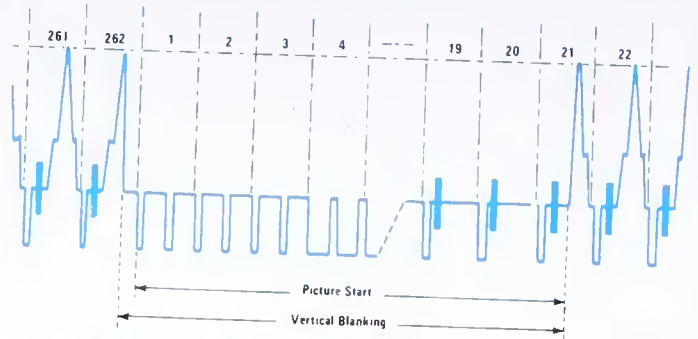
Installation checkout and subsequent service work with Broadcast Electronics control 16 automatic system will be the major responsibilities of **W. Do Jones** in his position as automation service manager. Dow joins the firm from the automation service department of Harris' broadcast products division.

John Leay has joined Reeves Teletape's facilities group as vice president of engineering. For the past three years, Leay has been an engineering consultant for Lincoln Center, the Metropolitan Opera, Roslyn Television Systems and IBM.

Fred Nakamura, executive vice president and chief executive officer, Fuji Photo Film, has been elected to the board of directors. Nakamura has been with the

MARCONI has the proven answer to 'H' & 'V' Blanking Measurements

Marconi Television Interval Timer Model 2920 measures the following parameters

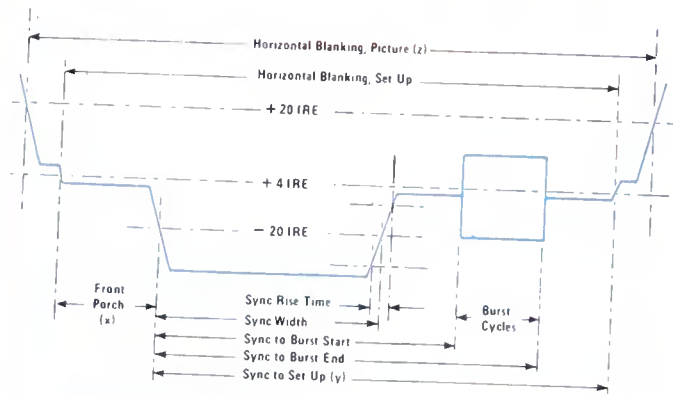


VERTICAL BLANKING MEASUREMENTS

- Total Vertical Blanking Interval
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Fast accurate measurements at the touch of a button
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 Blanking at set-up (+4 IRE) and picture (+20 IRE) measured independently to 10 nsec. resolution
 Vertical Blanking resolved to 1/10 line
 Printout from BCD output on command
 All functions may be remotely controlled for simple system integration
 Manufactured in U.S.A., domestic price \$4500



HORIZONTAL BLANKING MEASUREMENTS

- Set Up Blanking (+4 IRE)
- Picture Blanking (+20 IRE), (z)
- Front Porch, (x)
- Sync Width
- Sync to Burst Start
- Sync to Burst End
- Sync to Set-Up, (y)
- Burst Length in cycles
- Sync Rise Time

REFERENCE MEASUREMENTS

- Burst Amplitude in IRE
- Sync Amplitude in IRE

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People in the news

firm since 1953 most recently as executive vice president and resident manager.

The newly created position of executive vice president at Penril has been filled by **Paul E. Keane**. Keane has served as vice president for the past several years.

At the annual stockholders meeting of Penril held late last year, members re-elected **Alva T. Bonda** as chairman of the board and **Kenneth M. Miller** and **Merrill Solomon** as directors. The board re-elected as officers **Alva T. Bonda**, chairman and treasurer; **Kenneth M. Miller**, president and chief executive officer; **William S. Lambdin**, vice president; **Jack D. Phillips**, vice president; **Walter S. Robinson**, vice president; **Walter P. Olson**, secretary; **Gloria Ehrlich**, assistant secretary; and **Richard Margolis**, assistant secretary.

John Camarda has been named director of marketing for RF Technology. Camarda was most recently general sales manager for Thomson CSF Labs.

In a recent election, the Comsat board of directors elected president **Joseph V. Charyk** as president and chief executive officer and **John D. Harper** as vice chairman of the board. **Joseph H. McConnell** will continue to serve as board chairman until May when he plans to retire.

Kenneth M. Leondar has been appointed general manager of Cetec's antennas division. Leondar resigned from his position as marketing director for radio navigation systems at Teledyne Systems to accept the managership position last December.

Paul F. Amedick, former administrator of news and information, Broadcast Systems News Services, RCA Broadcast Systems, has been promoted to manager of the services. Amedick has been with RCA since 1968 in various public relations and publicity posts.

Marketing manager of Audio-Video, **Theodore M. Klarsfeld**, has been appointed to the board of directors. Klarsfeld has been with the firm since 1975.

The appointment of **Jim Lucy** as broadcast sales manager of C.S.P., Incorporated was recently announced. Lucy comes to the firm from Broadcasting for American Electronic Laboratories where he was national sales manager.

TRW Semiconductor has named **Kevin Finn** to the position of general manager, succeeding Stan Czerwinski. Finn has served as operations manager for the past year.

Elliot Schwartz has been named director of sales for KLH Research and Development joining the firm from Boss where he was national sales manager.

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Sound Workshop
Stanton
STI
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Tapco
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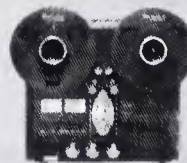


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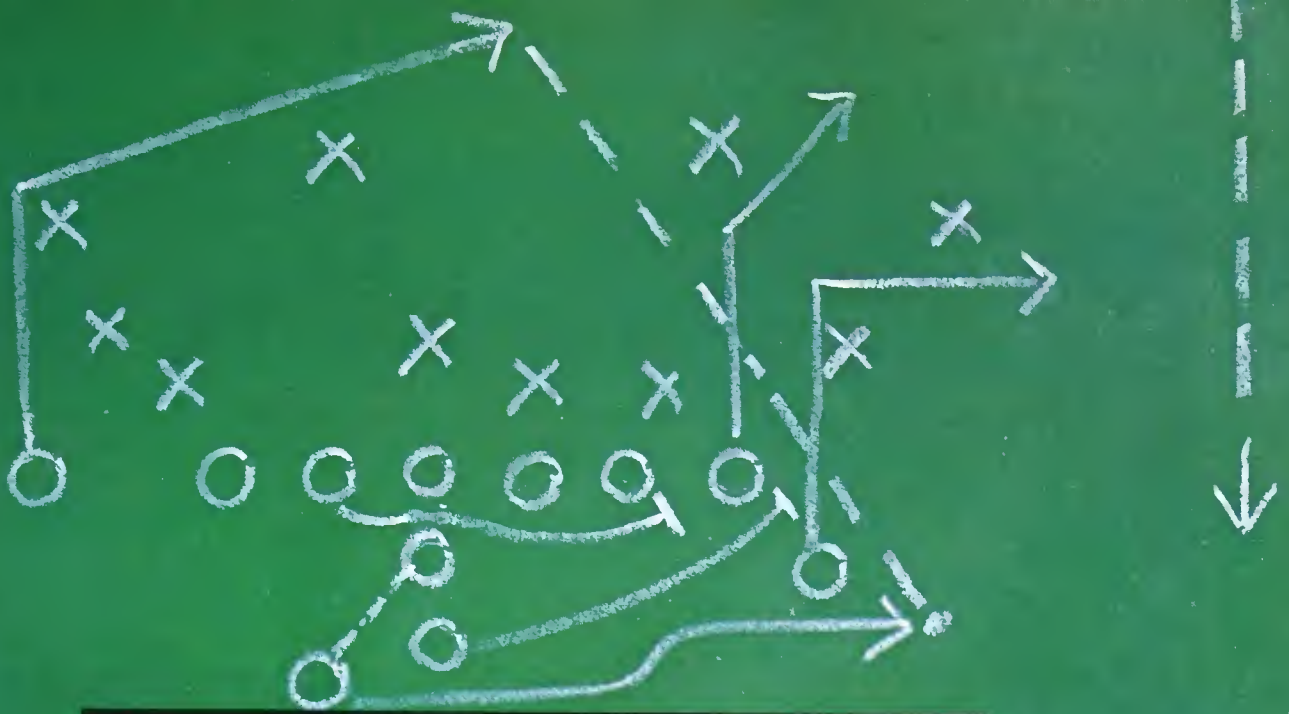
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The Digital Panel shown here fielded a barrage of questions on the future of digital television from a packed house at SMPTE's final Saturday session. From left, members of the panel were Ed Herlihy, Golden West Broadcasters (KTLA), Los Angeles; Dominique Nasse, CCETT, France; Arch Luther, RCA; Peter Rainger, BBC, London; Joachim Diermann, Ampex, Redwood City, CA; Marcel Auclair, Canadian Broadcast Corporation; Charles Ginsburg, Ampex; and K. Blair Benson, Video Corporation of America, New York.

The SMPTE Winter Television Conference convened February 2-3 at the St. Francis Hotel in San Francisco and the air was sparked with anticipation of new advances in digital television. Word had mysteriously leaked out that Ampex would unveil something special in its Saturday afternoon paper, and the house was packed with engineers eager to hear the news. They were not disappointed. Two Ampex engineers, Joachim Diermann and Maurice Lemoine, authored a paper which was delivered by Diermann during the Saturday afternoon session, relating Ampex progress on digital video recording. Because the word was out, this was somewhat more than a progress report; it included a spectacular demonstration of a laboratory digital video system.

But more about this achievement later. The SMPTE 13th Annual Television Conference set all new attendance records this year, exceeding all expectations even in view of the advanced billings for the conference format. The general arrangements for the conference were handled by Don Lincoln of KPIX in San Francisco, and the papers program was chaired by Carlos Kennedy of Ampex. The exceptional attendance this year appeared to be due to the efforts of the SMPTE Chairman as well as the content of the technical sessions and the exceptional quality of the exhibits.

Production update

The opening technical session on Friday morning was devoted to production and post-production operating experience with 1-inch videotape recorders. The welcoming remarks were delivered by Fred Remley, the SMPTE vice president for television

affairs and technical director of the University of Michigan Broadcasting Service. This was followed by a paper presented by David Fibush, chairman of the SMPTE Helical Sub-Committee, who presented a report on the SMPTE 1-inch helical VTR standards effort. Fibush, from Ampex, was the session chairman for this first session and is remembered for his excellent paper presented last year covering the technical developments of continuous field VTR which acknowledged the hard work of both companies and networks for the emergence of a compatible Type C 1-inch VTR format.

The first paper from industry was presented by Ray Schneider, CBS Television Network, New York describing the CBS operating experience with 1-inch VTRs. He reviewed the CBS installation of 1-inch videotape facilities in New York, at Television City in Hollywood, and at CBS's Studio Center Film Production operation in North Hollywood. His account illustrated a marked devotion to the 1-inch non-segmented Type C format usage since CBS initiated this service in July 1977. Since then, CBS has introduced the 1-inch videotape equipment into production recording, production insert playback, post-production editing, and delayed network record and playback.

In addition, a number of edit systems have been designed, constructed and operated specifically at studio-dedicated facilities. CBS's experience to date has revealed that the 1-inch facilities provide an exceptional ease of operation of machines and systems, acceptable long-term video and audio quality, improved machine reliability and maintenance, and reduced storage space for tapes. The tone of Schneider's report left no doubt in the minds of the

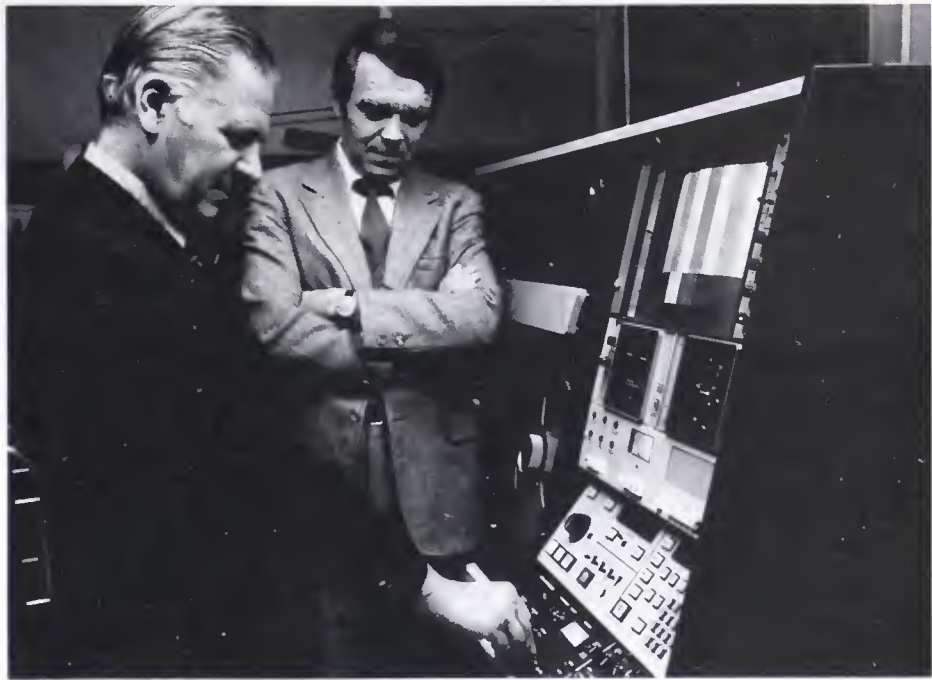
Ampex steals show with digital VTR demonstration

Two Ampex engineers reported at the SMPTE winter conference in San Francisco on the company's progress in digital videotape recorder technology and demonstrated an experimental digital VTR at the final session on Saturday that grabbed the full attention of a packed house.

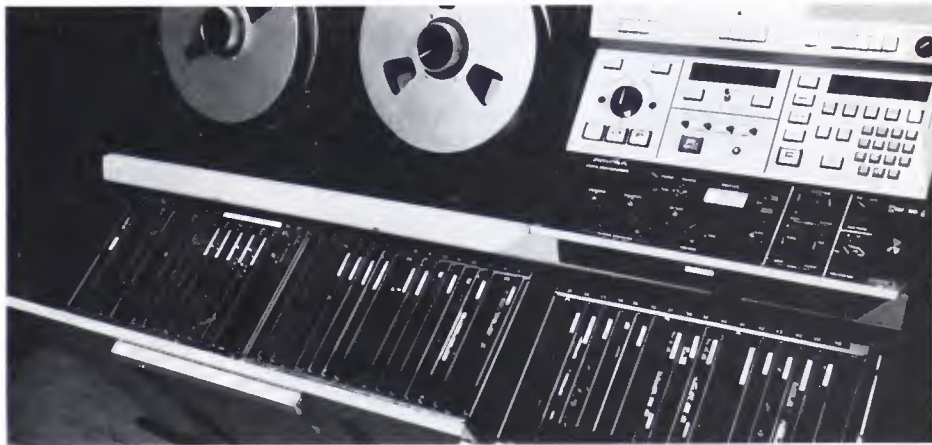
The engineers, Joachim Diermann and Maurice Lemoine, cautioned their audience that the experimental digital VTR is being used as a development tool in Ampex's laboratories and is not a product, or even close to becoming one. Diermann pointed out that many questions must still be answered before a practical digital VTR can become a reality. Among the questions are size, weight, operating cost, initial cost and total operating characteristics of a digital system.

At Ampex headquarters, Donald V. Kleffman, vice president and general manager of the audio-video systems division commented on this system. "This is a status report on an experimental recorder," he said. "And although its video performance is extraordinary, it is not a product and we are not even suggesting that the format we have chosen is close to ideal. We firmly believe that a practical digital videotape recorder that satisfies the real needs of the broadcast industry is not just around the corner; it will be quite a few years before such a recorder can become a viable product.

"We feel an obligation," Kleffman continued, "to keep the industry informed and to help it maintain a balanced view. This report and



Ampex engineers Maurice Lemoine, left, and Joachim Diermann captured a record SMPTE audience's rapt attention with a remarkable demonstration of digital video. The system was housed in a standard VPR-3 quadruplex VTR cabinet, but the electronics bay (below) in the base contained an impressive array of new PC boards to yield striking digital pictures.



Tape Format Parameters

Track width	5 mils
Guard band	2.5 mils
Head-to-tape speed	1600 ips
Linear tape speed	15 ips
Linear packing density	27 Kbit/in
Number of lines per dual head pass	16

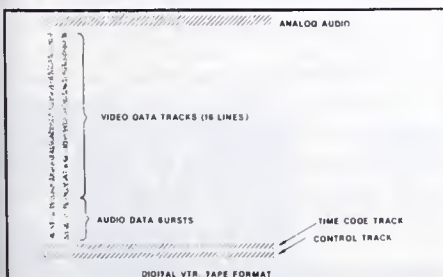
demonstration serve that purpose. We hope that others will follow our example and give the industry further insight into the status of this technology, and we also hope to encourage the users in this industry to tell the manufacturers in turn what it expects to gain from digital TV."

The Diermann/Lemoine SMPTE paper represents the latest in a continuing series from Ampex reviewing Ampex's progress in digital video development. At last year's conference, Diermann gave a paper outlining the parameters of this system; this year he followed up with an operating system.

The digital VTR demonstrated at SMPTE used Ampex AVR-3 quadruplex VTR chassis modified for test

purposes and containing an impressive array of new circuit boards. The system had a special video head assembly with eight transducers and a writing speed of approximately 1600 ips. The digitized video signal was recorded on two channels with each channel accommodating a bit rate of 43 mbits/sec. The composite 525/60 NTSC signal was sampled at $3 \times f_{sc}$, and each sample was digitized into an 8-bit word. Linear packing density was 25 kbits/inch.

This experimental unit had a conventional tape transport and utilized standard quad videotape. Track width was 5.0 mils with a guard band of 2.5 mils. The longitudinal tape speed was the standard 15 ips. □



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audience that CBS will continue its adaptation of network stations to the 1-inch format.

A similar report was presented by Richard Green and Christopher Cookson, ABC in Hollywood on their design of and operating experience with a 1-inch videotape recorder complex. ABC also began the process of converting videotape operations from the 2-inch quadraplex standard to the 1-inch helical scan format in July 1977. First they converted the production of *General Hospital* and advertising to this format. The use of the 1-inch systems made it possible to convert *General Hospital* from basically a live-to-tape production with a minimum of editing, to a program which is heavily edited, involving over 25 edits per each hour segment. The speed and accuracy of electronic editing using 1-inch VTRs made possible for ABC to rely heavily on post-production to create its hour-per-day drama. Green described these facilities which utilize a CMX-340 computer video editing system with a Grass Valley digital effect processor and E-MEM effects memory interfaced with Ampex VPR-2 machines. In addition, ABC uses an audio sweetening post-production facility with an MCA automated console.

In terms of remote field operations, Green described ABC's use of a VPR-2 to generate slow-motion effect on December 18, 1978 during the Miami/New England football game. (See page 48, this issue.) ABC used the SMC-60 slow motion controller to generate slow-motion effects directly from 1-inch VTR for the first time in the field remote operation. As true for CBS, ABC also praises the results of its conversion to 1-inch videotape machines. They have enhanced production and post-production capabilities and Green reports that expanding requirements in post productions will step up use of the 1-inch systems.

Allen Henderson, KSL Productions in Salt Lake City reported on the advantages which KSL Video Production has realized in the use of 1-inch VTRs in production creativity and profits. KSL began experimenting in 1976 with the 1-inch format using Ampex VPR-1 video recorders. The result is that KSL is now fully launched into the "video film-style" revolution.

Citing the advantages of 1-inch over quad Henderson reported a required capital investment 40% less than for 2-inch machines; far less videotape stock; lower total operating costs; reduced noise level because air conditioning and air compressors are not required; less space needed; high mobility in field productions; special production features such as still frame and slow-motion capabilities; a high confidence level from being able to see playback while recording; and the advantage of two full tracks of audio, plus a time code track.

Gridley Quihuis, Oral Roberts TV Productions Tulsa, reported on their use of the 1-inch Type videotape format. Quihuis reported that the battle operation, light weight, and versatility of the 1-inch videotape system has aided the university in production and editing its prime-time shows. Furthermore, Quihuis reported extensive use of the system in videotaping programs in Haiti, Trinidad and Israel, with virtually no difficulties with environment conditions of temperature or dust.

Microprocessors in editing

The afternoon session was devoted to microprocessor

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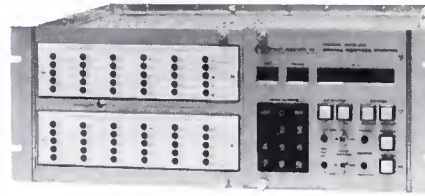


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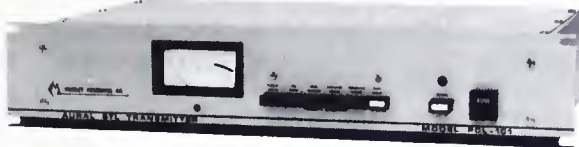
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sors in video editing and machine control systems, and the technical sessions were packed as usual. Norm Hobson, RCA, began the afternoon session by describing the TK-47 microprocessor-controlled color video camera. While this paper was, in essence, a replay of the RCA paper presented at the SMPTE conference in New York late last year, it provided an excellent balance to other papers by showing what microprocessors can do when used to the fullest in creating a fully automated, studio-type color camera.

In the paper that followed, George Bates, Convergence, described the use of a microprocessor with a unique software algorithm used in conjunction with a standard longitudinal time code and videotape recording control track to overcome limitations (such as velocity and change of velocity and direction) in time code editing systems. The use of the microprocessor in this application has made a marked advance in instrumentation possible.

Masahiko Morizono and Jun Takayama, Sony, Japan, described a microprocessor-based videotape editing system with film editing ease of operation using a microprocessor and hardwired arithmetic logic unit. As a result of this development, the authors expressed the belief that the key point in designing a videotape editing system is the ability to overcome the man/machine interface problems, especially if one is to surmount inherent system problems and realize fast decision making.

Hans-Dieter Geise of Bosch Fernseh GmbH, West Germany, described the use of microprocessors and mini-computers in the development of modern VTR controls. He described the development of helical scan broadcast VTRs that are broadening the horizons of production techniques with the use of intelligent components inside the VTR, and these are based upon sophisticated microprocessors. He described the 1-inch segmented field Type B Format VTR with slow-motion operation capabilities using a slow-motion programmer built around a microprocessor. Geise pointed out that their equipment employs a distributed processing concept which allows the equipment to fall into line with other control systems for Type B format VTRs.

This paper was followed by a stunning demonstration by Bruce Rayner of the Grass Valley Group, who used a videotape to show the full capabilities of video production and editing with a microprocessor-con-

trolled switcher using their E-MEM effects system. Rayner indicated that video switching philosophies may well change as experience is gained in applying memories and intelligent control aids in the operation of new switchers and switcher functions. Furthermore, he pointed out that microprocessor devices provide extensive aid in audio switching in post-production activities and provide significant intelligent links for character generators and in developing still store capabilities.

Exhibitor's popular

Throughout the technical sessions on both Friday and Saturday the exhibitor booths were open to the SMPTE conference attendees, and they were crowded with potential buyers, even though the conference sessions themselves were packed during most sessions. Nearly 40 exhibitors were on hand displaying sophisticated products for TV broadcasters.

Digital takes over

The entire Saturday morning technical sessions dealt with digital video effects and computer animation.

Michael Magri, NBC in New York, described in a paper on tracking chroma-keys with digital video effects how rear-screen TV projection systems can be replaced by chroma-key inserts controlling electronic image frames using digital video effects instrumentation. He pointed out that the alignment of the cameras and special effects generators is important, as well as special care to prevent insert motion and tearing, studio lighting, chroma-key screen position, and the relationship of the talent to the insert screen.

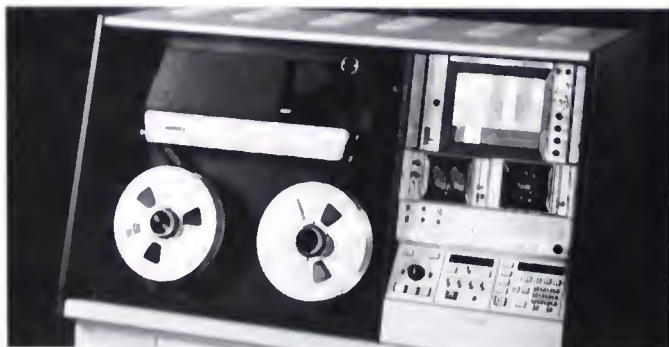
This paper was followed by one presented by Richard Taylor, Quantel, England, on the expanding world of digital effects. He described three new enhancement options for the Quantel digital effects system, all of which can be retrofitted on existing DPE 5000s. These enhancement effects include picture reversal, autolink, and multilink. The picture reversal gives the illusion of a picture reversing, mirror imaging, and picture spinning or tumbling. Autolink is a control routing switcher that enables multiple control panels to be used with one digital effects system.

Multilink, more sophisticated, allows interlinking up to four DPE-5000s with four control panels, in any combination, when multiple picture manipulation is required. First delivered late in 1977, the DPE-5000 system incorporates an LSI minicomputer, an Intel 8748 computer, and a 6800 microprocessor.

The one paper of the morning which seemed to fairly reach out and freeze the audience's attention was prepared by J. K. Moore, A. Kaiser and H. W. Mahler, CBS Technology Center, on further developments in the CBS Action Track. This system captured the audience's attention when Hank Mahler demonstrated how digital signal manipulations could produce striking visual effects when used with moving subjects. Action Track originally was introduced by CBS early in 1978 to produce multi-image displays of moving objects in real time. However, while last year's system was dramatic, it had undesirable limitations.

The adherent problem in the first generation Action Track was that early movements being stored and displayed interfered with subsequent movements tha

AVR-3 quadruplex videotape recorder/reproducer housed the experimental digital VTR demonstrated by Ampex at the SMPTE conference.



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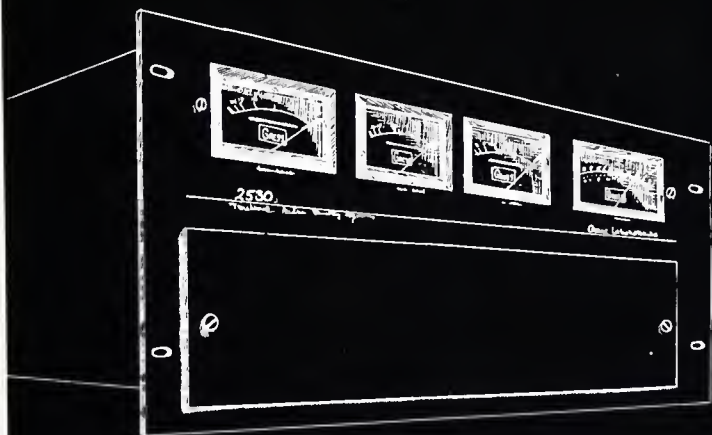


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were to be viewed. The CBS system displayed this year overcomes this limitation so that continuous movement can be displayed without earlier sequence pictures obscuring the following pictures.

The resultant effect displays the path of a ball, the stroke of a tennis player during a serve, or any other action where the sequence of every portion of the motion can be observed continuously from beginning to end. Another useful feature now incorporated in Action Track is that early images of a motion sequence can be made to decay, or to fade away at a selectable rate, as the action continues. The sequence of events then, as the action is followed, allows the ghost images of earlier events to fade away without interfering with subsequent action.

The next paper, by Edwin Catmull and Alexander Schure, New York Institute of Technology, on the use of computers in animated production contained some striking examples of what talent and computer-aided equipment can do to produce computer generated animations. The staff at NYIT consists of computer scientists, video technicians and animation artists assembled for the specific purpose of researching techniques to generate images and animations of broadcast quality. Their facilities include many computers, frame buffers, 2-inch VTRs, sophisticated computer graphics equipments and post-production facilities. The key piece of equipment for producing these graphics is the frame buffer, a memory which stores an entire colored video picture and is interfaced to their computer. However, even with sophisticated equipment and extensive software programs, digital synthesizing of pictures for animation takes from 15 seconds to 2 minutes duration. Even so, the resulting creations are striking in terms of color, motion and sound sync. To conclude, the authors presented a series of videotapes showing the use of their animations techniques and the power and versatility of their total system.

This paper was followed by one presented by Richard Shoup of Xerox Research on some experiments in television graphics and animation using a digital frame buffer. While this system seems to have been developed as an experimental toy by the staff of the giant Xerox Research facilities and is reported to have no commercial implications, the results demonstrated some remarkable achievements in terms of computer graphic creations. The experimental digital video system, which Shoup referred to as "SuperPaint," was built as a research program in computer imaging and digital graphic composition. He demonstrated the power of this system as used for news coverage of the NASA Pioneer Venus mission. SuperPaint consists of a digital image frame buffer holding 480x640 pixels (8 bits/pixel) representing the image picture, a data tablet and pen, several digital disc drives for picture storage and the mini-computer. Using a color monitor, the artist generating a graphic views an assortment of available colors, various brush shapes and sizes, and icons of various picture editing operations which he can utilize. A nearby monitor displays the picture he is creating, and this is, in essence, the artist's canvas.

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ty in interactive processes which help the artist create the computer images. And, an important feature is that the operator need not have any command of computer programming. He composes pictures from figures drawn by hand, from prepared art work, or any materials scanned with a convention vidicon, or from computed or synthesized images previously stored in memory. Furthermore, he has full command of the size of the picture, its movement and whether its overlaid, combined, saved or erased from the disc.

Digital video recording

The afternoon session on Saturday was the one awaited by all attendees. The house was packed, and standing room only was available for latecomers. Papers were presented by Peter Rainger, BBC, on a low bit rate system for digital coding of the television picture; Charles Ginsburg, chairman of the SMPTE study group on digital television, Ampex, on picture impairments caused by passing the NTSC color signal through a number of codecs in tandem; Dominique Nasse, France, on how separate-components digital video recording is needed and possible; Edward Herlihy, Golden West Broadcasters, on a review of digital video recording and what it will do for the broadcaster; and the anxiously-awaited progress report by Diermann and Lemoine, Ampex.

As previously indicated, word had escaped that the paper by Diermann and Lemoine would be accompanied by a laboratory demonstration of an Ampex digital video system. While all of the papers in the afternoon session were well attended, this one paper and its accompanying demonstration eclipsed everything that the conference had to offer. In the technical portion of the presentation, Diermann described a continuation of the design of a digital VTR system as previously outlined in his 1978 SMPTE winter conference paper. In that paper, he described the salient features of a digital VTR, conceived as a laboratory investigative tool, which could provide an

experimental vehicle to research the effect of digital video signals passing through magnetic recording channels. This year, with the help of co-author Lemoine, Diermann was able to demonstrate an actual experimental model of a laboratory system with broadcast quality digital video pictures.

The Ampex staff was quick to point out that this was an experimental digital VTR, not a commercial product. They acknowledged that this is not the first demonstration of this type; however, everyone at the conference recognized the far superior quality of the Ampex demonstration tape over previous systems. In fact, the quality of the tape demonstrated to the conference surpassed the quality of conventional videotape, with 60 dB S/N.

In the panel session that followed the digital tape session, numerous questions arose as to the future of digital video recording. In the final paper of the day, Herlihy, analyzed this problem from the broadcasters point of view. The key points of concerns to present day broadcasters, as reported by Herlihy, involve the status of recording digital standards, technical specifications for equipment, capital costs (this could be a problem if digital equipment costs exceed that of the 1-inch VTRs), operating costs, maintenance and the interfacing to remote control and editing facilities. Of all the points raised, Herlihy concludes that probably the most challenging aspect of the digital video questions is the adopting of suitable standards for the industry. He concluded that the role of the SMPTE in this aspect should take on new aspects; namely, standards should be set before the equipment is produced—not afterwards.

The digital panel which followed the digital session was moderated by Don West of *Broadcasting* magazine and consisted of Peter Rainger, BBC; Charles Ginsburg, Ampex; Dominique Nasse, France; Joachim Diermann, Ampex; Ed Herlihy, Golden West Broadcasters; K. Blair Benson, Video Corporation of America; Arch Luther, RCA; and Marcel O. Clair, Canadian Broadcasting Corporation. Questions from the floor and among the panel itself was lively and informative. Numerous questions were raised regarding the quality of the Ampex digital videotape itself. The conclusion voiced by both the attendees and by the panel itself was that Ampex had displayed a remarkable product in terms of picture quality.

The most significant conclusion drawn from the interaction of the panel and the audience was that digital video was certainly possible with today's technology, but that practical commercial systems would, and indeed should, be five to eight years away. A delay of this period is for the problems in digital standardization to be ironed out so that the new generation of commercial equipment would have standardized digital techniques already built-in. Therefore, expensive new equipment would not be quickly obsolesced. Everyone urged that efforts to continue standardization be pushed rapidly so that new equipment could be made available at the earliest practical time.

Following the SMPTE program, Ampex demonstrated their digital video system in a hospitality suite at the St. Francis hotel. People clamored and clawed their way to the foreground to see the digital system and to talk to its developer. While Ampex continued to proclaim that this was only a laboratory experiment, there was little doubt in anyone's mind as they left the conference that digital video is at hand. □

This is the vectorscope reading for the color bars in Ampex's demonstration experimental digital VTR.





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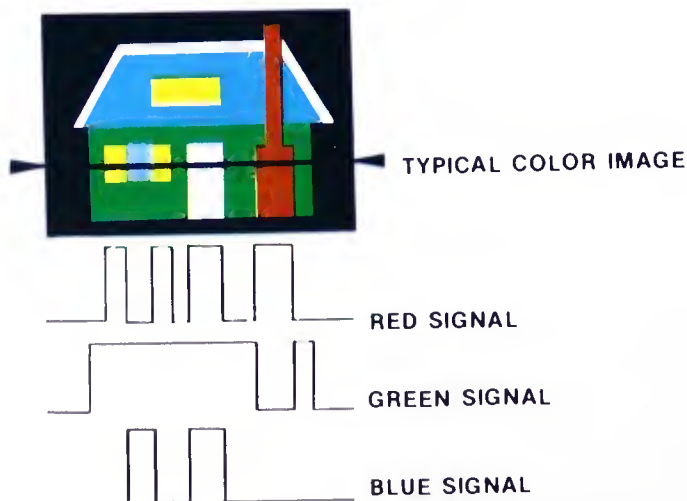


Basics of color video

Basics of color video Part 2



In the scanning process of a color image (upper left), the color camera separates the subject into three color image counterparts for transmission.



Waveforms show how the red, green and blue signals vary across a model color image during one scan line (Indicated by the horizontal bar and arrows).

By John W. Wentworth, manager of broadcast technical training at RCA Broadcast Systems.

This concludes the coverage of the basics of color video which began on page 44 of the February issue of *Broadcast Engineering*.

The Gamma-correction problem

The relationship between the grid-cathode voltage at the electron gun and the light output at the screen of a typical kinescope (either monochrome or color) is nonlinear, usually following a power law with an exponent (gamma) about 2.2. That is, to a first approximation, $L_s = e_s^{2.2}$, where L_s is the screen luminance and e_s is the signal voltage (biased so that zero signal voltage corresponds to cut-off). Because proper color fidelity requires strict proportionality in the handling of the red, green and blue primary values, it is necessary to provide gamma correction for red, green and blue video signals to compensate for the kinescope nonlinearity. For both economic and noise-immunity reasons, it is best to provide the correction at the transmitting end of a color TV rather than in every receiver.

Thus, a standard feature of broadcast-quality color cameras is a set of nonlinear amplifiers (gamma correctors) for the red, green and blue channels, as shown in Figure 11. The red, green and blue video signals are nonlinear functions of the basic color metric values of great practical significance in subsequent portions of the transmission system. (The gamma

correctors will not be shown in all subsequent diagrams in this article, but they are always implied.)

Encoding and decoding

To achieve compatibility with monochrome television, color TV signals must be processed so they can be transmitted through the same channels used for monochrome signals, and they also must be capable of producing good monochrome pictures on monochrome receivers. Since color TV involves three variables in contrast to the single variable (luminance) of monochrome television, an encoding process is required (Figure 12). Likewise, a decoding process is required in the color receiver to recover independent RGB signals for control of the electron guns in the color television set. Moreover, the process used must enable monochrome receivers to produce monochrome pictures from the three-variable color signal.

The specific encoding and decoding processes used in compatible color TV are known as *matrixing*, *bondshaping*, *two-phase modulation* and *frequency interleaving*.

Matrixing and band-shaping

Color video information is produced originally in most color cameras in the form of three gamma-corrected signals controlled by the red, green and blue components of the image. By repackaging this information in the form of a different set of three independent signals, it is possible to satisfy the compatibility requirement and also to reduce the bandwidth of the three signal components to achieve greater RF spectrum efficiency.

The repackaging is accomplished by so-called matrix circuits, which cross-mix the three primary-color signals in accordance with the following equations:

$$\begin{aligned} M &= 0.30 R' + 0.59 G' + 0.11 B' \\ I &= 0.60 R' - 0.28 G' - 0.32 B' \\ Q &= 0.21 R' - 0.52 G' + 0.31 B' \end{aligned}$$

The prime marks indicate that the R, G and B signals are nonlinear functions of the corresponding colorimetric values.)

One of the many possible circuit arrangements for performing the matrix operation is shown in Figure 13, and a typical set of M, I and Q waveforms derived from a simple image is shown in Figure 14.

If it were not for the gamma-correction problem, the signal component designated by M would be identical to the output of a monochrome TV camera with an ideal spectral sensitivity curve matching the standard luminosity function. That is, the coefficients for the red, green and blue signals have been made proportional to the relative contributions each primary makes to the total luminance, and they also have been scaled in such a way that 100% levels in all three primary channels (corresponding to the scanning of a reference white surface) will yield an M signal of 100% level. (Incidentally, in much of the literature of color television, the signal component designated here as M is designated Y or E_y .)

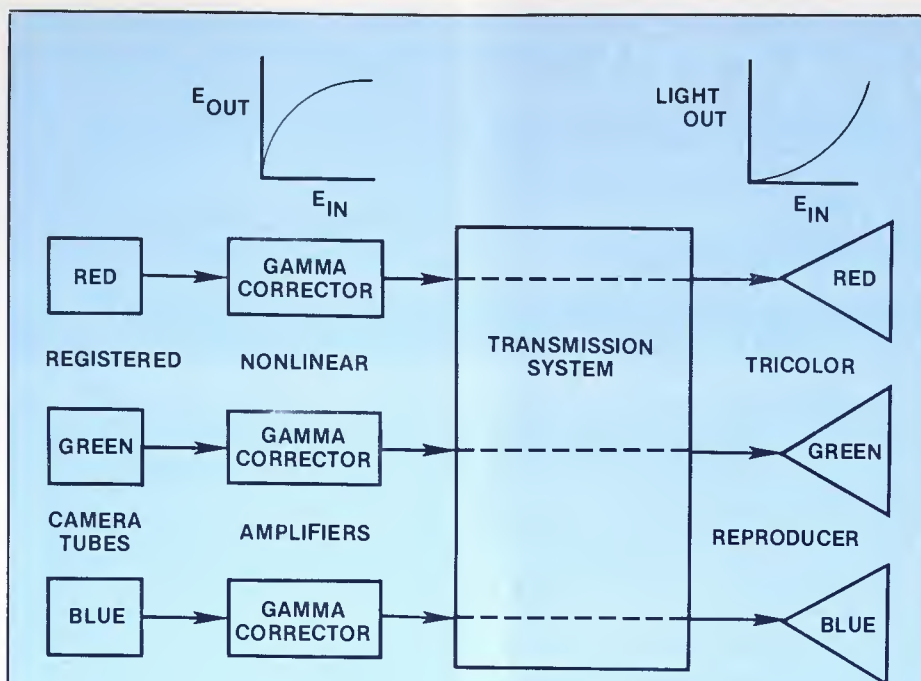


Figure 11. Broadcast-quality color video cameras contain a set of non-linear amplifiers (gamma correctors) inserted to achieve over-all linearity in the red, green and blue channels.

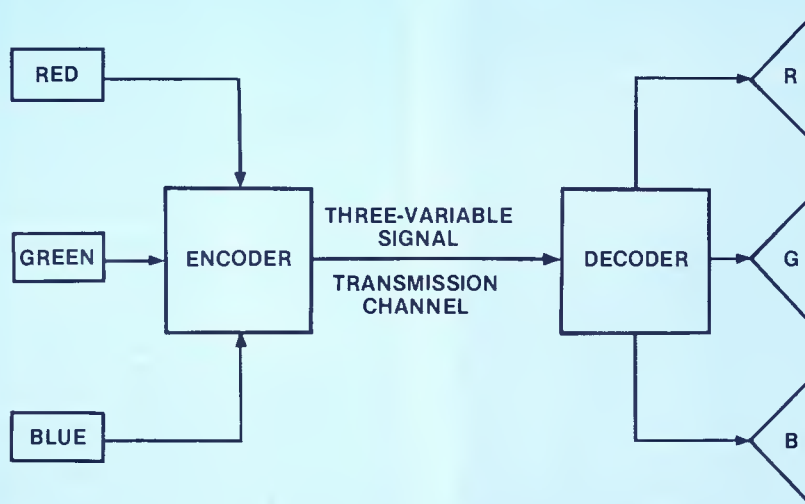


Figure 12. Encoding is required for the red, green and blue signals to provide a 3-variable signal that can be effectively broadcast over the single monochrome transmission channel.

Because of gamma correction, the M signal is only an approximation to a true luminance signal, but it is a sufficiently good approximation that this signal component is capable of producing good images on monochrome receivers. Note from the matrix equations (and the M waveform sketch in Figure 14) that the M signal is allowed to assume positive values only. This signal component is handled in most respects like an ordinary monochrome signal; that is, it is generated in accordance with the conventional scanning standards, it is combined with the standard synchronizing waveform, and it is modulated on a

carrier in a conventional TV transmitter.

I and Q signals

The I and Q signal components are known as *color-difference* or *chrominance* signals; they indicate how the color being transmitted differs from a white or neutral in two independent directions on a color diagram in which white is plotted at the center. The I signal conveys information pertaining to color differences in the orange to cyan (blue-green) direction, while the Q signal conveys information pertaining to color differences in the green to purple direction.

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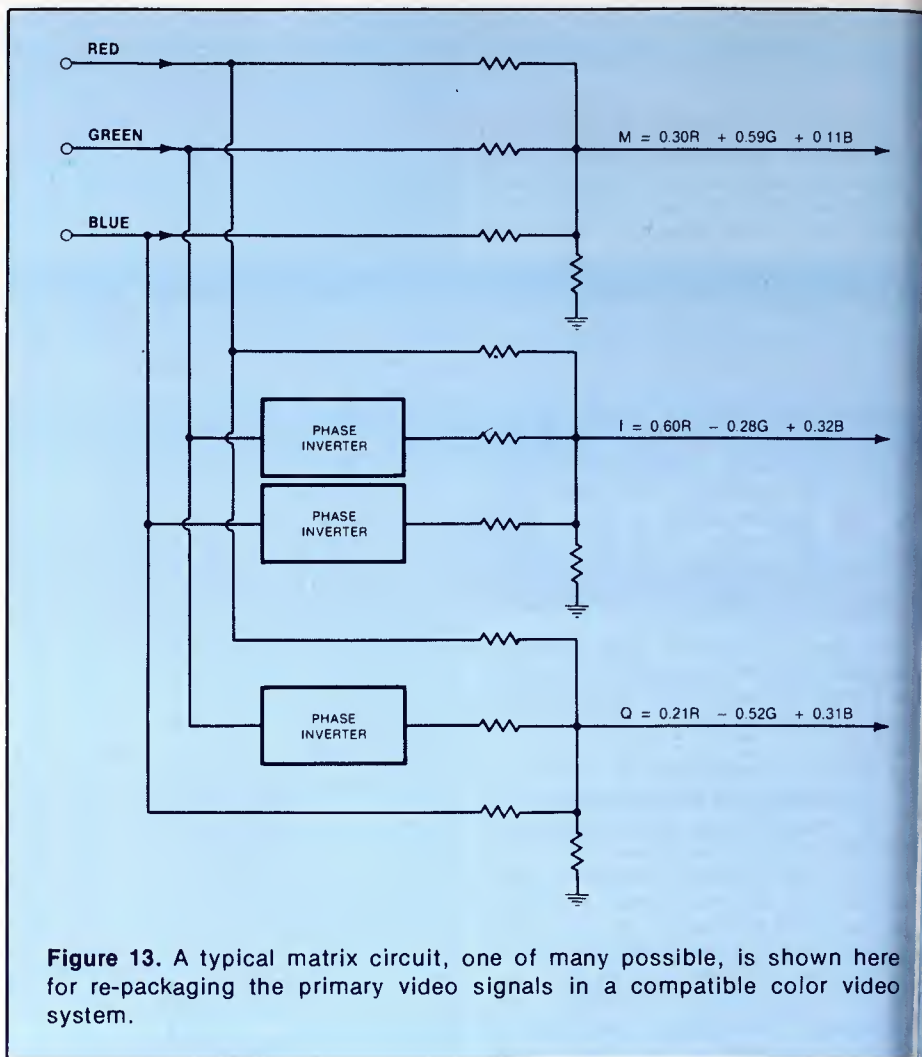


Figure 13. A typical matrix circuit, one of many possible, is shown here for re-packaging the primary video signals in a compatible color video system.

Color television

Because some of the coefficients are negative, the I and Q signals may swing either positive or negative, as indicated by the waveform sketches in Figure 14. Note that both I and Q go to zero when $R = G = B$, designating a white or neutral condition. This condition is illustrated by the white door in Figure 14. It is noteworthy that when a color television camera is pointed at a scene with no chrominance values (a monochrome test chart, for example), the I and Q signals automatically disappear

and the remaining signal (M) becomes truly identical to the output of a monochrome camera.

To recover red, green and blue signals suitable for the control of a tricolor reproducer, the M, I and Q signals are passed through a second matrix circuit in the color TV receiver which performs a cross-mixing operation that is the inverse of the original cross-mixing operation at the transmitting end of the system. The receiver matrix simply solves the set of three

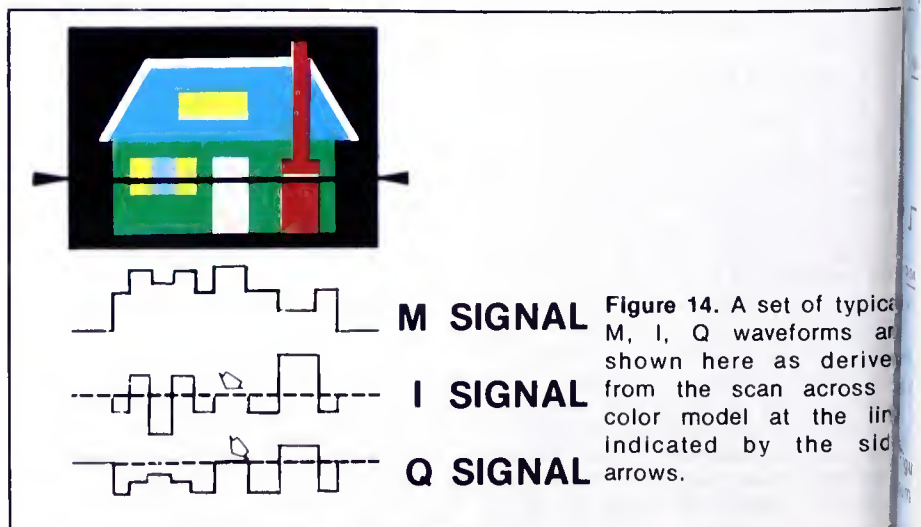


Figure 14. A set of typical M, I, Q waveforms are shown here as derived from the scan across color model at the line indicated by the side arrows.

GAMMA-CORRECTED SIGNAL INPUTS

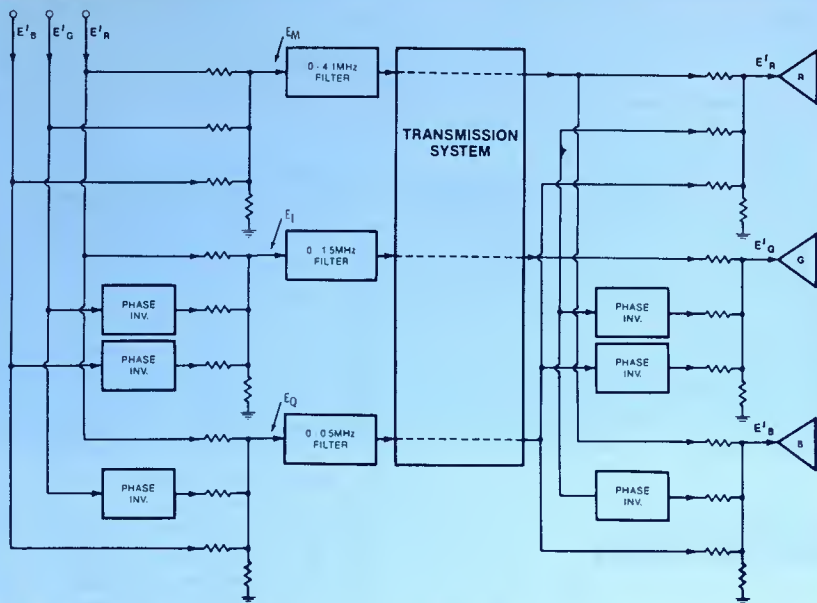


Figure 15. Typical compatible color video circuits are designed using the knowledge of the acuity of the human eye to adjust the bandwidths of the M, I, Q signals so that no more than the required information is transmitted.

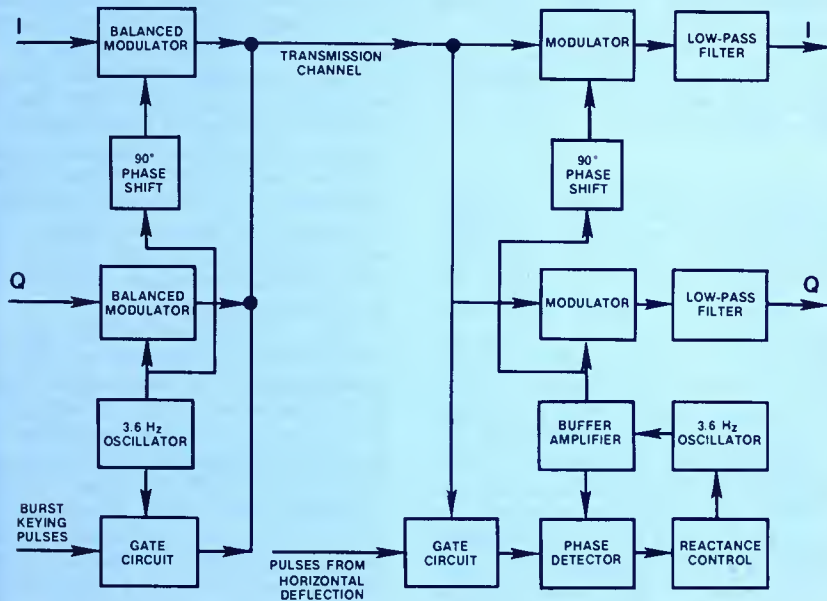


Figure 16. This block diagram shows the basic elements for transmission and reception of the I, Q and burst pulses.

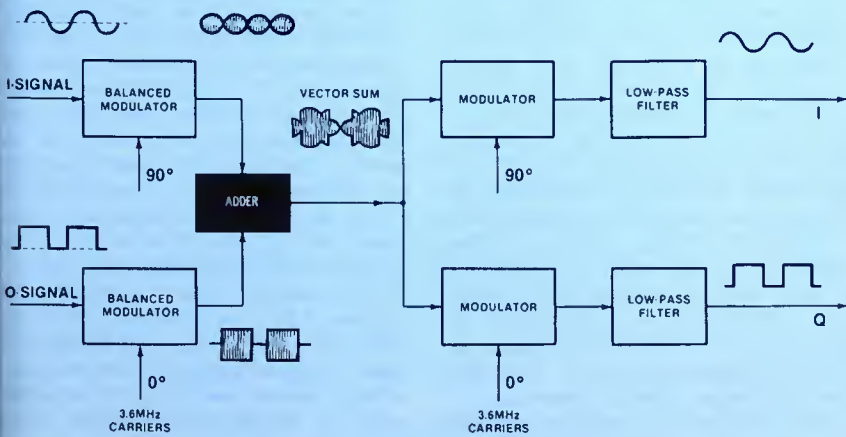


Figure 17. These waveforms represent the I and Q signals plus the vector sum of the suppressed carrier sidebands following the modulator.

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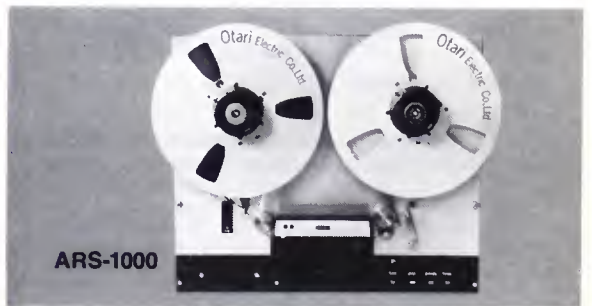
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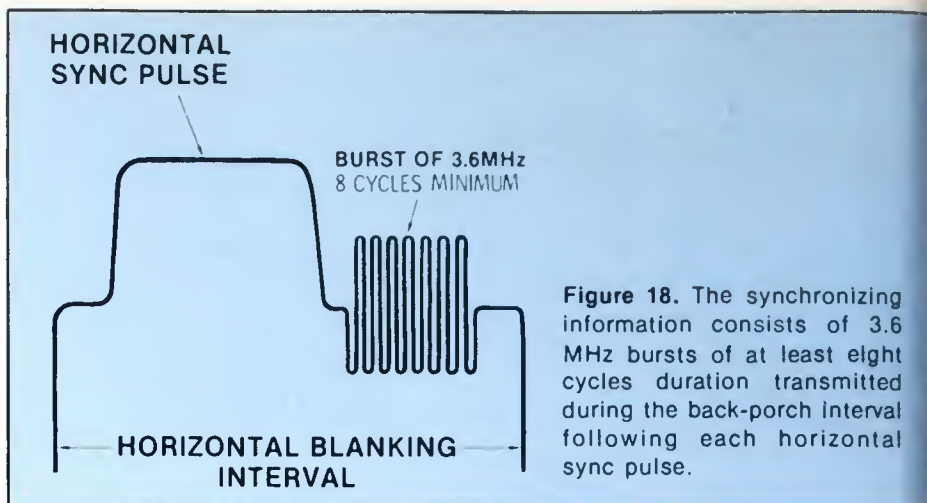


Figure 18. The synchronizing information consists of 3.6 MHz bursts of at least eight cycles duration transmitted during the back-porch interval following each horizontal sync pulse.

Color television

simultaneous equations used at the transmitter matrix to find the three unknowns: R', G' and B' as follows:

$$\begin{aligned} R' &= 1.00 M + 0.96 I + 0.62 Q \\ G' &= 1.00 M - 0.27 I - 0.65 Q \\ B' &= 1.00 M - 1.11 I + 1.70 Q \end{aligned}$$

Use of the matrixing or cross-mixing technique not only satisfies a basic compatibility requirement by providing a signal component nominally equivalent to an ordinary monochrome signal, but also results in two signal components whose bandwidths can be greatly restricted without significant loss of useful picture information. Studies of the acuity or resolving power of the human eye have shown the normal acuity for hue and saturation differences is much less than for brightness differences, and that acuity for color differences along a green-to-purple axis on a color diagram is considerably less than for color differences along an orange-to-cyan axis. This knowledge has been exploited by adjusting the bandwidths of the M, I and Q signals so as to transmit no more than the required amount of information in each case, as indicated by Figure 15.

The M signal component is transmitted with the standard 4.1 MHz bandwidth so that the luminance resolution in color images is nominally the same as for monochrome images. The bandwidth of the I component is limited to approximately 1.5 MHz, while that of the Q component is further restricted to only about 0.5 MHz. Although the resolution of the final color images is not great with respect to color differences, enough information is transmitted to produce perfectly satisfactory images at the normal viewing distance. The eye cannot perceive color differences in very fine detail, so it is pointless to use spectrum space to transmit high-resolution color difference information.

2-phase modulation
The 2-phase modulation technique

permits I and Q signals to be combined into a 2-variable signal for transmission over a single channel. This is accomplished by simple addition of the sidebands generated by the balanced modulation of two 3.6 MHz (nominal) carriers separated in phase by 90°. The resultant waveform is the vector sum of the two quadrature components. Basic elements of the transmitting and receiving system are shown in Figure 16. The two carriers, which are derived from the same oscillator, are suppressed by the balanced modulators.

Thus, only the two sets of amplitude modulated sidebands, 90° out of phase are transmitted. At the receiving end of the system, the I and Q signals are recovered by heterodyning the two phase wave against two locally-generated carriers of the same frequency but with a 90° phase separation, and applying the resultant signals through low-pass filters to the matrix circuits. The process is further illustrated by simple waveforms (distinctly different for the I and Q channels) in Figure 17.

The 3.6 MHz oscillator at the receiver must be accurately synchronized in frequency and phase with the master oscillator at the transmitter. The synchronizing information consists of 3.6 MHz bursts of at least 8 cycles duration transmitted during the back porch interval following each horizontal sync pulse as shown in Figure 18. The bursts are generated at the transmitter by gating circuit which is turned on by burst keying pulses derived from the synchronizing generator; the output of this circuit is simply added to the outputs of the two balanced modulators.

At the receiver, the two-phase modulated signal is applied to another gating circuit, known as a burst separator which is keyed on by pulses derived from the horizontal deflection circuit. The separated bursts are compared in phase detector with the output of the local 3.6 MHz oscillator. Any error voltage developed is applied through

smoothing filter to a reactance control device (such as varicap diode) which corrects the phase of the local oscillator.

FCC standard phase relationships between the I and Q signals and the color synchronizing burst are shown in the vector diagram of Figure 19. The I and Q signals are transmitted in phase quadrature, and the color burst is transmitted with an arbitrary 57° phase lead with respect to the I signal. Actually, this phase angle and the coefficients used in the basic I and Q equations are not quite as arbitrary as they might seem. These parameters were chosen in such a way that relatively low-cost receivers with chrominance bandwidth limited to 0.5 MHz can use simplified demodulator and matrix circuits. Demodulation along an axis exactly out of phase with the burst will yield a signal equivalent to 0.493 (B' - M), and demodulation along an axis exactly 90° behind burst phase will yield a signal equivalent to 0.877 (R' - M). These signals need only be adjusted in level and added directly to the M signal to yield B' and R' signals ready to be applied to the corresponding guns of the color kinescope. (A simple matrix is all that is needed to form the G' signal.)

2-phase modulated signal

Several interesting properties of the 2-phase modulated signal can be illustrated by vector diagrams which represent the resultant signal under known transmission conditions. For example, when a pure red color of maximum amplitude is being transmitted, the green and blue components are at zero and the I and Q signals have levels of 60% and 21%, respectively. (100% represents the full range between black and reference white in the accompanying M signal.) When modulated upon their respective carriers, these signals produce the resultant shown in Figure 20. The phase and amplitude shown is characteristic of pure red of maximum relative luminance.

Figure 21 is a composite vector diagram showing the phase and amplitude characteristics of all three primary colors and their one-to-one mixtures. This composite diagram indicates that there is a direct relationship between the phase of the resultant 2-phase modulated signal and the hue of the color being transmitted. There is also a relationship (although an indirect one) between the amplitude of the resultant signal and the saturation of the color being transmitted. If the phase of the resultant subcarrier and the level of the monochrome signal both remain constant, then a reduction in the amplitude of the subcarrier indicates a decrease in color saturation. The composite vector diagram also shows an interesting symmetry between complementary colors [colors are complementary if they produce a neutral when added together]. The resultant vectors for any two complementary colors are equal in amplitude but opposite in phase.

Frequency Interlace

Since the 3.6 MHz carriers, along

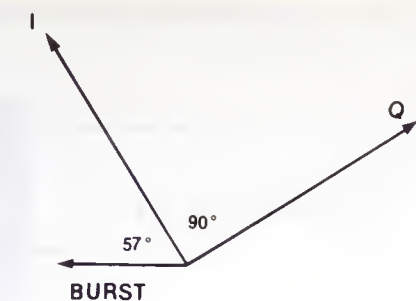


Figure 19. This vector diagram shows the phase relation of the I, Q and burst signals.

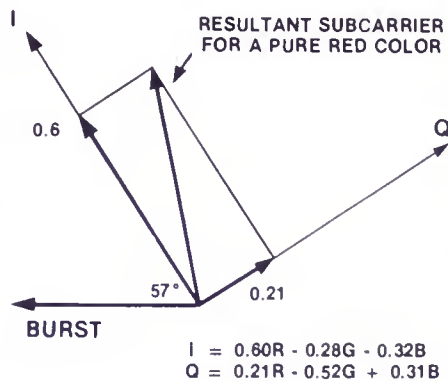


Figure 20. This vector diagram shows phase and amplitude relationship of the subcarrier for a pure red signal.

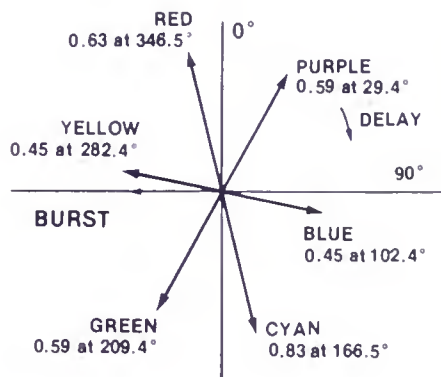


Figure 21. This is the composite vector diagram of subcarrier phase and amplitude for each of six video colors.

with their I and Q sidbands, fall within the 4.1 MHz video passband of the television channel (as shown in Figure 22), they are called subcarriers, and can be handled in many respects like unmodulated video signals. By use of frequency interlace, it is possible to add the several components of the chromi-

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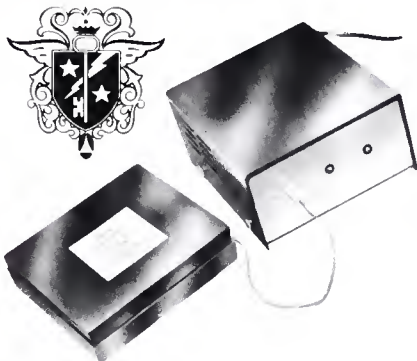
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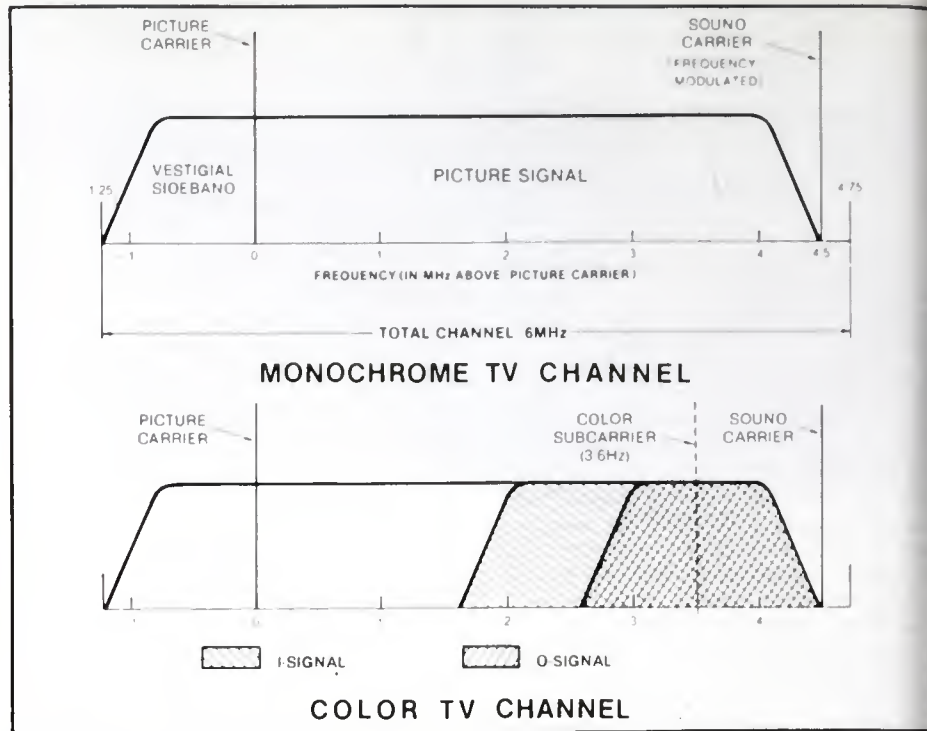


Figure 22. This diagram of the video channel shows portions occupied by monochrome and color signal components.

Color television

nance and luminance signals together without causing objectionable mutual interference.

Waveforms derived from a simple color image illustrate the practical significance of the straightforward addition of signal components made possible by frequency interlace. Figure 23 shows M, I and Q signals after the latter two have been band-limited and modulated upon 3.6 MHz subcarriers. Note that both the I and Q modulated waves are at zero during the scanning of the white door, a neutral area. The degraded rise and fall times of the I and Q modulation envelopes result from the band-limiting process.

Figure 24 shows the vector sum of the I and Q signals, and also the complete compatible color signal formed by combining all the components, including synchronizing pulses and color synchronizing bursts. A significant point about this signal is that it is capable of providing good service to monochrome receivers, even though a relatively high-level modulated wave has been added to the monochrome signal component. Although the modulated wave is clearly a spurious signal with respect to the operation of the kinescope in a monochrome receiver, its interference effects are not objectionable because of the application of the frequency interlace principle.

The frequency interlace technique is based on two factors: a precise choice of the color subcarrier frequency, and the familiar persistence-of-vision effect. By making the color subcarrier frequency an odd multiple of one-half the line frequency, its apparent polarity can be made to reverse between successive

scans of the same area in the picture. Since the eye responds to the average stimulation after two or more scans, the interference effect of the color subcarrier tends to be self-canceling, due to the periodic polarity reversals, as illustrated by Figure 25. In practice, the cancellation is less than perfect because of nonlinearity in the transfer characteristic of the kinescope, but the residual effect consists of the relatively harmless superimposition of an image-correlated dot pattern with dimensions roughly comparable to those in the familiar scanning pattern (and thus difficult to resolve at normal viewing distances).

The relationships among the various frequencies used in an NTSC compatible color system are shown in the block diagram of Figure 26. The actual frequency of the color subcarrier, which has been referred to as 3.6 MHz up to this point, is specified in the FC standards as 3.579545 MHz, or exact 455 times one-half the line frequency (The allowed tolerance on the subcarrier frequency is ± 10 Hz.) For color TV purposes, the horizontal and vertical scanning frequencies are lowered 1.01% relative to the older monochrome standards; this minor adjustment was made to minimize the visibility of spurious patterns in home receivers resulting from beats between the color subcarrier and the sound carrier receiver RF or IF stages.

Review of signal generation process

All major operations performed at the transmitting end of the system are shown in Figure 27. (For simplicity consider a single camera connected directly to a transmitter; in an actual

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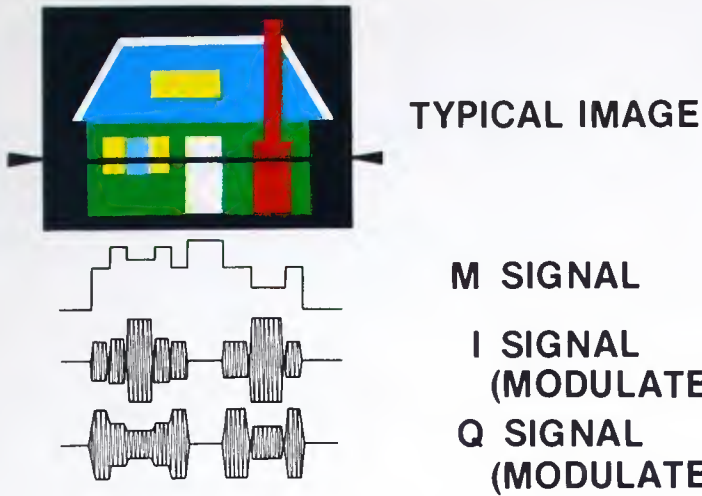


Figure 23. The waveforms for the M signal and modulated I and Q signals are shown here for a model color image along the line indicated by the side arrows.

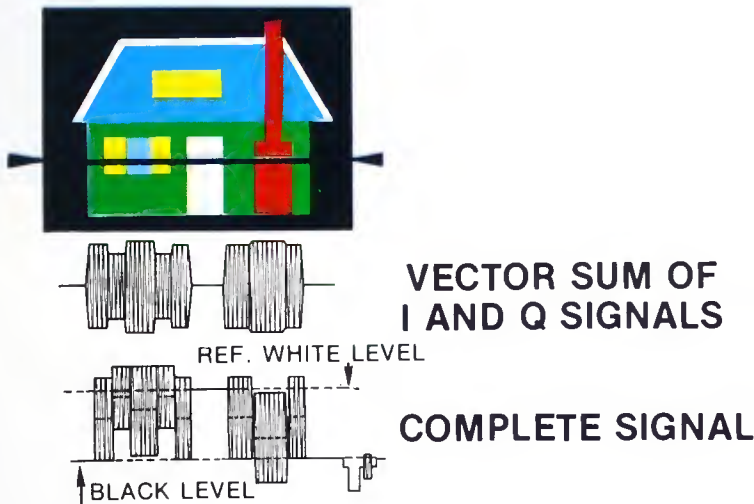


Figure 24. For the same color image as above, this sketch shows the vector sum of I and Q signals plus the composite waveform produced from the vector sum of all signal components.

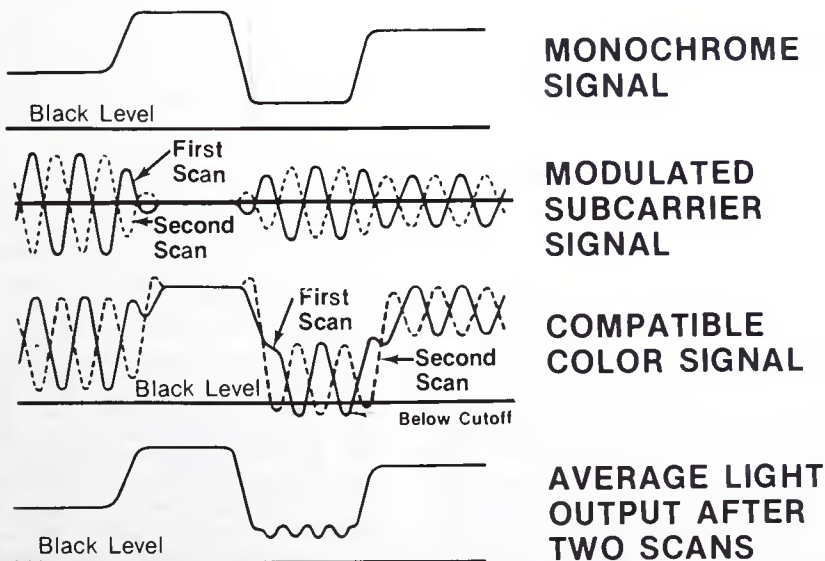
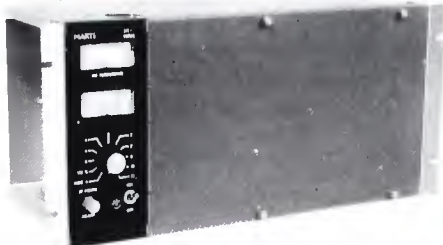


Figure 25. Superposition of modulated subcarrier on the scanning signals, the compatible color signal, and the effect of the subcarrier on average light output results in these waveforms.

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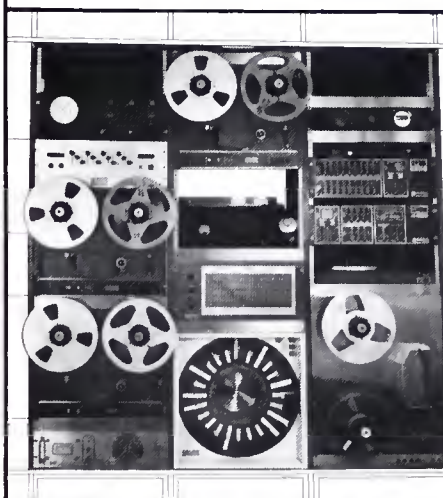
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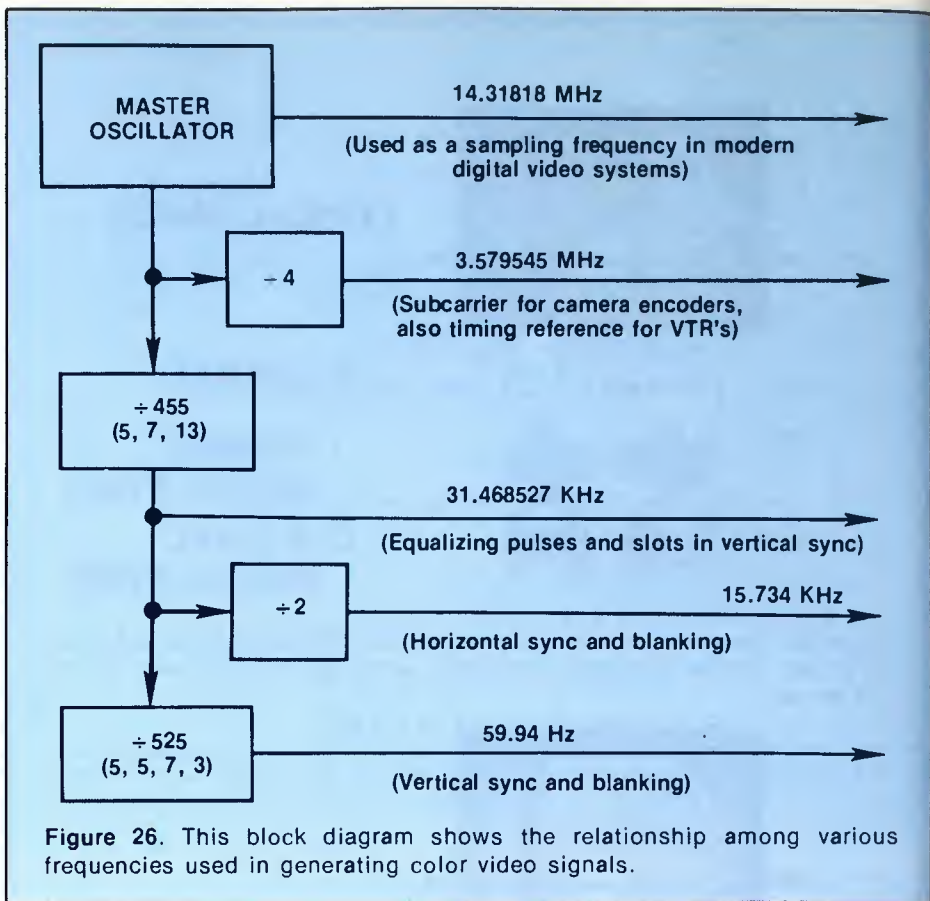


Figure 26. This block diagram shows the relationship among various frequencies used in generating color video signals.

Color television

studio plant there obviously would be multiple cameras, telecine and videotape equipment, and one or more video switching systems.) The camera contains three pickup tubes or other transducing elements which provide electrical signals corresponding to the red, green and blue components of the scene to be televised. These signals are passed through nonlinear amplifier stages (the gamma correctors) which provide compensation for the nonlinearity of the kinescope elements at the receiving end of the system.

The gamma-corrected signals are then matrixed or cross-mixed to produce a luminance signal (M) and two color-difference or chrominance signals (I and Q). In this particular circuit, one phase inverter is saved by forming -I instead of +I.

In the filter section (Figure 27), the bandwidths of the M, I and Q signals are established. The 4.1 MHz filter for the luminance channel is shown in dotted lines because, in practice, it is not necessary to insert a special filter to achieve this band-shaping. The bandwidth of the luminance signal is usually determined either by the attenuation characteristics of a broadcast transmitter (which must, of course, confine its radiation to the assigned broadcast channel) or by the limited bandwidth of a videotape recorder.

The bandwidths of 1.5 MHz and 0.5 MHz shown for the I and Q channels, respectively, are nominal only. The

required frequency response characteristics are described in more detail in the complete FCC Signal Specifications. Delay compensation is needed in the filter section to assure that all signal components are transmitted in time coincidence. In general, the delay time for relatively simple filter circuits of a given type varies inversely with the bandwidth—the narrower the bandwidth the greater the delay. Consequently, a delay network must be inserted in the I channel to provide the same overall delay introduced by the narrower-band filter in the Q channel, and still more delay must be inserted in the wide-band M channel.

In the modulator section, the I and Q signals are modulated upon two subcarriers of the same frequency but 90° apart in phase. The modulators must be of the doubly-balanced type, so that both the carriers and the original I and Q signals are suppressed, leaving only the sidebands. Some sort of keying circuit must be provided to produce the color synchronizing bursts during the horizontal blanking intervals. To comply with the FCC Signal Specifications, the phase of the burst should be 57° ahead of the I component or 147° ahead of the Q component. In this particular circuit, the I carrier is delayed with respect to Q (instead of the other way around) to compensate for the matrix circuit producing -I instead of +I. The burst flag signal is usually derived in a color sync generator from a combination of hori-

ontal and vertical pulses; the FCC standards require that burst signals be omitted for the 9-line period corresponding to equalizing pulses and vertical sync pulses.

In the mixer section, the M signal, the two subcarriers modulated by the I and chrominance signals, and the color synchronizing bursts are all added together. Provision also is made for the addition of standard synchronizing pulses, so that the output of the mixer section is a complete color television signal containing both picture and synchronizing information. This composite signal may then be put on-the-air through a conventional TV transmitter, although complex signal-handling systems are usually employed between the point of signal generation and the final transmitter.

Problems in handling color TV signals

The amount of handling which a color TV signal undergoes after leaving the colorplexer (or color encoder) depends upon the complexity of the broadcast or reproduction plant. In small operations, the signal may be sent only through a simple video switching system to a television tape recorder or transmitter. In more elaborate plants and in major networks, the signal must pass through a large number of distribution amplifiers, switchers, lengths of coaxial cable, stabilizing amplifiers, microwave delay links and possibly through several generations of video recording before it reaches the transmitter.

All of the equipment handling the color signal (including tape machines and transmitters) must be designed to operate within relatively narrow tolerance limits with respect to the following parameters:

Amplitude versus frequency. A change in response at the color subcarrier frequency relative to the lower frequencies causes an undesirable increase or decrease in the saturation of colors.

Envelope delay versus frequency. All signal components must arrive in time coincidence at the second detector of the receiver if certain edge effects or color smear effects are to be avoided. The FCC standards provide for envelope delay compensation at the transmitter or normal receiver errors in this respect.

Differential gain (subcarrier amplitude as a function of monochrome level). If an amplifier or other device compresses the signal in either the black or white region, there is a corresponding loss of color saturation in either the highlights or shadows.

Differential phase (subcarrier phase as a function of monochrome level). If subcarrier components transmitted near white level (corresponding to bright colors) are distorted in phase relative to those transmitted near black level (dark colors), there will be objectionable hue shifts as illumination conditions are varied in the televised scene.

Time base stability (a potential problem in tape machines). Because the color subcarrier system is phase-sensitive, jitter or other time-base instabili-

ties can lead to objectionable random variations in reproduced colors. As a practical matter, residual time-base errors must be reduced to about the 4-ns range.

• **Integrity of burst phase relative to chroma phase.** There are many types of processing amplifiers which regenerate the synchronizing portions of a composite color signal, including the color synchronizing bursts. It is essential that the phase of any regenerated burst be accurately re-established relative to the modulated I and Q signals, otherwise all colors are reproduced with improper hues.

The FCC standards do not specify performance requirements for each individual piece of studio equipment, but overall tolerance limits are placed on the signal as radiated. It is considered the manufacturer's responsibility to design equipment using no more than a fair share of the available tolerances.

During the early 1960s, much work was done in overseas laboratories to develop alternative techniques for encoding and decoding color television signals to reduce the requirements for extremely high fidelity in transmission and recording equipment, and two systems used in other parts of the world (known as PAL and SECAM systems) do incorporate some improvements in this respect. American experience has shown, however, that the problems of transmitting and recording NTSC color signals are not insoluble. The pioneering system of compatible color TV as utilized in the US continues to turn in a good account for itself even in comparison with the more-recently-developed alternative systems.

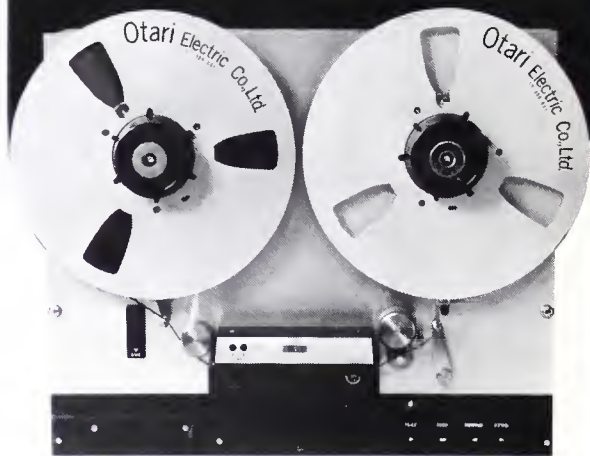
Decoding operations

A review of the decoding process used in color monitors and receivers to recover red, green and blue components from the composite color signal will complete this review. Consider a deluxe decoding arrangement designed to recover essentially all the information content of the signal; in practice, most monitors and receivers use simplified circuit arrangements which generally do not take advantage of the extra bandwidth of the I signal relative to the Q signal. A generalized block diagram for a deluxe color receiver is shown in Figure 28; a color monitor would use only that part of the circuit which follows the second detector.

In a compatible color TV receiver, the antenna, RF tuner, IF strip, audio channel and second detector serve the same functions as the corresponding components of a monochrome receiver. Up to the second detector the color receiver is no different from a monochrome receiver except that the tolerance limits on performance are somewhat tighter.

The signal from the second detector is utilized in four circuit branches. One circuit branch directs the complete signal toward the color kinescope, where it is used to control luminance by being applied to all kinescope guns in equal proportions. In the second channel, a band-pass filter passes only the

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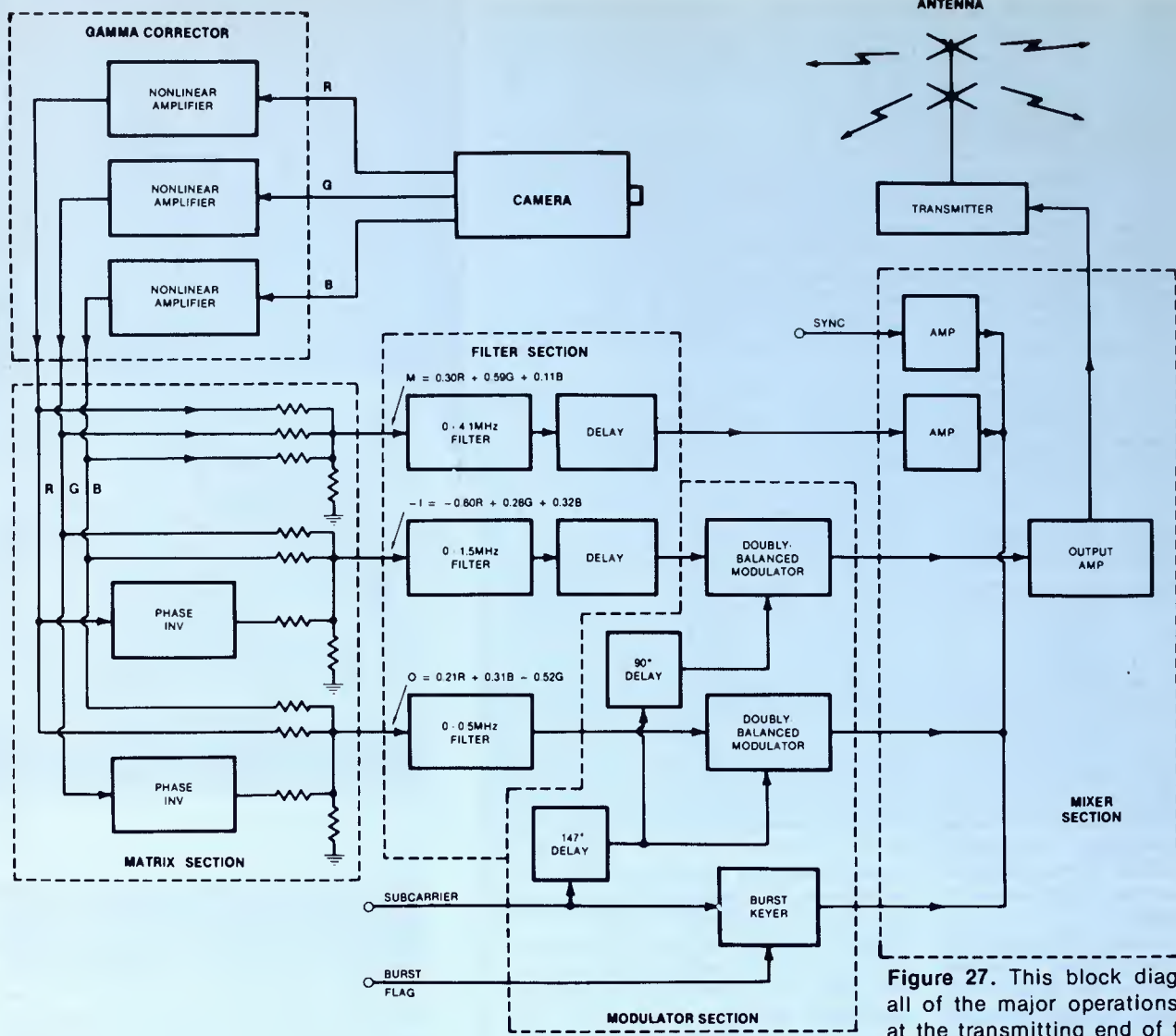


Figure 27. This block diagram shows all of the major operations performed at the transmitting end of the system.

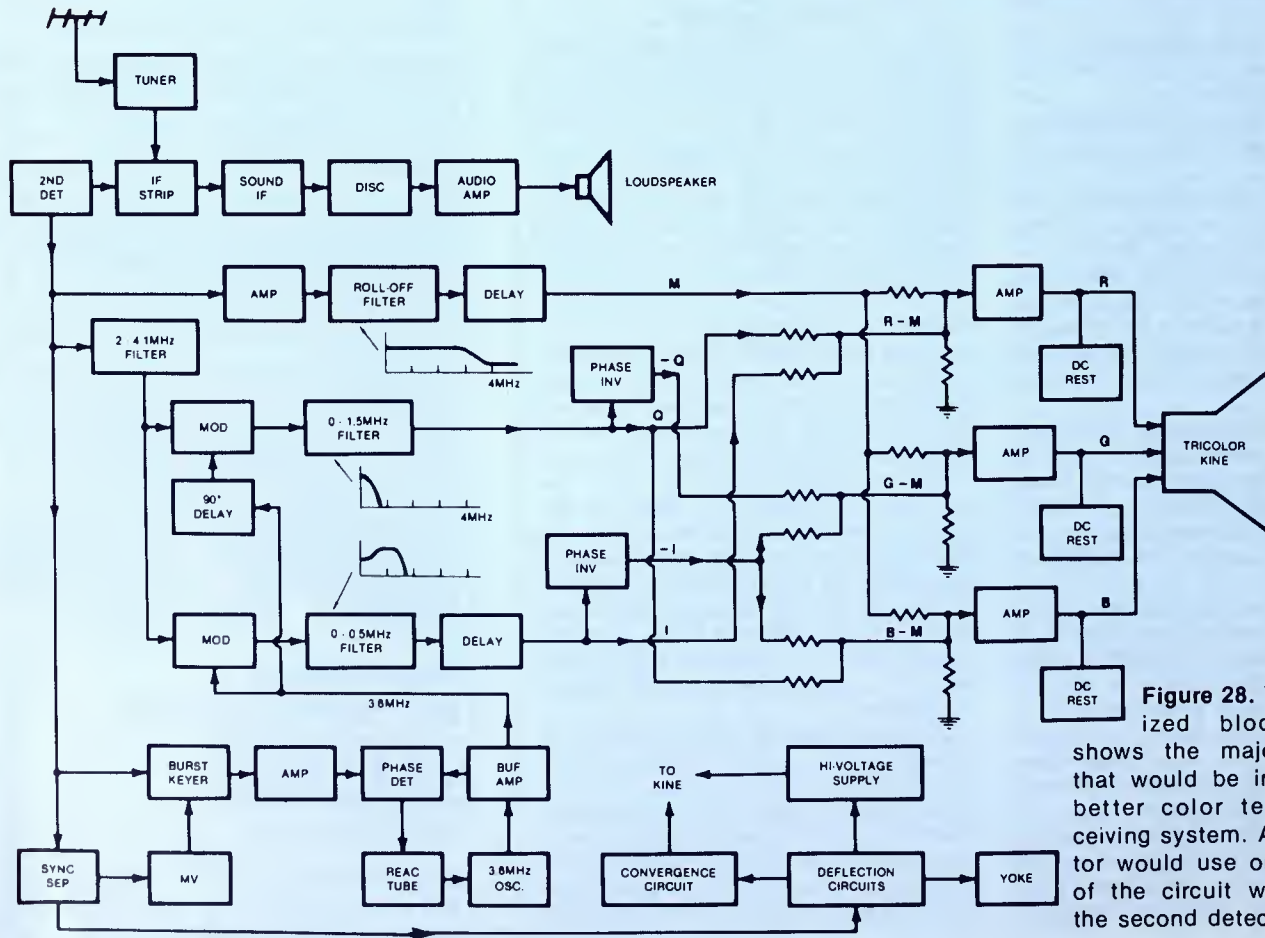


Figure 28. This generalized block diagram shows the major functions that would be included in a better color television receiving system. A color monitor would use only that part of the circuit which follows the second detector.

Color television

high-frequency components of the signal (roughly 2.0 to 4.1 MHz), consisting primarily of the two-phase modulated subcarrier signal. This signal is applied to a pair of modulators which function as synchronous detectors to recover the original I and Q signals.

It should be noted that those frequency components of the M signal falling between 2.0 and 4.1 MHz are also applied to the modulators, and are heterodyned down to lower frequencies. These frequency components do not cause objectionable interference, however, because they are frequency-interlaced and tend to cancel out through persistence of vision. It is quite possible, however, for high-frequency luminance patterns (such as might be encountered in tweed or striped fabrics) to produce false color effects.

The remaining two circuit branches at the output of the second detector make use of the timing or synchronizing information in the signal. A conventional sync separator is used to produce the pulses needed to control the horizontal and vertical deflection circuits, which are also conventional. The high voltage required to accelerate the beam in the kinescope is normally obtained from a flyback supply associated with the horizontal deflection circuit. Many color kinescopes require convergence signals to enable the scanning beams to coincide at the screen in all parts of the picture area; the waveforms required for this purpose are readily derived from the deflection circuits.

The final branch at the output of the second detector is the burst gate, which is turned on only for a brief interval following each horizontal sync pulse by means of a keying pulse. This pulse may be derived either from a multivibrator controlled by sync pulses (Figure 28) or from the flyback pulse produced by the horizontal deflection circuit. The separated bursts are amplified and compared in a phase detector with the output of a local subcarrier oscillator. Any error voltage developed by the phase detector is applied to the oscillator through a suitable reactance control element, thus causing the local oscillator to pull into precise synchronism with the incoming bursts. The absolute phase of the 3.6 MHz signal from the buffer amplifier is normally made adjustable to provide a HUE control for the color monitor or receiver. The phase-locked oscillator provides the reference carriers for the two synchronous detectors; a 90° phase shifter is necessary to delay the phase of the carrier applied to the I-modulator relative to that applied to the Q-modulator.

There is a filter section in the color monitor or receiver, roughly comparable to the filter section of the original encoder or colorplexer. The M, I and Q signals must be passed through filters in order to separate the desired signals from other frequency components which, if unimpeded, might cause spurious effects. The I and Q signals are passed through low-pass filters of nominally 1.5

and 0.5 MHz, respectively, just as at the transmitting end. A step-type characteristic is theoretically required for the I filter, as indicated by the spectrum sketch in Figure 28, to compensate for the loss of one sideband for all frequency components above about 0.5 MHz.

Actually, failure to provide this step characteristic results only in a slight loss in sharpness in the I channel. (As a practical matter, many mass-produced color receivers use no more than 0.5 MHz bandwidth for either I or Q.) A roll-off filter is needed in the M channel to attenuate the subcarrier signal before it reaches the kinescope. The subcarrier would tend to dilute the colors on the screen if it were permitted to appear at full amplitude on the kinescope grids or cathodes. Delay networks are needed to compensate for the different inherent delays of the three filters, as explained previously.

Following the filter section, there is a matrix section in which the M, I and Q signals are cross-mixed to recreate red, green and blue signals. The RGB signals at the receiver are not identical to those at the input of the encoding matrix because the higher frequency components are mixed, and are common to all three channels. This mixing is justifiable because the eye cannot perceive the fine detail (conveyed by these high-frequency components) in color.

There are many possible types of matrixing circuits; the resistance mixers shown provide one simple and reliable approach. For ease of analysis, the matrix operations at the receiver may be considered in two stages. The I and Q signals are first cross-mixed to produce R-M, G-M and B-M signals, which are in turn added to M to produce R, G, and B. Note that negative I and Q signals are needed in some cases.

In the output section of the receiver, the signals are amplified to the level necessary to drive the kinescope, and the dc component is restored. The complete, full-color image is then produced on the screen of the tricolor kinescope.

The block diagram of Figure 28 is intended only to illustrate the principles used in color receivers, and does not represent any specific model now on the market. Color receiver design engineers have shown great ingenuity in developing feedback stabilization techniques, in simplifying circuits, in combining functions, and in devising subtle variations in the basic processes which have made significant cost reductions possible while maintaining excellent picture fidelity.

The principles of compatible color television are now firmly established and confirmed by some 25 years of successful operation, but design engineers concerned with cameras, signal-handling equipment, video recording equipment and receivers continue to find opportunities for further refinements and advances in the application of the basic principles. □

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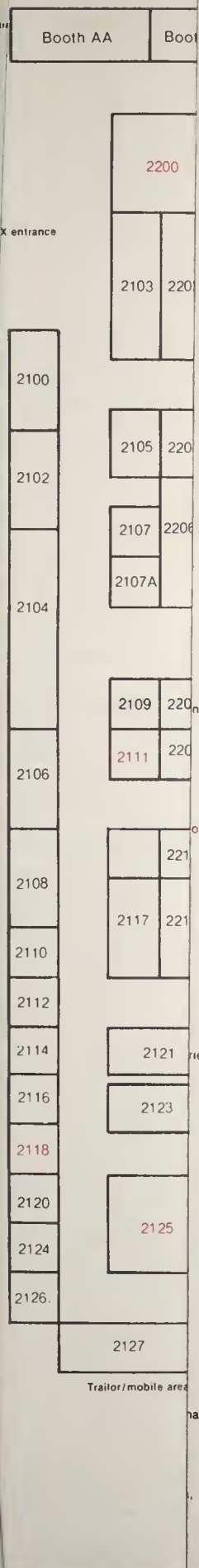
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If you're looking for a certain company, look them up in the exhibits roundup article (page 122). The exhibitors are listed alphabetically, and the information given includes the company's booth number and product line. (Or, use the alphabetical listing in this section.)

If you are looking for a particular product, look it up in the product directory (page 106). The products are listed alphabetically, with each company exhibiting that product listed underneath (along with booth numbers).

Suppose the company you're looking for is booth 2313. Fold out the exhibit floor plan and find Level II, aisle 2300. Then find the company on that aisle. Looking at the floor plan will give you an idea of where the company is located in the particular aisle. Mark the company, so when you use this guide in the Convention Center, you'll know just where to go.

The companies on the floor plan marked with a star (★) are exhibitors who advertised in this issue. As you read this issue, mark the exhibitors you'll want to see at the convention.

Mapping out your plan of attack now will give you time at the convention. And, with only four days to see over 320 exhibits, you'll want to plan to save as many steps as possible!

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Convention Agenda

Monday, March 25

5 PM—Opening Joint Engineering/Management Meeting (*Entertainment*)

Monday, March 25

5 PM—Opening Joint Engineering/Management Meeting (*Entertainment*)

Monday, March 26

RADIO ENGINEERING SESSIONS

10:30 AM—Workshop: *Audio Processing, Test, Measurement and Monitoring*

30 AM-NOON—Workshop: *Engineering Principles of Communications Satellite Systems*

30 PM-2:30 PM—Engineering Luncheon

30 PM-3 PM—Paper: *Adapting AM Transmitters for Stereo Transmission*

M-4 PM—Workshop: *AM-FM Receivers: The Manufacturer's Viewpoint*

M-5 PM—Workshop: *AM Stereo Broadcasting*

M-6 PM—Amateur Radio Operators Reception

TELEVISION ENGINEERING SESSIONS

10 AM-10:30 AM—Workshop: *1-Inch Videotape*

30 AM-NOON—Workshop: *Teletext, Closed Captioning and Other Television Ancillary Signals*

30 PM-2:30 PM—Engineering Luncheon

30 PM-4 PM—Workshop: *Television Blanketing Progress Report*

M-4:30 PM—Paper: *The CBS Blanking Width Corrector*

30 PM-5 PM—Paper: *The TK-47 Auto-Camera*

M-6 PM—Amateur Radio Operators Reception

RADIO MANAGEMENT SESSIONS

30 AM-11:45 AM—Workshops:
The New Breed, Retail Sales Developers: Do More Back Room for Retail;
The Co-optimist: Telling You How to Make Big in Coops, Even if Your Sales Staff is Small;
Next Time We Build One of These... That Automation Unit has More Personality Than My Morning DJ;
The 96th Congress and Radio

NOON-1:15 PM—Workshops:
New Rate Cards that Control Inventory and Maximize Revenue;
The New ASCAP/BMI Per Program License

Option;
Radio Research: You Can't Tell the Players Without a Scorecard;
It Can't be 5 O'clock Already;
"My FM Subcarrier Bills More Than My FM Station;"
What's the FCC's 'Violation Hot Button' for Radio in 1979?

TELEVISION MANAGEMENT SESSIONS

9:30 AM-11 AM—Workshop: *Information Odyssey: Television '79*

11:15 AM-12:15 PM—Workshops:
Creative Selling in 100 Plus Markets;
How to Use Research to Improve Your News;
Living with Wage and Price Guidelines;
Localism... Options for Tomorrow;
The Retransmission Concept: Is it the Answer?

3 PM-3:30 PM—In the Box (debate):
Resolved: Television Stations Should Not Pay Substantial Spectrum Fees

3:30 PM-4:30 PM—Workshop: *More Effective Communication through TV Commercials*

4:30 PM-5:30 PM—Workshops:
Cable Copyright Royalties;
How to Get Good Sales People, Train Them and Keep Them;
The Role of the GM in Union Negotiations;
Successful Personnel Recruiting and Selection within EEO Guidelines

Tuesday, March 27

RADIO ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: *Audiocassette, Cartridge and Reel-to-Reel Tape: Performance, Measurement and Standards*

10:30 AM-11 AM—Paper: *Microprocessor-Based Cartridge with Open Reel Quality*

11 AM-NOON—Workshop: *The Absence of Radiation Hazards in Broadcasting*

12:30 PM-2:30 PM—Engineering Luncheon (1979 Engineering Achievement Award to be presented to Robert W. Flanders of McGraw-Hill Broadcasting Company)

TELEVISION ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: *Digital Editing and Special Effects for Television: 1979 Update*

10:30 AM-11 AM—Paper: *Replacement of Slow Motion with 1-Inch Tape*

11 AM-NOON—(see radio engineering session)

12:30 PM-2:30 PM—(see radio engineering note on luncheon)

RADIO MANAGEMENT SESSIONS

9:30 AM-10 AM—Speech: *State of the Sales*

10 AM-11 AM—Speech: *Saying it with Humor*

11 AM-NOON—Panel: *FCC*

2:30 PM-3:45 PM—Workshops:
Last Newspaper Declares Bankruptcy

Promoting 'The World's Greatest Radio Station' in the Small Market.
Promoting 'The World's Greatest Radio Station' in the Medium/Large Markets;
National Farm \$\$\$ in Small Markets? You Bet!;
Birth of a Radio Jingle, Part 1;

4 PM-5:15 PM—Workshops:
Birth of a Radio Jingle, Part 2;
"If Business is so Good, How Come There's Nothing in the Checking Account?";
"Whatever Happened to Old What's-His-Name?";
Formats—An Executive Session for Radio Managers Who Also Wear a Program Director's Hat;
Community Involvement Can Increase Your Numbers

TELEVISION MANAGEMENT SESSIONS

9 AM-11:30 AM—Workshop: *UHF: The Quest for Parity and Second Class Status, First Class Results*

9:30 AM-10:30 AM—Workshops:
Update: FCC Rules and Policies You Must Know;
Is There Room at the Top? A Second Look;
The Managerial Woman

10:30 AM-11:30 AM—Workshops:
The Use of Investigative Teams in TV News;
The 96th Congress and TV;
How Good are Television Ratings?

11:30 AM-NOON—In the Box (debate):
Resolved: The FTC Should Regulate Children's Television Advertising

NOON-12:05 PM—Workshop: *And What Do Parents Think?*

12:05 PM-1:15 PM—Networks,
Superstations and You

Wednesday, March 28

RADIO ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: *Building New Radio Studio Facilities: Planning, Contracting and Purchasing*

10:30 AM-11 AM—Paper: *A Fresh Look at Directional Antenna Phasors*

11 AM-NOON—Joint meeting of Radio, Engineering and Television groups

NOON-2 PM—Closing joint Engineering/Management Luncheon (*Entertainment*)

TELEVISION ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: *Broadcast Tall Towers: An Aeronautical Hazard?*

10:30 AM-11 AM—Paper: *Engineering Preparations for the 1980 Olympics*

11 AM-NOON—Joint meeting of Radio, Engineering and Television groups

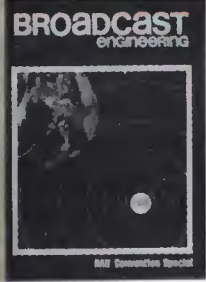
NOON-2 PM—Closing Joint Engineering/Management Luncheon (*Entertainment*)

GENERAL SESSIONS

See Engineering sessions from 11 AM until closing

NAB-DALLAS '79

Texas hosts biggest & best show yet



Texans like to boast that their state produces the biggest and the best. The NAB show at the Dallas Convention Center March 25-28 promises to give full credence to that boast. Anticipation and excitement already are running at an all-time high, with more than 320 exhibitors and more than 2100 paid

More than 320 exhibitors

pre-registered participants at presstime. And the count continues. All indicators point toward an outstanding 57th Annual Convention and International Exposition of the National Association of Broadcasters.

Again this year, the convention is divided into three sets of meetings: Radio (Management), Television (Management) and the Broadcast Engineering Conference. The meetings will run concurrently and registrants may attend any sessions. To make the choices even more difficult, the engineering conference workshops are divided into radio and television engineering (except where disciplines overlap). Obviously, some careful planning should be done before the convention to select the most critical workshops. (See *Planning convention strategy*, page 96.)

A joint opening session begins the convention Sunday with welcoming words by NAB board chairman Donald Thurston. The Distinguished Service Award will be presented (more on this later) and NAB

president Vince Wasilewski will speak on *Broadcasting: The Year Ahead*.

Joint sessions

NAB executive vice president and general counsel Erwin Krawnow will moderate a joint session Tuesday called *Gomes Broadcasters Ploy*. Be there to find out what the FCC rules are on running promotions and contests.

The legendary *Roone Arledge*, ABC News and Sports president, will moderate a panel discussion Wednesday on *Sports and Broadcasting: Where are We Headed?* Baseball commissioner *Bowie Kuhn*, NFL commissioner *Pete Rozelle* and NBA commissioner *Lawrence F. O'Brien* are among the panelists who will examine the future of sports in radio and TV. They, along with other panelists to be announced later, are expected to field questions from the floor.

More than 2100 paid pre-registered delegates

Also on Wednesday, Senator *Ernest Hollings*, chairman of the Senate Subcommittee on Communications, will share his ideas on renovating the Communications Act, rather than replacing it. He also will speak on other Washington issues affecting broadcasters.

Charles D. Ferris, chairman of the FCC, will be at the closing general assembly on Wednesday. He will

(Photograph courtesy of Dallas Chamber of Commerce)



Best show yet

address the convention, presenting not only a rare opportunity to see and hear the man who has so much influence over the industry, but to question him also. He will participate in a question and answer session with convention delegates.

A closing luncheon (Wednesday also) will feature comedian Bill Cosby and other top entertainers. Tickets for this event are expected to go fast.

Jack Anderson, investigative reporter and Washington bureau chief of *Parade* magazine, will address the radio luncheon on Tuesday. Anderson is noted for his news breaks concerning US military intervention in the Middle East and of major Watergate stories. He is heard daily on the Mutual Radio Network and does a daily commentary on *Good Morning America*.

Electronic supermarket

Billed as the "biggest display of broadcasting equipment in the world," the exhibition area will contain acres upon acres of equipment (more than 140,000 sq ft). The foldout map on page 97 should aid travelers in finding their way through the maze. Exhibit hours are 10 AM to 6 PM Sunday through Tuesday; 10 AM to 5 PM Wednesday.

But don't stop with just noting the booths to visit.

World's largest broadcast equipment display

Many suppliers have chosen to use hospitality suites instead of or in addition to booths for discussing their products and services. Insofar as possible, **BE** also has provided a guide to these suites under the section *NAB-Dallas '79: Exhibits roundup*, page 122. The

Hyatt Regency, Dallas Hilton and Fairmont have been designated radio hotels; the Loews Anatole and Marriott have been designated television hotels.

Awards

The NAB's 1979 Distinguished Service Award, the industry's highest honor, will be presented to Jack Harris, president of KPRC and KPRC-TV of Houston, TX, and executive vice president of the Houston Post Company, at the opening session. The selection was made by the 1979 Convention Committee during the NAB's semi-annual Board of Directors' meeting.

As a leader of broadcast industry affairs on the national scene, Harris has served on NAB's board of directors, the Broadcast Advisory Board of the Armed Services, the Executive Reserve and was a member of the Advisory Board to the US Information Service. For five years he was chairman of NBC's Television Board of Delegates. He also has served as president of the Association of Maximum Service Telecasters.

The award, established in 1953, is presented to a broadcaster who has made "a significant and lasting contribution to the American system of broadcasting."

Spouse special and tours

"The Mate's Place," a complete where-to-go, what-to-do information center, will be open daily during the convention. Special Monday and Tuesday morning sessions will be conducted so that spouses can participate in lively, broadcast-related sessions.

The Dallas Convention and Visitors Bureau has a packet of information available for those interested in tours. Contact the Dallas Chamber of Commerce, 1507 Pacific Ave., Dallas, TX 75201; (214) 651-1020. □

Planning convention strategy

This year's NAB convention issue of **Broadcast Engineering** has been designed to make those few hours in Dallas profitable, fun and free of the anxiety of missing something. A little pre-planning never hurts efficiency, and these simple guidelines for using this issue will help in accomplishing the maximum in that minimum amount of time.

- First, turn to the foldout section *NAB-Dallas '79: Exhibitor map & session agendas* on page 97 for help in scheduling sessions and workshops in radio and television management and engineering. The offerings are excellent this year and the choices will be difficult.

- Next, map out a plan of attack to the exhibit booths. Check the section *NAB-Dallas '79: Product directory* on page 106 for equipment categories to be exhibited. Each category is followed by a list of organizations (and their booth numbers) which are showing products in that category.

- The next section, *NAB-Dallas '79: Exhibits roundup*, on page 122, lists each exhibiting company alphabetically, followed by product categories to be shown, booth number, hospitality suite (if the information is available at press-time) and on what page the company is advertising in this issue. If the company is an advertiser, the ad almost certainly will give more information on the product(s) the company is exhibiting.

- For even more information on the newest technology and equipment being exhibited, turn to *NAB-Dallas '79: Innovative products* on page 176. This section previews products to be introduced from manufacturer-supplied data. For more information on any of these items, circle the appropriate number on the tear-out Reader Service Card in the back of the magazine. (Of course, many companies chose to keep

their newest products a secret until the convention. Look for descriptions of these in the June, 1979, issue of **Broadcast Engineering**.)

- With all of this information in hand (the booth numbers and hospitality suite hotels to visit, the equipment to be seen), turn back to the foldout exhibit floor plan of the Dallas Convention Center. Booths 300-400-500- are on Level III; booths numbered in the 2000-range are on Level II. Mark the companies on the map and take it to the convention center. It will then be possible to whiz around the convention with such efficiency that other less-prepared registrants will gaze on in envy and wonder.

But alas, even the best-laid pre-planning sometimes goes awry. So, extra copies of this issue will be available at the convention (for those who left theirs at home), as well as plenty of up-dated exhibit maps. □

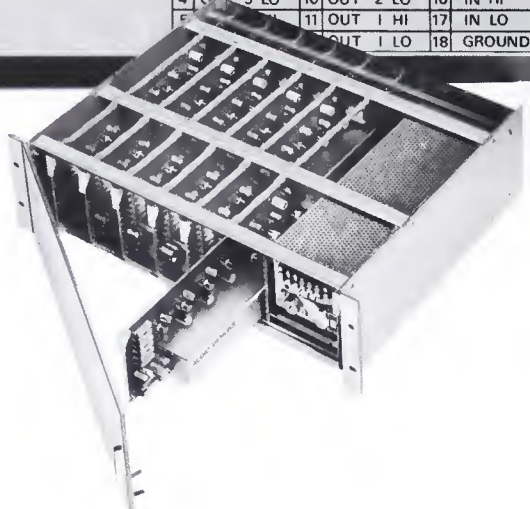


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and Manufacturing Inc.

DA-16A

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1	OUT 6 HI	7	OUT 3 HI	13	CENT. TAP
2	OUT 6 LO	8	OUT 3 LO	14	+20
3	OUT 5 HI	9	OUT 2 HI	15	-20
4	OUT 5 LO	10	OUT 2 LO	16	IN HI
5	OUT 4 HI	11	OUT 1 HI	17	IN LO
6	OUT 4 LO	12	OUT 1 LO	18	GROUND



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The DA16/CH20 is the broadcaster's answer to audio distribution. It offers a *unique* and *versatile* solution to this age-old problem.

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adjustments and individual test points for both power and audio.

- The CH20 rack frame has redundant power supplies with automatic changeover.
- The DA16/CH20 system is designed and built to demanding Audio Designs and Manufacturing quality standards.

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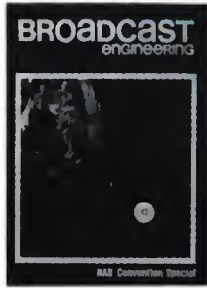
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NAB-DALLAS '79



Product directory

This section of this special convention issue is new this year. It is a directory of products to be exhibited and is designed to help the NAB participant even more.

Each product category (drawn from manufacturers' data and the September **BE** Buyers Guide) is followed by companies exhibiting that product along with their booth numbers. Because information from several companies was not available at presstime, this directory cannot claim to be comprehensive. But it will give you a good start on planning your exhibit booth visits.

Suppose, for example, that your station is in the market for a new routing switcher. Just look up "Switchers, routing" in the directory and you will find a list of companies exhibiting that product and their booth numbers. If you will mark the booth numbers of interest on the Exhibit Map in this issue, you'll be certain not to miss any companies exhibiting products you want to see.

Amplifiers, pre-amps

American Data, 312
Audio Designs & Mfg., 414
Audio & Design Rec, 2215
Automated Processes, 373
Channelmatic, 2517
Coherent Comm., 2115
Crosspoint Latch, 2801
Datametrics, 2813
Di-Tech, 2403
Dynair Elec., 368
Dynasciences, 497
Edco Products, 359
Grass Valley, 308
Gregg Lab., 2118
Inovonics, 2103
LPB, 383
Leitch Video, 561
Logitek, 2111
Marconi Elec., 322
Marti Elec., 349
Micro-Trak, 391
McCurdy, 321
McMartin, 317
QRK, 389
QSI, 2800
Ramko, 409
Russco Electronics, 427
Shure, 371
Technics-Panasonic, 481
Telemation, 342
Telemet, 333
Television Technology, 2306
Telex Comm., 357
United Research, 375

Versa-Count, 2120
Video Aids of CO, 553
Ward-Beck, 489

Analyzers, audio & video

Glentronix, 2609
Inovonics, 2103
Marconi Elec., 322
Philips, 314
Potomac, 377

Animation (equip., facilities)

Computer Image, 457
Eigen Video, 557
Interand, 2703

Antenna systems & hardware

Allen Gordon Ent., 2501
Andrew Corp., 360
Bogner, 2202
Cablewave, 381
CSP, 542
Cetec Brdcst., 307
Delta Electronics, 365
Farinon, 374
Jampro-Cetec, 499
Harris Corp., 303
Micro Communication, 513
Micro-Trak Corp., 391

Nurad, 533
Phelps Dodge, 353
RCA, 300
Rockwell Interntl., 2800

Antennas (earth station & equip.)

Andrews Corp., 360
Channelmatic, 2517
RCA, 300B
Scientific-Atlanta, 477

ATS & equip.

CCA, 305
Delta Electronics, 365
Logitek, 2111
Marti Elec., 349
Micro Control Assoc., 311A
Potomac, 377
QEI, 435

Automation equipment, audio

Automated Brdcst., 311
Automated Processes, 373
Broadcast Elec., 309
Consolidated Elec., 311
Cetec Brdcst., 307
Channelmatic, 2517
Data Comm., 339

Hallikainen & Friends, 2312
Harris, 303
IGM/NTI, 343
Interntl. Tapetronics, 319
MCI, 401
Sono-Mag, 397
Vital, 316

Automation equipment, video

Automated Brdcst., 311
Channelmatic, 2517
Dynair Elec., 368
Grass Valley, 308
Hallikainen & Friends, 2312
Vital, 316

Automation systems, business

Automated Brdcst., 311
Automated Business Concepts, 545
Automation Elec., 2208
Bloomington Brdcstg., 2308
Bonneville Data, 2206A
Broadcast Elec., 309
Data Comm. Corp., 339
Hallikainen & Friends, 2312
IGM/NTI, 343
QSI, 2800
Station Business Sys., 327
Vital, 316

See us at
Booth 2411
NAB

WHEN YOU THINK OF THE LEGENDARY AMPEX VR-1200's AND VR-2000's THINK OF AFA...

We're keeping the legend alive!

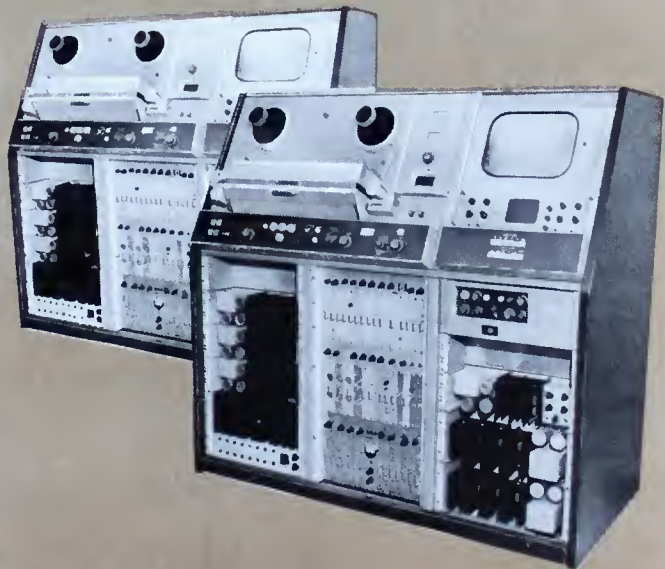
AMPEX VR-2000's and VR-1200's are the stuff legends are made of. . . they're the best. So if you can't afford a New VTR. . . consider owning a "pre-owned" legendary AMPEX VTR instead.

Our customers, including TV Stations, Manufacturers, Institutions, TV and Film Production facilities have purchased \$8 million in AMPEX VR-2000's; VR-1200's AVR-1's, HS-200's and paid only half that price. They know they're still getting the best in VTR's.

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Schneider

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over the
world



TV Lenses for 1 1/4" Plumbicon Cameras

TV 11 x Studio/OB	2.1/18-200
TV 13 x Studio	2.1/18-235
TV 15 x Wide Angle	2.1/16-240
TV 30 x Standard	2.1/20-600
TV 30 x Wide Angle	2.1/16-480
TV 30 x Tele/OB	2.1/33-1000

TV Lenses for 1" Plumbicon Cameras

TV 10 x Studio	2 /17-170
TV 11 x Studio/OB	1.7/14-150
TV 13 x Studio	1.7/14.5-190
TV 15 x Wide Angle	1.7/12.5-190
TV 20 x Special	2 /17-340
TV 30 x Standard	1.7/16-480
TV 30 x Wide Angle	1.7/12.5-375
TV 30 x Tele/OB	1.7/26-800

TV Lenses for ENG/EFP Cameras

TV 10 x Standard ENG/EFP	1.8/10-100
TV 15 x Wide Angle ENG/EFP	1.7/8.5-125
TV 15 x Tele ENG/EFP	1.7/16-240
TV 20 x Standard EFP	1.4/12-240
TV 30 x Standard EFP	1.4/11-330
TV 30 x Wide Angle EFP	1.4/8.7-260
TV 30 x Tele EFP	1.4/18.5-550

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Fed. Rep. Germany
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Telex 0422 800



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Product directory: Ba-Ch

Battery packs & chargers

Anton/Bauer, 2121
Christie Elec., 2600
Cine 60, 2700
Frezzolini Elec., 2415
Perrott, 2704

Broadcast loggers

Broadcast Elec., 309
Cetec Brdcst., 307
Dynair Elec., 368
Hallikainen & Friends, 2312
IGM/NTI, 343
QSI, 2800
Scully, 355
T & FT, 341

Cabinets, cases & racks

Anvil Cases, 2507
Cases, 2105
Fidelipac, 351
Research Tech., 539
Winsted, 2601

Cable (coaxial & audio)

Andrew, 360
Cablewave Systems, 381
Comrex Corp., 541
Phelps Dodge, 353
SWR, 2702
Telemet, 333
Trompeter, 511

Camera dollies, stands, tripods, heads

Camera Mart, 555
Innovative Television
Equip., 388
Listec, 465
O'Connor Eng., 2500
Quick-Set, 495
Television Products, 465

Camera stabilizing systems

Cinema Products, 2217

Cameras, color ENG/EFP

Ampex, 301
Asaca, 2502
Bosch Fernseh, 330
Camera Mart, 555
Cinema Products, 2217
Commercial Elec., 398
IVC, 346
Ikegami, 406
JVC, 408
Marconi, 322
NEC America, 2404
Panasonic, 483
Phillips, 314
RCA, 300
Sharp, 2400
Sony, 380
Thomson-CSF, 324
Victor Duncan, 2515

Cameras, film chain

Ikegami, 406
Marconi, 322

Cameras, film cine

Cinema Products, 2217
Frezzolini, 2415
Ikegami, 406
Marconi, 322
TeleMation, 342

Cameras, studio

Ampex, 301
Bosch Fernseh, 330
Camera Mart, 555
Commercial Elec., 398
Harris, 303
Hitachi, 334
Ikegami, 406
Interntl. Video, 346
JVC, 408
Marconi, 322
Panasonic, 483
Philips, 314
RCA, 300

Cartridge machines

Ampro, 369
Broadcast Elec., 309
Cetec Broadcast, 307
Harris, 303
IGM/NTI, 343
Interntl. Tapetronics, 319
RCA, 300
Telex Comm., 357
Track Audio, 2211
UMC, 407

Cartridges & accessories

Broadcast Cartridge
Serv., 2304
Capitol Magnetic, 361
Fidelipac, 351
David Lint, 447
3M, 439

Carts, equipment

Coherent Comm., 2115
E-N-G Corp., 2402
Micro-Trak, 391
Winsted, 2601

Catalogs, equipment

Bill Daniels, 2417
Storeel, 469

Character generators & titl

Beston Elec., 376
Broadcast Video Sys., 282
Camera Mart, 555
Chyron, 382

The First Frame Store We'd Put Our Name On



From the industry's first standalone Time Base Corrector through the innovative 2020 Series Signal Processor, MICROTIME has combined its highly creative design capability with advanced technology to provide the highest quality products for the Video Industry. MICROTIME's goal has always been simplicity, reliability, and low cost, while maintaining the best performance standards available. For that reason, the 2525 Video Signal Synchronizer is the first Frame Store we'd put our name on.

The 2525 includes:

- Line Error Detection
- A new RS-170A Sync Generator for improved lock-up and easy interfacing with any switcher
- Field 1, Field 2, or Frame Freeze for digital video effects applications
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- Output H Sync and Burst Level Control
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The 2525 will correct VTR signals from no-lock or V/H lock, synchronous or non referenced, direct or

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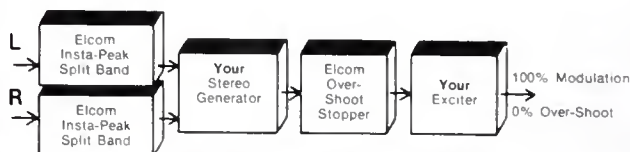
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CONDOLENCE FROM THE STAFF AND MANAGEMENT OF ELCOM



To those who spent over fourteen hundred dollars to try to achieve the loudest sound in town.

We respectfully suggest that you sell or shelve that \$3000 wonder box and buy the unbeatable Elcom system for crystal clear loudness. You will see the modulation meter rock between 95% and 100% but you will think that the peak flasher is burned out. Just try that with any other system!!!



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Product directory: Ch-Ex

Datametrics, 2813
Knox Video, 2706
Laird, 537
Listec, 465
3M, 302
MPB Technologies, 2815
Shintron, 410
Systems Concepts, 517
Thomson-CSF, 324
Video Data, 2703

David Lint, 447
Garner Ind., 415

Editors, film

Cinema Products, 2217

Editors, videotape

American Data, 312
Ampex, 301
Bosch Fernseh, 330
CMX, 477
Camera Mart, 555
Consolidated Video Sys., 1662
Convergence, 378
Datatron, 491
Dynasciences, 497
Hitachi, 334
Shintron, 410
Video Aids of CO, 25

Consoles (audio, TV, portable, editing, production)

Ampro, 369
Audio Design & Mfg., 414
Auditronics, 379
Autogram, 2114
Automated Processes, 373
Bayly Eng., 425
Broadcast Elec., 309
CCA, 305
Cetec Broadcast, 307
Cinema Products, 2217
Coherent Comm., 2115
Crosspoint Latch, 2801
CSI, 337
Harris, 303
Hitachi, 334
LPB, 383
Listec, 465
Logitek, 2111
MCI, 401
McCurdy, 321
McMartin, 317
Rupert Neve, 507
Pacific Recorder, 401
QRK, 389
Ramko, 409
Research Tech., 539
Rockwell Interntl., 2600
Russco, 427
Shure, 371
Studer Revox, 453
UMC, 407
Ward-Beck, 489
Winsted, 2601

Election reporting systems

Chyron, 382
Data Comm., 339

Encoders, color video

Cohu, 471
Shintron, 410
TeleMation, 342

Encoders, tone and EBS

Channelmatic, 2517
Logitek, 2111
Marti Elec., 349
McMartin, 317

Engineering services

David Lint, 447
Soll, 505

Decoders

Yves Faroudja, 412
Rohde & Schwarz, 386
Telemet, 333

Delay systems (audio & video)

Asaca, 2502
Allen Avionics, 2615A
Broadcast Video, 2823
Cablewave Sys., 381
Listec, 465
MicMix Audio Pdts., 421
Orban Assoc., 429
Telemet, 333
Television Equip., 364

Enhancers, video image

Cohu, 471
Consolidated Video Sys., 1662
Yves Faroudja, 412
QSI, 2800

Exciters (AM, FM, SCA)

Harris, 303
McMartin, 317
Philips, 314
QEI, 435
Rockwell Interntl., 2600
Versa-Count, 2120

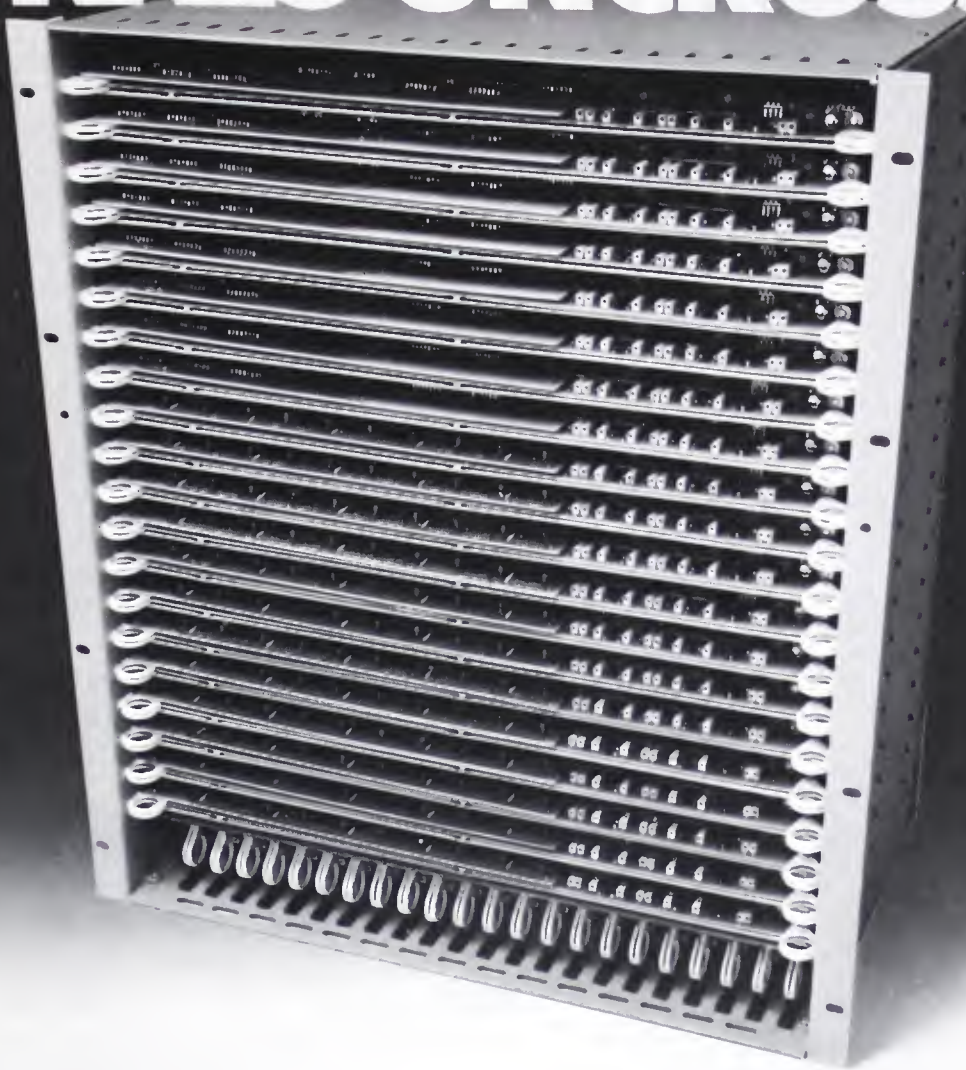
Duplicators (equip., facilities)

Audi-Cord, 419

Extenders, audio & LF

Comrex, 541
IGM/NIT, 343

GET YOUR SIGNALS UNCROSSED.



No matter how complicated your studio operation is, we can unspool your signals and send them on their way, with one of our nine off-the-shelf Switcher series.

For example, many broadcasters use our lower cost 15X or RX Series Switchers to switch input signals to their VTR machines. By providing instant access to signals at the touch of a button, difficult editing jobs are accomplished on the spot and, during the Vertical Interval.

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For audio use, our solid-state Series AX Switchers make the old fashioned patch panel a thing of the past.

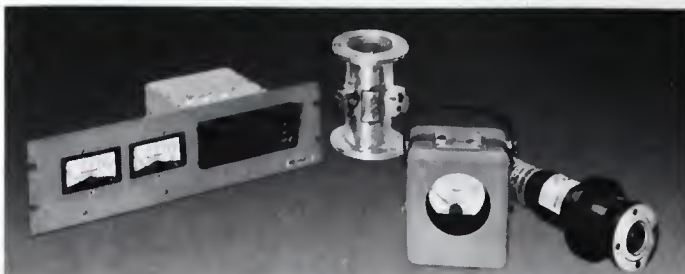
All 3M Routing Switchers can be built to nearly any input/output capability, with vertical interval switching and can be operated by many types of controls.

Studio operation is getting more complex every day. You can't fight it, so why not switch? Switch to 3M Routing Systems.

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Product directory: Ex-In

Fiber optics/optical links

Flash Tech., 547
Telemet, 30A

Film & processing services

Agfa-Gevaert, 2821
L-W Interntl., 338
Lipsner-Smith, 539

Film chain (systems/equipment)

Beston Elec., 376
L-W Interntl., 338
Rank, 348

Frame storers & synchronizers

Arvin/Echo, 390
Bosch Fernseh, 330
Camera Mart, 555
Colorado Video, 523
Consolidated Video
Sys., 1662
Digital Video Sys., 2709
EECO, 301
Micro Consultants, 404
Microtime, 2305
NEC America, 2404
Video Assoc., 2809
Vital, 316

Generators (FM, SCA, AM, stereo)

Belar Labs, 367
Harris, 303
Marti Elec., 349
McMartin, 317
Moseley Assoc., 329
QEI, 435
Versa-Count, 2120

Generators (time code & readers)

BTX, 2409
CMX, 477
Convergence, 378
Datametrics, 2813
Datatron, 491
E&O Systems, 2803
Listec, 465
MCI, 401
QSI, 2800
Skotel, 2827

Generators (video special effects)

Arvin/Echo, 390
Asaca, 2502
Bosch Fernseh, 330
Broadcast Video Sys., 2823

Computer Image, 457
Convergence, 378
Grass Valley Group, 308
3M, 302
MicMix Audio, 421
Micro Consultants, 404
NEC/America, 2404
Panasonic, 483
Shark, 2400

Generators (video, sync, burst, pattern)

Adda, 2104
Asaca, 2502
Crosspoint Latch, 2801
Datatek, 521
Datatron, 491
Dynair, 368
Leitch Video, 561
Lenco, 372
Micro Consultants, 404
Philips, 314
QSI, 2800
Sharp, 2400
TeleMation, 342
Video Aids of CO, 553

Head alignment gauge

Fidelipac, 351
Memorex, 485

Heads & reconditioning services, audio

Accurate Sound, 2103
Computer Magnetics, 529
David Lint Assoc., 447
Nortronics, 345
UMC, 407

Heads & reconditioning services, video

A.F. Assoc., 2411
Computer Magnetics, 529
Nortronics, 345
Spin Physics, 473
Taber, 459
Videomat, 459

Headphones

Setcom, with various
exhibitors
Stanton Magnetics, 363
Technics-Panasonic, 481
Television Equip., 364
Telex Comm., 357

Intercoms

Audio Design & Mfg., 414
Automated Processes, 373
McCurdy, 321
RTS Systems, 2115
Television Equip., 364

SWITCHERS DON'T MAKE MISTAKES...PEOPLE DO

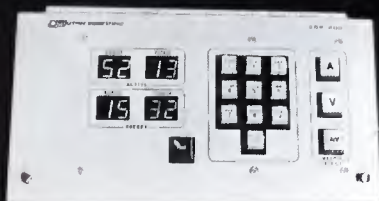
That's why we've designed a whole new series of human-engineered control panels that are setting new standards for goof-proof switching.

Once you've designed audio and video routing switcher matrices as transparent and reliable as ours, there's not much room for further improvement at that end. However, there has been a need for improvement in the control end--particularly where operators must make accurate, quick-decision source selections. The panels described below are designed to eliminate the confusion too often associated with routing switcher control, while providing the control flexibility so important to present-day signal routing requirements.

For installation simplicity, each of these new panels connects directly to the system party line via loop-through coax connections. They provide continuous status readout and can be encoded to permit each input (or output) to be addressed by its name (VTR-2, CAM-4, etc.) rather than by an arbitrary matrix number.

We are also prepared to supply custom variations of these panels to suit your exact requirements.

CSP-200



Permits audio and/or video selection--including simultaneous A/V switching from different sources--on a single output bus. Available in recessed mount, one unit per rack panel and two units per rack panel versions

CSP-200 Custom



Custom variation of the CSP-200 panel built for Opryland Productions permits single keystroke takes on two preselected audio/video sources as well as normal touchpad entry.

CSP-300/R



Full Matrix Control Panel. Permits audio and/or video switching on any selected bus. Encoded version can be restricted to switch only on specific pre-assigned busses. Available in either recessed or rackmount versions.

CSP-10

Controls ten randomly assigned busses providing continuous status readout on each bus. Touchpad data entry with numeric readout permits error-free switching on any of the ten busses. (Availability, February 1979.)

CSP-20/CX-20

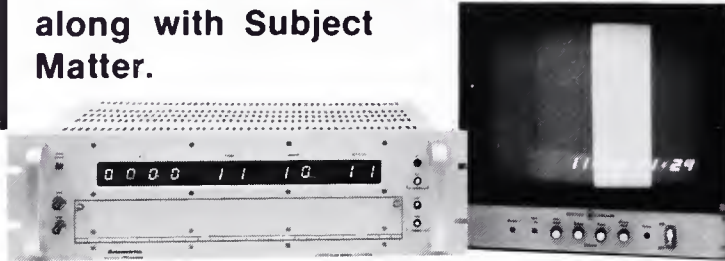
Permits button-per-source input selection on assigned bus. Basic panel accommodates 20 inputs. Expansion in 20-button increments is provided by adding slave panels. Permits fast single-stroke selection of any input. Button lamps provide continuous status indication from refresh memory. (Availability, March 1979.)

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Datametrics Model SP-722 Generates / Translates SMPTE Code and Displays Time on Video Monitor along with Subject Matter.



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Lasers (links, transmssn.)

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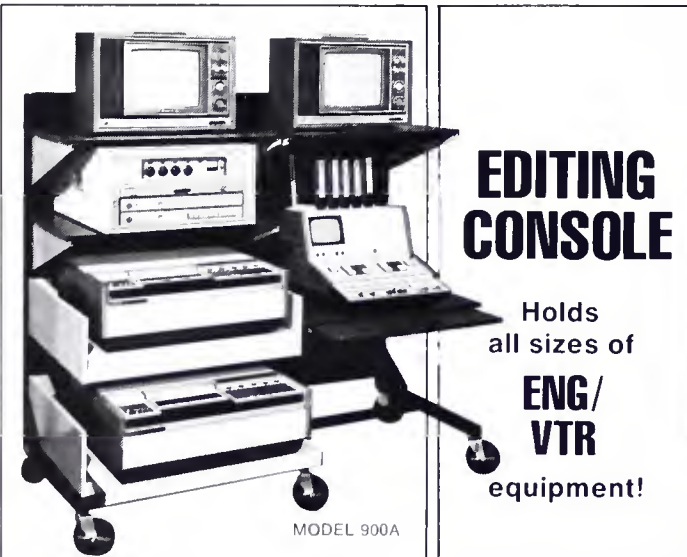
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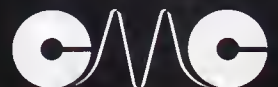


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Product directory: T-Te

TBCs, time code equipment

Ampex, 310
BTX, 2409
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Channelmatic, 2517
Consolidated Video
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Tape evaluators/cleaners/ gauges

Chyron Corp., 382
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Tape, magnetic recording (video)

Agfa-Gevaert, 2821
Ampex, 301

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Fuji Magnetic Tape, 402
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Test equip., monitors & meters (audio)

Audio & Design Rec., 2215
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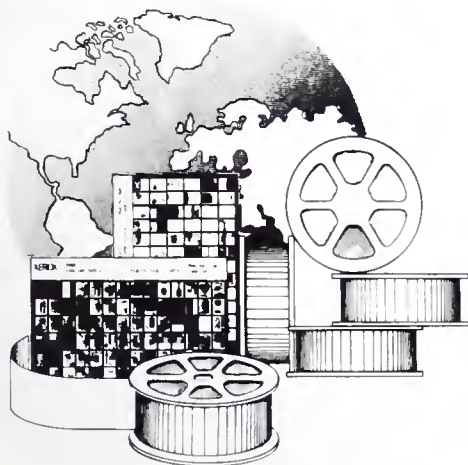
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Telemetry Equip.

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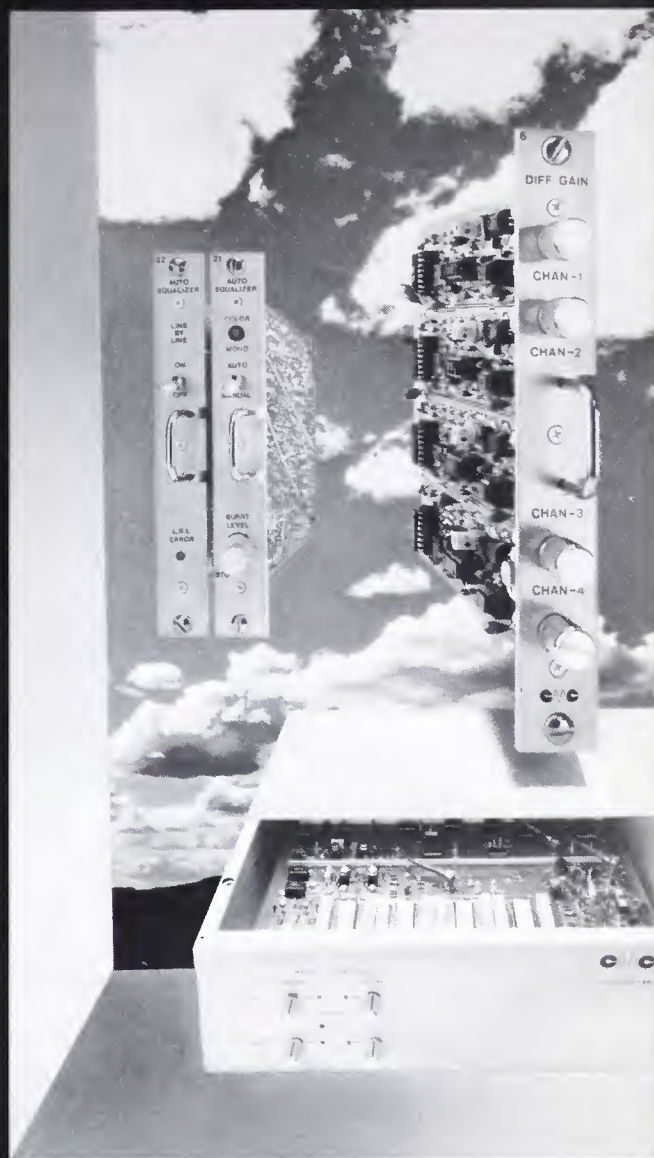
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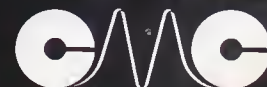
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Test patterns, charts

Telecommunications
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Timers & clocks (program)

Convergence, 378
 Dytek, 2301
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Turntables, tone arms & phono cartridges

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 Micro-Trak, 391
 McCurdy, 321
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 Russco Elec., 427
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 Stanton Magnetics, 363
 Technics-Panasonic, 481

Vacuum tubes (video cameras)

Amperex, 310
 Calvert Elec., 2117
 Ceco Comm., 431
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Vacuum tubes (transmitting TWTs)

Amperex, 310
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Vans and accessories

E-N-G Corp., 2402
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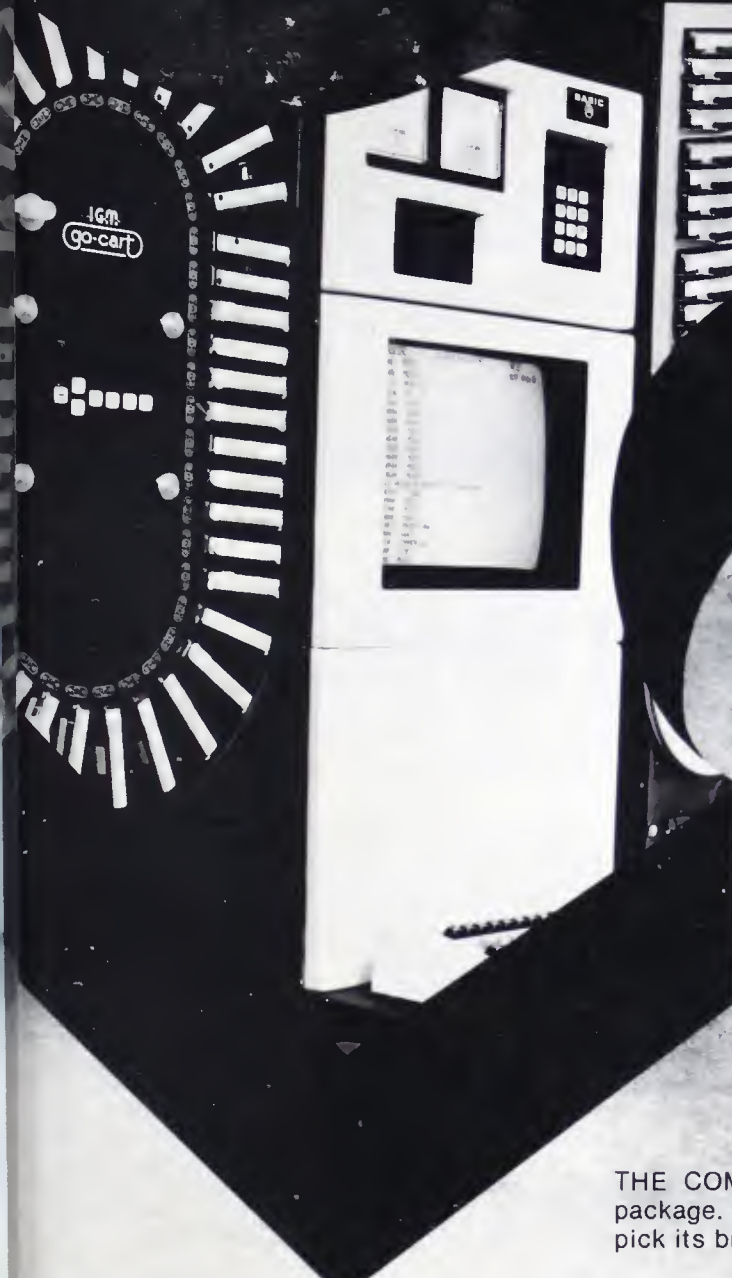
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Arvin/Echo, 390
 Technology Serv., 467
 Video Data Sys., 2703

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Exhibits roundup

This section of this special convention issue is a roundup of exhibiting manufacturers and a preview of the products they will have on display in the exhibition area of the Dallas Convention Center.

Along with the products to be shown, some companies are listing new products. These are products that will be shown for the first time at the NAB convention. A quick scan of the exhibitors will give you an idea of the variety of new products that will be on display.

If you're not going to the convention this year, this section will make the trip for you. Put this together with our *Innovative Products* section, and you'll be up-to-date on what's new.

This section can be especially helpful. Circle the booth numbers of companies showing new products you'd like to see for yourself. If the manufacturer advertised in this issue, there will be a color line running under the product information that says "See ad on page _____." If you'll take the time to turn to the ad, you probably will have a good idea of whether or not the product will be interesting enough to warrant a trip to his booth in the exhibition area. And, if you'll mark these booth numbers on the *Exhibit Map* in this issue, you'll be sure not to miss anything.

Exhibitors

A. F. Associates

Refurbished VTRs (525/625 NTSC PAL), 10-minute videotape presentation on Panasonic TV projection system. **New:** Blanking meter (V & H) with digital readout and optional video monitor character display, 525 NTSC 3M color dropout compensator. **Booth 2411.**

see ad on pages 25, 107

AMCO Engineering Company Booth 393

Accurate Sound Corporation

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Acrodyne Industries

1 kW UHF translator. **New:** 2.5/5 kW FCC type-accepted VHF transmitter, 10 kW VHF transmitter, 10 kW UHF transmitter. **Booth 479.** Hospitality Suite: Hyatt Rogency.

Adda Corporation Booth 2104

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Aim Limiter Booth 2108

Allen Avionics

Video and pulse delay lines, filters. **New:** Video delay line. **Booth 2615A.**

see ad on page 211

Allied Tower Company Booth 2100

Allotrope Booth 2108

Amber Electro Design Booth 2108

American Data Corporation

Video production system with Quan-

tel DPE, video production systems, production switchers, modular amplifiers, audio/video distribution switchers, master control system. **New:** Video production system, ENG/EFP production switcher. **Booth 312.** Hospitality Suite: Dallas Hilton.

American Telegraph and Telephone Booth 2511

Amperex Electronic Corporation

Sivicon silicon diode array, intensified Sivicon, vidicons, RF power tubes, industrial tubes, rectifier stacks, circulators, viewfinder CRTs. **New:** 3/8-inch diode gun Plumbicon, 1-inch diode gun Plumbicon. **Booth 310.**

see ad on page 47

Ampex Corporation

Quadruplex VTRs, helical VTR time base correctors, broadcast cameras, portable cameras, editing systems, production switchers, digital video production systems, audio equipment, transport control equipment, magnetic tape production. **Booth 301.** Hospitality Suite: Loews Anatole.

see ad on page 9

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for delivery

HI-BAND U-format VTR

The model HBU-2860 (Hi-Band U-format video cassette recorder) is a modified SONY VO-2860 with Recortec electronics mounted on top of the unit. The modification provides direct hi-band video recording made possible by tripling the scanner speed and the linear tape speed. HBU is not a kit, but a complete VTR.

QUALITY—At the 1200 ips head-to-tape speed the HBU video quality is as good as the "quad" or the new one-inch format. Significantly improved audio quality is also obtained with this modification.

CONVENIENCE—Standard and widely available 3/4-inch video cassettes for the HBU allow for simple loading, handling and storage.

DEPENDABILITY—The HBU does not alter the U-type recording format and thus takes advantage of the established interchangeability of the U-type recorders.

ECONOMY—Lowest cost in equipment, media and operations for any Hi-Band VTR.

RECORTEC, INC. 777 PALOMAR AVE., SUNNYVALE, CA 94086. TEL: (408) 735-8821

Exhibit roundup: Am-Be

Ampro Broadcasting

Broadcast cartridge machines, audio consoles, Monomax, tri-deck cartridge machine. **New:** Microtouch consoles. **Booth 369.**

see ad on page 24

Amtron Corporation

Booth 412A

Andrew Corporation

Heliac coaxial cable, STL microwave antenna systems, earth station antennas, transmitting antennas, UHF-TV. **New:** 12 m earth station antenna, 1 5/8-inch low-loss foam-dielectric heliac coaxial cable. **Booth 360.**

Angenieux Corporation

10x14.5 wide angle lens, 12x lens, 15x and 42x lens for studio and outside broadcasting, 42x telephoto lens for sports and outside broadcasting, 15x9.5 system for 2/3-inch cameras. **Booth 318.**

Anton/Bauer

Battery modules, holders and chargers; video belts and chargers. **New:** 12 Ah batter, silver charger, 13 V Nicad battery. **Booth 2121.**

Anvil Cases

EIA rack cases, video camera cases, VTR cases, combo camera/VTR cases, monitor cases, HMI lighting cases, tool cases (technician oriented), pullover clamping-lid style EIA rack case for special shock mounting, filmbase camera cases, audio-visual product cases. **New:** Shock-mounted rack cases. **Booth 2507.**

Arvin/Echo Science Corporation

Slo-Mo 1, EFS-1A, Tel-Weather—TW-1. **New:** Special controller. **Booth 390.**

Asaca Corporation

Portable color camera, noise meter, envelope delay, video sweep generators, digital pattern generator, 20-inch color monitor, 14-inch color monitor, color bar generator. **New:** Portable switcher for EFP, registration meter, MPX TV sound genera-

tor, 10-inch color monitor for EFP, test signal generator. **Booth 2503.**

see ad on page 7

Audi-Cord Corporation

Tape cartridge reproducers and record-reproducers. **Booth 419.**

see ad on page 136

Audio Designs & Manufacturing

Audio consoles for TV, intercom systems for broadcasting, distribution amplifiers, limiters, noise suppressors, patchbays. **New:** FM and AM stereo production consoles, FM and AM on-air consoles. **Booth 414.**

see ad on page 5, 105

Audio & Design Recording, Ltd.

Vocal stresser, compex-limiter, sweep equalizers, stereo broadcast limiter, music/voice ratio limiter, compressor-limiter, parametric equalizer, hi- and low-pass dynamic noise filter/gates, octave equalizer, distribution amplifier, PPM/VU LED level indicators, dual noise gate, expander/gate. **New:** Compressor-limiter, paragraphic equalizer, time shape module (analog delay), pan effects module (programmable panning). **Booth 2215.**

Auditronics

Audio console. **New:** Audio console. **Booth 379.**

see ad on page 169

Autogram Corporation

6-channel audio console, 10-channel audio console. **New:** 8-channel audio console. **Booth 2114.**

Automated Broadcast Controls

Complete automation systems. **New:** 1600S sequential controller for back programming. **Booth 311.**

Automated Business Concepts

Computer-based management system. **New:** Audience data system. **Booth 545.**

Automated Processes

Automated audio consoles, broadcast audio consoles, post-production audio consoles, audio routing systems, audio monitoring systems, audio processing modules, audio amplifiers, audio DAs. **New:** Audio console/desk, digitally programmable Intercom. **Booth 373.**

Automation Electronics (Autotron Systems)

Business automation system, Honeywell Level 6 minicomputer options. **New:** Options for business automation system. **Booth 2208.**

Avab America

Booth 2712A

B & B Towers

Booth 2124

The BTX Corporation

SMPTE time code generator, SMPTE time code reader, SMPTE time code video display, SMPTE time code synchronizer. **New:** SMPTE tape controller. **Booth 2409.**

see ad on page 172

Bald Mountain Lab

New: Audio step generator, auto-ranging dB meter. **Booth 309.**

Bardwell & McAlister

300 W - 5 kW spotlights, 650 W - 2000 W quartz lights, cyc strip lights, mounting and hanging equipment, lighting accessories. **New:** Century stands, grip heads, grip stands, other grip equipment. **Booth 559.**

Bayly Engineering, Ltd.

Solid-state FM transmitters, audio mixer, digital stereo program channels, digital mono program channels, analog mono program channels, analog stereo program channels, coaxial load resistors, alarm wattmeters, audio patch panels. **New:** PDM broadcast transmitters, 2-way radio equipment. **Booth 425.**

Beaveronics

Booth 369A

Belar Electronics

AM/FM monitors, TV monitor. **New:** FM stereo monitor, AM stereo monitors. **Booth 367.**

see ad on page 139

Berkey Colortran

Channel track, pantographs, ellipsoids, portable dimmer pack, meter control pack, Fresnels (1, 2, 3 kW), ¼ kW softlight, portable kit. **New:** 1 kW and 2 kW scoop. **Booth 367.**

QUAD PANEL REFURBISHING SERVICE

Be calculating.

Choose the state-of-the-art high technology hot-pressed ferrite quad video heads from Spin Physics. Superior picture and longer head life — from 3 to 5 times longer life than you get from ordinary heads — that's the reward for the Spin Physics customer.

Bring your quad machines into the new generation, the ferrite generation. Let Spin Physics show you how to save from 25 to 40 per cent and more of your quad refurbishing costs for Mark X, Mark XV or RCA High Band.

Contact the Spin Physics Regional Manager serving your area, listed below, for more information. Or contact David Franssens, Video Products Manager, in San Diego.

You'll like the numbers!



SPIN PHYSICS, INC.
A KODAK COMPANY

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PACIFIC REGION: Ken Thompson 415-961-7794 • **SOUTHWEST REGION:** Ed Gehle 805-964-3316
EUROPEAN REGION: Bill Kroon, Putten, The Netherlands (03418) 3689 or Telex (844) 47589

Exhibit roundup: Be-C

370.

see ad on page 10

Beston Electronics (BEI)

Auto-light controls for film, titler/character generators. **New:** Data-Prompter Character generator system. **Booth 376.**

see ad on page 120

Bird Electronic Corporation

Traditional ThruLine RF Wattmeters

to 250 kW, self-cooled and water cooled RF load resistors, low pass filters to 50 kW, digital RF calorimeter, remote-reset RF Power Monitor/Alarm. **New:** RF Terminations, ThruLine directional wattmeters, absorption wattmeters. **Booth 519.**

see ad on page 112

Bloomington Broadcasting

Computer system for radio sales, traffic, billing, general accounting, payroll and management information. **New:** Enhanced software for system. **Booth 2308. Hospitality Suite:** Dallas Hilton.

Bogner Broadcast Equipment Corporation

220 kW UHF TV transmitting antenna, circularly polarized TV transmitting antenna, VHF dipole transmitting antenna, VHF slot type transmitting antenna. **Booth 2202.**

Bonneville Broadcast Consultants Booth 563

Bonneville Data Systems

Computerized traffic and accounting system for radio and TV. **New:** Smaller version of business automation system. **Booth 2206A.**

Bosch Fernseh

VTR, portable VTR, digital video effects, slide store VTR, precision color monitors, studio cameras, portable cameras, EFP system. **New:** Slow motion programmer for BCI VTR, laser video transmission, VCR editing system, color camera. **Booth 330. Hospitality Suite:** Fairmont North Tower.

see ad on page 179

Boston Insulated Wire & Cable Booth 358

Broadcast Cartridge Service

Broadcast cartridges and accessories. **Booth 2304.**

see ad on page 170

Broadcast Electronics

Automation system, cartridge tap machines, audio control console studio accessories. **New:** Econom program automation system, high speed program logger. **Booth 309.**

Broadcast Programming International Booth 411

Broadcast Video Systems, Ltd.

NTSC PAL M transcoder, down stream caption inserter with border generator and color fill, video delimiters, safe area generator. **New:** Plug-in rotary wipe unit, VTR leader clock and clapboard, color corrector, waveform and vector monitor. **Booth 2823.**

see ad on page 170

CCA Electronics Corporation

Introducing The Galaxy

Our 12-C became the first broadcast standard turntable. We've bred this to become the second.



- Variable Speed Control
 - Slip Cueing
 - D.C. Motor
- Back Cue (no motor drag)
 - Instant Start
- Direct Speed Read-out on LED
 - Solid State Circuitry
 - Remote Start/Stop



CALL TOLL FREE (800) 344-2181

Californians call collect (209) 251-4213

1568 North Sierra Vista
Fresno, California 93703

Circle (99) on Reply Card

Five and Feisty!



CSI is now in its fifth year of offering commercial AM and FM transmitters to the broadcast industry. We'll be showing our wares at NAB in Dallas. Stop by Booth 337 and find how feisty a five-year-old can be!

CSI ELECTRONICS INC.

3800 South Congress Street • Boynton Beach, Florida 33435 • Phone 305/732-0300 • Telex 513458

In CANADA contact Peter MacFarlane, CSI Electronics, Pointe Claire P Q Phone 514-695-8130 or 514-484-6601

Circle (137) on Reply Card

March 1979 *Broadcast Engineering* 127

Exhibit roundup: C-Ce

AM, FM, UHF and VHF transmitters; mono and stereo consoles, FM Optimod, automatic power control, automatic transmitter switcher, VSWR protector, exciter switches. **Booth 305.**

CMX Systems (Orrox)

Videotape editing equipment, Videola system, time code reader/displays, time code generators. **New:** Editing keyboard. **Booth 477.**

CSI Electronics

AM/FM broadcast equipment, modulation monitors, consoles, transmitters. **Booth 327.**

see ad on page 127

CSP

RF contactors, fixed inductors, variable inductors, dummy loads, sampling loops, isolation coils, lighting chokes, static drain choker, jacks and counters, horn gaps, bowl assemblies. **New:** Antenna phasing

equipment, ATU units, detuning units. **Booth 542.**

Cablewave Systems

Microwave parabolic antennas, elliptical waveguide and assemblies, semi-flexible coaxial cable, delay lines, pressurization equipment, coaxial connectors. **New:** 4 1/8-inch Flexwell copper corrugated air dielectric coaxial cable. **Booth 381.**

see ad on page 33

Calvert Electronics

Electro optic devices and power tubes. **New:** Camera tubes. **Booth 2117. Hospitality Suite:** Sheraton Dallas.

Cambridge Products

BNC connectors. **New:** BNC coaxial connector for 8281. **Booth 2802.**

see ad on page 112

The Camera Mart

Cameras, VTRs, slow motion units, frame store, camera pedestals, monitors, character generators, video production center. **New:** Ulti-

matte compositing system. **Booth 555.**

see ad on page 4

Canon USA

Camera lenses, accessories. **New:** Zoom lens with pattern projector, lens with built-in 2x extender. **Booth 493.**

see ad on page 1

Capitol Magnetic Products

Broadcast cartridges. **New:** Broadcast cartridge. **Booth 361. Hospitality Suite:** Dallas Hilton.

see ad on page 171

Cases

Cases for video recorders, audio recorders, ENG, microphones and cameras. **Booth 2105.**

Ceco Communications

Transmitting tubes, camera tubes microwave tubes. **Booth 431.**

Central Dynamics

INSTRUCTIONAL TV

SLOW SCAN

Solve communication problems by means of electronic "still" picture transmission over conventional audio circuits. Use leased lines, the dial-up telephone network, microwave channels, or FM radio subcarriers. Colorado Video Scan Converters provide an interface to standard TV cameras and monitors to achieve a high degree of technical flexibility. Program production is far simpler and less costly than "real time".

Please write to us, or call, for equipment specifications and applications literature.



COLORADO VIDEO, INCORPORATED

Box 928 • Boulder CO 80306 USA • 303/444-3972 • TWX 910-940-3248 (COLO VIDEO BDR)

Circle (104) on Reply Card

For the best in ENG action, get the new LEAD-FREE $\frac{2}{3}$ " SATICON[®] from RCA.



Now RCA offers you a new $\frac{2}{3}$ " SATICON tube with a 7-pin base that equals or exceeds lead oxide performance in every way. The new BC 4390 SATICON provides the best picture quality available for ENG cameras. With the new RCA LEAD-FREE tube you get:

- Better resolution.
- Longer life expectancy.
- Uniformly high sensitivity.
- Low lag.
- Excellent temperature stability.

For more information on how you can get better ENG action with the new LEAD-FREE BC 4390, see your RCA Distributor. Or, contact: Camera Tube Marketing, RCA Electro Optics and Devices, Lancaster, Pa. 17604.

RCA
Electro Optics
and Devices

Exhibit roundup: Ce-Col

Booth 344

Centro
Booth 2406

Century 21 Productions
Booth 371A

Cetec Broadcast Group (see also Jampro-Cetec)
Wireless microphone antennas and accessories; radio transmitters; receivers; FM CP antennas; stereo consoles; radio automation with verified English logging/printing, multicart systems, Autocue, reel-to-reel and cartridge equipment. **New:** Wireless microphone system, firmware for radio automation. **Booth 307.**

see ad on page 17

Channelmatic
VCR sequencers, VCR controllers, earth station automation, video distribution amplifier, audio distribu-

tion amplifier, time-channel identifier, tone generator. **New:** Real-time controller, tone control equipment, audio-video switching and distribution equipment, videocassette automation. **Booth 2517.**

Christie Electric Corporation
Sequencer, 20-minute charger, battery packs. **New:** Xenon follow spot, 50th anniversary. **Booth 2600.**

Chyron Corporation
Graphics and titling generators, election reporting system, cassette cleaner and evaluator for 3/4-inch videocassette tape. **New:** Election reporting system. **Booth 382.**

see ad on page 58

Cine 60
Powerbelts, powerpacks, sun-guns, sun-gun kits, shoulder pods, snaplocks, battery power cables, fast chargers, quartz lights. **New:** Fast-charge batteries, AC adapter/fast charger. **Booth 2700.**

Cinema Products Corporation

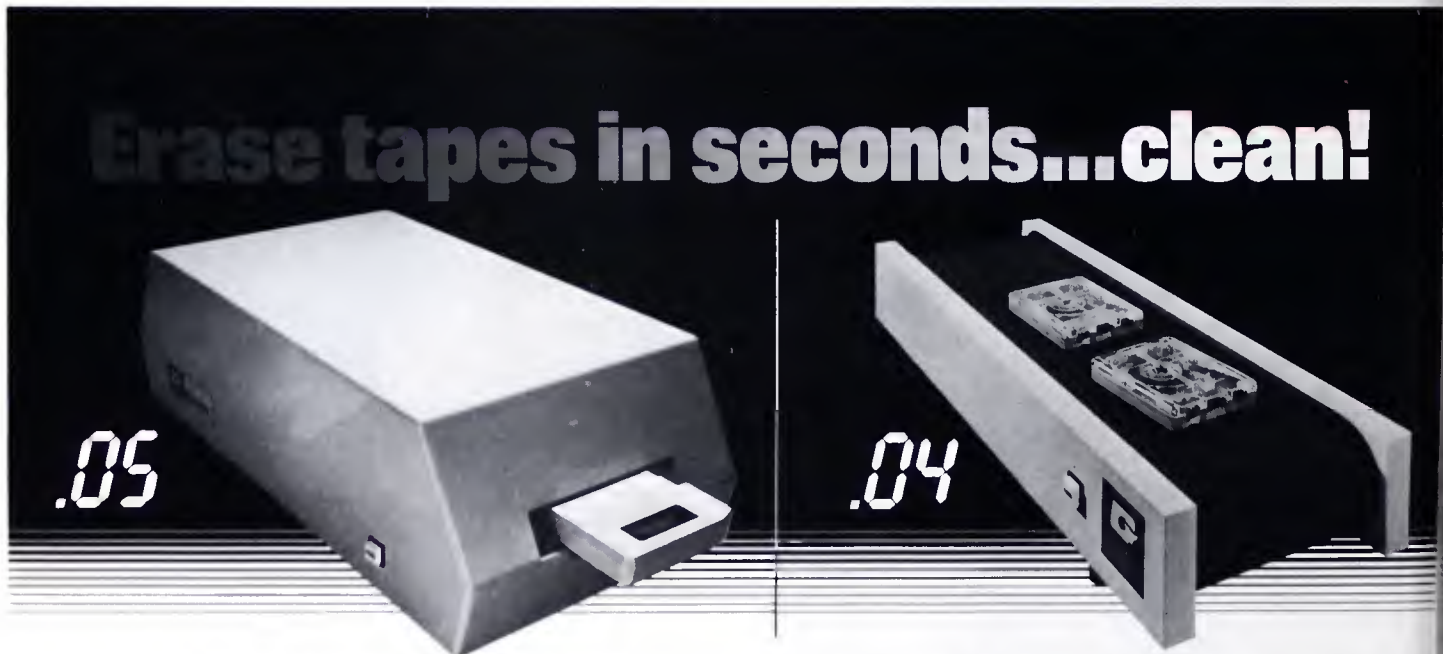
ENG/EFP video camera, reflex camera system, lenses for 16mm cameras. **New:** Lightweight 1-inch cartridge VTR, film-to-tape transfer, production system with CCU, portable editing console, 16mm cameras, camera stabilizing system. **Booth 2217.**

see ad on pages 12, 13

Coherent Communications
Surrey frequency shifters for audio feedback reduction, Q-Aid induction receiver, CineKart portable and collapsible equipment cart, PS-1 condenser mic power supply, Rycote mic windscreens and shockmounts, Auto-Bloop, sync and remote control for motion picture cameras, OSC-1 precision oscillator with switchable 50, 59.94 and Hz sync outputs. **New:** Mini-Mic line of electret microphones, Artech radio microphones, audio developments portable audio mixers, Wilson Mini-Com miniature VHF/UHF walkie-talkie. **Booth 2115.**

Cohu
New: Monochrome monitors, telecine system. **Booth 471.**

see ad on page 168



GARNER'S NEW VIDEO'RASER

In less than five seconds, get video tape erasure depth that exceeds professional standards. Garner's compact Video'Raser Unit completely automates your video cassette erasing in a simple one-step, in-and-out operation...perfect tape erasure in one pass.

GARNER'S AUDIO ERASING UNITS

In four seconds, our audio erasing units deliver a clean, "no-whump" erasure that meets the most stringent recording standards. Just hit the power button and drop any reel or cassette up to 16" on endless belt. You'll save valuable man-hours and do a better job.



Look to Garner for quality electronic audio and video products, including the Garner high speed tape duplicator. For more information, write or call:

GARNER INDUSTRIES Dept. BE-3, 4200 N. 48th St., Lincoln, NE 68504 Phone 402-464-5911

Circle (106) on Reply Card

What shock absorbers do for cars...



...new, Electro-Voice shock-mounted microphones do for sound.

DO56 Omni – The DO56 shock-mounted omnidirectional microphone is virtually impervious to mechanical noise. Its isolated capsule eliminates the possibility of capsule/case collision, making the DO56 the ideal microphone whenever there is lots of action. The excellent “G-factor” margin makes this new microphone less susceptible to the bell-like clang typically heard from other shock-mounted microphones when they are accelerated or decelerated rapidly. Plus, a built-in blast filter reduces “P-popping” dramatically to keep your audio clean.

The DO56 also offers attractive styling, making it ideal for broadcast applications where visual appeal is a necessity. The memraflex grille resists denting, keeping the DO56 looking like new indefinitely.

RE18 Super Cardioid – Where ambient noise rejection is mandatory, the companion RE18 super cardioid combines the best performance features of the famous RE15 and RE16 with superb mechanical noise isolation. Acoustic performance is the same as an RE15, while a refined small-profile blast filter resists “P-popping” as much as the larger RE16.

Unlike “multi-port” directional mikes, E-V’s exclusive Variable-D® design insures uniform frequency response at all angles, for uncolored pickup on and off axis. And Variable-D reduces the bass-boosting proximity effect found in Single-D cardioids, for consistent sound quality at any working distance.

Electro-Voice Warranty – Both microphones are covered by Electro-Voice’s unique two-year unconditional professional microphone warranty. For two years E-V will replace or repair these microphones, when returned to Electro-Voice for service, at no charge – no matter what caused the damage.

These are microphones to depend on, in the studio or in the field. If they weren’t, E-V couldn’t offer this warranty. When your application calls for a shock-mounted microphone, test one of these at your E-V professional microphone dealer.



Electro-Voice®
a gulton company

600 Cecil Street, Buchanan, Michigan 49107

NEW BROADCAST STUDIO FURNITURE FROM RUSLANG



If you're building or remodeling, add the elegant look of expensive furniture for much less than you would expect. We build electronic racks in various heights, consoles for any size tape deck, and control stations that put you on top of things. All are constructed of quality materials, including high pressure laminates, making them sturdy as well as attractive. They are available in either wood grain finish or various solid colors. Send for literature showing dimensions, etc.

THE RUSLANG CORPORATION
247 Ash Street, Bridgeport, CT 06605 Tel: 203 384 1266

Circle (108) on Reply Card

Exhibit roundup: Col-Con

Colorado Video

New: Video from store. **Booth 523.**

see ad on page 128

Comark Industries

Diplexers, couplers, filters, power dividers, demodulators, peak detectors, sound notches. **New:** Portable VSWR meters, UHF and VHF transmitters. **Booth 2203.**

Commercial Electronics

310 Camera. **New:** 330 camera studio color. **Booth 398. Hospitality Suite:** Ramada Inn.

see ad on page 71

Compact & Video Sales

Booth 2126, 2127

Compucan

Booth 2617

Computer Image Corporation

New: Electronic animation. **Booth 457. Hospitality Suite:** Hyatt Regency.

Computer Magnetics Corporation

Refurbished video and audio heads, videodiscs and heads, auto equalizer, differential gain adjustment, velocity error corrector. **Booth 529.**

see ad on page 117, 118, 119

Computer Management Systems

Booth 2212

Comrex Corporation

Cue systems for ENG, pocket TV aural monitors, wireless microphone systems. **New:** Low frequency extenders, 1 W transmitter, pocket transmitter, camera-mount receiver, portable diversity receiving system, cables, connectors. **Booth 541.**

Comsearch

Booth 2110

Conrac Corporation

19-inch color monitor and comb filter; 13-inch color monitor for VTF mounting; 19-inch color monitor; 15-inch monochrome monitor; 17-inch high resolution monochrome monitor; 9-, 14-, 17- and 23-inch monochrome monitors. **Booth 304.**

Consolidated Electronic Industries

Cue-rac automation system. **Booth 311.**

Consolidated Video Systems

ENG TBC, all-purpose TBC, CCT TBC, PAL/SECAM TBC, PAL-M TBC, enhancer/noise reducer, phase accessory, computer-aided editor. **New:** Digital frame synchronizer, 520-16 H window. **Booth 400.**

see ad on pages 59, 62

Continental Electronics Manufactu



Built-in 2X Extender
9mm to 306mm

**Introducing the world's lightest,
longest, widest ENG/EFP zoom lens.**

FUJINON'S new F/1.7 17 x 9 ... the One and Only.

The new FUJINON 17 x 9 ENG/EFP zoom is the **only** lens to meet all of these qualifications:

The longest: 306mm without attachments, 560 with the optional front extender.

The widest: 9mm without attachments, 7mm with the optional adaptor.

The lightest: 2.5kg
Which makes the F/1.7 17 x 9 the **one** lens for every assignment. Simply put, it outperforms anything else on the market.

It's at home at any range. Normal zoom is 9mm to 153mm. Flip the built-in 2X extender, an exclusive FUJINON feature, and the range is 18mm to 306mm. The optional extender and adaptor give you even greater range.

Zoom and iris are servo controlled, or you can use the manual override. Adjustable back focus gives you faster lens changing and eliminates making internal camera adjustments. And to make the new 17 x 9 an even better investment, FUJINON offers a full list of accessories for studio conversion.

More information or a demonstration of any FUJINON lens, including the new "one and only", is yours for the asking.

For your new cameras, for your existing cameras... specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

FUJINON

Fujinon Optical Inc.
672 White Plains Road
Scarsdale, New York 10583
(914) 472-9800 Telex: 131-642

West Coast Distributor: F.P. Optical Inc.,
3333 Bowers Avenue, Santa Clara, California 95051
(408) 727-2757, Telex: 171-200

Exhibit roundup: Con-Di

ing 5,000, 10,000 and 50,000 W AM transmitters. **Booth 331. Hospitality Suite:** Ramada Inn Convention Center.

see ad on page 58

Convergence Corporation

Editing systems, search module, program computer, dual digital tape time, Lip lock, animate remote control, CUT/LAP, automatic dialogue replacement, edit decision lister, time code reader, status display generator, audio-video switcher, switcher effects. **New:** 1-inch type C interface for editing control systems. **Booth 378.**

Crosspoint Latch Corporation

Portable video console, production switchers, sync generator, low light level amplifier. **New:** Video dissolve unit, production switcher. **Booth 2801.**

Bill Daniels Company

Booth 2417

Data Communications Corporation

Automatic switching, sales/traffic/accounts receivable package. **New:** Micro-computer, commercial inventory, electron system, radio automation. **Booth 339. Hospitality Suite:** Dallas Hilton.

Datametrics

Time code reader, time code generator, time code reader/generator and character generator. **New:** Compact time code/user bit reader. **Booth 2813.**

see ad on page 114

Datatek Corporation

Video and audio routing switchers; TV transmitter color phase equalizers; video sweep generators; envelope delay test set; video, audio and pulse DAs. **New:** Video and audio switching units. **Booth 521.**

see ad on page 39

Datatron

Editors, SMPTE code generators and

readers, jam-sync generators, SMPTE reader/character ins, coincidence comparator, editor/edit lister. **Booth 491.**

see ad on page 23

Delta Electronics

Operating impedance bridges, remote control system, amplitude modulation controller, automatic power controller, digital panel meter, ammeter systems, analog antenna monitors, toroidal current transformers. **Booth 365.**

see ad on page 54

Delta Group

Booth 2606

De Wolf Music Library

Booth 2605

Dielectric Communications

RF switchers, RF loads, RF wattmeters, FR waveguide. **Booth 509.**

Digital Video Systems

Time base corrector, framestores,

Split Second Time Machine

The Telex/Magnecord 1400 recorder. Split second time machine. A grid of 524 lines passing a quartz crystal control, records one capstan revolution. This senses, and corrects the speed of the DC servo drive some 4000 times per second*. Speed accuracy is so accurate the National Weather and the Environmental Services selected Telex/Magnecord 1400s over all others to record meteorological display data.

Of course, broadcasters also favor the 1400 for the rugged stability of the die cast main frame, DTL logic and exceptionally clean electronics.

Compare our speed, specs, and price. We invite you to make a split second decision.

*At 7½ ips, adjustable ± 1% to compensate for tape thicknesses and mechanical wear.

TELEX
COMMUNICATIONS, INC.

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Europe: 22 rue de la Legion d'honneur, 93200 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

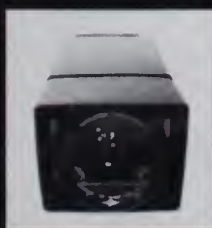
Circle (110) on Reply Card



Introducing the first ultra high resolution zoom lens for computerized cameras.

FUJINON presents the Over Achiever.

Ultra-high resolution — 40% higher than other tv lenses — sets a new standard in quality productions. And gives you the finest first generation tapes you've ever seen. A built-in test pattern projector provides for even faster, more accurate computerized camera set up. These are two of the achievements of FUJINON's new 1¼ inch format P14X16.5 Ultra High Resolution Zoom Lens. Here are more of its unprecedented performance characteristics:



R14X12.5 Ultra High Resolution Zoom Lens 1-Inch format

- Ultra high resolution (1300 tv lines) for incredible sharpness and detail at all focal lengths.
- Unique lens

design (taking lens moves with the zoom) delivers precise color convergence at all times.

- Constant F/2.1 aperture in all ranges for zooming and focusing.
- MTF exceeds 90% — not only in green, but in red and blue, as well.

If you're out to improve your image, see what FUJINON's new 14X Ultra High Resolution Zoom Lenses can do for you. For your new cameras, for your existing cameras...specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

FUJINON

Fujinon Optical Inc.
672 White Plains Road
Scarsdale, New York 10583
(914) 472-9800 Telex: 131-642

West Coast Distributor: F.P. Optical Inc.,
3333 Bowers Avenue, Santa Clara, California 95051
(408) 727-2757, Telex: 171-200

See the over achievers at the NAB Annual Convention, in Dallas. Booth 515.

Circle (111) on Reply Card

www.americanradiohistory.com

Exhibit roundup: Di-E

synchronizers. **New:** *Framestore and oblique time base corrector/oblique synchronizer.* **Booth 2709.**

see ad inside front cover

Di-Tech

Audio, video and pulse DAs; video DA with clamper and equalizer; video presence detectors; audio/video routing switchers; touch-tone control systems; audio monitoring amplifier; video source identifiers. **Booth 2403.**

Dolby Laboratories

Audio noise reduction for VTRs, 334 Dolby FM broadcast unit, noise reduction for broadcast use. **Booth 385.**

see ad on page 147

Drake-Chenault Enterprises Booth 2123

Victor Duncan

Video cameras, 1-inch portable VTR, support equipment, HMI and conventional lighting. **New:** *Metal halogen lamps and lighting equipment.* **Booth 2515. Hospitality Suite: Hyatt Regency.**

Dynair Electronics

Routing switchers, distribution and sync equipment, demodulator. **New:** *Automatic logging, time code switching, tally switching, telephone line remote control.* **Booth 368.**

Dynametrix Booth 2627

Dynasciences

Model 9048 graphic system, VTR editors, chroma keyer, processing system. **New:** *Video DA with loss of video detector.* **Booth 497.**

Dytek Industries

Editing switchers, production switchers, routing switchers, digital timers. **Booth 2301.**

EICO

Synchronizers: an Ampex VPR-2 locking with sound to an Ampex ATR-100 and a MM1200. **Booth 301 (with Ampex).**

see ad on page 174

EEV

Camera tubes, power triodes and tetrodes, character display tubes, vacuum capacitors, traveling wave tubes. **New:** *High efficiency Klystrons, water cooled vacuum capacitors, alpha numerics character displays.* **Booth 326.**

EG&G

High intensity obstruction lighting, lightweight 300mm beacon. **New:** *Rack-mounted controller.* **Booth 2302.**

EMS

Booth 2722

ENG Corporation Booth 2313

AT AUDI-CORD VALUE IS NOT EXPENSIVE

We applied cost conscious design to our Modu-Cart 100 Series Cartridge Machines. Consistently improved over our 2½ years in production and yet, we've been able to maintain our costs, resulting in increasingly higher value to our customers.

**THERE HAS NEVER BEEN A BETTER TIME TO BUY
MODU-CART! — WE INVITE YOUR COMPARISON.**

look at the features:

- 100% Modern Solid State Electronics
- Replay Lock-Out Circuit — Prevents Double Airing
- Front Access Controls — Removable Desk Covers
- Heavy Duty Inverted Head Mountings
- Rugged Mechanical Design — Cool and Quiet
- Optional Digital Recording Timer
- Internal Record Response Test System
- Six Position Auto-Switched Meter
- + 18 dBm Audio Output — Wide Headroom
- Desk or Rack Mount Optional
- 24 Model Variations For Your Needs

 **AUDI-CORD CORPORATION**
1845 W. Hovey Ave., P.O. Box 611 Normal, Ill. 61761

Circle (112) on Reply Card



RECORD-PLAY



PLAYBACK

Tomorrow's Design Today —

At Yesterday's Prices

Booth #419 NAB

PHILIPS

*the company that made
INNOVATION the key word
in broadcast technology
invites you to FOCUS on the
integrated design of the cameras
and camera systems that have
always made Philips the leader in
the industry. You'll see the many
breakthroughs in the new LDK-14
ENG/EFP/Studio portable; the renowned
LDK-25 camera family with diode-gun tube;
the extremely flexible VIDEO 80 camera
and production system; why our UHF/VHF
Transmitters and Exciters have been so
successful; our new 1" VTRs, and a host of
other Philips innovations. We've put it all
together at NAB Booth 314 and we call it:*

FOCUS ON TECHNOLOGY

*You'll call it the clearest picture ever on why
Philips technology has earned us the reputation
INNOVATIVE LEADER IN WORLD TELEVISION*

Philips Broadcast Equipment Corp.

A NORTH AMERICAN PHILIPS COMPANY
91 McKee Drive, Mahwah, N.J. 07430



PHILIPS®
TM N.V. Philips of Holland

Exhibit roundup: E-Fa

E-N-G Corporation

Van, EFP carts, EFP cars. **Booth 2402.**

ESE

Digital clocks and timers, time programmers and stopwatches. **Booth 403.**

see ad on pages 207, 209

Eastman Kodak Company
Booth 473

Edco Products

Broadcast audio cassette equipment, stereo phase enhancer, audio/vid-
eo/pulse preamps. **Booth 359.**

Edutron

Ccd-ih time base corrector. **New:**
Ccd-2h time base corrector, ccd-16h
time base corrector. **Booth 2603.**

Eigen Video

Sports controller for instant replay,

animation controller with live
demos. **New:** High-band color disc
recorder. **Booth 557.**

Electro & Optical Systems

Portable SMPTE time code genera-
tor, SMPTE time code readers,
SMPTE time code generators, vec-
torscope, waveform monitors, peak
program meters. **New:** Color moni-
tors, color receiver monitors, mono-
chrome monitors. **Booth 2803. Hospi-
tality Suite:** Marriott.

Electro Controls

New: Plexus 1000, Parellipspheres,
14- and 18-inch scoop. **Booth 2303.**
Hospitality Suite: Sheraton-Dallas.

Electrohome, Ltd.

9-, 11-, 14-, 17- and 23-inch single
and rack-mount monochrome moni-
tors; 19- and 25-inch color video
monitors. **New:** 9-inch monochrome
monitor for tape editing. **Booth 535.**
Hospitality Suite: Marriott.

see ad on page 40

Electro Impulse Laboratories

Loads, calorimeters, wattmeters, at-
tenuators. **Booth 417.**

Electronics, Missiles & Communica- tions

UHF transmitter, UHF translators,
VHF translator, MDS transmitter,
MDS amplifier. **New:** VHF transmit-
ter, VHF amplifier. **Booth 328.**

see ad on page 167

Electro-Voice

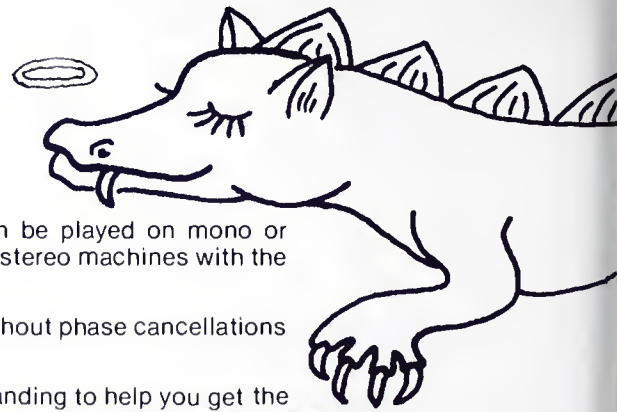
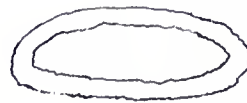
Microphones and accessories. **New:**
D056 shock-mounted dynamic omni,
RE18 dynamic shock-mounted varia-
ble D supercardioid microphone,
313A shock-mount microphone
clamp, AC24 power supply for
condenser microphones. **Booth 2504.**

see ad on page 131

Enterprise Electronics
Booth 2710

Farinon Electric

Frequency-agile portable microwave
transmission systems in 2-, 7- and
13-GHz bands; studio-transmitter
link, FM transmission channel sys-
tem. **New:** Low-noise 21-channel 2



- * cart compatibility—cartridges made using the Monstermat can be played on mono or stereo machines, and your old mono carts can now be played on stereo machines with the full mono signal on both channels
- * full fidelity—your mono listeners will receive your broadcasts without phase cancellations which result in muddy monaural sound
- * super signal-to-noise ratio—the Monstermat employs dbx companding to help you get the best out of your system



Taking up only 1 3/4" of rack space, the Monstermat solves the problem of broadcasting in stereo to a predominantly mono audience. By putting your all-important L + R mono signal safely on to one cart track, it eliminates the possibility of phase shifts due to machine misalignment or tape warp. The second track carries the difference, L - R, signal. Full stereo is restored on playback and dematrixing. No special cartridges are necessary for stereo use.

The use of the dbx noise reduction system ensures the best possible signal-to-noise ratio and dynamic range from your equipment. Switching of the dbx circuitry is automatic, so dbx-encoded and non-encoded carts may be mixed.

Eventide

the next step

Monstermat is a trademark of Eventide Clockworks, Inc.

EVENTIDE CLOCKWORKS, INC. • 265 WEST 54TH STREET • NEW YORK, N.Y. 10019 • 212-581-9290

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BELAR presents 1989.



Today.

1989's broadcast equipment is on the way NOW. Ten years before its time.

Belar Electronics, recognized throughout the industry as the pacesetter in advanced engineering, is readying equipment that may very well be state-of-the-art a decade from now.

Completely redesigned lines of AM and FM equipment—all ahead of their time—make Belar a better buy.

And, as always, Belar equipment does more than you expect. Incorporating all of today's standard industry features, plus the Belar touch: Tomorrow's Technology—Today.

For more information on how you can be more than just "up-to-date" call or write Arno Meyer today.

See us at booth **367** at NAB

BELAR
ELECTRONICS LABORATORY, INC.

LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • 80X 826 • (215) 687-5550

Where Accuracy Counts . . . Count on Belar

Circle (115) on Reply Card

March 1979 *Broadcast Engineering* 139

www.americanradiohistory.com

Exhibit roundup: Fa-Go

GHz ENG/EJ receiver. **Booth 374.**

[see ad on page 145](#)

Yves Faroudja

Comb filter decoder, record booster in rack, portable Crisp-Matic. **New:** Crisp-Matic with ringing suppression, combination enhancer/decoder. **Booth 412B.**

Fidelipac

Master cartridges, cartridges, cartridge racks, studio on-air light, wow and flutter meter, height gauge, head insertion gauge, right angle zenith gauge, splicing tape and blocks, standard lubricated cartridge tape, cartridge labels, delay cartridges. **New:** Gold standard alignment tapes, bulk tape eraser, foreign on-air lights. **Booth 351.**

[see ad on page 14](#)

Filmways Productions

Booth 2423

Flash Technology

High intensity tower lighting system, optical link, controller. **New:** dc operated beacons. **Booth 547.**

Frezzolini Electronics

Light power packs and belt packs, dc/ac inverter for portable field operation of TV equipment, belts. **New:** Belts for video cameras with built-in line isolated charger, 16mm camera for documentary. **Booth 2415.**

Fuji Magnetic Tape

2-inch broadcast videotape, hi-density videotape, 3/4-inch videocassette, VHS and Beta videocassettes. **New:** 1-inch videotape, 1/2-inch videocassettes. **Booth 402. Hospitality Suite: Marriott.**

[see ad on page 115](#)

Fujinon Optical

Camera lenses, teleconverter, wide angle converter. **New:** High resolution studio camera lenses, lens with 2x extender, lens. **Booth 515. Hospitality Suite: Fairmont.**

[see ad on pages 133, 135](#)

GTE Sylvania

Tungsten halogen lamps for studio

and theater lighting. **Booth 320.**

[see ad on page 116](#)

Gardiner Communications

Booth 2116

Garner Industries

High speed reel-to-reel tape duplicator for 1/4-inch tape, conveyor belt audiotape erasers, conveyor belt videocassette tape eraser. **New:** Bulk eraser for 2-inch quad videotape with conveyor belt design. **Booth 415.**

[see ad on page 130](#)

General Electric

Stage studio lamps. **Booth 2509.**

[see ad on page 118](#)

Glentronix

Video production switcher, routing switcher, logic analyzer, side band analyzer, time code equipment, clock systems. **Booth 2609. Hospitality Suite: Marriott Hotel, Room 321.**

Alan Gordon Enterprises

Stereo cassette recorder with sync resolver, master system, windscreen

CREATIVE RELIEF FOR PRODUCTION HEADACHES

Broadcast/Recording
Equipment from
MICMIX

CAUTION: Use of MICMIX equipment can be habit forming.

MIS MICMIX Audio
Products, Inc.

2995 Ladybird
Dallas, TX 75220


(214) 352-3811

Circle (116) on Reply Card

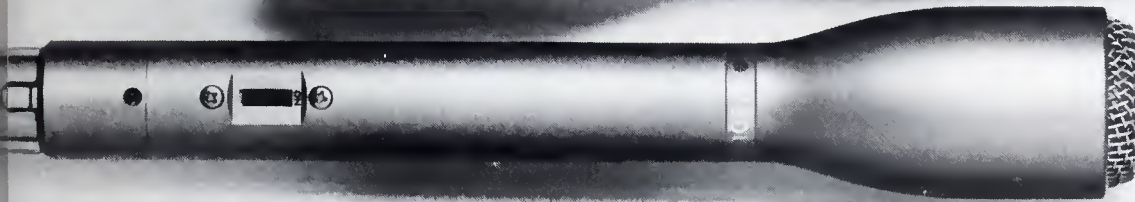
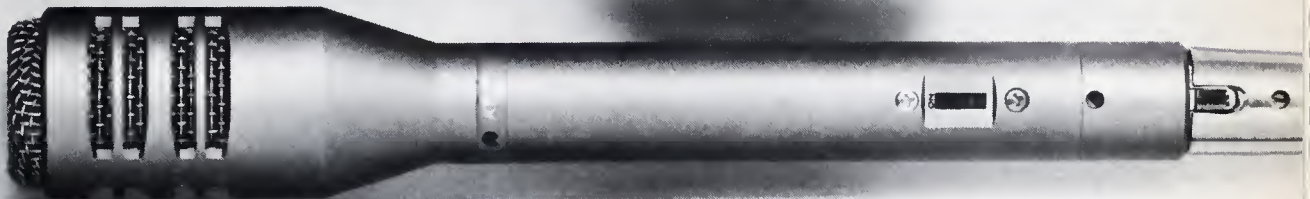
Audio-Technica introduces five new microphones... and a pleasant surprise.




AT813
Electret
Condenser
Cardioid



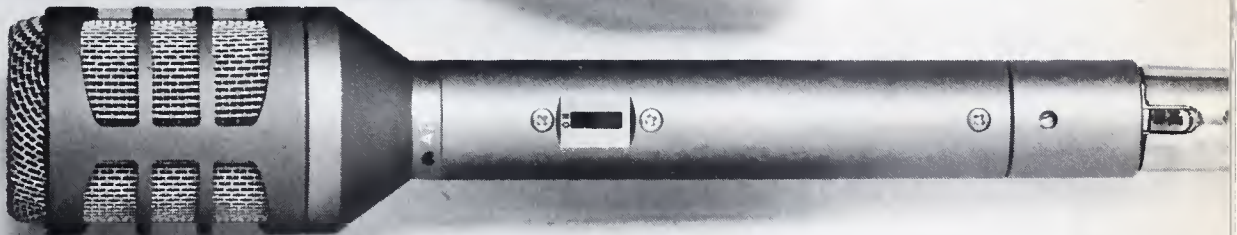
AT811
Electret
Condenser
Cardioid



AT801
Electret
Condenser
Omnidirectional



AT812
Moving Coil
Dynamic
Cardioid



AT802
Moving Coil
Dynamic
Omnidirectional

Take a close look at these new Audio-Technica microphones. Three electret condensers and two dynamics. Plus two clip-on miniature electrets (not shown). All are superbly finished. Carefully thought out in every detail. With the right "heft" and feel. Professional A3M Switchcraft output connectors, of course.

Then listen in your studio. Full-range, peak-free, clean and crisp. With

no distortion even when used close-up to high-level performers. And the balanced, phased Lo-Z (600 Ohm) output matches pro and semi-pro mixers alike.

Now for the surprise. The price. Both omnis are nationally advertised at just \$60, for either dynamic or electret condenser element. The two basic cardioids are just \$80, while the AT813

electret condenser with integral wind-screen is pegged at \$95. All complete with full one-year warranty.

Once you've seen and tried these new Audio-Technica microphones we think you'll welcome them. Not just because they cost so little...but because they do so much. Available now from your Audio-Technica Professional Products dealer.

 **audio-technica**. *Great sound, right from the start!*

Exhibit roundup: Go-1k

and shock mount, noise cancelling system, mic booms, director's viewfinder. **New:** Wireless mic systems, antenna systems, communicator system, microphones for use with company's transmitters. **Booth 2501.**

Gotham Audio Corporation

Microphones, disc playback system, noise reduction system, tape recorders, tape timers, audio level meters. **New:** Shotgun condenser microphone. **Booth 423.**

The Grass Valley Group

Production switchers, modular automation system, routing switchers, video processing system, distribution equipment, digital video effects system. **Booth 308.**

see ad on page 3

The Great American Market

Scene machine, projector patterns, special effects, Fresnel lights. **New:** HMI lights, strobe light. **Booth 2708.**
Hospitality Suite: Marriott.

Gregg Laboratories

Audio processing equipment. **New:** Tri-band processing amplifier. **Booth 2118.**

see ad on page 78

Groton Computer

Booth 2204

HM Electronics

Wireless microphone, triple diversity system, wireless hand-held mic, receiver rack. **New:** Flat pack portable receiver, wireless mic with dynamic expander. **Booth 2604.**

Hallikainen & Friends

Program logging system; TV audio system with output module, mixer module, digital telemetry, time announce. **New:** Digital telemetry, local display option. **Booth 2312.**

see ad on page 178

Harris Corporation

AM transmitter in an operating AM stereo demo, FM transmitter, VHF high band color TV transmitter, TV antennas, FM antennas, color TV

camera with triax, color TV camera, FM exciter/audio processor demo rack, audio processor demo rack, program control demo, facilities control demo, stereo consoles, cartridge equipment. **New:** Medium wave transmitter, FM transmitter, solid-state transmitter. **Booth 303.**

see ad on page 11

Hitachi

Time base correctors, editing systems, console package. **New:** Portable recorders, Type C recording equipment, monitors, ENG camera, studio/field camera. **Booth 334.**

see ad on pages 29, 31

IGM/NTI

Automation system with logging, multiple cart playback, micro floppy disc dump load. **New:** Off-air income expander method. **Booth 343.**

see ad on page 121

Ikegami Electronics (USA)

Film camera with auto color balance, ENG camera switcher, color monitors. **New:** ENG/EFP camera with multicore cable CCU, ENG/EFP camera with triax cable CCU, Studio/field camera with diode gun

If you sell or service audio tape equipment, you can GET THIS NEW \$2.00 TAPE EDITING GUIDE FOR ONLY 50¢.

Joel Tall, the inventor of modern tape splicing blocks, now gives you the secrets of undetectable tape editing. 32 pages. 25 pictures illustrating tape editing equipment and how to use it.

Chapters on: How to find where to cut the tape. . . Learning to recognize sound. . . Listening in reverse to recognize sound. . . Speech characteristics. . . The limits of hearing and how to employ them in editing. . . and much more!

If you are in the "trade," send this coupon with 50¢ (check, m.o. or two quarters) for your sample copy of Joel Tall's instructive book. Money back if you don't think it's great! Elpa Marketing Industries, Inc.

Limited offer. No order accepted without this coupon.



Elpa Marketing Industries, Inc.
Box 1050, New Hyde Park, NY 11040

BE279

Gentlemen: Please send me a copy of "Tape Editing." I am enclosing 50¢ to cover postage and handling.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Circle (118) on Reply Card

If you're hung up on zoom ratios, how about... 52:1?

- **VAROTAL MRL**—It's the smallest production TV zoom lens in the world, yet its versatility delivers a range of angles of view from 10:1 to 52:1.

MRL—It means multi-role lens. Here's the kind of image quality, flexibility, and economy that engineers, cameramen, and directors can agree on for: 1. brilliant image, 2. portability inside or outside, and 3. close-ups (less than 5 feet from cameraman to subject).

MRL has snap-on front elements—one for studio, one for outside broadcast, and one for those, compromise, all-around shots. Lens interchange is instantaneous and requires no adjustment or re-registration.

Why buy a zoom ratio when what you really need is the world's most economical, flexible TV lens?

With MRL you can think in terms of angles of view.

Discover the quick-change artistry of Varotal, by Taylor-Hobson.

Send for 12-page Bulletin MRL



**VAROTAL
MRL**

**RANK OPTICS
TAYLOR-HOBSON**



RANK PRECISION INDUSTRIES, INC.

260 North Route 303 West Nyack, NY 10994 (914) 358-4450

BOOTH 348 National Association of Broadcasters

RO-179

Circle (119) on Reply Card

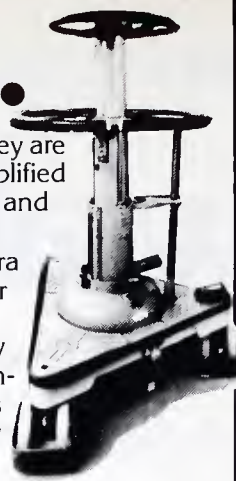
March 1979 *Broadcast Engineering* 143

Outstanding...

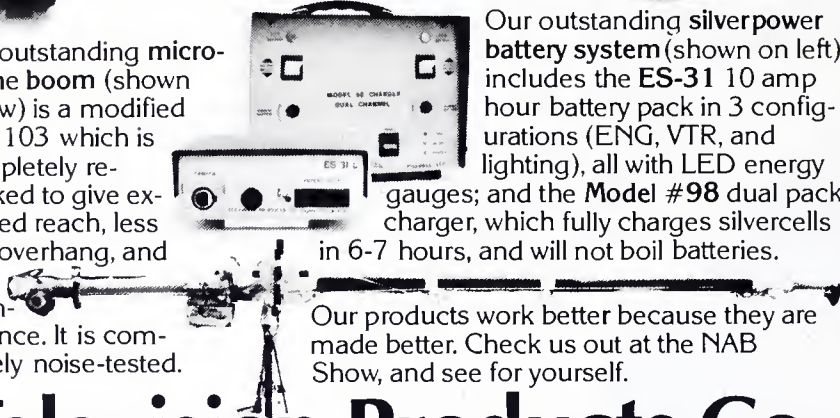


Our products are outstanding in the way they are manufactured...superb engineering and simplified design make them virtually maintenance-free and give many years of dependable service.

With 5 to choose from, we have a camera pedestal for every need, ranging from our P-20 to our heavyweight, the P-50. The P-20 (shown on left), which weighs only 160 lbs., will operate with 300 lbs. of camera weight. The P-50 (shown on right) has unsurpassed stability with extreme versatility and heavy camera weight capability.



Our outstanding microphone boom (shown below) is a modified M-R 103 which is completely re-worked to give extended reach, less rear overhang, and low maintenance. It is completely noise-tested.



Our outstanding silverpower battery system (shown on left) includes the ES-31 10 amp hour battery pack in 3 configurations (ENG, VTR, and lighting), all with LED energy gauges; and the Model #98 dual pack charger, which fully charges silvercells in 6-7 hours, and will not boil batteries.

Our products work better because they are made better. Check us out at the NAB Show, and see for yourself.

Television Products Co.

9016 Aviation Blvd., Inglewood, CA 90301 Phone: (213) 776-3276

Circle (120) on Reply Card

Last year, America invested in two programs to help the hard-core unemployed.



One of them paid a terrific return on investment.

Although public assistance programs are necessary, they are also expensive. Last year they cost \$24 billion. And brought back no tax dollars in return.

The National Alliance of Businessmen, on the other hand, costs comparatively very little, \$8.5 million, last year. Yet by working with business people like yourself to find jobs for the unemployed poor, Vietnam-era veterans, needy youth, and ex-offenders, the National Alliance of Businessmen reduced welfare payments and created brand-new tax revenue totaling several hundred million dollars.

This year we're also trying to bring business people together with educators, to develop work-study programs that will give our youngsters the skills they'll need when they graduate.

If you're a business person who is willing to work to help curb steadily rising welfare costs, please call the National Alliance of Businessmen. We're in the white pages of your telephone book.

Help America work.



The National Alliance of Businessmen

Ad Council A Public Service of This Publication & The Advertising Council

Exhibit roundup: Ik-J

Plumbicon, ENG camera, studio camera with triax cable, portable production camera. **Booth 406. Hospitality Suite: Ramada Inn, 1121.**

see ad on pages 41, 42, 43

Image Transform Booth 2309

Image Video Limited Booth 2819

Industrial Sciences (ISI) Video production switchers, master control, routing switcher. **New: Rotary wipes, audio mixer. Booth 531.**

Innovative Television Equipment **New: Counter balance studio pedestal, hydro head for counter balancing cameras, ENG tripods. Booth 388.**

Inovonics Limiter, audio optimizer, noise suppressor, tape electronics, tape reproduce amp, tape tensioning kit, acoustic analyzer. **New: Multiband AM audio processor, automation reproduce amplifier. Booth 2103.**

Interand Multi-page Telestrator system with digital scan converter and "scratch-proof" graphics input tablet, Telestrator demonstration videotapes illustrating capabilities of Telestrator systems, model 600 Telestrator with Mark II Symbol Generator. **New: Telestrator programmable animation system, Telestrator pointer-tracker, unitized model 600U Telestrator. Booth 2703.**

International Tapetronics Corporation Cartridge machine line with delay units, economy cart units, eraser/splice locator, reel-to-reel recorders and reproducers. **New: Tape cartridge machine, cartridge system. Booth 319.**

see ad on page 20

International Video Corporation 2-inch VTR, 1-inch VTR, BCN 1-inch VTR. **New: Studio camera, portable production camera. Booth 346.**

Our new receiver couldn't care less where your ENG crew goes.



With Farinon's new FV2CR Central Receiver, you can now send your ENG crew to wherever the action is. And minimize the problems of weak signals and distortion. That's because this outstanding receiver has an unsurpassed 32-dB dynamic range. When signal strengths vary due to different transmission distances, the FV2CR compensates automatically to assure optimum performance.



For transmissions as far away as 300 miles, the FV2CR can operate with a minimum system fade margin of 20 dB. And with the ENG crew as close as 1/8 of a mile, the receiver's front end won't overload and cause distortion like other receivers.

The FV2CR provides 21 synthesized channels in the 2-GHz band. By instantaneous phase-lock loop, the channel you select (manually or remotely) is the channel you get. And the receiver's unique, extremely sharp IF SAW filter provides excellent selectivity of at least -45 dB with maximum half-channel rejection. Also its noise figure of only 3 dB is tops in the industry.

Now you'll have a new degree of freedom in news coverage. So you can send your ENG crew wher-

ever the action is. And Farinon's new FV2CR Central Receiver couldn't care less where they go.

Farinon Video also offers portable and mini-portable video transmission systems, STL micro-

wave radios, FM transmission channel systems, as well as video baseband treatment units and ancillary equipment.

For information, contact Farinon Video today.



A Farinon Company

Main Office: 1680 Bayport Ave.,
San Carlos, CA 94070; Telex: 34-8491
Domestic, Phone: (415) 595-3500
Export, Phone: (415) 592-4120

Canada: 657 Orly Ave., Dorval, PQ H9P 1G1
Phone: (514) 636-0974; Telex: 05-82-1893;
TWX: 610-422-4122

See Farinon's new FV2CR Central Receiver and other ENG video equipment at NAB, booth 374.

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March 1979 *Broadcast Engineering* 145

Get it from a reliable source

That's ROH.

For years we've been making communication-grade audio equipment designed for superior performance and we'll match our reputation for quality with anyone. If you're in the market for signal distribution, routing, monitoring, or intercom equipment which will provide years of maintenance-free service, let us be your source.

For more information, please write or call Jim Godwin at (404) 449-0873



roh corporation

4313 NORTHEAST EXPRESSWAY ATLANTA, GA 30340



Exhibit roundup: J-L

JAM-Creative Productions
Booth 2510

US JVC Corporation

AAP44 AC adapter, CR 8500 editing, 7860 VM color TV monitor, G-71 color camera, HR 4100 battery operated VTR, CR 4400 portable VCR, CY 88-0 ENG color camera, CR6060 remote controllable color VCR. **Booth 408.**

see ad on pages 18, 19

Jampro (Cetec Antenna Company)

Spiral omnidirectional CP antenna, ring-panel CP antenna, zig-zag and batwing TV transmitting antennas, FM antenna, compendium of CP/TV test and performance data. **Booth 499.**

Jefferson Data Systems
Booth 551

Kaman Sciences Corporation/BCS
Booth 325

Keeline
Booth 2107A

Kings Electronics Company
Booth 394

Kliegl Brothers

Memory lighting control console with option packages, portable dimming system, HMI TV booster, softlights, HMI lighting, CSI lighting, Fresnel fixtures. **Booth 366.**

see ad on page 168

Knox Video Products

Titling systems, disc memory system. **New:** Microprocessor-controlled disc memory system. **Booth 2706.**

see ad on page 38

LPB

Audio consoles, equalizer/preamps, distribution amplifiers, compressor/limiters, studio furniture systems, turntable systems, AM transmitters. **New:** Audio consoles, FM transmitter, turntables. **Booth 383.**

see ad on page 46

Go anywhere SMPTE Edit Code Generator and Companion Reader that will give you an instant shot list.



The only portable SMPTE Code Generator. Shintron Model 640 SMPTE Edit Code Generator.

- Goes anywhere with your ENG crew.
- Light and rugged. It attaches to your VTR and produces accurate edit code as you shoot important scenes.
- You cannot enjoy full advantages of ENG unless you have the 640 SMPTE Edit Code Generator.
- EBU European Standard version available.



Model 644 Edit Code Reader

When Shintron builds a new product, we think of our customers' convenience first. Good Edit Code Readers are a dime a dozen today, but which one can generate an instant shot list? The only one is Model 644 Edit Code Reader / Raster Display and Shot List printer.

SHINTRON Worldwide

Cambridge, MA 02142 USA
(617) 491-8700 / telex: 921497

Circle (123) on Reply Card

With the Dolby system, the sound can match the picture.

A great deal is happening these days to improve the quality of television audio. New distribution methods such as diplexing, new post-production techniques for laying down sound-tracks without having to re-record them repeatedly on VTRs, the reality of stereo TV audio in some countries — these factors and more are combining with the growing audience sensitivity to good sound to put a new emphasis on television sound quality.



Dolby noise reduction can improve the audio performance of virtually any VTR.

However, a major bottleneck remains: noise. The better the rest of the studio and distribution chain becomes, the more the noise from the audio tracks of VTRs limits the ultimate fidelity of television sound. The audio signal-to-noise ratio of 2" quad machines is typically worse than 50 dB, while the specs for the new generation 1" machines are typically 52-56 dB. That kind of performance is not as good as many consumer audio tape recorders, and unless improved, may always keep television sound in second place to the high fidelity color picture.

Dolby noise reduction is the proven way to break the noise bottleneck, here and now. It provides 10 dB of noise reduction (rising to 15 dB at higher frequencies), without audible degradation of the original signal. It reduces hiss, hum, rumble, the effects of multiple-generation re-recording — *all* noise not part of the original signal. It reduces print-through, even years later. It can reduce distortion by permitting the use of lower record levels. And Dolby noise reduction is the key to taking full advantage of the wider frequency range now increasingly being provided in the rest of the TV audio chain.

Since its introduction 13 years ago, Dolby noise reduction has become universally accepted for quality audio tape recording, both professional and consumer. It is also regularly used to improve the audio quality of VTRs in several European countries. Just ask any professional audio recording engineer about the benefits of the Dolby system, or contact us for full technical information. Let us help you in your efforts to provide television sound which matches the television picture.

Visit Dolby Laboratories at Booth 385, NAB, Dallas, March 25-28.

DD Dolby®

Dolby Laboratories Inc

'Dolby', Dolbized and the double-D symbol are trademarks of Dolby Laboratories

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S79/1597

Circle (124) on Reply Card

March 1979 **Broadcast Engineering** 147

Need it in a hurry?

We ship most catalog items from stock the same day an order is received.

Fast service and dependability is our standard. Request our free catalog of equipment and components.

We have 15 years of experience in serving the broadcaster's equipment requirements.

Broadcast Equipment & Supply Co.

P.O. BOX 3141
BRISTOL, TENNESSEE 37620
(615) 878-2531

Circle (125) on Reply Card

Camera Titling Made Easy



WITH THE NEW VIDEO RETICLE GENERATOR VR-116

- Independent control of Safe Title and Safe Action reticles
- Unrestricted selection of limits both horizontally and vertically
- Remote control switching of Safe Title, Safe Action and cross-hairs
- Continuous brightness control from 0 to 100% luminance value
- Joy-stick control of Safe Action reticle from dead-center to edge of blanking area

Call or write:

GRAY ENGINEERING LABS, INC.

504 W. Chapman Ave.
Orange, Ca. 92668
714-997-4151

Circle (126) on Reply Card

Exhibit roundup: L-Li

L-W International

Telecine slow motion freeze-frame projectors. **Booth 338.**

see ad on page 152

Laird Telemedia

Booth 537

see ad on page 160

James B. Lansing Sound (JBL)

Studio monitors amplified monitor. **New: Studio monitor. Booth 2623.**

see ad on page 155

Leitch Video, Ltd.

Master sync generator, source or slave generator, sync source generator, video processing amp, distribution amps, color test generators, automatic changeover, PAL sync generator. **New: PAL video processing amplifier, 8-inch digital clock with sweep indication. Booth 561.**

see ad on page 53

Lenco

Terminal equipment, video noise meter. **New: High resolution color monitors, broadcast waveform monitors and vector scopes. Booth 372. Hospitality Suite: Loew's Anatole.**

see ad on page 55

Lightning Elimination Associates

Lightning dissipation arrays, power line surge eliminators, transient eliminators for data and phone lines, lightning warning systems, grounding systems. **New: Electronic filtering systems, surge generators, guy charge dissipation chokes, transient eliminators ranging to 1 GHz. Booth 437.**

see ad on page 84

David Lint Associates

Professional recorders, broadcast and studio recorder heads, motor repair service, head relapping/replacement, cartridges, in-cassette duplicator, complete turnkey AM/FM broadcast stations. **New: Recorder heads. Booth 447.**

Lipsner-Smith

New: Film cleaning/conditioning system. Booth 539.

Listec Television Equipment

You get only one chance at a live feed. So put a TerraCom TCM-7 "Miniwave" at the scene.

The TCM-7 is the best performance ENG microwave available anywhere — and the easiest to set up and operate. Field tune to any channel. No reported failures on the first one hundred links delivered. Available in 2, 7 and 13 GHz — as well as all other bands.

That's it — fine reliability, high performance, easy to use, all bands, and tunable frequency. Best price too.

For more information or a demonstration, call Bob Boulio or Stan Sievers at TerraCom (714) 278-4100 9020 Balboa Avenue, San Diego, CA 92123

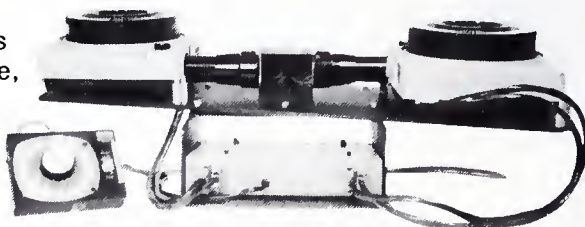


L LORAL Corporation
Circle (127) on Reply Card



If you are using
Standard Kodak
Slide Projectors
in your TV filmchain,
you can now convert
to Random Access
Projectors, easily.

Mast Series 137 Random Access Slide Projectors are dimensionally and optically identical to Kodak Ektagraphic Series Projectors. Many dissolve, programming and control options allow easy adaptation to broadcast use. Ask us about the extraordinary slide projectors from Mast.



Call Dave McAndrews for immediate information. (319) 326-0141.

MAST DEVELOPMENT CO.
2212 E. 12th St., Davenport, IA 52803

Circle (128) on Reply Card

Camera mountings, prompters, audio consoles, time code generator, titler, delay lines, safe area generator. **New:** 3-stage portable pedestal and crabbing base, fluid cam head with tilt compensation, post head for ENG cameras. **Booth 465. Hospitality Suite: Marriott.**

see ad on page 170

**Live Sound
Booth 2714**

Logitek Electronic Systems
Audio consoles, balanced-input turntable preamp, EBS equipment, game show scoreboards and accessories. **New:** Transmitter remote control, digital clocks and timers, audio power amps. **Booth 2111.**

see ad on page 209

Lowel-Light Manufacturing
Omnilight system, lighting systems, softlights, reflectors, link location grip system. **Booth 2506.**

**MBH Enterprises
Booth 2523**

MCI
2- and 4-track recorders, 8-track recorder, broadcast recorder, 24-track recorder, automation control center for multitrack recorders. **New:** SMPTE/EBU generator/reader/synchronizer, automated console. **Booth 401.**

3M (A/V Products & Mincom)
1-inch videotape, quad videotape, videocassettes, audible range tapes, magnetic film, production switchers, video routing switchers, character generators, video effects generators. **New:** Dual microprocessor graphics generator system, character generator, microprocessor routing equipment, digital effects generators, microprocessor video production switcher. **Booth 302. Hospitality Suite: Loew's Anatole.**

3M (A/V Products)
New: Endless-loop radio cartridge system. **Booth 439. Demonstration Suite: Fairmont, 1601.**

see ad on page 111



**Equipto
Enclosures**
... the highest quality
electronic cabinets
you can buy!

Here's why:

1. Designs are handsome and functional
2. Cabinetry is durable, rugged
3. Service — prompt and dependable

Whatever you're looking for in cabinetry or desk systems, we have several lines of modular enclosures available to effectively display and protect your instrumentation. Or, we'll custom design enclosures to suit your individual needs. Choice of color at no extra charge.

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EQUIPTO ELECTRONICS CORPORATION
403 Woodlawn Ave. • Aurora, Illinois 60507
Phone: 312/897-4691

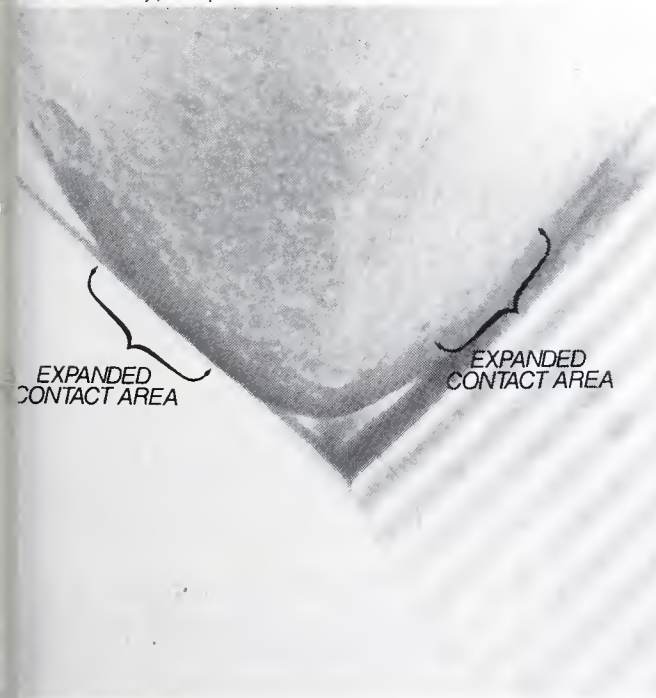
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PROFESSIONAL

**WUHY-FM, Philadelphia, rates Stanton's
881S superior in every aspect!**



Disc Jockey, Stephen Brooks at the mike.



Scanning Electron Beam Microscope photo of Stereohedron® stylus, 2000 times magnification; brackets point out wider contact area.

- The Stanton 881S cartridge, with its Stereohedron stylus, has been rated, worldwide, as the outstanding stereo cartridge of its time. So, it ought to be a rather delicate pick-up. Not so, says WUHY... outstanding National Public Radio FM Station in Philadelphia. Mr. Ajit George, Director of Development and Awareness, quotes his Engineering Staff in this way:
- 1) We back cue the 881S with no damage to the stylus.
 - 2) It has excellent flat frequency response.
 - 3) It handles high level complex music passages with complete freedom from mis-tracking.
 - 4) The 881S has the highest output compared to average high quality magnetic cartridges, plus the fact that it gives superior signal-to-noise ratio from the phono preamp."

We are in total agreement with all of the above except, honestly, the 881S was not designed for back cueing.

Stanton guarantees each 881S to meet the specifications within exacting limits. The most meaningful warranty possible, individual calibration test results, come packed with each unit. Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the Stanton 881S.

*For further information write to: Stanton Magnetics,
Terminal Drive, Plainview, N.Y. 11803*

Visit Stanton at the NAB in Booth #363 for exciting news.



STANTON!

The choice of the professionals™

Circle (130) on Reply Card

March 1979 *Broadcast Engineering* 151

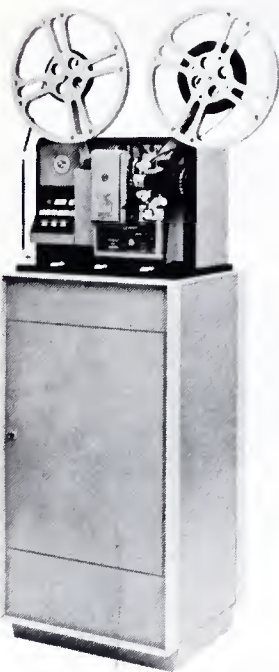
FREEZE-FRAME & SLO-MO

"the easy way"

ATHENA 4000

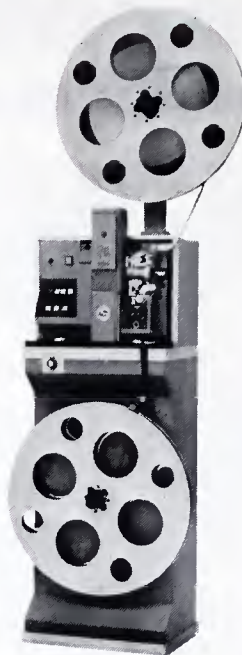


ATHENA 5000



The Athenas give you six more features than the RCA TP-66 or the EK CT-500: **AT LOWER COST!**

1. Freeze-frame, instant start/stop, animation, slo-mo—all direct from film to tape by TV film chain.
2. Digital control CMOS circuitry for complete low-voltage remote control and/or computer control.
3. 115V 60 HZ or 220V 50 HZ
4. Modular digital design for easy service.
5. Extended 2-3 year warranty.
6. Insured against obsolescence—retrofitable to new design improvements and options.



SEE US IN BOOTH
338 AT NAB



L-W INTERNATIONAL
6416 Variel Avenue
Woodland Hills, CA 91367 U.S.A.
Telephone: 213/348-8614

Circle (131) on Reply Card

ANTENNA IMPEDANCE MEASUREMENTS WITH INTERFERENCE IMMUNITY

The Model SD-31 Synthesizer/Detector Is...

... designed for antenna impedance measurements in presence of strong interference

- High-level oscillator compatible with General Radio 916 Series, 1606 Series, and Delta OIB-1 Impedance Bridges
- Special coherent detector circuit rejects interfering signals during measurements
- Crystal controlled frequency, variable in 500 Hz steps from 100.0 kHz to 1999.5 kHz

- Receiver for detector can be external or optional built-in RX-31

- Powered by rechargeable batteries

- Self-contained portable package
- Field proven

- Versatile — can use as an RF signal generator for troubleshooting antenna systems; as a variable frequency oscillator for antenna site survey; or other applications requiring a precise frequency source.



CONTACT US FOR DETAILS.

POTOMAC INSTRUMENTS

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

Circle (132) on Reply Card

Exhibit roundup: M-Mi

MPB Technologies

New: Desk-top character generator and graphics system. **Booth 2815.**

Mach One Digital Systems

Booth 2505

Marconi Electronics

Studio camera, portable camera with triax, ENG cameras, telecine, standards converter, 1-inch type C VTRs, UHF/VHF transmitter, video switchers, audio equipment, VDAs, automatic VITs analyzing equipment. **New:** TV interval timer, low distortion oscillators, distortion and noise meter, wow and flutter meter. **Booth 322.**

see ad on page 45

Marti Electronics

AM stereo STL package, remote control, mobile ENG repeater, battery-powered ENG transmitters, transmitter encoders, mobile ENG transmitters, FM stereo STL, sub-carrier equipment, compressor-limiters, monitor amplifier, program amplifier, automatic transmitter switcher, automatic receiver switcher. **New:** Remote control system, audio processor. **Booth 349.**

see ad on page 90

Memorex

Spindle height alignment gauges: MRX 716-1-inch broadcast, MRX 716-2-inch (IVC-9000), MRX 8-C-1/2-inch, 1-inch and 2-inch, MRX QzHD 3/4-inch, MRX VHS 1/2-inch cassettes, MRX audio training cassettes. **New:** MRX-spindle height alignment gauge for 3/4-inch VCR. **Booth 485.**

Merlin Engineering Works

New: Custom quad VTRs and accessories. **Booth 412.**

Micmix Audio Products

Master audio meter (LED), reverbs, effects units. **Booth 421.**

see ad on page 140

Micro Communications

Coaxial transfer switch, CP FM antenna. **New:** Channel combiner for TV, dual transmitter phase comparator. **Booth 513.**

see ad on page 46

KING TUT LIVES AGAIN AND AGAIN AND...

The magnificent treasures of Egypt's legendary Boy King, Tutankhamun, are currently on view in a tour of major museums throughout the country. To add an extra dimension for museum-goers, a recorded commentary about the exhibit is available that singles out fine points of this most important exhibition of ancient Egyptian artifacts.

The pre-recorded cassettes used for these tours must be highly reliable. Typically, each cassette—both tape and mechanism—must hold up under 1500 plays, and as many as 50,000 stops and starts on a yearly basis.

That's the challenge Acoustiguide Corporation, the company that produces these recorded tours, posed to TDK. And we met that challenge, by providing cassettes that have proven themselves again and again to give outstanding reliability and faithful sound reproduction.

TDK's unlabeled "Y" series cassette for high-speed duplication, and our AVMC audio/visual cassettes are ideal for AV and industrial uses. They're loaded with the same high-quality tape as our regular top-rated "D" cassettes, for low-noise, high-output reproduction, with broad dynamic range and unusually-low distortion. The cassette shells feature TDK's five-screw cassette mechanism (as opposed to molded-type construction) for superb performance on every type of duplicating machine at even highest speeds. (If you prefer, the same tape is also available in 1/8" pancake).

In addition, we also offer TDK Audua Series open reels and pancakes for the ultimate in 1/4" lab-quality formulations, as well as a complete selection of endless, dictation (leaderless), data and test cassettes.

Get the reliable performance needed to keep King Tut alive—check your AV or professional products supplier, and ask for our technical specification sheets and full-color brochure on TDK Professional Tape Products.



TDK®

World Leader in Recording Tape Technology

TDK Electronics Corp., 755 Eastgate Blvd.,
Garden City, NY 11530 (516) 746-0880;
106 W. Peterson Ave., Chicago, Ill.
60645 (312) 973-1222;
141 Rosecrans Ave., El Segundo, Ca.
90245 (213) 644-8625.



Circle (133) on Reply Card

March 1979 *Broadcast Engineering* 153

Exhibit roundup: Mi-N

Micro Consultants

Digital standards converter, digital frame store synchronizer, automatic noise reduction device. **New:** Digital effects, low-cost synchronizer. **Booth 404.**

Micro Control Associates

Studio-transmitter links, remote control systems, automatic transmitter systems, accessories. **New:** Aural studio-transmitter links. **Booth 311A.**

Microprobe Electronics

Booth 445

Microtime

VSP, CCD time base corrector, image processing, digital automatic programming, PS PAL/SECAM TBC. **New:** Video signal digital processing system, video signal synchronizer frame base corrector. **Booth 2305.**

see ad on page 109

Micro-Trak Corporation

Remote audio control center, sportscaster audio consoles, furniture, antenna heater control, phono pre-amps, audio consoles, tape cart racks. **New:** Audio center, audio console, furniture, turntable. **Booth 391.**

Microwave Associates

Booth 340.

Mole Richardson Company

Booth 384

The Money Machine

Booth 335

Moseley Associates

Digital control system with computer option, digital remote system, remote control, aural studio-transmitter links, audio limiter, stereo generator, remote pickup links, tele-control system, subcarrier system. **New:** Microprocessor remote control, telemetry return link, subcarrier main frame. **Booth 329.**

see ad on page 75

Motorola Communications & Electronics

Booth 433

Musicworks

Booth 2512

Mutual Broadcasting

Live satellite distribution. **Booth 2200. Hospitality Suite:** Hyatt Regency.

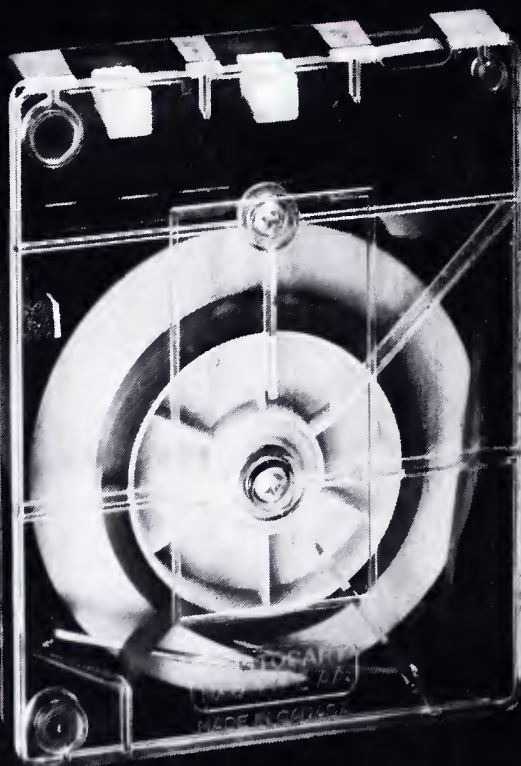
see ad on page 79

McCurdy Radio Industries

Radio on-air consoles, radio production consoles, intercoms, switchers, turntable assemblies, audio distribution assemblies, power supplies. **New:** TV production console, compressor/limiters, telephone talk show interface, audio DAs. **Booth 321. Hospitality Suite:** Hyatt Regency.

McMartin Industries

FM transmitters and exciter; AM transmitters; remote pickup equipment; FM, stereo and SCA monitors;



NAB TYPE AA Cartridge
manufactured by
ARISTOCART DIV. WESTERN BROADCASTING LTD.
505 BURRARD ST. VANCOUVER, CANADA V7X 1M6
TEL: (604) 687-2844 TELEX: 04-54639

We've set
the industry's highest standard
of cartridge sound reproduction
— and we maintain it
in every cartridge

With ARISTOCART, quality variation problems and time-consuming selection routines are eliminated. What you tape is what you hear — consistently. Each ARISTOCART is individually tested for phase, frequency response and overall performance. On a properly aligned machine, it will deliver stereo fidelity at least equal to the most sophisticated reel-to-reel equipment. Or we replace it at our expense. Another plus: ARISTOCART's exclusive pressure pad configuration prolongs the life of your expensive head by as much as 100%.

So you save significantly on maintenance.

Note to AM operators: ARISTOCART delivers superb mono quality now and incomparable stereo when you convert, without further alteration.

ARISTOCART

The cartridge for people who care how they sound

Circle (134) on Reply Card

HEAR FROM US BEFORE YOU HEAR FROM THEM.

Today's broadcasting equipment and standards let you transmit things you never could before.

Like tape hiss, cue tone leakage and turntable rumble, to name a few.

And that's precisely why you need the 4301 Broadcast Monitor. It's made by JBL, the recognized leader in professional sound equipment.

The JBL 4301 lets you hear everything you're

transmitting. All the good stuff. And, all the bad. So you can detect the flaws before your listeners do.

It's super-compact, so it fits all EIA Standard racks. 19" h x 12 $\frac{1}{16}$ " d x 11 $\frac{1}{2}$ " w.

Just give us your name and address and we'll send you all the 4301's very impressive specs.

Along with the name of your nearest JBL Professional Products Dealer.

He'll tell you everything you need to hear.



GET IT ALL.



James B. Lansing Sound, Inc. / Professional Division, 8500 Balboa Boulevard, Northridge, California 91329

Circle (136) on Reply Card

Exhibit roundup: N-Or

EBS equipment; studio and remote consoles; audio amplifiers. **New:** AM transmitter, FM amplifier/transmitter, simultaneous transmission of audio and digital data over same SCA channel. **Booth 317.**

see ad on page S2

NEC America

Time base corrector; transmitters; color camera; digital video effects; DFE; 7-, 13- and 40-GHz Domsat; switcher. **New:** Digital strobe action, multi-freeze. **Booth 2404.**

see ad on page 67

NOAA (Weather) Booth 2840

NTI America Booth 2209

Nagra Magnetic Recorders

Nagra stereo 2-track portable recorder, Nagra E monaural recorder, Nagra IS intermediate monaural recorder, QGB extension 10½-inch

NAB reel adapter. **Booth 525.**
see ad on page 16S

Network Recording Productions Booth 2807

Rupert Neve

Multitrack tape machine, radio broadcast console for medium markets. **New:** NECAM computer-assisted mixing console for TV post-production. **Booth 507.**

Nortronics Company

Magnetic replacement tape heads, magnetic tape heads, relapping kit, alignment tapes, splicing blocks, head cleaners, maintenance products for magnetic recorders. **New:** Broadcast cart machine head degausser, broadcast conversion kit. **Booth 345.**

Fred A. Nudd Corporation

Towers. **New:** Monopoles. **Booth 2310.**

Nurad

Quad horn system, antennas. **New:** Digital remote control system, dual band quad system, directional antenna, 7 GHz transmit antenna. **Booth 533.**

Oak Communications Booth 2223

O'Connor Engineering Laboratories
Fluid pan & tilt camera heads, Hydro-P&D model 102 B. **Booth 2500.**

see ad on page 63

Oktel Corporation

Slow motion disc recorder, RGB machine, slo-mobile, slide file disc recorder. **Booth 2125.**

see ad on page 81

The Olesen Company Booth 2607

Orange Coast (Van) Booth 2717

Orange County Electronics

The Orban 672A: A Dream Equalizer at a Practical Price



The 672A is a single-channel equalizer offering astonishing control and versatility. There are eight non-interacting parametric bands with reciprocal curves and the convenience of graphic-style controls. Highpass and lowpass filters with 12dB/octave slopes that tune continuously over a 100:1 frequency range. And, separate outputs that let you use the 672A as an eight-band parametric cascaded with an electronic crossover in reinforcement and monitor tuning applications.

*suggested list

The dream equalizer is usable practically *everywhere* in professional and semi-professional sound: recording studios, cinema, theater, reinforcement, broadcasting, disco — you name it! Yet its price is down-to-earth: \$499*. And, it's built to full professional standards.

Check it out at your ORBAN DEALER.

orban

Orban Associates Inc.
645 Bryant St.
San Francisco, CA 94107
(415) 957-1067

See it at the NAB booth 429.

New Trends Begin At QSi Systems At NAB Dallas

We'll be showing our unique line of broadcast equipment.

Come to Booth 2800 and see how QSi Systems can fill your equipment needs.



QSi/CB-8000

The QSi/CB-8000, is a high quality, test signal generator, combining a color bar generator, a character generator and an audio signal source in a single, rack-mounted unit for studio, remote and common carrier signal origination.

- **Standard 525/60 NTS color sync generator**
- **Standard EIA-RS-189 split field color bar generator**
- **Standard ASCII code character generator** with on-board programming
- **Standard 600 ohm balanced +18 dbm 400 HZ audio tone generator**, with mike input, adjustable level and front panel VU meter
- **All solid state integrated electronics**
- **Standard 19" X 1 3/4" rack mountable**



QSi/TVL 2400

You get a full day of off-air logging without a tape change with QSi Systems' 24-hour logging package.

- **24 full hours of off-air television logging**
- **24 full hours of off-air radio/computer CRT video logging**
- **Video and audio recorded on same tape** with automatic synchronization
- **Easily understood audio, precise video** for highly accurate logging
- **Standard thickness video tape** eliminates "thin tape" problems

QSi systems, inc.

See us at Booth 2800
NAB Dallas, Level II

For more information on QSi Systems' full line of broadcast equipment, call or write: QSi Systems, Inc., 993 Watertown St., West Newton, MA 02165 (617) 969-7118

Circle (138) on Reply Card

Exhibit roundup: Or-Po

series of clocks. **Booth 416.**

Rigid coaxial line. New: FM broadcast antennas. **Booth 353.**

Stressors, FM stereo processor, stereo processor. **New: Parametric equalizer module. Booth 2107.**

Orhan Associates

Audio processing systems for AM and FM, dual-spring reverb, stereo synthesizer, stereo compressor/limiter, dynamic sibilance controller, parametric equalizer. **New: Equalizer, dynamic sibilance controller. Booth 429. Hospitality Suite: Adolphus 1008.**

see ad on pages 32, 138

Orrox Corporation Booth 350

Otari Corporation

2-track recorder, 2-speed 2-track reproducer, broadcast recorder, 8-track recorder. **Booth 405.**

see ad on pages 85, 87, 89, 91

Pacific Recorders & Engineering

Multilimiter/multimax. **New: BMX 12 and 22 input console, Digitimer**

Packaged Lighting Systems Booth 2611

Panasonic Company Video Systems (see also Technics-Panasonic)

ENG/EFP color cameras, studio color cameras, 3/4-inch videocassette editing recorders, 3/4-inch VCRs, monitors and accessories, special effects generator, VHS recorders and players, time lapse video recorder, 4-hour VHS recorder, portable VHS recorder, high resolution monitors, TV projection system. **New: VHS player/recorders, camera, 3/4-inch recorders, professional microphones. Booth 483.**

see ad on page 57

Perrott Engineering Labs

Silver zinc battery packs for cameras, VTRs and portable lighting; battery chargers, nickel cadmium battery packs. **Booth 2704. Hospitality Suite: Fairmont.**

Phelps Dodge Communications

Philips

ENG/EFP camera, multicore studio/field camera, triax studio/field camera, portable production camera, camera system, UHF and VHF transmitters, transmitter exciters, VTRs, videotape synchronizer, demodulators, modulators, RF converter, pattern generators, video signal generator, VITs analyzer, VITs inserter/generator, color analyzer, signal generator. **New: Automatic noise reducer. Booth 314. Hospitality Suite: Hyatt Regency.**

see ad on page 137

Potomac Instruments

Antenna monitors, audio test equipment, audio signal generator, intermodulation analyzer, harmonic distortion analyzer, wow and flutter meter, stereo phase meter, AM field strength meters, FM/TV field strength meter, frequency synthesizer, jack panels, plugs, patch cords. **New: Automatic transmission system for standard broadcast directional antenna arrays. Booth 377.**

see ad on pages 16, 152

CHECK THE BOTTOM LINE . . .

We're Audio Consultants, Inc. That's not just our name, it's our business. And our clients think we do it pretty good. It is no accident that we are the largest professional audio dealer in the southeast.

CONSIDER THE FACTS:

- We are specialists in the craft of acoustic design and electronic systems design. We have designed and built some of the finest recording studios in the world.
- Our list of product lines reads like a *Who's Who* in the audio equipment business. We are the exclusive dealer in the southeastern U. S. for MCI consoles and tape recorders. We also sell AKG, BGW, Beyer, DBX, Dolby, Electrovoice, Eventide, JBL, Keith Monks, Lexicon, Marshall Electronics, Neumann, Orban, Sennheisers and Urei, just to name a few.
- And the equipment we sell you will be that which matches your needs. And furthermore, it won't come in a factory sealed box, because our staff will already have made a careful pre-delivery check on the equipment before you receive it.
- We also offer a quality of installation worthy of the equipment we sell. Our experience with multi-track recording studios puts us way out in front of the strictly broadcast supplier. And of course, we are in Nashville, which is a convenient location for two-thirds of the country.

So, if you think you need some sound advice on an audio problem . . . check the bottom line.

Audio Consultants, Inc.

1200 Beechwood Avenue • Nashville, TN 37212

615-256-6900

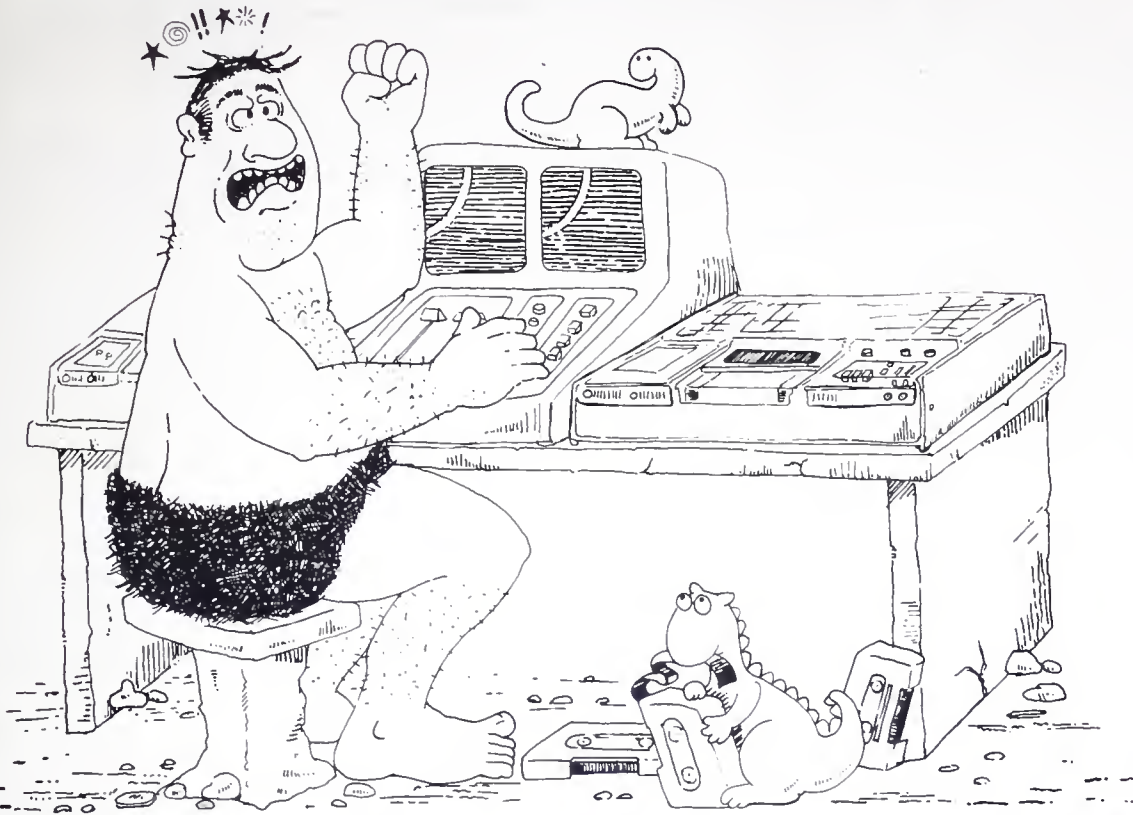


**EQUIPMENT
+ EXPERIENCE
+ INSTALLATION**

= HIGHEST QUALITY AUDIO

Circle (139) on Reply Card

HAS STONEAGE 3/4" EQUIPMENT GOT YOU WHIPPED?



THE PRO-PAK 1 IS THE SOLUTION.

PRO-PAK 1 – A servo system that allows the 3/4" format to take its rightful place as a viable production tool for the broadcast medium.

PRO-PAK 1 updates the current 3/4" tach lock to a full broadcast, quality control and synchronizing system. This system allows full frame synchronizing of the television signal and eliminates vertical blanking problems caused by the TR. With PRO-PAK 1, the 3/4" user will gain many of the benefits associated with the best servo and monitoring systems used in today's QUAD and 1" recorders, while retaining all the benefits of the 3/4" format. PRO-PAK 1 minimizes the need for the time base correction in editing systems. In situations where correction is required, the PRO-PAK 1 makes it possible to use even a narrow-window

Currently, 3/4" VTR's are tach lock machines. At the 1978 NAB, VAL introduced the Direct Drive D. C. Drum Servo - the tightest tach lock system available for 3/4" VTR's. This was a good beginning; however, no matter how tight a tach lock servo may be, it still can't cure problems such as speed timing variations, a major cause of vertical blanking problems. To correct these variations, VAL expanded on the D. C. Drum Servo and the PRO-PAK 1 evolved. Here are some of its features. V-lock fully frame-synchronizes the output of the VTR regardless of the source of the tape. H-lock gives you the ability to monochrome key over tape black without a TBC. H-lock brings about a major reduction in multiple generation chroma velocity errors. H-lock

permits the use of a very narrow-window TBC, and eliminates the need for a TBC in many non-broadcast situations. **Stability marks** permit the quality control monitoring of a tape as it is being edited.

PRO-PAK 1 is a powerful tool! To insure that both the user and the engineer can realize all of the benefits available, VAL provides a **complete complement of servo status indicators** designed to be functional for both parties. Its design will allow the user to check the mode of operation and the status of all systems with a single glance. If there are any problems, the indicators will pinpoint them to the engineer, and allow him to make all operational adjustments without an oscilloscope.

PRO-PAK 1 is a comprehensive package that offers: • **Direct Drive D. C. Drum Servo** • **Framer** • **Full Monitoring Package** • **Comprehensive Status and Set Up Panel** • **Horizontally Stabilized Cueing** • **A Fully Synchronized Tach, V and H Locked Capstan-Framed System, That Will Edit In Any Of Those Three Modes.**



Video Associates Labs

2304 Hancock Drive Austin, Texas 78756
512/459-5684

Come Thumb Our Drum At Booth 2809

Circle (135) on Reply Card
www.americanradiohistory.com

Exhibit roundup: Po-Ra

Power-Optics
Booth 2407

QEI Corporation
FM automatic transmission system, FM exciter, stereo generator, audio processing. **New:** 2nd generation FM stereo monitor. **Booth 435.**

QRK Electronic Products
Audio consoles, turntables, tone arm, pre-amps, furniture. **New:** dc motor turntable, electronic clock, 16-inch turntable, ac speed control, disco mixer. **Booth 389.**
see ad on page 126

QSI Systems
TV off-air logger, video source identifier, video frame/field counter, TV clock system, master clock calendar, test monitoring switcher, time date generator, video distribution amplifier. **New:** Color bar identifier, video back timer, radio broadcast logger. **Booth 2800.**
see ad on page 157

Q-TV/Telesync
Video prompter systems. **Booth 332.**

Quick-Set, Inc.
Pedestals, tripods, cam heads, fluid heads, dollies. **Booth 495.**

RCA (American Communications)
Satellite transmission or multipoint distribution of TV or program audio. **Booth 300B.**

RCA Broadcast Systems
TV cameras, VTRs, editing systems, radio transmitters, radio antennas, audio consoles, cartridge tape handling systems, turntables. **New:** UHF TV transmitters, CP TV antenna. **Booth 300.**

RCA Electro-Optics & Devices
Camera tubes, Power tubes. **Booth 300-A.**
see ad on page 129

RE: DB Company
Booth 2811

R. F. Technology
Booth 2410

RTS Systems
Intercom system, master station intercom, in-line microphone pre-amp. **Booth 2115.**

Radio Original Network
Booth 2612

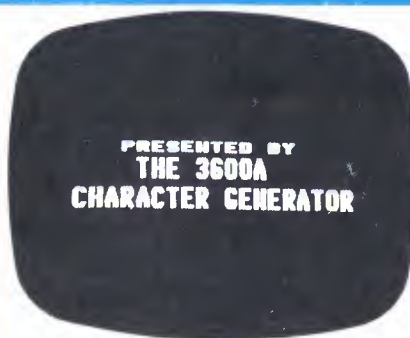
Ramko Research
Audio consoles, audio distribution amps, line amplifiers, monitor amplifiers, mic/line amps, equalized line amps, automatic tape winder, turntable pre-amps, turntable, reel-to-reel, clock/timer. **New:** Turntable pre-amp, portable mixing console, audio router/amplifier, solid-state VU meters. **Booth 409.**
see ad on page 205

Rank Precision Industries
Camera lenses, zoom lenses, automatic color correction for film chains, pre-programmed color correction with pan scan and machine

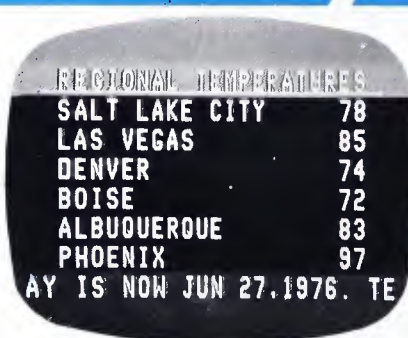
LAIRD TELEMEDIA INC.®
2125 SOUTH WEST TEMPLE • 801 487-6251
SALT LAKE CITY, UTAH 84115

**TELEVISION
CHARACTER
GENERATOR**

**MODEL
3600A**



PGM 1



PGM 2



KEYBOARD AND
DATA-CASSETTE RECORDER

- ★ SYSTEM EXPANDABILITY
- ★ 10 LINE 25 CHARACTER FORMAT
- ★ SIMPLIFIED KEYBOARD CONTROL
- ★ ADJUSTABLE WIDTH FONT
- ★ ADJUSTABLE HORIZONTAL EDGING
- ★ MULTIPLE FLAG FUNCTIONS
- ★ FORMAT POSITIONING
- ★ DATA ROLL AND CRAWL
- ★ NON-ADDITIVE MIX
- ★ UNLIMITED DATA STORAGE
- ★ COMPUTER INTERFACE
- ★ OPTIONAL COLOR BILLBOARD
- ★ OPTIONAL LOWER CASE FONT
- ★ TWO GENERATORS IN ONE

3600A

THE GENERATOR WITH CHARACTER

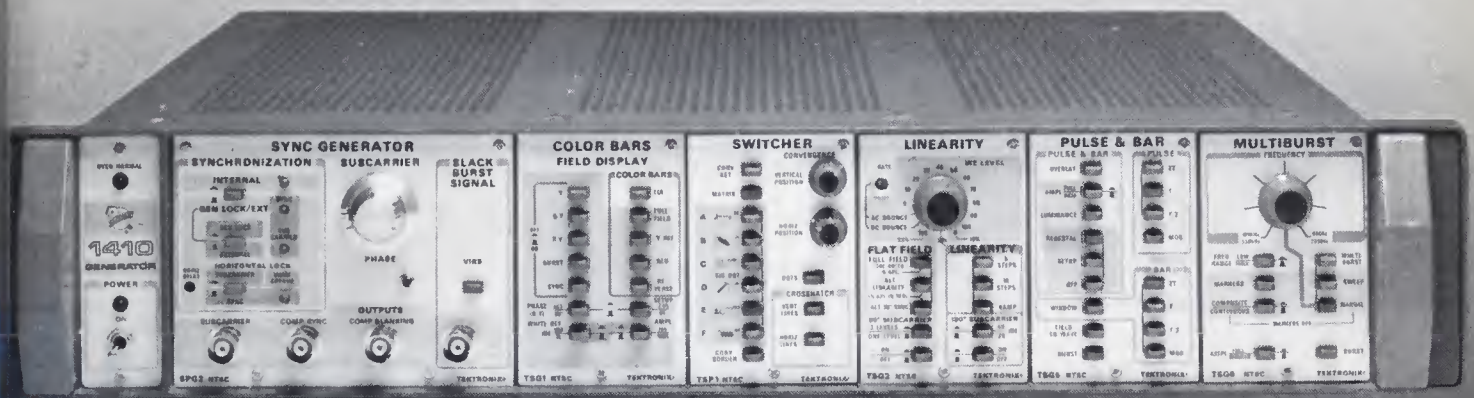
VISIT BOOTH 537 AT NAB

Circle (140) on Reply Card

THE TOTAL TEST SIGNAL GENERATOR

We've added important capabilities to our 1410 Series Generators. With the new TSP1 Switcher/Convergence Generator and TSG6 Multiburst/Video Sweep Generator, the 1410 is a complete, all-purpose sync and test signal generator. The 1410 mainframe accommodates any combination of five or six test signal generators driven by one sync pulse generator. Select the exact generator package you want without paying for more than you need. You can choose from genlock or non-genlock sync pulse and black-burst generators, and test signal generators for color bars, convergence, linearity, pulse and bar, or multiburst/video sweep.

For more information on the 1410 Series or on the new TSP1 Switcher/Convergence and TSG6 Multiburst/Video Sweep Generators, write Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077. Or call our toll-free automated answering service at 1-800-547-1512. In Oregon, 1-644-9051.



SWITCHER CONVERGENCE

CONV KEY VERTICAL POSITION

MATRIX HORIZ POSITION

A

B

C CONV

D SIG OUT

E

F

CONV BORDER

VERT LINES

HORIZ LINES

TSP1 NTSC TEKTRONIX®

The TSP1's single switchable output gives access to all the test signals generated by your 1410. Select a single signal for full-field display, or use the signal matrixing capability to evaluate several performance parameters at once.

MULTIBURST FREQUENCY

100MHz 330MHz 6MHz 20MHz

FREQ LOW RANGE HIGH MULTI-BURST

MARKERS SWEEP

COMPOSITE CONTINUOUS MANUAL

MARKERS OFF

AMPL FULL REDUCED BURST

TSG6 NTSC TEKTRONIX®

The TSG6 provides 20 MHz sweep signals and high/low frequency range multiburst signals for frequency response testing in TV studios and on manufacturers' production lines. Markers are available for amplitude and frequency reference.

For Technical Data Circle (141) on Reply Card
For Demonstration Circle (164) on Reply Card

Tektronix®
COMMITTED TO EXCELLENCE

Exhibit roundup: Ra-St

control, telecine. **New:** Lenses for 2/3-inch cameras, EFP lenses, film chain with Digiscan. **Booth 348.**

see ad on pages 37, 143

Recortec

Reel servo modification, videotape addressor for 2-inch, editing for quads, 1-inch tape cleaner/evaluator, 3/4-inch tape cleaner/evaluator, videotape timers. **New:** High band 3/4-inch VTR. **Booth 336.**

Research Technology (RTI)

Film cleaning systems, film and video storage racks, splicing and editing equipment. **New:** Micro-computer film timing system, speech processor, editing consoles. **Booth 539.**

see ad on page 64

Rockwell International (Collins Broadcast & Transmission)

FM exciter, FM transmitter, AM transmitter, FM antennas, satellite communications, microwave communications, audio console 8-channel stereo. **New:** Audio console 10-channel stereo. **Booth 315 & 2102. Hospitality Suite:** Adolphus, 2600.

Rohde & Schwarz Sales Company

TV precision color monitors, TV demodulators, multi-standard color receiver/monitors, multi-standard chroma, decoders. **New:** ENG color monitor, precision bridge monitor. **Booth 386.**

Rosco Laboratories

HMI lighting equipment. **New:** Colors in a range of TV lighting filters. **Booth 2211.**

Ross Video

Switchers. **Booth 2508.**

Russco Electronics Manufacturing

Consoles, turntables, phono pre-amps, disco mixers. **New:** Turntable tone arm, variable speed turntable. **Booth 427.**

see ad on page 74

SWR

Coax switches, various coax products. **New:** Coax transmission line with heat flow connector. **Booth 2702.**

see ad on page 15

Scientific-Atlanta

Earth stations, receiver, automatic earth station control unit, TV demodulator, protection switching. **New:** Meteorological satellite terminal. **Booth 477. Hospitality Suite:** Hyatt Regency.

Scully Recording Instruments

Audio recorders, tape reproducers, servo drive recorders, master recorders, broadcast logger recorders. **Booth 355.**

see ad on pages 34, 35

Servo Corporation of America

Booth 2716

Sescom

Booth 443

Setcom Corporation

New: Television cameraman headset, television director/producer headset, television headset for portable camera. **Exhibiting with various distributors.**

Sharp Electronics Corporation

Saticon ENG and EFP cameras, Vidicon ENG and EFP cameras, sync generator system, special effects generator, 19-inch color TV receiver, 19-inch color TV monitor-receiver, 13-inch color TV monitor-receiver. **New:** 13-inch rack-mounted monitor, half-rack waveform monitor. **Booth 2400.**

Shintron Company

Switchers, character generator, encoded chroma keyer, edit code generator. **New:** Color switcher, edit code reader/raster display/printer. **Booth 410.**

see ad on page 146

Shure Brothers

Professional microphones, mixers and other circuitry, audio consoles, amplifiers, hi-fi cartridges and tone arms. **New:** Studio condenser microphone. **Booth 371.**

Sintronics Corporation

AM transmitters. **New:** FM broadcast transmitters. **Booth 387.**

see ad on page 177

Skirpan Lighting

Booth 2625

Skotel Corporation

SMPTE time code generator, SMPTE time code reader. **Booth 2827.**

Elmer Smalling

Booth 2800B

Soll

Videotape presentation of installations. **New:** Color graphics/computer control for RF switching systems. **Booth 505.**

Sono-Mag Corporation

Programmer systems. **New:** Improved facilities for program data entry, editing and display. **Booth 397.**

Sony Corp. of Am.

New: VTR with Dynamic tracking, TBC, camera with low-light capabilities, heterodyne monitor, professional broadcast monitor, VHF wireless mic transceiver. **Booth 380.**

see ad on pages 26, 27

Sound Technology

Distortion measurement systems, signal generator. **Booth 2405.**

see ad on page 120

Spin Physics

Videohead refurbishing using hot-pressed ferrite video heads. **Booth 473. Hospitality Suite:** Loew's Anatole.

see ad on page 125

Stainless

Tower line. **New:** Device to prevent galloping guys. **Booth 2109.**

Stanton Magnetics

Cartridges, styli, headphones, gyropoise turntable. **New:** Phono cartridge, pre-amp. **Booth 363.**

see ad on page 151



**"The TDF-1
makes
all our signals
studio quality."**

"The TDF-1 Digital Noise Filter has made a major difference in how our news feed looks..."

"As a member of ITNA, we receive co-op news feeds from all over the world, and sometimes they are 6th or 7th generation converted from PAL by the time we receive them. The TDF-1 absolutely dramatically cleans up even the worst feeds. It makes us look live . . .

"Commercials shot with ENG/EFP equipment look better. It cleans up shots under existing light to the point where the client is happy with them . . .

"Overall, our day-to-day operations look significantly better."

— Hal Protter
Vice President and General Manager
KPLR-TV, St. Louis, Missouri

"The TDF-1 has given us a consistent air look and higher overall quality - better than network ..."

"It really makes life easier — it improves the signals that need improving and leaves the rest alone . . .

"We did a side-by-side test with a competitive unit, which we thought was pretty good, but when we brought the TDF-1 in — well, somebody had sure done their homework on it! It especially handles film grain better . . .

"It's fabulous on cartoons! By the time you run the TDF-1 up to its top correction, you end up with a signal that has no grain . . .

"I haven't seen anything it doesn't handle well."

— Jim Gonsey
Chief Engineer
KPLR-TV, St. Louis, Missouri



TeleMation
A Division of Bell & Howell
P.O. Box 15068, Salt Lake City, Utah 84115
(801) 972-8000, Telex 388-352

© 1978 Bell & Howell Company. All rights reserved. TeleMation and Bell & Howell are trademarks of Bell & Howell Company.

Circle (142) on Reply Card

March 1979 *Broadcast Engineering* 163

Exhibit roundup: St-Te

Station Business Systems

Business automation systems. **New:** TV computer system. **Booth 327.**

Storeel Corporation

Room stretch for RCA carts, Ampex cassettes, storage for audio carts. **Booth 469.**

see ad on page 175

Strand Century

Memory systems for lighting. **New:** Bambino lighting, Lekolite spotlights. **Booth 475.**

Studer ReVox

Recorder reproducers, mixing console series. **New:** Audio multi magnetic tape recorder, mixing console series, telephone hybrid with electronic impedance matching, mono/stereo compatible recorder reproducer, code T control/digital FM tuner. **Booth 453.**

see ad on pages 60, 61

System Concepts

Character generators. **New:** Character generators. **Booth 517.**

TA & Track Audio

New: Discriminate audio processor, cart machine, peak program meter, compressor limiter. **Booth 2712.**

TM Productions

Booth 2307

Taber Manufacturing & Engineering

Ampex VTR audio heads, RCA VTR audio heads, Ampex audio recorder heads, Scully audio recorder heads, Taberamp-recorder electronics, Taberaser (bulk tape eraser), professional audio head reconditioning service. **Booth 459.**

Tangent

Booth 2106

William B. Tanner Company

Booth 2206

Tayburn Electronics

Booth 2502

Technics-Panasonic (see also Panasonic Company Video Systems) Tape decks, cassette decks, turntables, dc preamp, peak average meter unit, headphones. **New:** Turntable, studio-monitor speakers. **Booth 481.**

see ad on page 57

Technology Service Corporation

Weather radar to TV color converter, electronic map overlay, automatic time lapse recorder. **Booth 467.**

Tektronix

Automatic TV signal measuring system SECAM-PAL equipment. **New:** Down converter for demodulator. **Booth 306.**

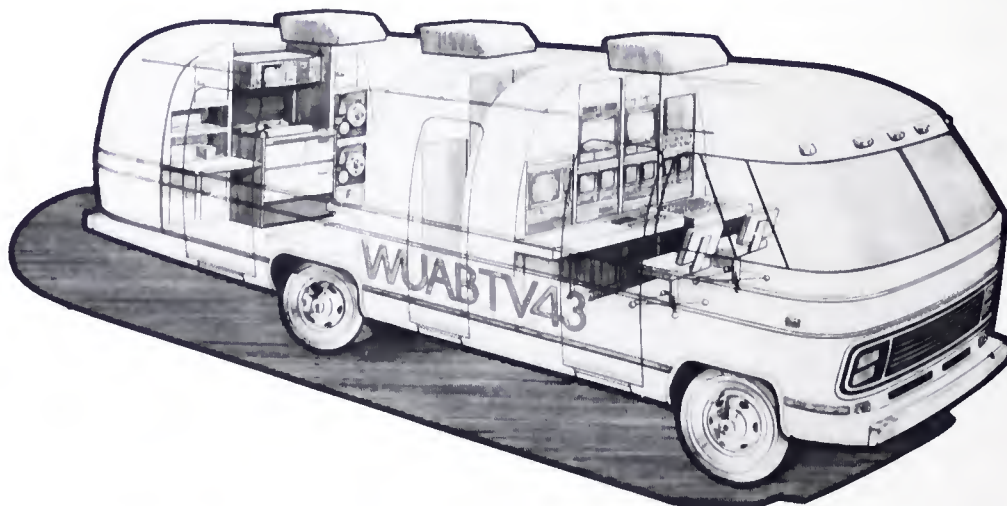
see ad on page 161

Tele-Cine

Schneider lenses for 1¼-inch, 1-inch, ⅔-inch cameras, lens accessories, remote pan & tilt equipment. **New:** Schneider lenses and adaptors. **Booth 392.**

FOR MOBILE PRODUCTION SEE US AT THE NAB

BOOTH 503



Wolf Coach Inc.

200 Bartlett Street • Northboro, Mass. 01532
(617) 393-2551



TELEVISION ENGINEERING CORPORATION

519 Rudder Road • Fenton, Missouri 63026 314 343 5605

Circle (144) on Reply Card

NAGRA

Portable Perfection

Stereo Or Monaural With A "Flick Of A Switch"

Booth 525-NAB Show

March 25-28, Dallas



UNITED STATES DISTRIBUTION, SALES AND SERVICE

NAGRA MAGNETIC RECORDERS, INC.

19 West 44th Street, Room 715 • New York, NY 10036 • (212) 840-0999

West Coast Sales, Service & Technical Center — **RYDER MAGNETIC SALES CORP.**, 1147 N. Vine St. • Hollywood, CA 90038 • (213) 469-6391

In Canada — **ARRI/NAGRA INC.**, 6467 Northam • Mississauga, Ont. L4V 1J2 • (416) 677-1033

Circle (145) on Reply Card

**\$9,800
IS THE PRICE!**



IMI-3000

**LARGE SCREEN
TV PROJECTION**

6FT. — 20 FT. WIDE

**WIDE ANGLE VIEWING
ON STANDARD FRONT
OR REAR SCREENS**



739 Airway Circle,
New Smyrna Beach Fla. 32069

(904) 427-5293 - 5294

Circle (146) on Reply Card

Exhibit roundup: Tel

Telecommunications Industries Limited

Television test charts, test chart systems, telecine test slides, telecine alignment films, transparency illuminators, test pattern transparencies, optical test media. **Booth 449.**

Telegen

Teletext data transmission system. **Booth 2221.**

TeleMation (Bell & Howell)

Graphics system, video/audio distribution switcher, color film camera, optical multiplexer, sync generator, video distribution amplifiers, pulse distribution amplifiers, subcarrier distribution amplifiers, black burst generator, digital color encoder, video/audio switcher, audio distribution amplifiers, audio monitor amplifier, digital noise filter. **New: Machine control system. Booth 342.**

see ad on page 163

Telemet

Clamping amplifiers, repeaters, modulators, sideband analyzers, test signal generators, chroma keyer, fiber optics, video cable terminals, RF test equipment, demodulators, group delay measuring equipment, video & pulse distribution amplifiers, chroma keyer decoder. **Booth 333.**

Telescript

Monitor prompting systems, telecue transport, telescriptor transport. **New: Contrast enhancer, 800 line monitor/prompter. Booth 356.**

Television Equipment Associates

Video delays, video filters, automatic video equalizer, TV line selector, chroma corrector, headphones, test equipment, color monitor comparator. **New: Intercom system, tape evaluator. Booth 364.**

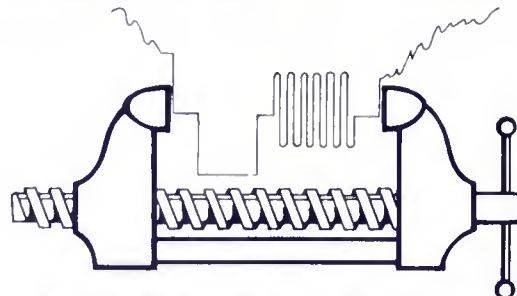
Television Products

Line of camera products. **New: Remote Location Dolly camera pedestal. Booth 459 (with Listec).**

see ad on page 144

FCC SQUEEZING YOU?

Public Notice FCC78-423



**OVER 200
NOW
IN USE!**

Our Blanking Squeezer

- Provides H and V Blanking below FCC Maximums-adjustable
- Works in any unit with a non-adjustable single-chip sync generator
- Is easily installed in any camera or TBC
- Processing before air restores correct blanking widths

**FOR \$200, WE WILL SEND YOU A SQUEEZER AND INSTALLATION INSTRUCTIONS
FOR YOUR TK76, HL77, CVS504, CVS516, etc.**

PEIRCE-PHELPS, INC.
video systems

2000 N. 59th STREET, PHILADELPHIA, PA. 19131
(215) 879-7171

10215 FERNWOOD ROAD, BETHESDA, MD. 20034
(301) 530-9580

EMCEE

A New Line of Low and Medium Power T. V. Transmitters!



TTU-10,000/10 kilowatt UHF transmitter
TTU- 5,000/ 5 kilowatt UHF transmitter
TTV-10,000/10 kilowatt VHF transmitter
TTV- 5,000/ 5 kilowatt VHF transmitter

Total System Capability
UHF, VHF, ITFS, MDS turnkeys

See us at NAB Booth 328

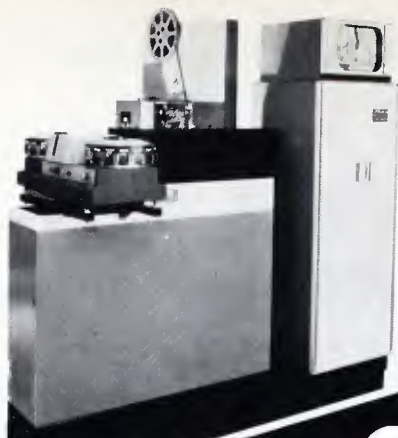
BROADCAST PRODUCTS

717-443-9575

P.O. Box 116, White Haven, Pennsylvania 18661

Circle (148) on Reply Card

March 1979 *Broadcast Engineering* 167



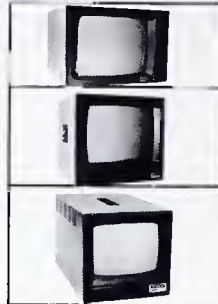
SEE
the INDUSTRY
"PERFORMER"
1550 TELECINE
in
ACTION

visit **COHU** at **NAB**

COHU's 1550 Telecine has a new ENCODER/ENHANCER/AUTO BALANCE that makes its outstanding COLORIMETRY even better.

Also see COHU's new line of BROADCAST QUALITY MONITORS.

Available in 9, 14 and 17-inch models with Cohu's EXCLUSIVE AUTOMATIC VIDEO LEVEL. Other features include 800-line resolution; back porch gated dc restoration; interchangeable plug-in modules and more.



You expect more from Cohu
...and you get it.

See us at booth 471

Post Office Box 623 □ San Diego, CA 92112 □ Phone: (714) 277-6700

Circle (149) on Reply Card

**There's a good
chance that we
know more about
studio lighting
than you do.**

Kliegl was in the lighting business for more than 40 years before and we've been furnishing TV lighting and control equipment for more than 40 years after the advent of television. The fact is we've been able to help more than a thousand studios and facilities, including the five major networks in North America.

Our seasoned staff will be happy to assist you in coming up with a carefully-engineered custom design to fit your specific and special needs.

Or, if you want a really economical buy, one of our typical packages will meet the usual needs for standard sized studios.

If you like the look of your studio before you've talked to us, you'll love it after it's lighted with Kliegl equipment.

For further information, see your local agent or dealer or write Kliegl.



Kliegl Bros.
32-32 48th Ave.
Long Island City
New York 11101
212/786-7474

Circle (150) on Reply Card

Exhibit roundup: Tel-Ti

Television Technology

VHF translator, VHF amplifier, FM translator. **New:** UHF translator, FM translator. **Booth 2306. Hospitality Suite:** Ramada Inn.

Telex Communications

Headsets, reel-to-reel tape recorders, tape logger, cartridge tape recorders, tape transports, amplifiers. **Booth 357.**

see ad on pages 28, 134

Tentel Corporation

Audio tension gauge, video tension gauge. **Booth 395.**

see ad on page 210

TerraCom

TCM-6 series microwave radio, TCM-7 series microwave radio, TCM-3 series microwave radio. **New:** THP-2T20 digital program channel. **Booth 2401.**

see ad on page 149

Thermodyne International Booth 2408

Thomson-CSF Laboratories

Character generator system, color correction system, automatic level controller, automatic peak controller, for AM/FM VHF transmitter, UHF transposer. **New:** Digital video processor, portable camera. **Booth 324. Hospitality Suite:** Hyatt Regency.

see ad on page 50, 51

Thomson-CSF-Electron Tubes Booth 2210

Time & Frequency Technology

AM frequency & modulation monitors, FM frequency & modulation monitors, TV frequency & modulation monitors, digital remote control equipment. **New:** Microprocessor alarm and logging system, studio to transmitter link equipment, routing switches remote control. **Booth 341.**

see ad on page 66

Times Wire & Cable Company Booth 2519

"This Auditronics 501 was one of TM Productions'

first boards six years ago and it still runs a tightly packed schedule of original vocal session recording and mix-downs", says Ken Justiss, Operations Manager of TM Productions in Dallas. "Since we do more commercials and station ID's than anybody else in the world, we produce literally thousands each year, and at some point they've all gone through this Son-Of-36-Grand (serial number 011)."

"There's not a faster board to work with than the Auditronics 501 whether we use it for building demos or complex production tasks. It's compact; all its controls are so very accessible even trainees become proficient on it quickly."

"Its reliability is outstanding. We've literally worn out the faders once, and we've changed a switch or two, but the things I've seen go wrong with this board in six years are so minor, it's a waste of time to even talk about. It's an excellent creative tool and I'd find it hard to fault our Auditronics 501 in any area. In fact, our success with this board was largely responsible for our buying three more Auditronics consoles."

If you'd like to know more about how TM Productions' four Auditronics consoles are producing for Ken Justiss and his colleagues, we invite you to call him at 634-8511 while you're at NAB, or visit Auditronics in exhibit 379.



auditronics, inc.

3750 Old Getwell Road, Memphis, Tennessee 38118 (901) 362-1350

Circle (151) on Reply Card



SOUND PERFORMERS

Our AUDITION three way system means sound as it was meant to be. The AUDITION provides rich bass response, without booming, and midrange and tweeter are each independently adjustable.

CONTACT YOUR DEALER OR

ALC

Auernheimer Laboratories & Company
4561 E. Florence Avenue-Fresno, CA 93725



Circle (152) on Reply Card

NO SPRINGS ATTACHED!

VINTEN *The Smoothest in Lightweight Heads*

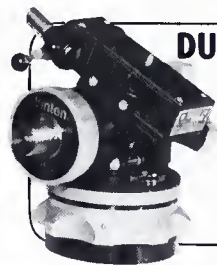
DUNLIN 51 L.F.

50 lb. capacity

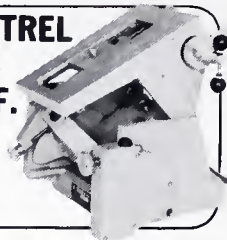
PETREL 76 L.F.

100 lb. capacity

- perfectly adjustable balance without springs
- LF dampening-smoother than "fluid" heads



DUNLIN 51 L.F. **PETREL 76 L.F.**



LISTEC TELEVISION EQUIPMENT CORP.

NAB Booth 465
LISTEC
39 CAIN DRIVE, PLAINVIEW, NEW YORK 11803
(516) 694-8963 TELEX 640470
(WEST COAST)
4527 SAN FERNANDO ROAD, UNIT 1, GLENDALE,
CALIFORNIA 91204 (213) 244-0838

Circle (153) on Reply Card

Through these terminals pass some of the best sounds around.



Install Shallco attenuators for reliable performance. Replacements available for most all consoles.

Request catalog 102

Shallco

Shallco, Inc. P. O. Box 1089
Smithfield, N. C. 27577 919/934-3135

Circle (154) on Reply Card

Don't miss this at NAB!



A simple, economical, accurate method of measuring television V and H blanking widths (or any other pulse width) without a 'scope.

Booth 2823 Level II

broadcast video systems Ltd.

1050 McNicoll Ave., Agincourt, Ont. (416) 497-1020

Circle (155) on Reply Card

Exhibit roundup: To-Un

Torbet Radio
Booth 2800A

Toshiba International Corporation
Booth 2701

Trompeter Electronics
Patching equipment, patch jacks, patch cords, plugs, paralleling networks, terminations, connectors, adaptors, attenuators, cable assemblies. **New:** Connector, electro optics, TPS, connector, electro optics, SMA. **Booth 511.**

Tuesday Productions
Booth 2205

Tweed Audio (USA)
Booth 2207

UMC Electronics
Cartridge machines, splice finders, audio consoles, news recording systems, audio heads, motors, multi-cart machines, motorized azimuth cartridge machine. **New:** Multi-cartridge machines, semi-automated cartridge systems, audio consoles. **Booth 407.**

see ad on pages 22, 56

US Tape & Label Corporation
Booth 2201

Unarco-Rohn
Towers, communication. **Booth 373-A.**

Uni-Set, Div. of Kniff Woodcraft
Booth 396

United Media
Booth 2711

United Press International
Booth 2300

United Research Lab Corporation
Tape recorders, replacement amplifiers, motors, pinch rollers. **New:** Capstan idler assembly with ball bearing. **Booth 375.**

see ad on pages 116, 211

"We evaluated all carts and have standardized on the Audiopak® AA-3"

—Bob Kanner
Chief Engineer
KRTM, FM 101
KHJ, AM 93
Los Angeles

"Our test results show that the Audiopak® AA-3 holds stereo phasing better than any other cart on the market."

"The excellent phase stability of the AA-3 will be of major importance as AM stations convert to stereo."

"The High Output, Low Noise (HOLN) tape in the AA-3 gives us excellent frequency response combined with 6db more headroom."

"The AA-3 maintains excellent tape motion with low wow and flutter."

"We had had previous cart pressure pad problems with our multiple playback machines — these have been resolved by the durability of the AA-3 pressure pads."

"The AA-3 is the 'state of the art' in cartridges — it meets or exceeds the specifications of the current NAB standards."



Capitol Magnetic Products
A Division Of Capitol Records, Inc.
1750 North Vine Street
Los Angeles, California 90028



New Audiopak® AA-3 Broadcast Cartridge

See the AA-3 Demonstration Booth 361 — NAB

Circle (156) on Reply Card

Exhibit roundup: Us-Vi

Utah Scientific

Audio-video routing switchers. **New:** Compact series switchers, control panels. **Booth 2707.**

see ad on page 113

Utility Tower

Actual tower material, Rigid I-beam anchor, galvanized hardware, lighting equipment. **Booth 323.**

V & B Tower Booth 2610

Thomas J. Valentino Booth 441

Van Ladder

Van mounted aerial ladder. **New:** Von mounted aerial ladder. **Booth 2804.**

Varian Associates

Power grid tubes, UHF-TV kly-

strons. **New:** Power tetrode. **Booth 487.**

Versa-Count

FM exciters/transmitters, FM translators, stereo generators, video processing amplifier, audio distribution amps. **New:** TV translator for VHF-UHF, RF power amplifier, stereo modulation monitor, modulation monitor FM. **Booth 2120.**

Vega-Cetec (see Cetec Broadcast Group)

Video Aids Corporation of Colorado
Color sync generators, cross-pulse generators, electro isolators, editor programmers, video distribution amplifiers, burst-phase meter, H-phase meter, VIRS meter, black burst generator, party lines, video switches. **New:** Edit-oid, VIRS inserter, isolators for Sony recorders. **Booth 553.**

Video Associates Labs

Direct-drive DC drum servo, refer-

ence field framer, **New:** Pro-Pok-I **Booth 2809.**

see ad on page 159

Video Data Systems

Titler, character generator, digital weather system, titler/message unit. **New:** Microprocessor system. **Booth 2419.**

Videomagnetics Booth 2705

Videomax, an Orrox Corporation
Quad video heads. **Booth 459.**

Videomedia

VMU 44 add-on audio and video kit, VMC 100 3/4-inch videotape machine sequencer. **New:** Z-6, VM95U. **Booth 2825.**

see ad inside back cover

The Video Tape Company

Videotape stock (all formats). **New:** Master broadcast videotape, 3/4-inch videocassettes plus an expanded

Superior SMPTE from BTX

4200 Reader and Digital Display

4300 Reader and Video Display

4100 Edit Code Generator

4400 Decoder

BTX guarantees superior performance from 1.5 to 1200 IPS even at -18dBm or with any degree of time jitter.

BTX guarantees superior reliability and assures it with a 100-hour operational burn-in prior to shipment.

BTX guarantees time-code system compatibility with its complete line of cost-effective modular building blocks. For complete information, call:

The BTX Corporation • 438 Boston Post Road
Weston, Massachusetts 02193 • 617-891-1239

Circle (190) on Reply Card

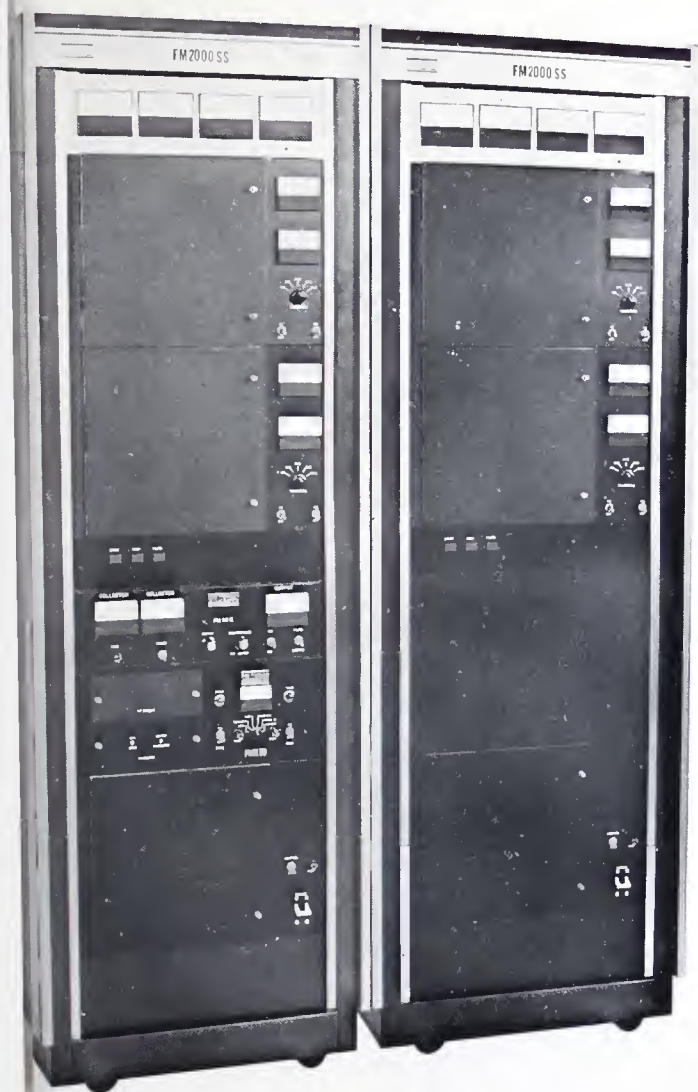
WILKINSON ELECTRONICS, INC.

FM 2000 SS 2KW

SOLID STATE FM TRANSMITTERS

FM 500 SS/FM 1000 SS .5/1KW

SOLID STATE FM TRANSMITTER



See us at NAB Booth 347

FEATURES

Absolute Reliability With Multiple Amplifiers
and Power Supplies

Low Operating Cost - No Tubes - No Filament
Power - High Efficiency

Incomparable Exciter
So Drift Free it Requires No Oven
Noiseless -70db below 100% Modulation
Distortionless .2% 20 to 15000 Hz
Response 1/4db 30 Hz 350 KHz

Even Solid State IPA — Over 100 in Service

Solid — Solid State 500 Watt Power Amplifier
Modules

Broad-banded Power Amplifiers So Stable Requires
No External Tuning Controls

VSWR Protected With Automatic Power Reduction

Individual Power Supplies For Each Section

Unique Heat Exchanger Cooling Operates in Nearly
Any Ambient Temperature or Altitude

Circulator Combining For Low Loss and Reliability

Exhibit roundup Vi-Z

range of videotape duplication and distribution services. **Booth 527.**

Videotek

Color monitors, demodulator. **New:** Demodulator. **Booth 2602.**

Vital Industries

Total automation system, total TV production package, digital video switcher, terminal equipment. **New:** Frame synchronizer, switcher, automation. **Booth 316.**

see ad on back cover

Vitex Division/Vital Industries Booth 2219

see ad on back cover

Wang Voice Communications Booth 2112.

Ward-Beck Systems

Radio consoles, transportable console, production console, television console. **New:** Intercom amplifier, intercom matrix amplifier, distribution amplifier. **Booth 489.**

Weatheration Booth 2615

The Webster Group Booth 2621

Western Union Telegraph Company Booth 549

Wilkinson Electronics

FM transmitters, amplifiers, silicon rectifiers, line surge protectors. **New:** 80 kW calorimeter dummy load, 250 W AM transmitter. **Booth 347.**

see ad on pages 36, 173

The Winsted Corporation

Editing consoles, mobile cabinets, videotape and film storage systems, tape and film trucks. **New:** Digital editing console, portable production console, 1/2-inch videocassette storage system, dubbing packs for 1/2-inch and 3/4-inch. **Booth 2601.**

see ad on page 114

Wolf Coach/Television Engineering Corporation

New: Mobile Production Unit. **Booth 503.**

see ad on page 164

World Video

Rack mount color monitors, portable color monitors. **New:** ac/dc color video monitor, multi station intercom. **Booth 501.**

Ze-Mark Corporation Booth 2521

For Precision Indexing

EECO MTG 550 Series

Master Time Code Generators



2-79 1119

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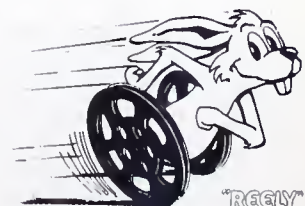


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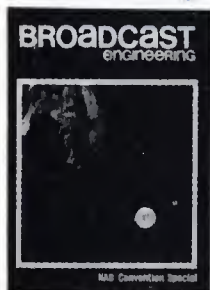
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March 1979 *Broadcast Engineering* 175



Innovative products

This section includes products being exhibited for the first time at NAB-Dallas'79. The information was supplied by exhibiting companies willing (and ready) to release news of their latest offerings. Other companies, for a variety of reasons, have preferred to make the announcement at the convention. But this section of **BE** should get you started on knowing what will be available at the show this year.

Following each of the products described, a number will be included for use with the Reader Service Card at the back of the issue. When you find a product that interests you, turn to the card and circle the appropriate number.

Retrieval system

The electronic still processor (ESP-100B) by Addo is a digital still frame storage and retrieval system designed for use by stations serving small-to-medium-sized broadcast markets.

The system is microprocessor based and can store up to 200 digital stills on-line on a fixed disc. The freeze-frame capability enables graphic artists to create stills from moving feeds such as 2-inch, 1-inch or 3/4-inch videotape recorders, 16mm film chain, live camera, network or satellite feeds. Two outputs allow fades, dissolves or super outputs.

Circle (210) on Reply Card

Video delay lines

The model VP2075 video delay line by Allen Avionics features longer delay with flat loss of 3 dB for any delay setting. It is made up of 7 delay lines which can be switched in and out so any delay is achievable from 0 to 2.075 μ s in increments of 25 ns.

Circle (211) on Reply Card

Diode gun Plumbicons

Amperex Electronics offers two models of diode gun Plumbicons which provide higher resolution than previously used triode guns. Dynamic beam control circuits allow greater camera mobility. The 1-inch

Plumbicon model 73XQ, is designed for EFP, studio and electronic cinematography applications and features internal bias lighting for improved lag characteristics. Model 74XQ, the 3/8-inch unit, is designed for ENG and EFP applications.

Circle (212) on Reply Card

Metal particle tape

Ampex has developed a metal particle recording tape that is said to offer dramatic improvements in sound reproduction. The tape incorporates a binder formulation and a highly stable metal particle.

For the audiocassette, the tape is said to improve high frequency saturation capability by more than 10 dB over standard gamma-ferric oxides measured at 10 kHz and more than 5 dB over high-bias formulations.

Circle (213) on Reply Card

Microtouch consoles

Microtouch, a line of moderately priced audio consoles, is being offered by Ampro Broadcasting. Compact packaging and electromechanical switching to replace lever key switches are featured.

The consoles are available with up to 21 inputs in 5- and 8-channel rotary and linear fader configurations with dual mono and dual stereo outputs. The unit is styled in a black matte finish panel with

anodized markings, stainless steel top, walnut end panels and a padded armrest.

Circle (214) on Reply Card

Camera lens

The Angenieux 25x lens system is specially designed for 2/3-inch cameras such as the BCC-14, LDK-14, TK-760 and the TK-76B. The basic lens features a continuous zoom range up to 25:1, 10 to 250mm. Servo zoom and iris, manual focus and back focus adjustment are standard features. The relative aperture at short focal lengths is f/1.4 and f/2.8 at long focal lengths. An under-the-lens support bracket, sunshade and lens cover are standard.

Circle (215) on Reply Card

ENG/EFP cases

A complete line of cases for field portable television products used in ENG/EFP applications are available from Anvil Cases. Cases for individual videotape recorders and television cameras or as combination units housing a complete ENG/EFP package are available.

The exterior is constructed of high impact ABS material, epoxy bonded to 1/4-inch plywood and finished with steel riveted aluminum edging and heavy duty steel hardware. Interiors are custom sculptured to the shape of the equipment out of high density polyfoam.

A full line of over 350 standard

What makes these new Sintronic FM transmitters so exciting?



SI-10-T (10 Watt)

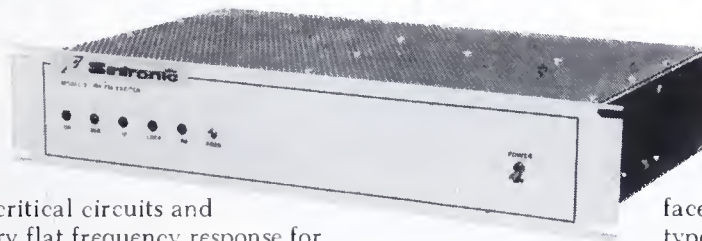
SI-F-25 (27.5 kW)

SI-F-5 (5 kW)

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Our new transmitters' conservative design can also be exciting! They use stable zero-bias, grounded-grid power amplifiers, eliminating neutralization and the screen and bias power supplies. Their tuning and loading lines are really heavy duty, made for long-term reliable service. The entire transmitter's design is clean, straightforward and mechanically conservative. Standard features on all our FM transmitters include automatic step/start switching, full protection



against overload, recycling with a memory-type visual indicator that tells you the status of all critical circuits. Further, they will interface with any standard STL or wire-type remote control and have a built-in, automatic power output control.

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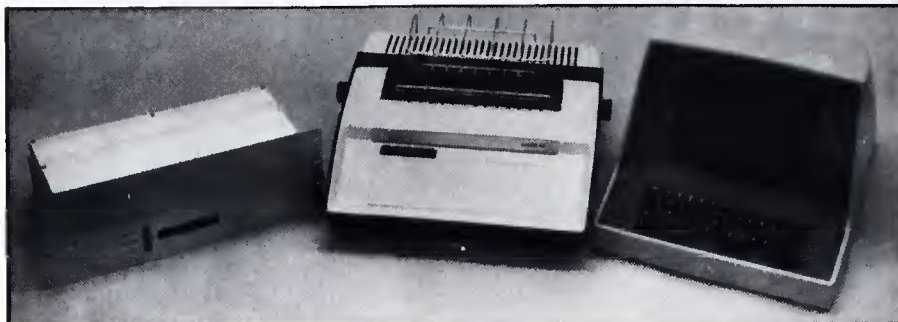
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March 1979 *Broadcast Engineering* 177

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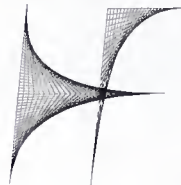


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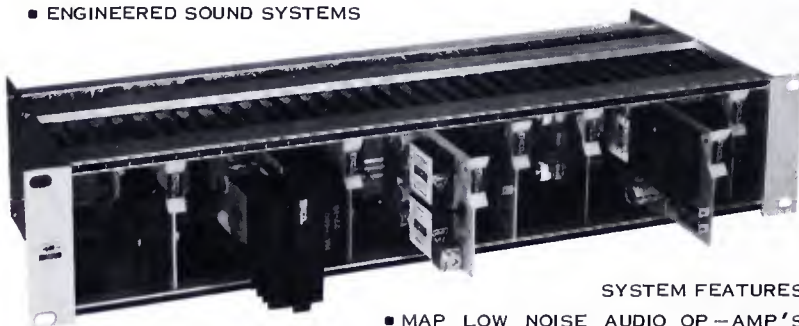


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Circle (162) on Reply Card

NAB new products

cases are available for other reproduction equipment such as monitors and mixers.

Circle (216) on Reply Card

Switcher

The ASW-100 multifunction switcher by Asaca is capable of performing all required operations for a portable field production system. The unit will operate with up to three cameras and can be powered by its own battery-pack, a 12-V vehicle battery or from 120-V ac lines.

Remote controls can be incorporated into the unit as an option enabling camera operation through multi-conductor cables with connectors provided on the rear of the unit. Synchronization pulses can be provided to any equipment requiring them through the internal sync generator.

Circle (217) on Reply Card

Equalizer

The E950-RS Paragraphic equalizer by Audio & Design Recording is switchable between stereo six band per channel or mono 12 band. Pot, variable frequency and 'Q' with fader variable amplitude controls are offered. The entire audio spectrum is covered with each band spanning four octaves.

Circle (218) on Reply Card

Broadcast consoles

The 2400/3200 series broadcast audio production consoles by Audio Designs and Manufacturing are modular, multi-input studio and production center units designed to be electrically and aesthetically compatible with video state-of-the-art.

Microphone and line level preselection with up to 92 microphone and 116 line level sources and two master output busses are featured. Interchangeability between equalizers, filters, limiters and noise suppressors is possible with both units.

Full four band, 14 frequency reciprocal equalizers and four independent monitor busses selectable from any of 12 sources with level controls are standard.

Circle (219) on Reply Card

Sequential controller

Automated Broadcast Controls introduces the 1600S sequential controller for backup programming automation. The controller will

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March 1979 *Broadcast Engineering* 179

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NAB new products

pand to 32 events from 16. Up to nine stereo sources can be controlled with one special event. The unit is part of the ASSIST™M backup program automation system.

Circle (220) on Reply Card

Minicomputer system

Automation Electronics' Autotron Star System is a totally in-house minicomputer system designed for sales, traffic, management controls, and receivables for radio broadcasters. The system can be expanded to include general ledger, accounts payable, payroll and fixed asset depreciation modules.

Optional modules are also available including a word-processing system, a cross-index system to prepare a music log and an intercomm module which provides interstation communications.

Circle (221) on Reply Card

Control system

The BTX Corporation is introducing model 4600 SMPTE tape controller. The programmable audio production system controls all functions of video-audio recorders. It accounts for 30 sequential events at one time. Features include the ability for replaying material before the final recording is made and the ability to learn plus reassemble.

Circle (222) on Reply Card

Audio step generator

The audio step generator by Bald Mountain Lab features nine precise crystal controlled frequencies which correspond to those used in proof of performance measurements. The frequencies are pushbutton selectable.

Frequencies can be sequentially stepped one time, or repeatedly, with rates ranging from one second to 1000 seconds. The unit is 1 3/4-inch rack mountable and features a front panel output jack.

Circle (223) on Reply Card

FM stereo monitor

Model FMS-2 FM stereo monitor from Belar Electronics offers operational ease and a high order of magnitude and specifications. The unit features two independent modulation meters for simultaneous monitoring of left and right channels. Two autoranging volt meters

provide automatic measurement LED display of channel separation, crosstalk, subcarrier suppression and noise.

Circle (224) on Reply Card

Generator prompter

Beston Electronics is offering a character generator system for prompting. The Data-Prompter features continuous variable roll speed with manual control and an automatic mode, auto-time.

The auto-time has an over-ride to speed up or slow down the roll. When the over-ride is released the system will recalculate the roll speed required to make the spot time out.

Circle (225) on Reply Card

Load resistor

The Termaline RF load resistor by Bird Electronics is designed for use with low power transmitters and features a rugged thermal design. Models are available with 1 5/8-inch or 3 1/8-inch flanged or unflanged input or QC cable connectors. VSWR is 1.1 from dc to 1000 MHz.

Circle (226) on Reply Card

Program automation

The Econo Control 16 by Broadcast Electronics provides broadcasters with many of the advantages of the full Control 16 but at a lower cost. The microprocessor system features 2000 program events and 10 repetitive compare times.

Full data entry error sensing, four remote alerting relays and completely interchangeable universal source cards are standard features.

Circle (227) on Reply Card

Rotary wipe

With the Cox 360 rotary wipe from Broadcast Video Systems the start of any wipe can be positioned using the joystick positioner. The speed of rotation and the extent of wipe can be changed for a variety of shapes along with the four standard shapes. The optional effects amp module allows stand alone operation of the unit.

Circle (228) on Reply Card

Editing keyboard

CMX Systems expanded/dedicated

keyboard incorporates a new approach to the logic of videotape editing sequences. The keyboard is re-structured into a more organized, human engineered layout, and the software has been improved so that simpler commands are necessary from the program editor.

Operational parameters are directly accessible through the keyboard without the need of lengthy initialization dialogue. The E/D keyboard is applicable to existing CMX Systems 340X editors.

Circle (229) on Reply Card

Dielectric cable

The Flexwell cable from Cable-wave Systems is a copper corrugated air dielectric cable for high power, low loss broadcast application.

A corrugated tubular copper center conductor, high density helix dielectric, corrugated copper outer conductor, polyment and black polyethylene jacket are included. Low insertion loss, high power and mechanical stability are features.

Circle (230) on Reply Card

BNC connector

Cambridge Products introduces a BNC coaxial connector for 8281. It is a fast-fit, easily assembled 1-piece connector. It requires no

special tools; just trim the cable and screw it on. The connector also is available for RG-58 and RG-59 cable.

Circle (231) on Reply Card

Compositing system

UltiMatte, a tool for compositing television scenes, is being marketed in the New England states and New York by Camera Mart. The system is used in production where a live video camera is on the foreground and the background comes from a previously recorded tape, or where live video is used on foreground and background. For post production, the system composites images recorded on film onto tape. The composites are made during film-to-tape transfer.

Production features include shadow control where it is possible to reproduce, darken, lighten or eliminate shadows. A surface gloss control allows for minimization of reflections of the blue screen from glossy surfaces.

Circle (232) on Reply Card

Zoom lens

Canon's model P12X18B W/PP zoom lens is designed for 30mm plumbicon TV cameras such as the HK-312 and the TK-47. The focal

length is 18mm to 216mm with a maximum f-stop of 2.1. The lens features a built-in pattern projector and extender.

Circle (233) on Reply Card

Lubricated tape

Q17 high output, low noise (HOLN) back lubricated tape by Capitol Magnetic Products has been designed for use with the AA-3 broadcast cartridge. The tape uses ferric oxide and is bias compatible with the industry standard lube tape and Capitol's Formula 17 as used in the A-2 broadcast cartridge.

A low friction binder on the oxide side results in smoother tape motion regardless of the tape pack length. The tape is slit on precision equipment to eliminate skew and weaving, assuring no tape-related phase instabilities.

Circle (234) on Reply Card

Wireless microphones

The Dynex option offered by Cetec Vega for their wireless microphone systems expands the dynamic input range of the microphone and eliminates the need for continuous mic gain adjustment. The option is especially suited for live musical recordings and applies to hand-held, lavalier and pin-on models.

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on items advertised or described in this publication, use the Reader Service Card.

NAB new products

Battery charging system

A ReFlex 20 nicad battery charging system for ENG, EFP, video and film cameras is available from Christie Electric. The system provides a full charge of completely discharged nicad packs in 12 to 20 minutes at a 90 to 97% net charge efficiency. A "Trough Voltage" sensor as well as multiple protection circuits are provided to prevent overcharging.

Circle (236) on Reply Card

Election reporting system

The TTC-400 television titler controller by Chyron Telesystems is an interfacing, communications, and controlling microprocessor which allows a computer to control and feed data to the Chyron graphics and titling system.

Automatic computer control switching allows normal operation except during time when data is being transmitted from the computer to the Chyron. The remote computer control allows the computer to be controlled from the data entry terminal connected to the TTC-400 or the optional light pen device.

Circle (237) on Reply Card

Editing console

The U/F-16 upright/flatbed editing console by Cinemo Products employs coaxial sprocket wheel assemblies and six terraced horizontal feed and take-up plates accepting one 16mm picture track and two 16mm magnetic sound tracks.

A hollow polygon prism system for continuous flickerless projection on an 8"x10" screen and crystal-controlled sync sound speeds of 24 and 25 fps, with infinitely variable speed control from 0 to 240 fps, forward and reverse are featured.

Portable mixer

The AD031 Micromixer by Coherent Communications is a portable mixer suited for location sound recording. The unit is equipped with eight inputs (extendable to 18) and features microphone or line switching. The system is battery powered and completely self-contained and features XLR connectors for input and output connections.

Circle (238) on Reply Card

Monochrome monitors

The electronics division of Cohu offers the DM series of monochrome TV monitors for surveillance, industrial, computer, educational and broadcast applications. Three picture tube sizes are featured: 9-inch, 14-inch and 17-inch. Available options include CRT phosphors, remote contrast and brightness control, external drive capability, rack slides on the 17-inch model, a tally light on the 14- and 17-inch models, a yoke mount on the 17-inch model and an underscan switch.

Circle (239) on Reply Card

Video frame store

A tool for research or industrial inspection, the model 274 video frame store by Colorado Video Incorporated, allows single frame freezing of television information in a digital memory for computer processing, decision making, and redisplay.

A/D and D/A converters and a solid-state memory provide versatility of either video in with video or digital out, or digital in and digital or video out. The unit is available with either 256 x 256, or 256 x 512 picture elements and can be interfaced with minicomputers or other digital processing equipment.

Circle (240) on Reply Card

Camera system

Commercial Electronics introduces the CEI 310 modular broadcast color television camera system. The camera head contains a prism optical assembly with bias light and 4-position filter wheel. High-gain, low-noise pre-amplifiers deliver a S/N of -52 dB. The camera head can be operated up to 600 ft from its electronics unit. The camera can be a portable EFP camera, a studio systems camera or a studio self-contained camera.

Circle (241) on Reply Card

Computer animation

Modifications of Computer Image's Caesar and Scanimate computers now allow all the animation capabilities of the systems applicable to full color inputs, such as original color artwork, slides or previously taped live action scenes.

The process preserves the original

nal color without posterization or fading to monochrome. Rotation and perspective manipulations are possible.

Circle (242) on Reply Card

Sync generator

Consolidated Video Systems is marketing an automatic VTR advance sync generator that reduces the possibility of excess vertical blanking with broadcast-type time base correctors (TBCs).

Designated the AVA (automatic vertical advance), the unit will operate as a stand-alone accessory for most broadcast TBCs. The unit monitors offtape vertical sync, compares it with TBC vertical sync and generates a steering signal. The AVA fits in a standard, 19-inch rack.

Circle (243) on Reply Card

Editing control systems

The ECS-100 series Superstick by Convergence now includes 3/4-inch helical and 1-inch type "C" videotape recorder interfaces. The Superstick controls tape motion in both the record VTR and up to three source VTRs.

Pushbuttons control preview edit, perform edit and replay. The CUT/LAP option allows creation of fades to or from black and soft edit transitions between scenes using a single source VTR. Other features include edit decision listing, special effects switching, A/B rolls, time code and automatic animation.

Circle (244) on Reply Card

Production switcher

Four buses and two mix-effects systems with separate pattern generators and positioners are features of the model 6112 production switcher by Crosspoint Latch. The mix-effects function is possible because each system has its own re-entry.

A downstream keyer and two additional keyers are standard. Other features include pattern modulator, colorizer, border, soft wipe, intercom, toggle, auto and manual orders.

Circle (245) on Reply Card

Switching unit

The D-4300 series of video and

audio switching units by Datatek are designed for auxiliary switcher and small routing switcher applications.

Available as 6x1 video, 6x1 audio, 16x1 video-audio, 20x1 video and 20x1 audio, the units feature their own power supply. Applications include input preselects to production switchers to expand their capacities, switching inputs to Vectorscopes and monitors, adding preview busses to existing switchers and VTR input selection.

Circle (246) on Reply Card

Time code reader

Datametrics is offering a compact time code/user bit reader. The 9"x2 1/2"x10" reader has an all speed operation plus forward and reverse. It displays the time information or user bits. Other features include front panel switches and logic compact outputs.

Circle (247) on Reply Card

Time base corrector

Digital Video Systems is offering model DPS-1, a frame store/oblique timebase corrector/oblique synchronizer. All systems operate at 4X subcarrier with digital controls. Printed circuit board modules, housed in a wire wrapped mainframe, are interchangeable between systems for longer product life.

Circle (248) on Reply Card

Disc recorders

Eigen Video is marketing three 6 MHz high-resolution videodisc recorders which are said to provide 50% more detail in recording than the standard 4 MHz disc recorder.

The slow motion recorders have 20 (1200 fields) or 10 (600 fields) capacity. Model 16-05 has 500-track capacity with each track holding one TV field. All units feature a continuous loop format, with odd numbered tracks recorded when the head is stepping to the center of the disc and the even tracks recorded in the outward direction.

Circle (249) on Reply Card

Memory control system

The Plexus 1000 memory control system by Electro Controls is capable of many configurations including a memory only record and play

back system and a memory only system with space for future manual single or two scene preset.

All control panels are modular plug-in units and an optional CRT display provides complete cue and sequence display with preview capability to simplify play back, sequence or intensity modification. The manual or memory control modules or both may be used to record cues.

Circle (250) on Reply Card

Dynamic microphone

Electro-Voice's model D056 is a shock-mounted omnidirectional microphone for handheld broadcast and sound reinforcement applications. The main acoustic cavity and the diaphragm/voice-coil assembly are isolated as an integral unit from the case which enhances shock isolation. Frequency response extends to 18,000 Hz with slight emphasis in the 2,000 to 12,000 Hz range which allows vocal qualities without low frequency noise interference.

Circle (251) on Reply Card

Surveillance monitor

Model ESM-914, offered by Electrohome, is a 9-inch surveillance monitor designed for a variety of applications. The monitor features 10 MHz frequency response, simplified operator control, rear control, externally adjustable to permit scan adjustment from 80% to 105% of CRT size and a 750 line resolution.

The model can be used for security surveillance, industrial process surveillance, data display systems and tape editing systems.

Circle (252) on Reply Card

VHF transmitter

Electronics, Missiles and Communications offers a VHF transmitter which is internally diplexed and therefore more compact than previous models. Designated model TTV-5000B, the unit is a 5000 W highband transmitter and features two amps and medium power output. All components are solid-state except for the IPA and the PA which are tetrode tubes.

Circle (253) on Reply Card

NAB new products

Central receiver

A central receiver designed to minimize the problems of weak signals and distortion related to ENG has been introduced by Farinon Video. The receiver has a dynamic range of 82 dB and can operate with a minimum system fade margin of 20 dB for transmission distances up to 300 miles.

Designated the FV2CR, the unit operates from 1.99 to 2.11 GHz and has 21 synthesized, phase-lock channels for remote or manual selection.

Circle (254) on Reply Card

Tape eraser

Fidelipac's new tape eraser, Blank-It, is an all-format magnetic tape eraser. It is said to have a longer duty cycle than any other hand-held unit, making it a good choice for long-term field taping sessions. The eraser features thermal overload coil protection to prevent burnout and a no-mar work surface.

Circle (255) on Reply Card

Videotape

The H-621 high energy 1-inch Beridox broadcast videotape by Fuji Photo is specially designed for rugged performance in editing. The estimated tape life is 2000 passes. Its audio-video S/N is 0 dB (relative to 621 reference roll). The tape is capable of stop motion exceeding one hour.

Circle (256) on Reply Card

Camera lens

The 17x9 ERM lens offered by Fujinon Optical comes with a built-in 2X extender. The focal length of 1X is 90-150mm. The lens can be used for EFP or ENG.

The lens is treated with EBC (electron beam coating). The process reduces lens reflection and veiling glare and allows higher light transmission.

Circle (257) on Reply Card

Antenna diversity systems

The Swintek antenna diversity systems by Alan Gordon Enterprises are designed to incorporate the most advantageous features of space diversity application to radio microphone operation.

Two ANT-2 receiving antennas virtually eliminate dropouts and buzz zones and other forms of interference are significantly reduced by using dB-S equipped systems. Gain dB per channel of the Mark 9 is 3 dB while the Mark 9B is 12 dB. Frequency range is 10-250 MHz for the Mark 9 and 10-470 MHz for the Mark 9B.

Circle (258) on Reply Card

Digital antenna monitor

Model CMR digital antenna monitor by Gorman-Redlich is remote controllable and FCC type approved. The true ratio readout is a factor of 10 more stable than instruments that measure normalized amplitude. An optional repeater-controller is available for hardwire remote control and readout via multiconductor cable at distances of up to 1500 feet.

Circle (259) on Reply Card

Shot-gun microphone

An ultra-directional shot-gun microphone, model KMR 82i, is being marketed by Gotham Audio. Smooth frequency response and a directional pattern which is said to differentiate pattern vs. frequency less severely than in the past.

The microphone has a charcoal matte finish and accessories include a foam wind screen, elastic suspension, wind-proof blimp and active handle for hand-held use. A 9-V battery is used for the 48-V phantom powering converter.

Circle (260) on Reply Card

Flash strobe

The Great American Market is offering a self-contained special effects random flash strobe unit for concert, television special, club and disco application.

The unit may be hung behind scrims for star effects, interspersed with band gear, hung in the air for fireworks effects or provide a glitter effect for bandstands. Designated the Star Strobe, the unit is mounted in a Plexiglas tube and plugs into any 110-V line.

Circle (261) on Reply Card

Tri-band amplifier

Gregg Laboratories offers Series 2530, a tri-band audio processing

amplifier designed for AM, FM and TV broadcast transmission and recording applications. Filters and gain control amplifiers to process the audio three bands are featured to eliminate gain control effects. Parameters which determine the sound are controlled through front panel controls.

Circle (262) on Reply Card

Portable receiver

HM Electronics' WM 152 flat pack portable receiver can be operated on four 9 V Alkaline or four Nicad rechargeable batteries. The auto-lock detection feature prevents drift and distortion. Other features include a 95dB dynamic range; receiver and transmitter power on LEDs and a meter indicator for VU, RF and internal battery status condition.

Circle (263) on Reply Card

Digital telemetry

Hallikainen & Friends announces the TEL 172. The digital telemetry converts the Moseley PBR-30AW or PBR-30AR to digital metering transmission.

The system consists of five printed circuit boards that substitute directly for the metering oscillator, audible metering processor, SCU metering processor, metering demodulator and the analog meter. The local display is mounted in the transmitter control unit and it duplicates the readings displayed by the studio control unit.

Circle (264) on Reply Card

FM transmitter

The 25 kW FM transmitter by Harris, designated the FM-25K, features just one high gain tetrode tube and a wide bandwidth solid-state IPA. Features include solid-state control logic, automatic power control, full status lights and simple remote control capability.

Circle (265) on Reply Card

Color camera

The SK-96 convertible camera from Hitachi Denshi features a die-cast housing. Several lens options are available for hand-held or studio use. The camera is suited to equip a remote van by using a 22:1 zoom lens on the studio/field mode

and a 14:1 portable lens on the hand-held configuration. The color camera has internal triax.

Circle (266) on Reply Card

CART player

IGM introduces the Information Retrieval Instacart, a new version of the broadcast Instacart. The information unit can play any or all of its cartridges simultaneously, each of a differing output. This enables a station to lease out separate information cartridges to advertisers for telephone access by stenographers.

Circle (267) on Reply Card

Audio mixer

The Industrial Sciences model 702 audio mixer is a 10 input, two output, audio mixer designed to compliment the model 902 video production switcher. Each input channel features equalization, fold-back/echo send, CUE and muting capabilities and may be selected on either one or both of the output channels. A built on calibration oscillator is provided for testing and level-setting purposes.

Circle (268) on Reply Card

ENG camera

Model HL-78B is a self-contained portable ENG camera offered by Megami Electronics. State-of-the-art performance is provided in the areas of sensitivity, signal-to-noise ratio and low power requirements.

Standard features include rapid auto white balance, +9 dB/+18 dB added video gain, genlock, adjustable horizontal and vertical blanking pulse widths and a +12 V attachable battery power supply.

Circle (269) on Reply Card

Pointer-tracker

Interand's Telestrator pointer-tracker unit permits the operator to insert a movable symbol instantly into any video image. Pushbuttons are used to select symbols which automatically appear in the video scene at the point where the stylus touches the image. Two units are available: the Mark I will accommodate six pre-programmed symbols while the Mark II accommodates 12 symbols.

Circle (270) on Reply Card

Audiocassette machine

International Tapetronics offers the Series 99 audiotape cartridge machine. The Series 99 utilizes computerized control and solid-state electronics and mechanical features to provide reel-to-reel sound from cartridge tapes.

Circle (271) on Reply Card

Studio cameras

The IVC-7005 studio camera by International Video Corporation is an improved version of the IVC-7000. Improvements include a high brightness, flat-faced 7-inch viewfinder; preamplifiers; and a wire intercom.

The IVC-7005P is an updated EFP camera with diode gun tube capability coupled with an instantaneous beam correction system for elimination of specular highlights. Horizontal blanking width is 10.6 μ s maximum.

Circle (272) on Reply Card

Lighting control

The Performer lighting control console by Kliegl will interface with any solid-state dimmer system presently available. The unit is available in 32, 64 and 96 channels of control with either 100 or 200 memories and features a manual split dipless crossfader, two timed faders, 10 group master controls with grand master, display mimic, integral back-up matrix and loop, delay and auto follow functions.

Circle (273) on Reply Card

Audio console

The Monogram series audio consoles from LPB features 5-mixer mono and stereo models using the mother/daughter board plug-in. The all input channels utilize maximum input flexibility. The audio console includes necessary functions such as built-in monitor; cue; headphone amplifier; and using relays.

Circle (274) on Reply Card

Studio monitor

Model 4313 monitor/loudspeaker system by James B. Lansing Sound is designed for control room, mix-down facilities and other profession-

al applications. The system features a low frequency driver and system design utilizing in-line mounting of transducers.

All components mount directly to the baffle panel and can be removed from the front of the walnut finished enclosure.

Circle (275) on Reply Card

Equipment carrier

Lee-Ray Industries introduces a video equipment carrier that weighs 20 lbs. The body is welded tubular steel. It comes equipped with an adjustable handle and 16-inch spoke wheels with semi-pneumatic tires. A 1-year limited structural warranty accompanies the carrier.

Circle (276) on Reply Card

Color monitors

A line of color monitors offered by Lenco features high resolution, shadow-mask precision and in-line CRTs. Available in a 14-inch, 19-inch or 23-inch screen, all monitor functions are completely remote controllable up to 1000 feet. Standard features include A, B and RGB inputs and a comb filter which provides a 6 MHz video bandpass.

Circle (277) on Reply Card

Filtering systems

Kleanline electronic filtering systems by Lightning Elimination Associates are designed to protect computers and microprocessor controlled equipment against surges, spikes, lightning and RF disturbances.

Standard features include instant response, absolute protection, neon status indicator, bi-polar protection and bi-directional protection.

Circle (278) on Reply Card

Film cleaner

Lipsner-Smith has developed the CF200 Micro-Perfect film cleaner with non-evaporative drying. With the CF200 process nothing touches the film but filtered cleaning/conditioning solution.

This new model is designed for use in film and microfilm libraries, media centers, TV stations and motion picture labs. The CF200 machines are available to clean 8mm-105mm film, as well as micro-

NAB new products

film on either reels or flanges.

Circle (279) on Reply Card

Camera pedestal

Vinten introduces the Fulmar pneumatic pedestal type 702. The Fulmar provides a low operating height of 21 in. to a full extended height of 58½ in. The pedestal incorporates center ring control for both steering and elevation. Tiller steering is dispensed with and the cameraman can crab, or steer, and adjust camera height by precise center ring control. The Fulmar uses the triangular base, a 2-stage pneumatic ram and a 3-stage tube assembly.

Listec Television Equipment distributes Vinten products for the US market.

Circle (280) on Reply Card

Monitor and remote control

The Logitek DIMARC 30/15 is designed to operate over a single voice-grade phone pair. The DIMARC 30/15 provides 30 control functions along with 15 simultaneous metering functions, plus 40 on/off status indicators.

Each metering function is individually displayed at both ends of the system. Calibration is accomplished by thumbwheel controls.

Circle (281) on Reply Card

Generator/reader/synchronizer

The MCI AutoLock is designed to provide a SMPTE/EBU code synchronizer for all MCI tape machines. The AutoLock locks combinations of audio/audio, video/audio and film/audiotape machines together and will generate the code required.

The unit is microprocessor-based, needs no wide band amplifiers for slave, the offset range is limited only by the length of tape and it has NTSC color code capability.

Circle (282) on Reply Card

Radio cartridge system

3M's Magnetic Audio/Video Products Division is offering the CentraCart Radio Cartridge System. The system consists of a special cartridge, new magnetic tape and play/record equipment. The endless loop cartridge system allows the

recorder/player to optimize tape alignment and head-to-tape contact.

Circle (283) on Reply Card

Character generator

3M Mincom Division introduces a dual microprocessor character generator. In addition to two high-resolution channels which can be mixed, the D-8800 offers internal storage of up to four type fonts, proportional horizontal spacing, pre-programmed roll/crawl and selectable mask position.

Other features include centering on line-by-line or page-by-page basis, eight color character-by-character control and an interactive control panel which instructs the new operator through system operation.

Circle (284) on Reply Card

Graphics system

The VISTA 80 Graphics System desk top model from MPB Technologies is a 2-channel microcomputer controlled character generator and graphics system. It permits keyboard control of eight color, multiple-style character displays, graphics, logos and their storage and recall from discette. The two channels can be used independently or they can be mixed to produce special overlay effects. Both channels can be controlled by a remote computer.

Circle (285) on Reply Card

TV interval timer

Marconi Instruments offers a television interval timer which provides critical measurement of H and V blanking. Designated the model 2920, the timer provides digital readout of up to 15 parameters at the touch of a button. Front panel selection monitors any parameter changes.

Circle (286) on Reply Card

Effects unit

MICMIX Audio Products announces additional features of the Dynaflanger. The control voltage tracking reversal feature is utilized in all modes. CV tracking reversal allows an increase in control voltage to cause either a higher or a lower fundamental flanging frequency in the output.

Another addition is a front panel

switch that allows the unit to operate in either the normal flange mode, the direct (bypass) mode or the delay-only mode.

Circle (287) on Reply Card

Time base corrector

Micro Consultants is offering a digital synchronizer/time base corrector which is capable of synchronizing any non-synchronous NTSC TV signal and time base correct direct record and non-phased video-tape recorders.

Standard features include look-ahead velocity compensator, sync pulse generator, drop-out compensator, diagnostic store analyzer and switch-selectable blanking of VITS and VIRS.

Circle (288) on Reply Card

Signal synchronizer

The video signal synchronizer 2525 by Microtime will correct VTR signals from no lock or V-H lock, non-synchronous or synchronous, direct or heterodyne ½-inch helical through 2-inch quad. The unit includes line error detection; field one, field two or frame freeze; for digital video effects applications, a RS170A sync generator for improved lockup and interfacing with any switcher; Hetrocolor processing provides optimum performance for color under signals.

Standard features include H-phasing for output timing control; auto freeze or black selectable and a low error rate computer memory.

Circle (289) on Reply Card

Remote terminal

The model MRC-1 microprocessor remote control from Moseley Associates features programmable command functions and status input for latching/following and NO/NC telemetry mapping and keyboard calibration. Full tolerance alarming is standard. Up to 64 command lines, 32 status and 32 telemetry channels, nine sites and automatic logging are available.

Circle (290) on Reply Card

AM transmitter

McMartin's BA-5K2 is an addition, not a replacement of, the 5 kW AM transmitter. The AM transmitter is a single ended, 3-tube mode

oused in a single cabinet.

The unit features modulation capability, a 12-phase power supply, two crystal controlled oscillators, LED status indicators and full metering.

Circle (291) on Reply Card

Cartridge head degausser

The Recorder Care Division of Pertronics announces a broadcast cartridge degausser designed to remove residual magnetism from the heads in broadcast cartridge machines.

The QM-380 develops a magnetic field of 400 gauss which degausses heads regardless of the type of material from which they are fabricated.

Circle (292) on Reply Card

AM processor

Orange County Electronics announces the VS-1 Stressor which contains a PEQ Parametric Equalizer module. The complete processing system includes the separate functions of peak limiter, compressor with adjustable ratio, threshold, release time and expander/noise-gate.

Circle (293) on Reply Card

Equalizer

The Orban 627A is a quasi-parametric equalizer that includes an active balanced input, optional transformer balanced output and extensive RF suppression.

Other features include equalization technique, the high- and low-pass filters, the graphic EQ controls, the broad tuning range and an overload indication.

Circle (294) on Reply Card

Color camera

Panasonic self-contained ENG color camera, model WV-3800, is equipped with a 1-inch stripe filter integrated vidicon tube that produces 250 lines horizontal color resolution.

The VSD color camera also is equipped with a full system operation and has available optional remote control unit and 5-inch viewfinder.

Circle (295) on Reply Card

FM broadcast antennas

Phelps Dodge Communications ex-

pands its series of circularly polarized FM broadcast antennas by adding three models, SPC-1, SPC-2 and SPC-4.

Each antenna features lower Q than previous designs. They have a VSWR of 1.1:1 for approximately 500 kHz, 2½ times the bandwidth of the standard circularly polarized low power and high power antennas.

Circle (296) on Reply Card

Transmission system

The ATS-11 automatic transmission system by Potomac Instruments is designed for automatic monitoring and control of standard broadcast transmitters utilizing directional antenna arrays. The system can accommodate antenna arrays of up to 12 towers with three separate directional patterns.

The system automatically adjusts modulation and power and continually compares antenna monitor and other specified parameters to preset limits. Transmitter parameters, common point current, antenna phases, and current ratios are continually monitored.

Circle (297) on Reply Card

Audio mixer

The QRK BroadKaster utilizes slide attenuators for audio mixing and master controls. The unit is contained in one cabinet; all the electronics of the 4-fader mono-stereo audio mixer are constructed on printed circuit boards. Each fader has two switchable audio inputs.

The normal operating output level of the console is 8 dBm across 600 Ω but distortion-free operation will occur to 18 dBm output level.

Circle (298) on Reply Card

Color bar identifier

The QSI Systems CB-8000 color bar identifier is a color bar generator combined with a character generator and audio signal source.

The video signal is standard NTSC color 525/60 sync with color bars generated in accordance with EIA-RS-189 specifications. The audio generator provides a 400 Hz tone from 600 Ω balanced, transformer isolated output at a full level of +18 dBm.

Circle (299) on Reply Card

Television transmitters

RCA Broadcast Systems has introduced a series of lowband and highband VHF television transmitters which feature the latest advances in solid-state design techniques. The transmitters are available for operation on all color broadcast standards including NTSC, SECAM, PAL-B and PAL-M.

Circle (300) on Reply Card

Turntable preamps

Features for the Ramko Research ESP-38 turntable preamps include pushbutton activated scratch, brilliance and rumble filters and a mono output push button. These push buttons are located on a front panel plate that may be removed and mounted remotely from the unit. A remote turntable start/stop is built in.

Circle (301) on Reply Card

Color telecine

Rank Precision Industries offers a flying spot Cintel color telecine with digital frame store. The 3B flying spot telecine offers the same transport options for 16 and 35mm film or slides in color or mono (positive or negative).

Circle (302) on Reply Card

Videocassette recorder

Recortec announces the model HBU-2860 ¾-inch VCR. The unit is a Sony VO-2860 recorder which has been modified by tripling its normal scanner speed and increasing the linear tape speed by the same factor. It uses standard ¾-inch videocassettes.

Features include quad quality without banding, two audio tracks, full editing capability and compactness.

Circle (303) on Reply Card

Speech processor

Research Technology Incorporated has developed a speech processor for use with film viewing systems. Quik-Trac delivers modulated voice tones at 48 frames per second. Quik-Trac is offered as a factory-installed option on the TV-120, Evaluator, Pulsar, Omega, Omni and the Edette self-drive previewer.

Circle (304) on Reply Card

Audio console

Rockwell-Collins introduces a stereo audio console, the 212R-1. The console provides 30 inputs to 10 mixers, all medium to high level, balanced. Eight microphone pre-amps can be accommodated within the console, providing eight mono or four stereo mic channels.

Headphone and monitor amplifiers can be driven by either program line, the mono mix channel, the cue buss or one of two external sources. Front panel level controls are provided for headphone, cue and monitor amps.

Circle (305) on Reply Card

Turntable

Russco Electronics announces a variable speed turntable. The turntable utilizes the belt driven capstan and has a servo control mechanism. The turntable is capable of varying 10% over or under the speed.

Circle (306) on Reply Card

Transmission line

The C "K" model by SWR is a high performance rigid transmission line which dissipates heat from the transmitter to the antenna. A thermal probe which is built into the connector eliminates hot spots and increases the life of the line itself.

Circle (307) on Reply Card

Fresnel lens spotlights

A smaller, lighter line of fresnel lens fixtures manufactured by Ianiro in Italy are being marketed by The Stanley Schwartz Company in the US.

Designated the Bambinos, the units are available in 2000 W, 5000 W and 10,000 W configurations. The 2000 W spot, model 3302, has a 6-inch lens and weighs 14 lbs. The 5000 W spot, model 3505, weighs 24 lbs and features a 10-inch fresnel lens. The third unit, model 3701, is the 10,000 W spot and features a 14-inch fresnel lens. It weighs 38 lbs.

Circle (308) on Reply Card

Satellite terminal

The METeorological SATellite Terminal (METSAT) by Scientific-

Atlanta consists of an orbital programmer, a receiver, an elevation/azimuth pedestal and an 8-foot reflector with feed and downconverter.

The orbital programmer accepts inputs of satellite orbital elements and calculates the satellite trajectory. Orbital data for as many as 10 polar orbiting satellites can be stored and signals are optimized by front panel controls.

Circle (309) on Reply Card

Communication headsets

A line of Phantom powered communication headsets designed for interface with existing Western Electric circuitry have been introduced by Setcom.

Model 5-TV1 is a single-speaker cameraman's unit with an all-plastic, adjustable headband. The fully adjustable stainless-steel boom can be rotated through 360° with no exposed microphone cable.

Model 5-TV2, the dual speaker director's headset, features a second speaker that allows monitoring a program and is terminated with a twin-pin connector.

Circle (310) on Reply Card

Effects generator

Shintron offers a color special effects generator with 12 inputs, including built-in color black and two color background generators. Designated model 375, the system features an internal RGB chroma keyer, a downstream matte keyer with panic fade to black, a built-in luminance keyer with both internal and external keying and ten wipe patterns.

Circle (311) on Reply Card

Edit code reader

Model 644 edit code reader/raster display/printer by Shintron is capable of reading SMPTE (NTSC) or EBU code with no equipment modification. The audio edit code is displayed on a TV raster and on an instant paper tape printout. The unit reads edit code at tape speeds ranging from 1/5X to 40X forward or reverse. Edit code or user code can be displayed in characters

selectable as black or white, large or small and can be positioned anywhere on the screen.

Circle (312) on Reply Card

Condenser microphone

Shure Brothers' model SM81 microphone is a cardioid condenser unit designed for mechanical and environmental ruggedness.

A 3-position, low-frequency response switch located on the microphone's case is adjustable without tools or disassembly and can provide the option of flat response, a low-frequency rolloff of 6 dB per octave below 100 Hz, or a low frequency cutoff of 18 dB per octave below 80 Hz. A switchable 10 dB attenuator is built into the microphone head to prevent high sound pressure levels from overloading the microphone's internal components.

Circle (313) on Reply Card

Broadcast transmitter

The model SI-F-25 FM broadcast transmitter by Sintronic is a 27.5 kW RF power output unit which features a direct solid-state exciter, grounded grid driver and power amplifier.

A dual rugged, welded steel frame structure with lift-off side panels houses the transmitter. A 12-pulse power supply eliminates power supply complexity by a single high-voltage source for PA and driver plate and IPA plate/screen operation. A stereo generator and multiplex generator are optional.

A 3.5 kW transmitter, the SI-F-3 is also available.

Circle (314) on Reply Card

VTR and TBC

Sony's newest VTR features Dynamic Tracking for on-air noise-free playback video, from quarter speed in reverse through still to twice forward speed. The programmed jog function allows the tape to be shifted automatically between any chosen points; yet no Dynamic Tracking functions affect the video signal quality. The BVH-1100 also features a confidence head which the operator can use to monitor the video and sync signals. Signal-to-

noise is 48 dB.

A time base corrector, the BVT-2000 also is being introduced as a compatible unit. The TBC is said to have a recognizable picture up to 30 times real time when used with the BVH-1100.

Circle (315) on Reply Card

Stereo cartridge

The model 680 SL cartridge by Stanton features a stereohedrom stylus tip which makes professional sound quality possible in the consumer market. A self-cleaning brush can be attached to the cartridge that cleans the grooves before the stylus. Frequency response is 20 Hz to 20 kHz and channel separation is 30 dB.

Circle (316) on Reply Card

Peak meters

A line of peak program meters are being marketed by TA & Track Audio. Eight models are available which feature dual channel and a printed board carrying two low pass filters with roll off above 20 kHz.

Two full wave rectifiers for peak voltage, a logic generator and counter, an impulse former for extended scale and a voltage multiplier of 24-230-V are standard.

Circle (317) on Reply Card

Manual turntable

Model SL-5100 manual turntable from Technics (Panasonic) incorporates digital pitch readout and double isolated suspension design. An anti-resonant material, TRNC, is used in both the turntable base and main base for greater resistance to howling.

All controls, including the cueing lever, are on the front panel for ease of operation. The stator is structurally unified with the motor casing, while the motor and turntable platter are designed in a single unit.

Circle (318) on Reply Card

Zoom lenses

Tele-Cine is marketing three Schneider 30X zoom lenses for 2/3-inch format cameras. Lenses

included are a 30X standard Fl. 4/11-330mm, a 30X wide angle Fl. 4/8.7-260mm and a 30X field Fl. 4/18.5-550mm.

All lenses require a mounting adaptor and include a flat iris for at least 13X with iris compensation for remaining zoom and a modular drive system.

Circle (319) on Reply Card

Machine control system

The TMAC-1 machine control system by TeleMation is used for station automation. The unit provides remote control of VTRs, film islands and other related equipment.

The system is capable of operating up to 99 separate machines and can be either manually or computer operated.

Circle (320) on Reply Card

Camera pedestal

Television Products introduces a Remote Location Dolly (RLD) camera pedestal. The lightweight (140 lbs) unit is designed for remotes. It features a removable base that will go through any standard door opening. Height range is 30 to 50 inches; capacity is up to 200 lbs.

Circle (321) on Reply Card

Multiplexer

The THP-2T20 program channel multiplexer by TerraCom features four 15 kHz program channels to produce a 1.544 Mb/s data stream. Transmission is possible on T-carrier lines or microwave radio. Standard features include interchangeable PC boards color coded for error-free positioning, front panel test and monitor points and modular construction.

Optional interface formats including the standard T1 interface, AMI, NRZ and biternary for microwave transmission are also available.

Circle (322) on Reply Card

Video processing system

Model 9100 digital video processing system by Thomson-CSF features a digital noise reducer, a frame synchronizer, a 4x1 input switcher and a freeze frame, all operating at

4x subcarrier sampling.

Multiple remote video sources can be phased to studio sources and selectable synchronization and precise automatic timing for multiple picture sources are possible without genlocking.

Circle (323) on Reply Card

Logging system

Model 7840 microprocessor alarm and logging system is being offered by Time & Frequency Technology. The programmable software logging printer and scanner is microprocessor based. The model 7610 remote control unit is needed for complete operation.

A computation software package is optional. The package offers continuous automatic computation of power (direct, indirect, forward and reverse), efficiency 1 and efficiency 2 and VSWR.

Circle (324) on Reply Card

Capstan idler assemblies

United Research Laboratory introduces the BB100068M capstan idler assembly with self-aligning ball bearing. The assembly, designed for most professional recorders, is coated with almost indestructible ML-6. It is available in a number of sizes: 1/4- to 1/2-inch, 1-inch, 1 1/4-inch and 1 1/2-inch.

Circle (325) on Reply Card

Connectors

A line of electro-optical connectors for single and bundle fiber communications has been introduced by Trompeter Electronics. The single channel connectors are all metal and include two styles: the threaded SMA and the quick disconnect bayonet TPS.

Each unit will accommodate a single fiber as small as 125 μ m as well as large bundles of 1143 μ m in diameter. The TPS style requires no torquing while the SMA style does. A three lug bayonet features positive locking for stability.

Circle (326) on Reply Card

Control panels

Utah Scientific introduces the line of control panels for the AVS-1

NAB new products

series audio-video routing switchers. All feature loop-through party line matrix connection, continuous status readout and separate audio-video switching and statusing.

The CSP-300 is a full matrix control panel. The CSP-200 is a single buff control panel. And the CSP-10 is a 10 buff control panel.

Circle (327) on Reply Card

Aerial ladder

A van mounted aerial ladder for maintenance of microwave dishes is available from *Van Ladder*. The positioning system features a rugged 24 V electrical motor drive worm gear reduction for positive control and braking.

The positioning controls are located in the bucket and on the platform. Electrical rack and pinion drive controls the antenna tilt system. Safety features include a warning system alert when the antenna is raised, thermal circuit breakers for overload protection, non-skid ladder rungs and platforms and weather protected electrical equipment.

Circle (328) on Reply Card

Radial beam tetrode

The *Varian EIMAC 4CX40, 000G* is a ceramic/metal power tetrode designed for use in audio or radio-frequency applications. A high-stability pyrolytic graphite grid and internal mechanical structure which results in high RF operating efficiency are featured.

The anode is rated for 40 kW of dissipation with forced-air cooling. Applications include FM broadcast service, RF linear power amplifier service and VHF TV linear amplifier service.

Circle (329) on Reply Card

TV translators

Versa-Count Engineering is offering two models of VHF to VHF TV translators. Model V-213 has an output of 1 W and model V-214 has a 10 W continuous output.

Features include highly selective proprietary phase corrected IF filtering, keyed AGC to insure that peak video will remain constant with varying input levels and minimizes rapid rate of changes in received signal level caused by airplane flutter.

Circle (330) on Reply Card

Servo system

Video Associates Labs' Pro-Pak-I is designed as a servo system for the Sony VO-2860 and will allow full frame synchronization of the television signal leaving the VTR. Features associated with quad recorders including V-lock, H-lock, stability marks, head override and servo status indicators can be incorporated with the unit.

Circle (331) on Reply Card

Editing system

The Z-6 editing system from *Videomedia* features frame-accurate editing and a 99-event memory without SMPTE time code. The system utilizes a Z-80 microprocessor control which functions on industry standard S-100 buss electronics.

Standard features include bidirectional shuttle controls, auto search, cruise control, event tag, rehearse, perform and review edit, prompting for proper entries and an error message with keyboard lockout to prevent mistakes.

Circle (332) on Reply Card

Editing console

A ¾-inch editing console which requires no mechanical modifications to the VTR is available from *Videomedia*. Designated the NV950W/VM95U the unit will interface the Panasonic NV 9200, NV 9500 and the Sony VO 2860.

Standard features include bidirectional joystick control, random search, remote control of BTRs and a dual tape timer.

Circle (333) on Reply Card

Broadcast videotape

The *Video Tape Company* introduces the master broadcast video-

tape, VTC 1000. Features include a S/N of more than 50 dB, the capability of 4000 passes, audio uniformity of ± 1 dB and a head-wear of less than 4 μ m per hour.

Circle (334) on Reply Card

TV tuner/demodulator

Videotek's model DM-4R demodulator is designed for broadcast, CATV, microwave modulation and CCTV applications. The unit features automatic fine tuning with defeat switch for accurate tracking of all 83 channels.

The audio output is adjustable with 4.5 MHz output impedance and 75 Ω unbalanced level. The video output is 1.5 V adjustable into 75 Ω . Front panel controls and indicators are featured.

Circle (335) on Reply Card

Production switcher

Vital Industries PSAS-1 production switcher automation system is capable of simultaneously controlling fader handlebars, positioners, preset limits, border width or softness and select sources and modes for three mix/effects units and the squeeze zoom.

Unlimited floppy disc storage of up to 2000 events per discette is featured. The unit can be initiated internally or externally with output pulses for starting machines, pan/tilt or zoom camera standard.

Circle (336) on Reply Card

Mobile TV unit

Wolf Coach and Television Engineering have introduced a custom engineered mobile unit for out-of-studio TV recording and production. The unit is self-contained and completely equipped with cameras, audio control, video switching and video and audio tape systems.

Vehicles are provided with the required mounting racks, consoles, electrical distribution, ducting and interior/exterior decor. □

Circle (337) on Reply Card

Automatic Transmission Systems (ATS): A survey

By Donald L. Markley, BE facilities editor and consulting engineer

The use of automatic equipment to monitor and control transmitting systems for non-directional AM stations and for FM stations was first authorized by the FCC effective February 14, 1977. This was the result of a rather lengthy rule-making which received heavy comment. Several manufacturers have since developed systems which operate within the simple framework of the Rules and Regulations and some of those manufacturers have additional systems in the design phases at the present time.

Before going into the actual hardware available, it is useful to briefly review the applicable Rules and Regulations. These can be found in Volume III as follows:

AM: Sections 73.140 to 73.146

FM: Commercial in Sec. 73.340 to 73.346

Non-Commercial in Sec. 73.540 to 73.546

It should also be noted that the commission has

Thoughts on ATS: A new box needed?

Automatic transmission systems have now been legal for over two years. The equipment has been available on the market for such systems for almost that long and is currently available in a wide range of sophistication and ability. Yet, despite the hue and cry of the broadcaster for such systems, only a small percentage of the operating stations have elected to install ATS. *Why???*

A large school of thought, to which I subscribe, feels that the basic philosophy of ATS is to blame. The current crop of systems function as an "add-on" type of black box which simply eliminates the need for an operator to ride herd on the facility all of the time. However, if an oscillator circuit fails, as one example, the station will still go off the air until someone physically goes to the transmitter and eliminates the problem either by repairs or by switching circuits. Of course, this can be eliminated by use of a second transmitter which can be switched physically into service by the ATS. However, this is simply another patch rather than an attempt to solve the basic problem, and some downtime will still occur.

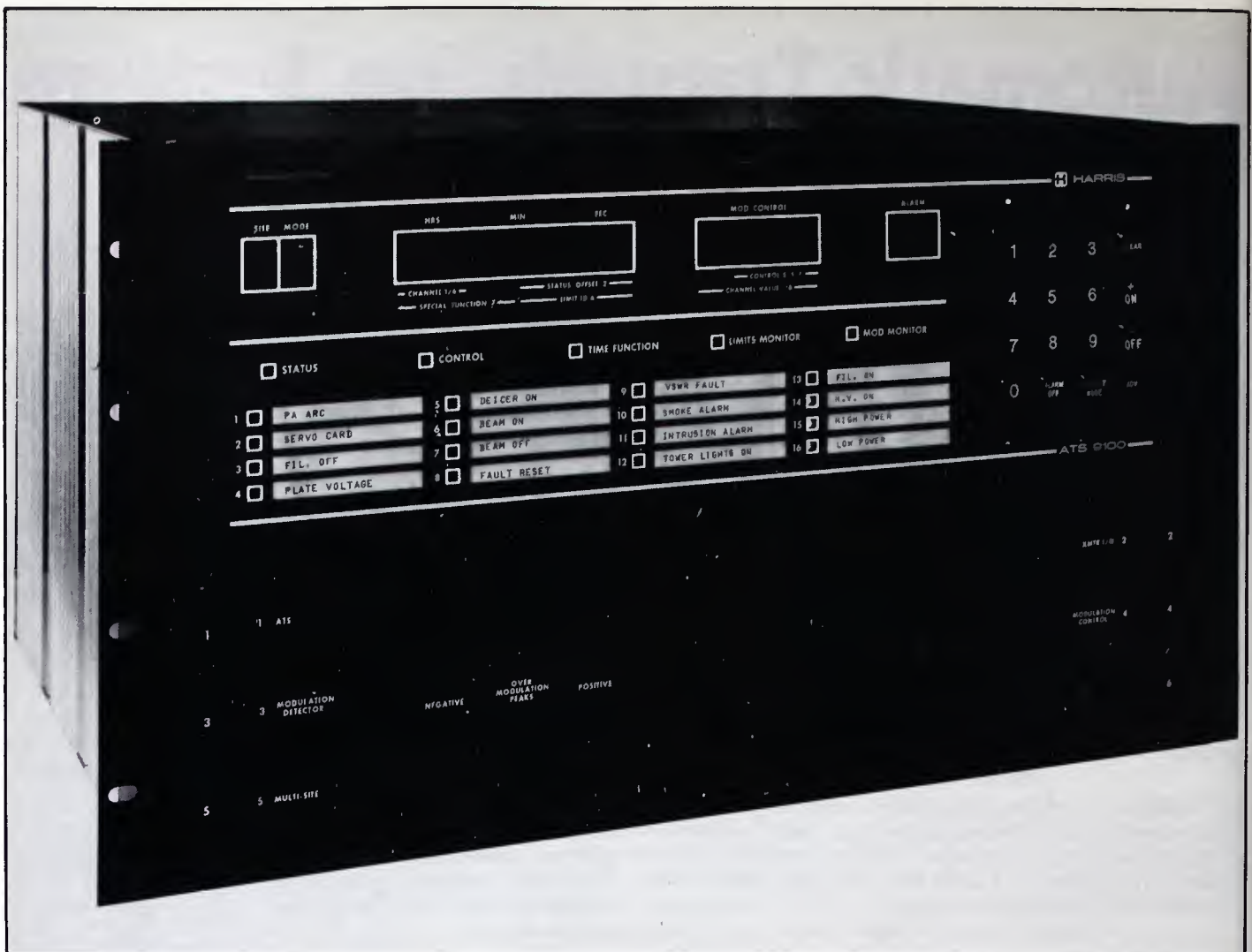
A more desirable approach to the whole concept of ATS would be to design the transmitter itself to contain the type of control and monitor circuitry necessary to operate not only within the requirements of the commission's ATS rules but within the capability of the state-of-the-art. There is no sound technical reason why transmitters cannot be built to incorporate redundant circuitry throughout with automatic fault sensing and change-over; trend spotting of variation in parameters; plug-in circuitry; automatic storing of parameter records for later print-out, if desired, and multiple location alarm-notification in case of major failures. Such a transmitter would provide the high reliability desired by the broadcaster, meet the spirit of the commission's regulations and significantly reduce the need of the broadcaster to have a technician available at a moment's notice.

Before you start bombarding the manufacturers with your orders, it should be pointed out that two highly

significant non-technical problems are associated with such a project. First, the development leading to such a product would be expensive. All such development costs are obviously going to end up as part of the purchase price of the transmitter. In this day of fierce price competition for the broadcast market, it is questionable whether enough broadcasters are willing to pay for the quality product proposed. This determination would require a market survey far beyond the scope of this article.

The second problem concerns the average broadcaster and the "If it doesn't look like a transmitter, it isn't one" syndrome. An old friend who is a highly experienced broadcast engineer long ago stated that all transmitters with output power of 1 kW or less should be kept in the chief engineer's desk. Yet most engineers who have been around for a few years remember when one of the major manufacturers offered a new transmitter, far ahead of the rest of the field, which was not in a standard 3'x3'x7' box. Its acceptance by the industry was, conservatively speaking, underwhelming. That same manufacturer now has a new transmitter which is probably the largest selling unit for 1 kW AM. However, it looks very much like all of the older transmitters with the exception of being slightly smaller. The CE's desk is still empty while low power transmitters have enough empty space to store the station's miscellaneous files.

For ATS to become widely used, a new series of hardware needs to be designed and marketed which does not simply try to replace the operator but which is *designed* to not need an operator in the first place. It probably wouldn't look conventional, which would bother some, but it would bring the broadcaster's transmitter into the same decade of sophistication as his program automation system. Downtime would be virtually eliminated, yet the equipment would be operated with constant supervision and would require only careful routine maintenance by the licensed operator. □



The new Harris 9100 Facilities Control provides microprocessor-based protection for broadcasters' large plant investments and provides monitoring and/or control of the entire transmitter plant. It boasts expanded remote control channelization and has an optional video terminal and/or logging printer at the studio to identify problems and keep the transmitter plant on the air.

ATS survey

indicated that ATS for television stations and for AM stations which use directional arrays will be permitted in the future.

The Rules and Regulations permit the station to design, purchase and install the ATS equipment without the necessity of a previous application. Stations also are permitted to make such transmitter modifications as are necessary to permit the proper operation of the ATS equipment. After the installation, the equipment and its operation is to be checked by the chief engineer, technical director or the station's consulting engineer, who must then prepare a statement advising the commission with the applicable Rules and Regulations. The station will then receive and Regulations. The station will then receive permission from the commission to start operating with the ATS system.

ATS requirements

As to the actual requirements for the system itself, the ATS system must, as a minimum, perform the following functions:

- The system must periodically monitor the output

power or, for AM stations, antenna current. In the case of FM stations, this power measurement may be by the indirect mode. If the power of the station becomes outside of the permitted limits, the system is to automatically adjust the transmitter power output back to be within limits. If the automatic adjustment capability is unable to bring the power back to below 105% of the authorized value, the system must shut down the transmitter within a maximum of three minutes.

- The system must continuously monitor the modulation levels on both main channels and sub-carriers. In accordance with a defined method, the system must both sense over-modulation and adjust the levels to eliminate such over-modulation. Again, this is a "fix-it or shut-it-off" type of rule.
- The system must check itself periodically without interfering with the broadcast operations.
- The system must prohibit operation outside of the authorized hours or with the power at the wrong level for those particular hours.
- The system must require the initial command of the day to start the system in operation to be originated

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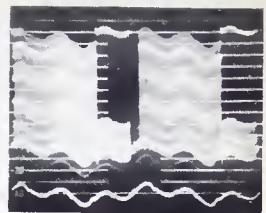
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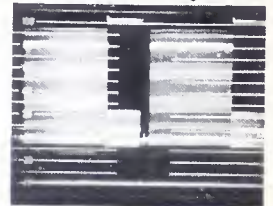
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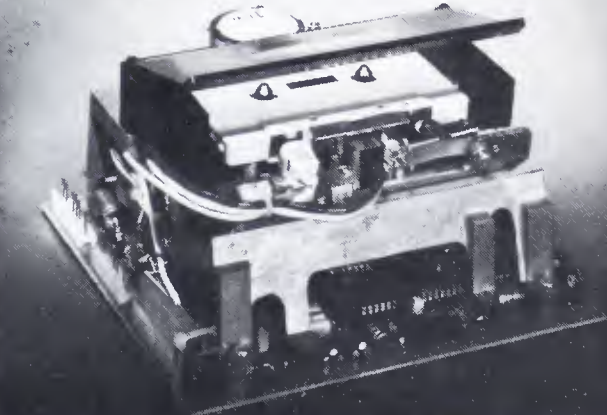
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The DYMA model 702 ATS is microprocessor based and is extremely flexible. It was developed to achieve a system that provides automatic supervision of the transmitter plant with much the same attention to detail and system functions as would be exercised by a human operator.

by being "manually activated," which means that the morning man must push his first switch of the day. (The commission is obviously aware of the type of operator frequently found as the door opener in the morning since the regulation does not require the activating function to be performed by a live person.)

- Finally, the system must alert the operator of failure of the transmitter, ATS or associated systems to operate normally. This alert must be provided to at least one operator/control point which may be almost anywhere as long as the required alarms are available and off-the-air monitoring is available.

While not required by the Rules and Regulations, the ATS may switch to a second transmitter automatically upon the failure of the main unit to operate within the authorized limits.

Obviously, all of the units presented to BE for this survey by current manufacturers met all of the above listed requirements. The level of sophistication, as well as the price, did vary considerably along with the list of optional features. The following listing highlights the main individual features of those units for which information was furnished.

Dyma Engineering—The newest unit on the market, the Dyma model 702, is a microprocessor based system. In addition to the normal and required functions, this unit will operate the standby power plant, switch to alternate transmitters and antenna systems, monitor tower lights and the building systems. In addition, the microprocessor provides for correction of parameters back to normal rather than just to within limits. The same unit is used for both AM and FM. Follow-up products are planned for television and directional AM systems.

Harris Corporation—The model 9100 Facilities Control unit is also microprocessor-based and will operate either on AM or FM systems. It has a sophisticated rack-mounted 2-channel amplifier which has digitally controlled gain. The increments of gain are typically less than 0.2 dB per step which the manufacturer

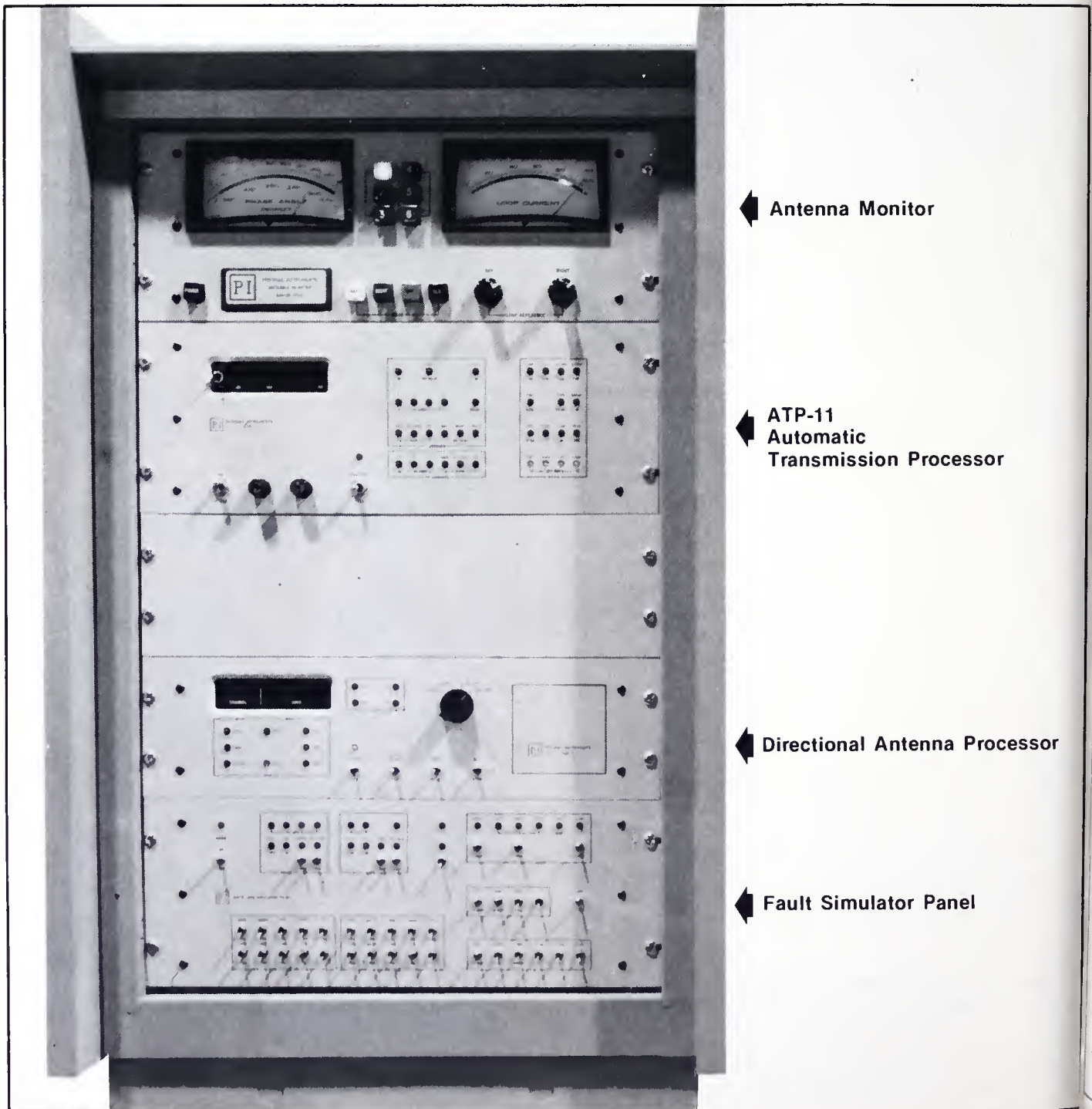
ATS survey

claims will allow very accurate adjustment of system gain and modulation level. This is intended to minimize the cross-talk problems caused by any unbalance in the performance of the individual audio channels. This unit also permits two sets of limits to be assigned to input parameters. One of these initiates an adjustment sequence; the other causes immediate system shut-down to save the equipment from damage in the case of a serious change in operation.

Potomac Instruments—This unit is unique because it

has been expressly designed for systems using directional antenna systems, although it may be used also with nondirectional AM or with FM stations. The system mates with the Potomac antenna monitoring system to automatically monitor all of the essential parameters of a directional antenna system when the commission authorizes such operation. The system will operate arrays of up to 12 towers, three patterns, three power levels, multiple transmitters and two co-located FM transmitters. When a transmitter change accompanies a change in the stations operation, the system even turns on the filaments

The Potomac ATP-11 system is designed for use with directional antenna systems, but may be used for nondirectional complexes as well. It mates with other Potomac system components to monitor transmission parameters: up to 12 towers, three patterns, three power levels, and multiple transmitters. Shown here is a portion of a demonstration system, with the ATP-11 highlighted, rack-mounted with other available components.





The QEI models 7775 (for FM) and 5775 (for AM) ATS units include their own modulation monitors for baseline modulation level sensing, reducing the station equipment necessary for interfacing with the ATS.

early and blinks a light to advise the operator that the change is about to occur. An optional rack-mounted printer will log up to 32 parameters at intervals ranging from ten minutes to three hours, or on command.

QEI Corporation—The QEI model 7775 FM ATS and model 5775 AM ATS units are unique in that they include their own modulation monitors for baseband modulation level sensing. This reduces the amount of station equipment necessary to interface with the ATS. The units are furnished complete with such items as antennas for off-the-air reception and necessary samplers. The modulation for the FM transmitters is controlled by adjustment of the composite signal using a system which controls the base band and subcarrier inputs without changing the pilot injection and phase.

CCA—While not responding with equipment descriptions at this time, CCA did advise **BE** that they were developing a new system which would be based on the use of dual transmitters. □

ATS product literature

The following firms have responded to a request for information on ATS products. Circle the appropriate number on the Reader Service Card at the back of the magazine for more information on their products. Or, use the **BE** Buyers Guide (September issue) to contact them directly. And, of course, visit their booth or hospitality suite at NAB/Dallas.

- CCA Electronics589
- DYMA Engineering590
- Harris Broadcast Products Division591
- Moseley Associates.....592
- Potomac Instruments593
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Microphone roundup

Part 2

Part 1 of this roundup appeared in the February, 1979, issue of **Broadcast Engineering** along with an article explaining how to select a microphone (pages 78 through 87). Just a few representative microphones have been chosen from each manufacturer to indicate the range of choices available. Detailed manufacturers' data for these and other microphones may be obtained by using the reader service card or by contacting the manufacturers at the addresses listed.

HM Electronics

6151 Fairmount Ave.
San Diego, CA 92120



System 22E

System 22E—Cordless RF mic system consists of a crystal-controlled VHF-FM pocket transmitter and matching receiver. Incorporates Dynamic Expansion Circuit, increasing dynamic range to 95 dB. Signal-to-noise ratio increased since floor noise is lowered up to 30 dB. Logarithmic compressor circuitry prevents overmodulation.

Circle (595) on Reply Card

AD series—Multiple mic antenna system prevents signal dropouts in wireless applications. Triple-antenna dipole setup along with combining circuitry eliminates phase-cancellation. Preamplifier circuit provides RF signal boost to offset internal system losses.

Circle (596) on Reply Card

Coherent Communications

13733 Glenoaks Blvd.
Sylmar, CA 91342



Mini-Mic

Mini-Mic—Omnidirectional electret condenser mic measures less than $\frac{1}{2}$ "x $\frac{1}{3}$ "x $\frac{1}{3}$ ". Low-current FET deposited within mic capsule yields low noise and long battery life. Sensitivity to 60 dB below 1V rms/ μ bar. Frequency response is selected to perform as a lavalier mic, but does not compromise use as a hidden mic.

Circle (597) on Reply Card

Artech—Line of wireless mic products includes transmitters, receivers and accessories. In UHF and VHF models, the overall frequency response is 80 Hz to 20 kHz \pm 2 dB; typical dynamic range is 99 dB; S/N is 64 dB. Transmitters: hand-held mic/transmitter or pocket transmitter; compatible with low-Z dynamic mics and can power many condenser mics; up to 33 hours of battery life. Receivers: 150 Ω balanced mic-level output, separate earphone output, metered battery and signal level.

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Accessories—Rycote windscreens and shock mounts are designed for AKG and Sennheiser mics. Windscreens are non-reflective neutral gray and lightweight, unaffected by water, and have a positive retention dimple and Velcro closure. Shock mounts are lightweight with laminated wood pistol grips, positive locking swivels and cradle-type suspension.

Circle (599) on Reply Card

AM stereo's impact on the industry

Excerpted from a speech to the Radio Club at their 69th Annual Conference

By Leonard R. Kahn, president, Kahn Communications

Editor's note—As the AM stereo issue continues to face the industry and the FCC, **Broadcast Engineering** continues to include news and conference coverage on this hot topic. The FCC's final decisions will affect a half-billion dollar plus industry; at least five firms with vested interests anxiously await the FCC decisions. And, broadcasters are ready to move with new equipment purchases following the long-awaited decision.

In the calm before the storm, the author of this article has taken time to speak to interested broadcasters about AM stereo. Previously delivered to the Radio Club at their 69th Annual Conference, this message is reflective in nature. It is not a comparison of the systems proposed and being tested. But, please note that **BE**, in sharing these thoughts, is not endorsing any current or proposed AM stereo system from any manufacturer. Furthermore, **BE** will entertain the publication of objective appraisals on AM stereo from manufacturers, station engineers and managers and leading consultants.

On September 14, 1978, the FCC unanimously adopted a Notice of Rule Making for AM stereo. Some of us have been waiting for this step for almost two decades. (RCA, Philco, Westinghouse, and Kahn Research, independently filed petitions for AM stereo in the late 1950s and early 1960s.)

While promptly acting on a similar request for an FM stereo Rule Change in 1962, the FCC denied proposals for AM stereo; partly because of the lack of interest on the part of AM broadcasters, and partly because the commission wished to aid the then very sick FM broadcast industry by allowing them to be the sole broadcast service offering stereo. Now, however, the commission, has shown all indications of moving quickly, and actually moved from the Notice of Inquiry phase to the Rule Making phase in only 15 months. This speediness was partially in response to the urgent leadings of AM broadcasters. There are expectations that AM stereo will be on the air with the full blessing of the commission by the end of this coming summer.

The reason for the dramatic shift of interest by the AM broadcasters is that AM has been seriously challenged by FM (now much healthier, indeed), and AM broad-

casters need to effectively use all available technology to best serve the public.

FM stations have now surpassed AM stations in audience and income in a number of major markets (Dallas, Washington, Detroit, and Philadelphia). While AM broadcasters still serve more listeners than FM, they are continually losing ground and should be released from artificial restraints.

AM stereo can help provide a healthy and proper balance in the aural broadcasting industries, allowing FM to reign supreme in the homes close to stations, while allowing AM to best serve distant homes and automobile listeners. At this time, neither FM nor AM requires any artificial restraint enforced on its competitor in order to maintain its viability. The public will be best served by allowing both systems to fully mature, taking advantage of all that technology can offer. Such elimination of artificial restraints is especially timely in view of the FCC chairman's recent statements concerning deregulation.

Advantages of AM stereo

The obvious and well understood advantage of introducing stereo to AM radio is that it provides a major improvement in fidelity by faithfully

reproducing a dimensional characteristic which is lost in monophonic systems. This characteristic allows the listener to more closely approximate theater listening, enjoying the spatial characteristics of the music.

There has been a rebirth of interest in radio dramatic programs in the past few years and stereo can be most useful in enhancing dramatic effects.

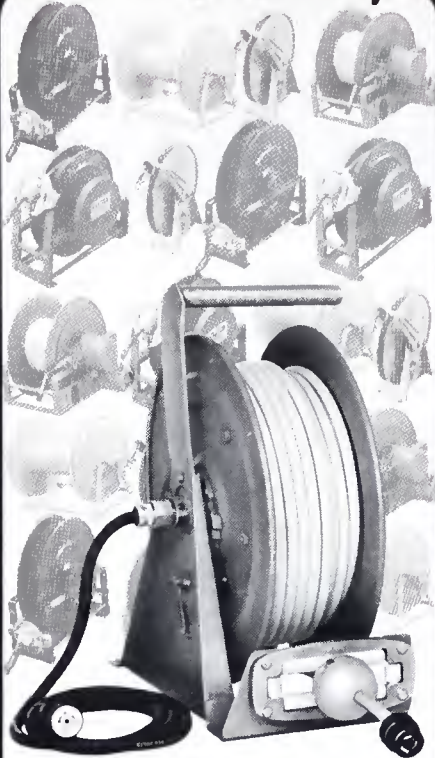
Also, in broadcasting certain news events, such as debates and news conferences, the stereo effect can be used to allow listeners to more readily follow a back and forth argument and ease the problem of determining which person is speaking. The importance of this effect can be judged by asking a secretary to transcribe a conference from a monophonic recording. The difficulty of understanding such recordings, as compared with transcribing from a stereo recording, provides ample proof of the utility of stereo reproduction.

An additional advantage of one form of AM stereo is the "cocktail party" effect, which helps listeners concentrate on one speaker when more than one person is talking. There have been studies showing how successful a human being with normal hearing is in separating one conversation from a number of conversations, even though the interference produces sound pressures commensurate with the desired conversation.

The "cocktail party" effect also can be used to alleviate significantly adjacent channel interference. If the stereo system spatially separates on the basis of frequency, adjacent channel interfering sounds can be made to fall all the way to the left-hand speaker for lower frequency adjacent channel stations, and all the way to the right hand speaker for higher adjacent channel frequencies.

Listeners to the desired signal can spatially discriminate against the

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AM stereo

adjacent channel interference sounds. Actually, such an effect can be made available when receiving monophonic signals, and the "cocktail party" effect also can be applied to non-broadcast communication systems.

Other advantages of AM stereo

Many AM broadcasters in expectation of AM stereo are sprucing up their stations at every point, from the microphone to the antenna. AM stereo is being equated to high fidelity, and at the same time stereo operation is initiated the quality of the equipment at all points in the broadcast system may be improved. During discussions with a number of broadcasters about AM stereo, the vast majority have indicated that they have budgeted considerably more money for studio equipment than the actual stereo exciter.

AM stereo will cost more than just the price of a new transmitter adapter. A major cost element is studio equipment. Also, the broadcaster must maintain two paths between the studio and the transmitter in order to handle the L and R information. But, again, it seems that most broadcasters willingly will make the investment in equipment that improves their signal and allows them to compete better in the marketplace.

The improvements that occur along with the introduction of AM stereo will not be restricted to the efforts of the broadcaster, but also will be found in the receiver manufacturing field. Actually, the set manufacturers may have the most to gain from the introduction of AM stereo. Estimates of increased revenue of 500 million to over 1 billion dollars per year have been published.

With all this at stake, it is to be expected that set manufacturers will stop treating the AM band as a stepchild. The weakest link in the present AM broadcasting system is the receiver. It is truly shocking to see how poorly the average AM receiver performs. Many receivers are limited in frequency response to 3 or 4 kHz, and introduce significant amounts of distortion. It is a test of manual dexterity to tune many receivers.

By use of modern filtering techniques, it is now possible to improve fidelity substantially and to improve selectivity from adjacent channel interference significantly. "Significantly," moans 20 or 30 dB. To

prove how reasonable it is to expect such improvements, examine the excellent selectivity characteristics of a number of modestly priced CB receivers.

Like their broadcast associates, a number of receiver manufacturers have indicated that they have decided to improve their product, but they are waiting for the advent of AM stereo to initiate these improvements.

There is another effect that is a by-product of binaural or stereo operation: For a given sound pressure level a binaural signal sounds louder and is more capable of competing with acoustical noise. This is most important in the automobile, where ambient acoustical noise is a serious problem, and should enhance not only musical reception, but also news and dramatic shows.

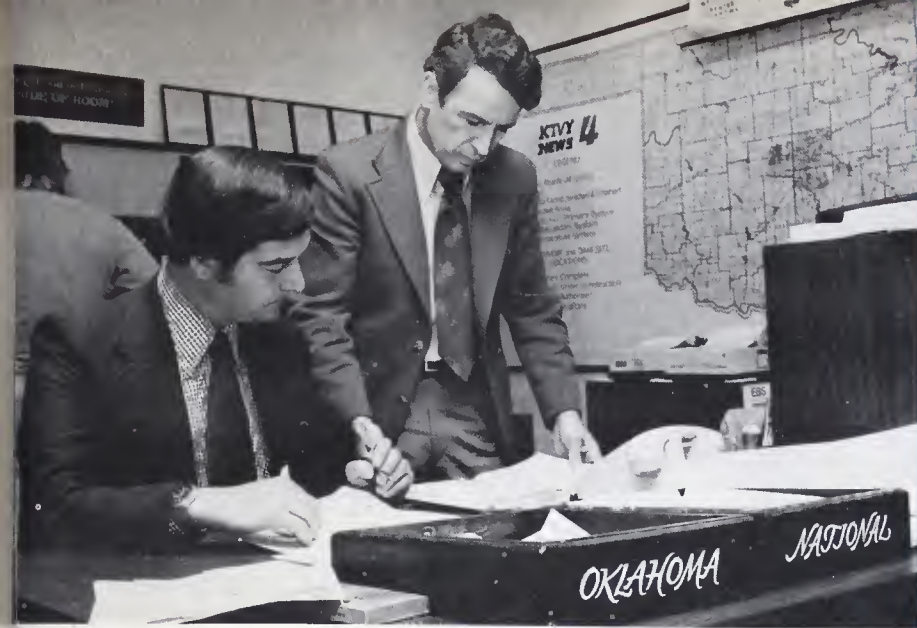
It is possible that the sum of these peripheral advantages will be greater than the stereo effect which helped set them off.

It should be noted that the AM broadcaster is not without enemies in and out of the government. (I have even heard such statements as "isn't it time to allow AM broadcasting to die?") There has been considerable discussion of reducing the separation between AM stations from 10 kHz to 9 kHz. There has also been consideration of even further reduction to spacing and limiting the fidelity to as low as 5 kHz to make more room for stations.

These proposals are not new but have been presented repeatedly for many years. With a perfunctory consideration of, for instance, the complexity of a shift of 9 kHz spacing in North America, it is easy to see why it has been generated with so little enthusiasm in this part of the world.

The FCC, fully cognizant of the fact that the best utilized megaHertz of spectrum is the standard AM broadcast band, has resisted any attempts at reducing the quality of AM broadcasting. More people in the United States rely on this megaHertz of spectrum for their information and entertainment than any other megaHertz. (The AM broadcaster, with more stations and more listeners, utilizes only 5% of the spectrum occupied by FM broadcasting.)

It is therefore important to the public, to the broadcaster and to the economy, that the commission move promptly in adopting appropriate rule changes.



George Tomek (left), news director of KTVY, and Ernie Schultz, director of information, discuss the day's scheduled news events. (Photographs courtesy of Eastman Kodak)

Case study:

KTVY-TV, Oklahoma City

There is a lot of action and viewer interest in the downtown demolition of a tall building—but not so many ways to cover an event that may be over in the matter of a second or two.

"We could have filmed the building falling in slow motion," Charles Stacey, photojournalist at KTVY, Oklahoma City recalls, "but that would have meant passing up using the camera's ability to show viewers an event from many angles and viewpoints."

Instead, the station sent every available photojournalist and used seven cameras, including one operated by remote control at the base of the building.

That night, Oklahoma City television viewers were treated to a heart-stopping sequence showing the building toppling, again and again, in instant replay fashion—clipped with a final shot of bricks and mortar seemingly hurtling onto the camera at the base of the building. Stacey says the hotel demolition story fit the concept of photojournalism at KTVY not because of the quality of the individual shots but because of the planning and integration of effort that went into the assignment. KTVY had once again taken a routine assignment, and given the story the visual excitement that earned it the 1977 Television News Photography Sta-

tion of the Year" award from the National Press Photographers Association (NPPA). The award is sponsored annually by Eastman Kodak Company.

The tradition of photojournalistic excellence was, in fact, the theme of KTVY's winning station entry. The news department was similarly honored by NPPA in 1968 and 1974, while chief photographer Darrell Barton was selected NPPA "News Photographer of the Year" in 1973. Stacey, another senior staff member, has made a strong bid for top individual honors during each of the last two years.

It all adds up to a station that is very conscious of the impact of visuals in news reporting.

"Our big investment is not in on-air talent," Ernie Schultz, director of information for KTVY, says. "We emphasize putting people on the street, digging for news and developing interesting visuals to help tell the story."

Fourteen KTVY staffers are well-rounded photojournalists capable of shooting film as well as reporting. Though some do more of one than the other, the most common combination is for a reporter to serve as photographer for one story, and trade places with another reporter for the next.

"The ideal and most honest way to cover a story would be to have no

narration," Schultz says. "Ideally, the participants in an event would be the only ones the viewer heard from. That is a great deal more accurate and effective than having a reporter stand up and tell the viewer what has happened. In practice, most stories fall short of the ideal, but having news teams made up of two photojournalists helps tie the words and pictures together as closely as possible. If we don't use visuals effectively, we are wasting the power of television. There are no secrets or tricks—just the ability to look past surface events to see the real story.

"Two things make our visual coverage of the news challenging," Stacey says. "First, Oklahoma City is not a hotbed of fast-breaking spot news. The big murder, the dramatic fire, the typical gunman-hostage situation are rare occurrences here."

The stickler is that KTVY eschews many of the visually interesting spot news events, simply because they are not important stories.

"We seem to have become more selective about the spot stories we use," Stacey points out. "Not every accident makes it on the air, nor every fire. The news team on the scene can dump a story if team members don't think it's worth it, and the assignment desk can't override that decision except in



Charles Stacey (left) and Dave Smith prepare to cover a story in the rural town of Cement, OK.



For a story on circuit-riding city managers, Stacey and Smith followed their subject as he made rounds of city halls in Cement and Apache, OK.

Filming the city manager in a moving car provided a relaxed, natural attitude and lent an air of realism to the film report.



unusual cases."

Schultz agrees. "We cover a broad section of the state, and so we must consider whether a story is interesting to a large number of people. What may seem to be an event of purely local interest may, on closer examination, have relevance to a broader audience. So we can't arbitrarily decide that this type of story will be covered, while this other type won't. Each event must be weighed on its own merits."

News gathering has changed since KTVY won its first station of the year award in 1968, but what has surprised Schultz has been that television news hasn't changed as much as had been predicted.

"When we won the last time, in 1974, ENG hadn't made much of a penetration in television news," he recalls. "But it was predicted that it would revolutionize the industry in only a few years.

"Changes have been made," Schultz continues, "but chiefly in the area of compressing the clock. Both film and ENG techniques have been improved to allow getting visuals on the air much more quickly. With ENG, the deadline is now. The same things make news a made news 10 years ago, and our way of covering events hasn't changed that much. ENG has given us a new set of tools that lets us go live if we need to."

The NBC Television affiliate operates seven CP 16 cameras and one Ikegami electronic news gathering unit. Three of the film cameras are used for sports, farm news, and special projects. The ENG unit is used for late-breaking news and long events such as meetings of the legislature and sports. KTVY's attitude has been to use ENG where electronics offered the opportunity to do a better job, and film where the advantages of the lightweight compact CP 16 cameras were desirable.

"A lot of us like the reliability of the film cameras," Stacey says. "We will shoot more than a million feet of film in a year, and lose only a story or two because of camera malfunction. And usually that can be blamed on abuse."

In addition to mounting cameras in the path of falling buildings, the KTVY staff has operated CP 16 cameras in weather so bad once a crew had to stop and pour water out of an Angenieux zoom lens before they could continue filming.

KTVY photojournalists work

our-day week which includes two 8-hour days and two 12-hour days. The long days give reporters added time to work on a story, or to make progress on two assignments in the same time period.

Even Schultz, who was president of the Radio and Television News Directors Association in 1977-78, gets out with a camera and shoots a story occasionally.

Some members of the KTVY staff say Schultz promotes a lack of hierarchical distinction among his news team. Newer members often turn to veterans like Barton, or News Director George Tomek for advice and help, but the newest recruit may serve as producer for a story on which the most experienced reporter functions in a subordinate role.

This broad interchange of assignments has meant that the KTVY staff as a whole consistently performs to a high level. Indicative of the depth of the photojournalism staff is the fact that 11 persons shot film for the station's winning entry.

The films in the entry covered a broad range of news events including a hotel fire, a plane crash in the mountains, old people playing bocci, a new congressman winning an uphill battle and little league football.

"These all had one thing in common," Schultz says. "Good use of the basic syntax of visual reporting. Every story should have a beginning, middle and end. Such things as camera angles, proper lighting, and the use of close-ups are all part of the visual reporting language."

Vivid visuals are more than a means of attracting viewers, he emphasizes.

"Let's be honest," he says. "There are a great many people who get all their news from television. If we can't bring the important stories to them in an interesting way, an event might as well not even have happened for many viewers."

"If society was so comfortable with television that it would erect no barriers as to what we can and cannot cover, I think the level of news reporting would improve," Schultz says. "We could ignore some of the eye-catching stuff we have to run because we can't gain access to where the real news is being made. Then the real power of television to inform could finally be realized." □



A small town restaurant provided the locale for much of the city manager's report. Here, Stacey uses a CP 16 camera to maneuver in the tight confines of the restaurant.

Reporter-photographers Bella Shaw and Michael Rosenthal discuss a mutual project as the film is edited.



Broadcast quality may mean a new exciter

By Brad Dick, director of engineering, KANU/KFKU, University of Kansas

The term broadcast quality often is used to describe something of very good quality, usually equipment performance. For years the goal of every hi-fi affectionato was to have a stereo capable of reproducing sound with broadcast quality. Times have changed, however, and it seems that broadcast quality is no longer the high standard toward which the listener should strive. Could it be that the receiving equipment actually is capable of better performance than the transmitters? This question led KANU to examine that possibility.

Typical transmitter/receiver
Using manufacturer supplied

data, KANU examined 85 FM receivers in 26 different areas. These data enabled not only receiver comparisons, but they also generated a "typical receiver." A composite set of specifications was drawn up from the data sheets that resulted in a typical inexpensive receiver costing less than \$200. The

performance shown is the average for all of the receivers in the \$200 price class.

The same process was followed to measure exciter performance. Four presently available, relatively new exciters were used to generate the "typical exciter."

The results are as follows:

	Receivers	Exciters
Distortion	0.28%	0.40%
Separation at 1 kHz	42.3 dB	37.5 dB
Frequency response	+0.55 - 1.36 dB	0.92 - 1.0 dB
Signal-to-noise	67.5 dB	66.67 dB

Figure 1 Demodulated composite baseband. Pilot and SCA on. Note lack of intermodulation. (10 kHz, 10 dB/div.)

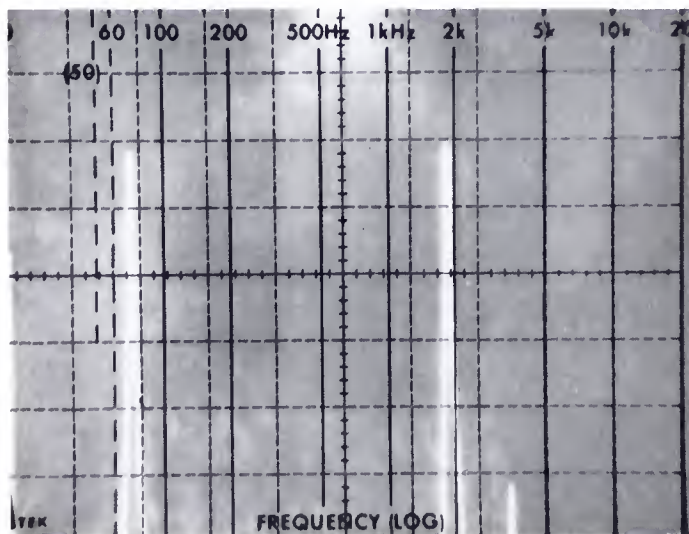
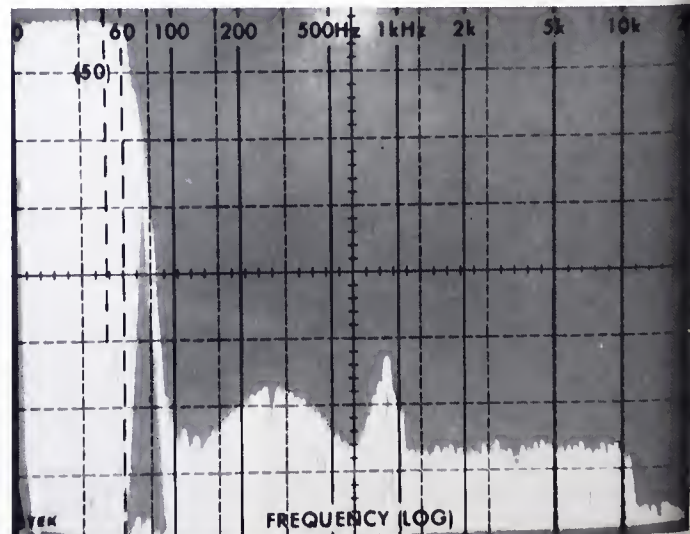


Figure 2 Sweep of L = R from 50 to 17 kHz. Notice lack of interference around 67 kHz. 0 - 100 kHz. (10 kHz, 10 dB/div.)



Note that \$200 buys a lot of performance. The most interesting aspect of these specifications is not that they are really quite good, but that the "typical" modern broadcast exciter is not capable of even matching the receiver specs. This means that the average listener can buy for \$200 a receiver capable of better performance than his local station is likely capable of broadcasting. If older equipment had been considered, the results would have been even more dramatic. With these facts in mind, KANU decided to examine a new exciter from Harris, the MS-15.

The Harris MS-15 system

The MS-15 is a completely new exciter from the ground up. Even the packaging is different from other Harris products. The mainframe has room for 13 plug-in modules, each securely held in place by its own locking bar. The top front panel drops down to reveal the input and output filters, metering circuits and power supply components. The rear panel has both a barrier strip and a multipin socket with identical connection points for both audio and interfacing requirements.

The exciter has dual front panel metering for checking any of 20 signals and voltages, a feature which makes it extremely easy to spot check all-important parameters and signals. Each module has its own on card voltage regulator, and front panel LEDs tell at once if any regulator fails. Modules can be inserted or removed with the power on without harm. The mainframe has already been wired for future quadrasonic broadcast, and space for the necessary modules has been provided so conversion will be easy.

One new Harris development on the MS-15 is called the Dynamic Transient Response (DTR) Filter. By a clever series arrangement of three filters, the DTR filter inaudibly reduces modulation overshoots to less than 2%. This filter can allow a two-to-six dB increase in loudness with no audible effect. (Our local "golden ears" tried for hours without success to detect when the filter was switched in or out.)

The RF module is VSWR protected and can be shorted or left open without damage. An automatic circuit senses the VSWR and shuts down the output state if it exceeds a particular level. Both forward and reflected power can be read on the front panel meters. The bandwidth of the RF module is so wide that there are no tuning adjustments of

any kind! A single jumper is used to select either the upper or lower half of the FM band.

The exciter uses a 10 MHz TCXO reference oscillator and programmable divider in the AFC system. The synthesizer provides outputs at almost all of WWV frequencies for easy zero beating and the exciter can be programmed to any carrier frequency in the FM band in 50 kHz

increments. To change frequency, all one has to do is move a couple of jumpers, and again, no tuning.

The stereo section uses a new method of generation. Called Digitally Synthesized Modulation (DSM), the generator is capable of extremely good separation. (Harris warns that only good test equipment can be used to measure its performance, which KANU's tests soon verified.)

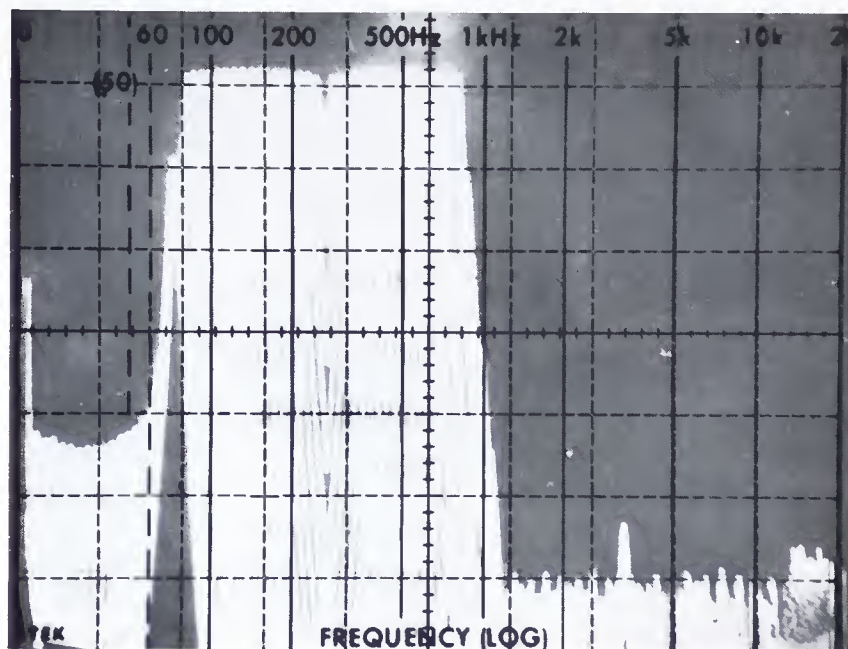


Figure 3 Sweep of L = R from 50 to 17 kHz. Notice lack of interference in SCA region. 0 - 100 kHz. (10 kHz, 10 dB/div.)

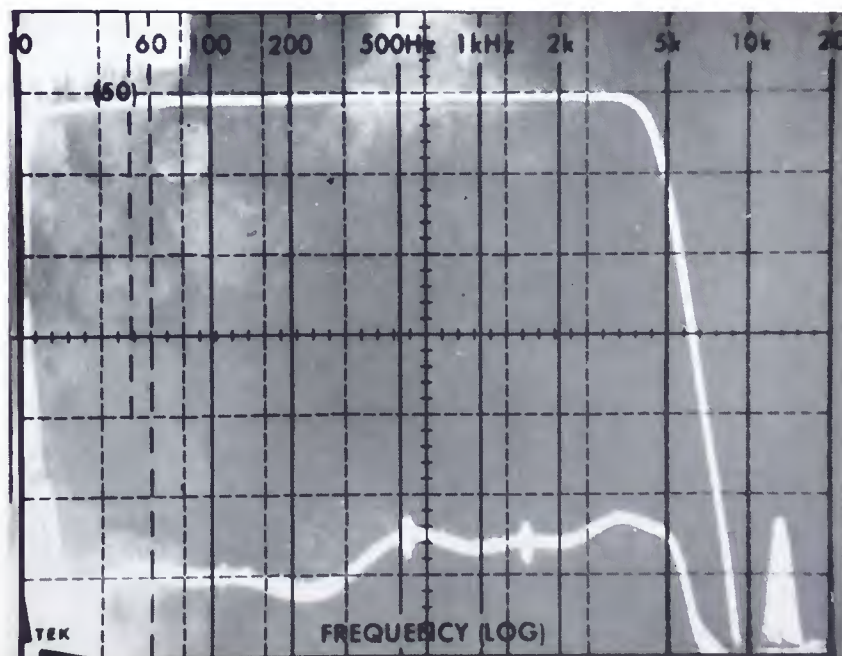


Figure 4 Separation test. Top trace = left channel, bottom trace = crosstalk into right channel. 0 - 20 kHz. (2 kHz, 10 dB/div.)

Exciter performance

Equipment manufacturers often overlook the need for instruction manuals. But the MS-15 comes with two manuals which weigh a total of five pounds: one contains simplified operating instructions and basic

circuit descriptions; the second contains all the information needed for servicing. Detailed circuit descriptions with complete alignment instructions have been included along with flow charts for troubleshoot-

ing. (For audio and RF broadcast gear this is a first; hopefully, other manufacturers will follow Harris' lead.)

Performance

Over the past year KANU began using new test procedures which allow rapid, yet thorough, examination of exciter performance. Central to these tests are a Tektronix 5L4N spectrum analyzer and a precision 75 μ s deemphasis filter. Backing up this equipment are two sets of modulation monitors.

First, the standard tests were run for measuring THD and IM distortion, both of which turned out to be 0.1% or less. Figure 1 shows the composite base band of the MS-15 exciter after demodulation. Notice that there is no 38 kHz present. The analyzer is reading 80 dB down and still no 38 kHz product is visible. The 76 kHz signal is over 70 dB down.

The next test, the hardest for any exciter to pass, requires very good phase response and almost perfect linearity throughout the modulator. In Figure 2, the exciter is swept with L = R signals at 100% modulation from 50 to 17 kHz. After setting the oscillator frequency, the analyzer sweeps and records any spurs or products generated. This test is very exhaustive because by checking the complete 50 to 17 kHz band rather than a single frequency any errors in the modulator process will be detected. A single frequency test will not necessarily show up problems. Figure 2 shows that the crosstalk, L + R to L - R, is greater than 56 dB. Of more importance to a station with SCA is the region around 67 kHz. Note that the signal products in this area are better than 65 dB down. Keep in mind that the photo shows all spurious signals created from L = R modulation.

Figure 3 shows spurious signals created by modulating only the L = -R channel. Again, the oscillator frequency was set and the analyzer then swept the base band. Crosstalk is about 45 dB. Note, however, that the area around 67 kHz is again very clean. The products at 67 kHz are 70 dB down, an extremely good figure.

Harris uses the term Dynamic Stereo Separation when discussing stereo generators. The idea is that single frequency tones are fine for tests but separation under actual program conditions is more meaningful. The MS-15 specifies a Dynamic Stereo Separation of 40 dB

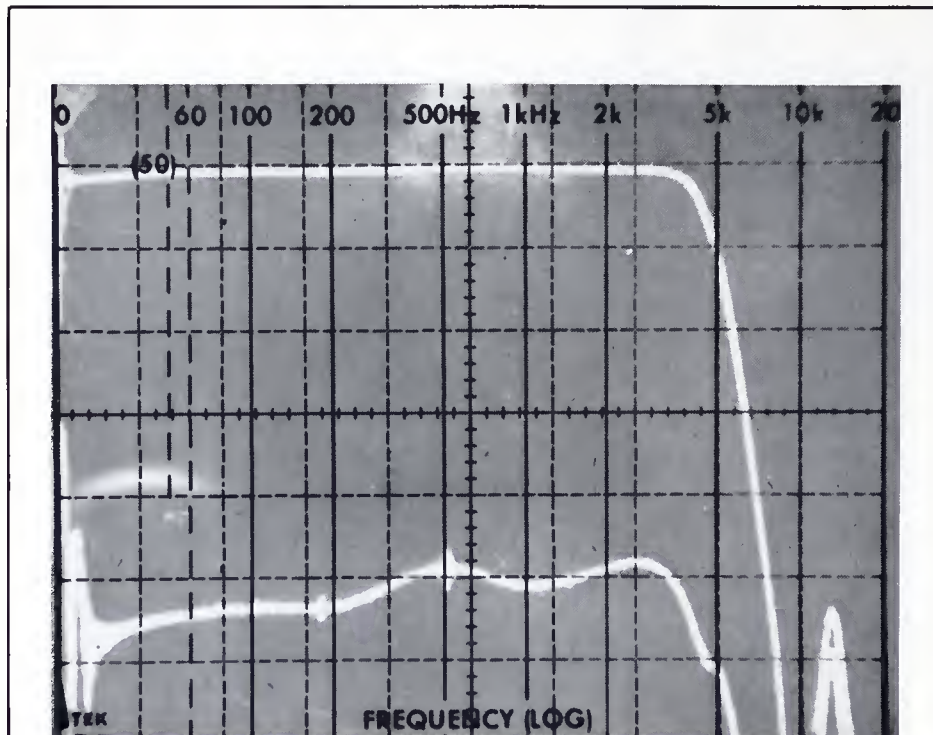


Figure 5 Separation test. Top trace = right channel, bottom trace crosstalk into left channel. 0 - 20 kHz. (2 kHz, 10 dB/div.)

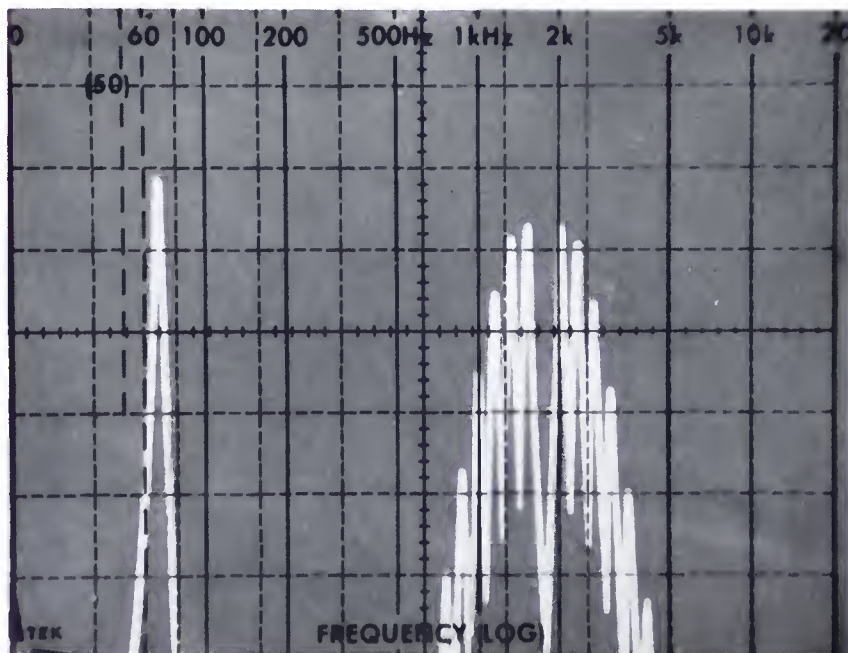


Figure 6 SCA to main crosstalk. Maximum deviation of SCA = +5 kHz. 0 - 100 kHz (10 kHz, 10 dB/div.)

minimum and Stereo Separation as 5 dB minimum. It turns out these are conservative figures.

While a true dynamic test is difficult to record on a spectrum analyzer, the result of a similar test is shown in Figures 4 and 5. In these figures the oscillator output was fed to the appropriate exciter input through the 75 μ s deemphasis filter. The upper trace shows full modulation on the left and right channel, respectively, and the lower trace is the opposite channel output. The photos show all possible crosstalk from the opposing channel from 50 Hz to 17 kHz. The separation from left to right is over 52 dB across the band and over 48 dB from right to left. The results were spectacular, 50 dB of separation across the band is nothing short of unusual. No other exciter or stereo generator KANU measured could come even close.

SCA/main channel crosstalk

Two other tests were performed in the audio analysis of the exciter. The first concerned SCA to main channel crosstalk. The SCA was modulated at 100% (± 5 kHz) with a 107.9 Hz tone. This represents maximum excursion of the SCA carrier. Note that the carrier has disappeared, indicating 100% modulation. Although difficult to see, Figure 6 shows the crosstalk to the main channel to be over 68 dB down. Figure 7 was obtained from a

MS-15 spectrum analyzer on Max store. In this position, the analyzer updates the display any time the input exceeds the presently stored level. Both the main channel and SCA channel were modulated with program material for 3 minutes at 100% peaks. The material was quite dense and the average modulation was very high. The figure shows the excellent separation between main and SCA channels. The notch at 58 Hz is 65 dB down.

Figure 8 was taken from the output of a McMartin TRE 5 SCA receiver. (KANU felt that if it could obtain satisfactory results here, the SCA operators would be happy.) The main channel was again modulated at the 100% level at frequencies from 50 to 17 kHz. After the frequency was set, the analyzer could sweep the output of the TRE receiver. Any display on the analyzer would indicate crosstalk from the main channel. The photo shows that all crosstalk in this test was at least 56 dB below the SCA carrier level.

The results of this test are very impressive. The printed specifications from Harris obviously under-rate the exciter, in most cases by significant amounts. Although the cost of the exciter is fairly high, the

features, performance and construction make it well worth the price. Any station considering updating its FM exciter would do well to consider the MS-15, especially if SCA is involved. \square

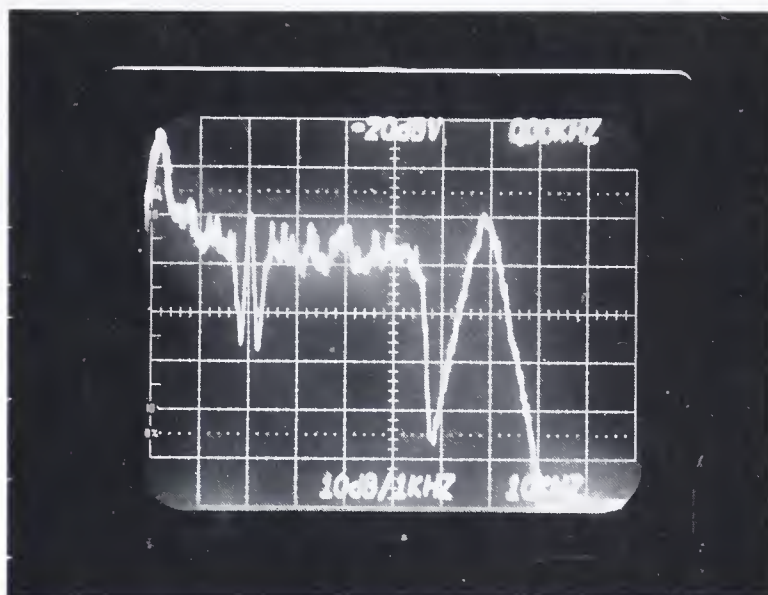


Figure 7 Maximum input levels stored for three minutes. Notice excellent main to SCA separation. 0 - 100 kHz. (10 kHz, 10 dB/div.)

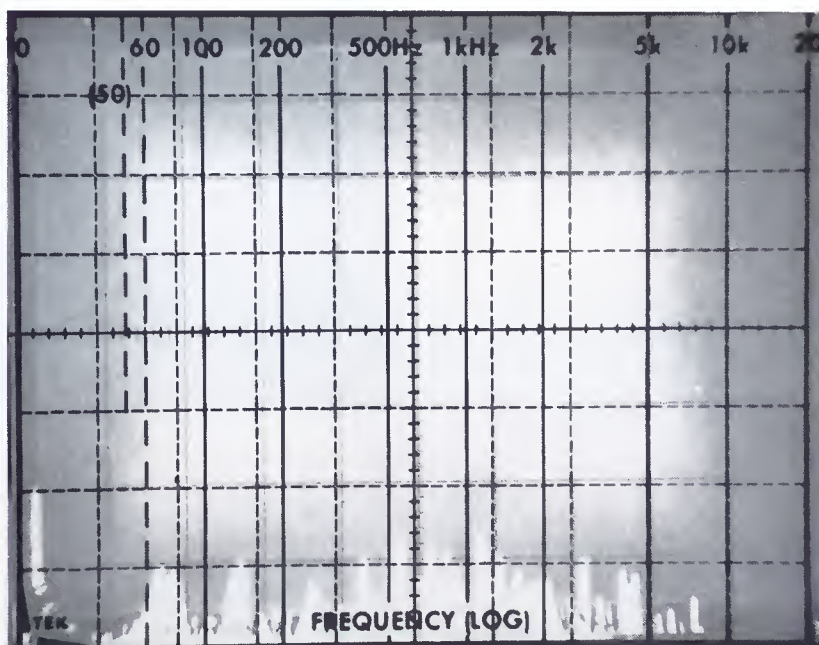


Figure 8 Crosstalk measure on TRE 5 SCA receiver using 150 μ s deemphasis. (2 kHz, 10 dB/div.) (100% SCA deviation = the -10 dB graticule marking.)

Editor's note—With this issue we begin a new department of information to serve broadcasters. It will contain letters from our readers and the industry, short technical notes on advances not long enough for a formal article, highlights of staff visits to stations

and manufacturers and notes of trends that do not fit into our other regular departments. This department provides us a means of communicating briefly on facets of the industry which we have not been able to include before.

SMPTE and Bay Area broadcasters vibrant with industry activities

Following the SMPTE meeting in San Francisco, I took a few days off to visit a number of radio and television stations in the Bay Area, plus a couple of manufacturers, to discuss a number of aspects of the industry. In particular, I wanted to see what was going on at some various stations while I was in the Golden Gate Area.

The Ampex tour

At Ampex in Redwood City, I got the grand tour of their spectacular facilities and had an opportunity to discuss broadcast equipment with Mark Sanders, general manager,

videotape recorder group, audio-video systems division. Sanders and I discussed a good many topics, but one I was particularly interested in was the fulfillment of orders for broadcast equipment. Elsewhere in the industry I had heard rumors of complaints that several manufacturers (definitely not Ampex) were having problems with meeting delivery schedules. Sanders assured me that extreme care is exercised at Ampex in order entry and fulfillment and that major equipment orders are generally being filled in 30 to 60 days. Production seems to be so well organized at Ampex that the

exact time for an instrument coming off a production line can be pinpointed well in advance. The only reason why an instrument shouldn't be shipped on schedule, according to Sanders, is if it should fail to pass Ampex's exhaustive QC tests, and this is a relatively rare occurrence.

A visit to Dolby

I visited the staff at Dolby Laboratories in downtown San Francisco to review the status of Dolby's efforts to help broadcasters reduce audio noise. Because of the interest by broadcasters in top quality

Eidophor wows audiences

The Eidophor Projection System by Conrac was used at the Miss America Pageant to astound an audience of 23,000 at Atlantic City's Convention Hall. According to Don Pike, engineering supervisor at NBC, the Eidophor provided the brightest picture imaginable in spite of the 5 kW to 10 kW spotlights used on stage.

Ranging up to \$425,000 for a color version, the Eidophor system claims virtually no degradation in color brilliance or hue compared to the original as viewed on a professional TV receiver; unprecedented large image display (up to 50 ft wide screens); image display compatible with a wide selection of sources—TV cameras, VTRs, TV receivers; character or graphic generators, or radar scan converter; and flat screen display for wide angle viewing with low loss and distortion.

This system is expected to have applications where large audiences, such as major sporting events, concerts or rallies, cannot see fine details without optical enlargements.

This system is distributed

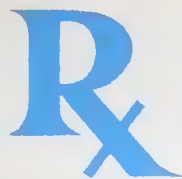


through Conrac's System-E Division, 32 Fairfield Place, West Caldwell, NJ 07006. John Lawton Jr., general manager of the division, and Lynn Blascovich, marketing manager, described features of the system and some of its restrictions. "The picture width," they said, "is crucial; optimum viewing ranges from 1-1/2 to 10 times the picture width. Also, speakers should not be located behind the screen

since there are no perforations for sound transmission."

The system is available with a variety of lenses to accommodate various viewing situations, up to 7,000 lm output, and with remote controls possible. Purchase or leasing plans have been devised to suit customer needs.

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Feedback

sound, especially in FM stereo, Dolby's business in noise reduction appears to be quite prosperous. Dolby is continuing to look for new market areas to penetrate, and some of these are expected to be revealed at NAB in Dallas.

One of these areas could be the incorporation of Dolby into VTRs and VCRs. This would be an even greater possibility should the TV industry go the direction of stereo for the audio portions of the programs such as we witnessed at SMPTE in New York for stereo TV as demonstrated from Japan.

There is rumor that manufacturers of tape editing systems may be moving toward incorporating Dolby noise reduction in their editing machines. One manufacturer already doing this is Bosch-Fernseh with use of Dolby in their BCN 40/50 editing systems. By the time NAB-Dallas rolls around, other manufacturers may be using this feature also.

KBHK

At KBHK (Channel 44), I discussed the operation of an independent station with John Nielsen, engineering manager. Unlike the VHF stations, KBHK does not produce news programs but has found a good marketplace in other programming. Nielsen gave me a tour of the facilities under construction which soon will be operational. He said that one of their major problems is in finding and keeping good people for the engineering division. This concurs with the problem mentioned in the final SMPTE conference session where many stations express concern about obtaining qualified people at all levels of engineering and maintenance. Nielsen said that they have tried many avenues and that they simply have not found a convenient way to recruit new people into the industry.

KSAN

Just down the street from Dolby, I visited KSAN 95FM, and it was a madhouse of activity. A British group known as "The Clash" had just finished a recording, and engineer Beverly Wilshire was getting ready to switch into the mid-afternoon news as I toured these facilities. KSAN uses the Dolby noise reduction in broadcasting, but the facilities are located at their transmitter rather than in the studio. Engineer Rick Sadle gave me the grand tour and showed me not

only their studio facilities but described in some detail their remote recording truck.

KRON

Later in the evening I was able to get a complete tour of KRON (Channel 4), an NBC affiliate. Engineer Craig Bass gave me a thorough tour, filled me in on their service to the area, and arranged for me to witness the production of their 1-hour news program beginning at 6:00 PM. This session was of particular interest to me because Channel 4 features an old acquaintance of mine from Cleveland, John Hambrick, as anchor man. Channel 4 uses the Grass Valley switcher and E-MEM switcher and video effects machine to enhance their celebrated news program. Channel 4 which employs 72 engineers, is giving a greater emphasis to ENG now than previously, and is stepping up their production capabilities to provide local programs, especially in the area of developing commercials for large San Francisco accounts.

KPIX

At KPIX (Channel 5) a CBS affiliate, I arranged with Don Lincoln to scale the tower at Mt. Sutro. If you haven't met Don, you might want to read his article beginning on page 38 of the January issue of **Broadcast Engineering**. Don walks our readers through these facilities and appears himself in several pictures. Together we scaled the tower and got a magnificent view of San Francisco from the 6th level, over 700 ft above ground. In addition to briefing me on the KPIX transmission facilities, Don also introduced the Channel 7 staff (in the same building) to me. I did not visit the KPIX studios on this visit, mainly because KPIX is getting ready to move to new headquarters just a few blocks from Dolby Laboratories. When this move is completed, **BE** will cover the new installation's design and features.

KNBR/KYUU

At KNBR/KYUU, an NBC affiliate, I discussed station operations with Bill Newbrough, manager, technical operations. This visit was almost like an old homecoming because Newbrough used to work with Pat Finnegan who wrote extensively for **BE** in the past. Newbrough gave me a tour of their facilities, showed me their engineering control console,

and seemed particularly pleased with the performance of their relatively new McCurdy control console and their banks of 10 automatic cartridge machines. They have 20 engineers on the staff, including four females.

KKHI

At KKHI, high in the St. Francis Hotel, I visited with engineer, Steve Woodlord, and classical music librarian, David Knight. They also use the Dolby noise reduction equipment and indicated that their loyal listeners have expressed great appreciation for the high quality of their programming and transmission. Since they simulcast on AM and FM, listeners in San Francisco can also get their beautiful music on their AM dial at 1550. I listened to this channel on my way up to Mt. Sutro and enjoyed some beautiful music.

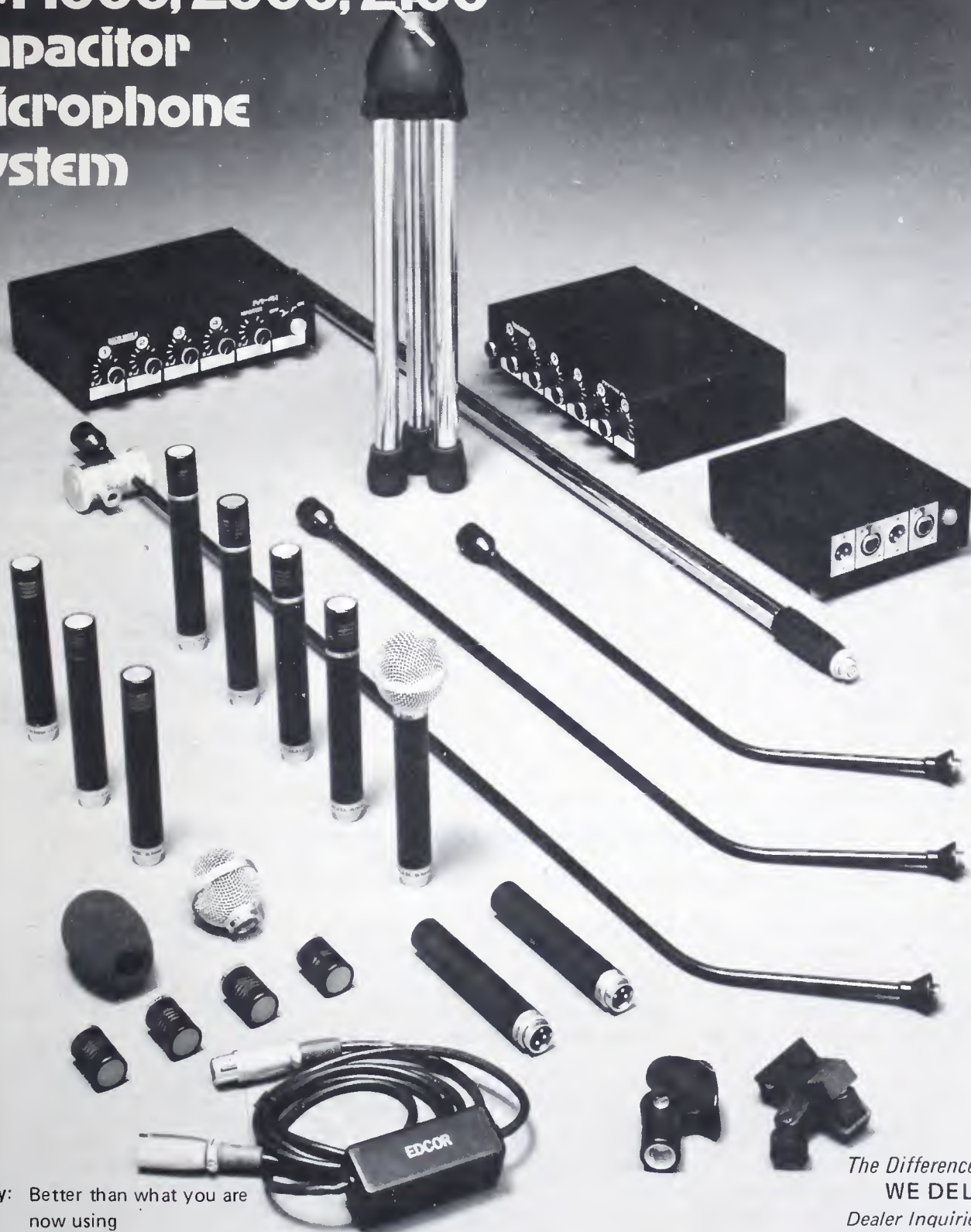
KGO

At KGO, an ABC affiliate, I was able to talk to radio and television people under the same roof. Although the engineering department for Channel 7 was locked up in planning sessions, I was able to get a tour of the facilities and see one studio in operation, tour the engineering control center, and see the installation for two new Ampex recorders. The Ampex equipment had been uncrated just the day before, but they were working perfectly. There are more than 380 people on the KGO Channel 7 staff, 80 of whom are involved in developing a crackerjack news program.

On the radio side of KGO, I talked extensively with Veldon Leverich, chief engineer. Of all the people I visited with in San Francisco, Leverich asked the most penetrating questions regarding the health of the broadcast industry as we saw it from the publishing side and delved most deeply into the business of publishing broadcast magazines themselves. He then gave me the tour of the facilities and showed me the control rooms, new studio construction areas, and the maintenance/design engineering section. I saw some consoles in production which are not available commercially, and I expect to be publishing an article on these developments when they are completed and in use.

Bill Rhodes, editorial director.

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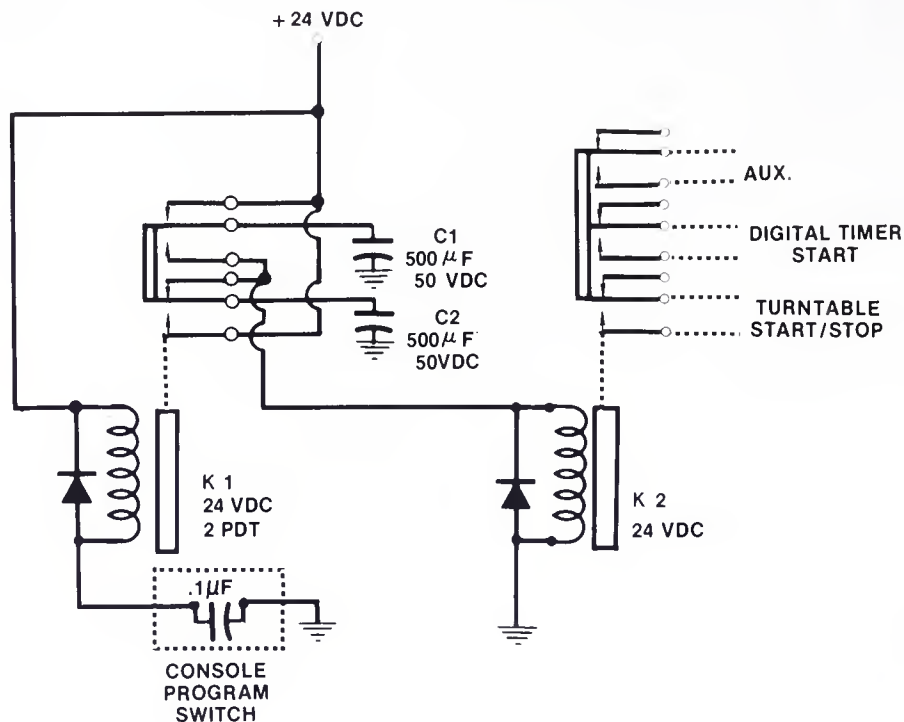
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Station-to-Station

Remote operation of turntables requiring contact closure

By Ed Raabe, chief engineer, KWIZ, Santa Ana, CA



Some of the newer turntables require a momentary contact closure to start and stop the table. Since most consoles only provide a regular on/off switch closure, it presents a problem when one wants to operate remotely these types of turntables.

With the console program switch off, the 24 V supply charges C-1 up to the supply voltage. When the program switch is turned on, the capacitor, C-1, discharges through K-2s coil providing a contact closure until the capacitor is completely discharged (about a half second).

Meanwhile, the supply voltage is charging C-2 up to the supply voltage through a different set of K-1s contacts. When the program switch is turned off, C-2 discharges through K-2s contacts. When the program switch is turned off, C-2 discharges through K-2s coil providing another momentary contact closure to turn the turntable off. Therefore, the end result is the turntable operating in accordance with the program switch on the console.

Use analog multiplexer chip in an audio matrix

By Donnie R. Dunbar, video engineer, John Deere Television

To maintain flexibility and eliminate patching problems involving feeds to our Ampex AG-440 recorders, we decided to build our own switching matrix.

We have two AG-440 recorders, one 4-track and one 8-track. Our Cetec 40LM audio board is divided into two parts. One part is for production and the other part is for editing. Each side has four output lines.

One channel on each recorder is reserved for SMPTE time code. This means that our matrix should have a balanced 8-line input capacity and a balanced 10-line output capacity.

For each one of the 10 output lines there is an octal coded switch. This switch will select any one of eight input lines and feed it to the recorder. This matrix gives the

operator the flexibility of selecting any one of eight sources and feeding it to any of seven channels on the 8-track recorder and any of three channels on the 4-track recorder without the hassle of patching.

We started with the MC4051 analog multiplexer chip, DC4010 buffer, the LM747 dual operational amplifier, a 600:600 Ω output transformer, and an octal coded selector switch.

Since we had balanced inputs, two MC4051s were required for each output line. The CD4010s were used between the octal switch and the MC4051 line selector. No elaborate debouncing circuit was needed because switching is done before recording. The LM747 op-amps are used as buffer drivers for the

600:600 transformer.

Our recorders are controlled by a CMX-340 editor and consequently the tape is not lifted from the heads during rewind and fast forward. In either of the two modes, the audio line and voltage from the audio board will reach 20 to 23 volts and this will overdrive the input to the MC4051s causing severe crosstalk and latching. When one recorder was in play or record and the other in rewind or fast forward, crosstalk would show up in the play or record recorder. Placing two 7.5V zener diodes across each input line limited the audio input to 15V, which is the power supply output also. This eliminated the crosstalk problem.

The power supply consisted of a 200 mA, 36V transformer, one 7812

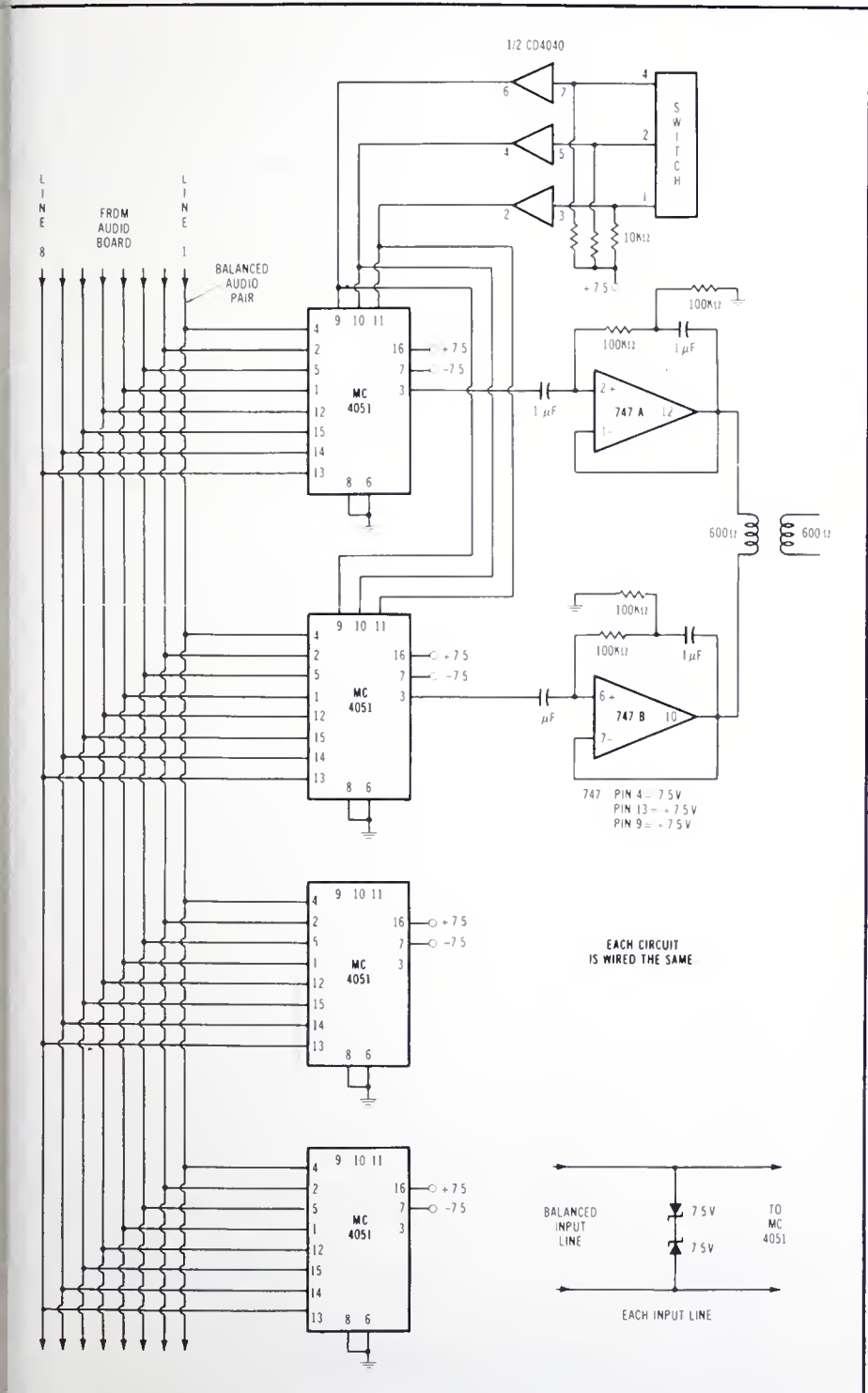
and one 7912 voltage regulator, one bridge rectifier, filters and two 7.5V zener diodes.

The on/off switch was placed in the back of the unit to prevent accidental turn off. The MC4051s should always be powered up before any input signal is applied. That will prevent the chip from latching up.

We used wire wrap techniques to build the boards, being very careful

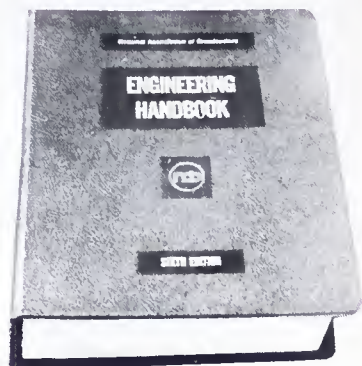
to dress the audio wires neatly and in a straight line (not crossing each other) and using shielded audio wire for all inputs and outputs.

We built an 8x10 matrix (80 crosspoints) and contained it in a 1½"x19"x15" package. The cost was less than \$8 per crosspoint. Crosstalk between channels on the MC4051 is specified at 100 dB. On our output lines, crosstalk was between 70 and 80 dB down. □



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Send your items to: Station-to-Station editor, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. Please indicate if you want to receive the *Handbook* or prefer to receive a check.

The *Handbook* can also be purchased directly from the NAB at \$30 a copy for NAB members and \$45 a copy for non-members. Write to: Station Services Dept., NAB, 1771 N Street, N.W., Washington, D.C. 20036.

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Station-to-Station

Automatic recording of EBS messages for rebroadcast

By Paul Hurd, chief engineer, WHDH/WCOZ, Boston, MA

The EBS system at WHDH/WCOZ consists of two receivers. A Rivers Du-Alert 2 receiver monitors WCBS or WABC, in New York, for national level tests or emergencies. A TFT model 760 monitors the local FM relay for state emergencies.

A constant audio output is available on the TFT receiver. The Rivers unit was modified to provide a constant audio output. This was achieved by taking the audio signal from the receiver, before the monitor switch or relay, at the input to the decoder board and routing a parallel feed to the rear panel and a two position barrier strip. As we are feeding the audio to a high impedance bridging input on the cassettes machine, there is no problem with loading.

The output of the receiver is connected directly to an inexpensive cassette recorder's audio input. As shown on the schematic, the remote start feature of the cassette machine is connected to the relay (KH 4703-1 or equal). The cassette machine is placed in the record mode and left engaged constantly.

When the EBS receiver goes into the alert mode, the normally open contacts of its alarm relay close, completing a ground return for our K1. The external K1 is latched through one set of contacts and a N.C. reset switch. To indicate reception of a test, 24 VDC is also fed to a lamp mounted on the rack panel. A third set of contacts switches the cassette machine remote start. A normally open switch was also installed to permit testing of the cassette machine without

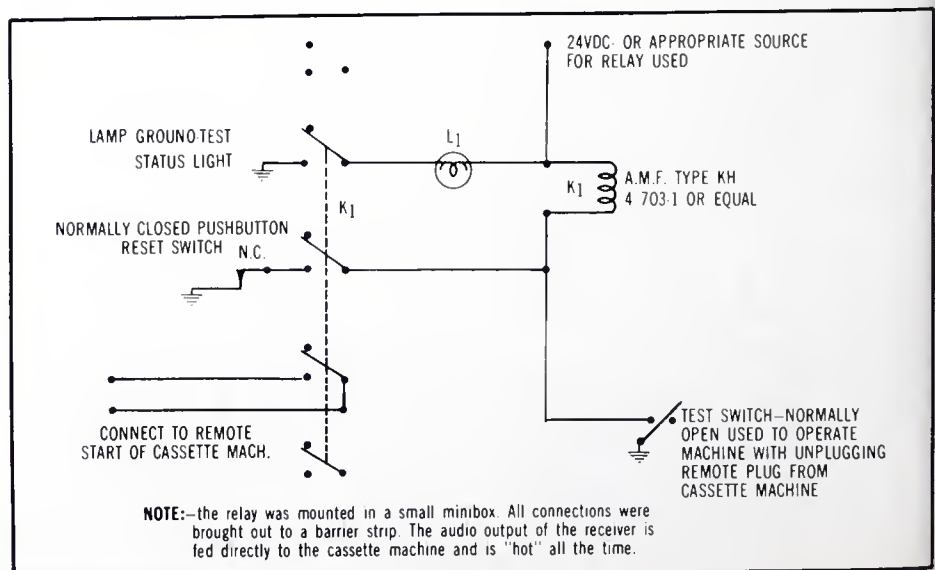
having to unplug the remote control.

An operator's first reactions when the EBS receivers' alarm goes off is to reset the alarm condition. By building a silent external alarm system, using constant audio from the receiver, the EBS alarm may be reset without resetting the aircheck system. The aircheck is left running long enough to determine the nature of EBS alert. If it is a test, then the cassette is rewound to prevent confusion in later playback. If the message is an emergency message, such as NOAA alerts for storms, hurricanes, tornados, etc., then the message may be dubbed to cartridge or aired directly from cassette. This system insures that the operator will not have to manually copy information, with the potential for serious errors, and will guarantee the ability of the station to accurately rebroadcast emergency messages.

A side benefit of the aircheck package is a backup on our own log keeping. By playing back the cassette we may confirm whether or not we have received EBS tests and not logged them, or if there is in fact a failure in our EBS receiver.

If the relay contacts, provided on the EBS receiver, are already in use with an external alarm panel, such as the WHDH/WCOZ, we simply use steering diodes to isolate the two relays.

By using an inexpensive machine such as a Panasonic RQ-413-AS or a Sony TC-110, you can easily provide a simple, reliable, carefree method of ensuring the broadcast of critical information in time of emergency.



new literature

.....

Snap-action switches

Cherry Electrical Products—A 16-page handbook contains national standards for snap-action switches and is designed to give switch users a working knowledge of switch testing methods. Application procedures, specifications, markings, creepage and clearance distances and electrical life requirements are also included.

Circle (550) on Reply Card

Broadcast transmitters

Bayly Engineering—A 32-page brochure contains information on the broadcast transmitters to be marketed in North America by Bayly, a member of the AEG-Telefunken group. Transmitter configurations, as well as technical data on longwave, mediumwave and shortwave transmitters are detailed.

Circle (551) on Reply Card

Electronics magazine

Ampex—A semiannual magazine offered by Ampex has been developed to increase the flow of information within the electronics community. *Horizons* will feature articles on developments made by Ampex engineers and researchers in various disciplines.

Circle (552) on Reply Card

Antennas

Phelps Dodge—A catalog sheet illustrates the series of super power, circularly polarized FM broadcast antennas with descriptions of the three models in the series. Electrical and mechanical specifications also are included.

Circle (553) on Reply Card

Drafting aids

Webtek—The By-Buk Brand Printed Circuit Drafting Aids Catalog No. P-55 is a 12-page publication which contains hundreds of shapes, patterns, and conductor line tapes for the preparation of printed circuit artwork. Patterns and shapes are shown for 2-times and 4-times scales with basic dimensional references in standard and metric measures.

Circle (554) on Reply Card

Wire terminals

AMP—A Purchasing Man's Guide to Wire Terminals is a 12-page brochure which explains the terminology and characteristics of crimp-type terminals. Illustrations of application tooling from simple handheld crimping tools to fully automated lead-making machines.

Circle (555) on Reply Card

Applications articles

Semiconductor Circuits—The November 1978 issue of *Watts Up*, the corporate publication for Semiconduc-

NEW! The most useful audio tool your station may ever buy.



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March 1979 *Broadcast Engineering* 205

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New literature

tor Circuits, contains applications articles on such topics as watch temperature specifications, power source selection, partitioned power and backup batteries in uninterruptible power supplies. New product and literature descriptions also are included.

Circle (556) on Reply Card

Minicomputer accessories

Minicomputer Accessories—The Winter '79 catalog contains 64 pages of over 800 products including line-printer ribbons, printwheels, computer paper, binders and furniture for the computer room. Also included are in-stock cables and connectors available on a 24-hour-shipment basis plus special cables designed and built on a modified-standard or a custom-built basis.

Circle (557) on Reply Card

Broadcast equipment

Micro Communications—A 10-page bulletin contains illustrations and specifications on such equipment as circular polarized TV and FM antennas, diplexers, combiners, direction couplers and notch filters.

Circle (558) on Reply Card

Micro-miniature switches

CW Industries—A 2-page technical bulletin describes the new additions to their line of micro-miniature switches. A line diagram with callouts illustrating the construction and operation features as well as detailed specifications and possible circuit configurations are included.

Circle (559) on Reply Card

PC terminals

CTS of Asheville—Data sheet 2100B contains two printed circuit terminals available for wire-wound Series AW potentiometers produced by CTS. Electrical and mechanical specifications as well as features and constructions are detailed.

Circle (560) on Reply Card

Storage oscilloscopes

GoULD—A 6-page bulletin contains illustrations and descriptions of two digital storage oscilloscopes designed for flicker-free and fade-free viewing of long-term events and transients. Advantages of digital signal storage and specifications of two portable dual trace models are included.

Circle (561) on Reply Card

Transmission cable

Brond-Rex—An 8-page brochure on the various configurations in signal transmission cables contains technical data and charts which examine twisted pairs, three types of coaxial cable, twin-and-tri-lead, flat flexible transmission tape cable and fiber optics. Charts range from a comparison of signal transmission cables to coaxial cable characteristics.

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Tape noise reduction system

DBX—A product specification sheet contains information on the model 208 8-channel tape noise reduction system. Photographs, specifications and applications are included.

Circle (563) on Reply Card

Power processors

TRW Power Semiconductors—An 8-page booklet describes the various techniques for designing power processors with high-power Darlington transistors and Schottky diodes. Six proven designs of switchers used for low-voltage, high-current switching power supplies are illustrated.

Circle (564) on Reply Card

Video and control systems

American Laser Systems—An 8-page brochure describes the application and use of optical communicators to transmit high quality video, audio and control signals. A discussion of how this wireless, license-free means of communication works is followed by numerous examples of where the systems are used in network television, entertainment, medicine, industry and automated industrial control.

Circle (565) on Reply Card

Data logger

Datel—A 20-page catalog announces a micro-power cassette data logger. The system is contained in a module, occupying 134 cubic inches, weighing less than two pounds and operating from a single 12 Vdc source. It requires 900 mW when recording. The catalog features system anatomy, inter-connection block diagrams, timing information and system specifications.

Circle (566) on Reply Card

Semiconductor replacement guide

GTE Sylvania—The third supplement of the 1978 Sylvania ECG Semiconductor Master Replacement Guide is a 32-page publication containing data on 47 new ECG devices and approximately 3230 industry parts numbers.

Circle (567) on Reply Card

Engineering note

Dranetz—True-RMS or Average Sensing in AC Measurements—Which is Best for your Application?, the fourth in a series of engineering notes on power system measurements, defines the problem and offers suggested solutions.

Circle (568) on Reply Card

Power supply journal

Semiconductor Circuits—A 12-page issue of *Watts Up* at **Semiconductor Circuits** features four tutorial mini-articles on power source applications. New products and a catalog and engineering guide also are included. □

Circle (569) on Reply Card

Circle (177) on Reply Card

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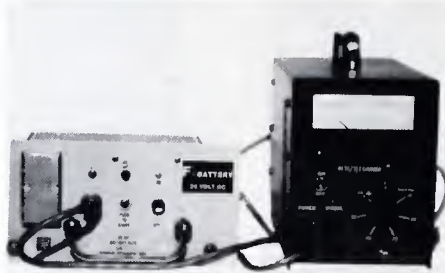
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Circle (178) on Reply Card

new products

Battery packs

Frezzolini Electronics model HL33/35NC "F" battery packs are designed to supply power for the Ikegami HL-33 and HL-35 hand-held video color cameras and are interchangeable with Ikegami battery packs.



The battery features high-capacity sealed cylindrical nickel-cadmium cells with a capacity of 7 AH (ampere-hours) at 12.5 Vdc for 2½ hours camera operating time.

Circle (570) on Reply Card

Microphone stand

Model PS-S microphone floor stand available from Atlas Sound features the exclusive touch control clutch instead of the customary rotary adjustment.



Standard features include solid steel legs for weight support, built-in retention locking assembly and a non-reflective black epoxy base with oversized triangular knob. The stand is suitable for auditorium and stage use, both indoors and outdoors, and terminates in US standard 5/8-inch - 27 male threads compatible with all microphone holders. Height extension is from 39-inches to 62-inches with telescoping to 36-inches for shipment.

Circle (572) on Reply Card

Surge protectors

Dymo Engineering introduces 12 hard-wired models of line surge protectors with power line hash, glitches and RF interference reduced to a minimum.



The surge suppressor absorbs the energy from transients that exceed the protection level and the ferrite filter suppresses spikes, transients and noise that fall below the level of the surge protector.

Circle (571) on Reply Card

Editing system

Mach One Digital Systems has introduced a computerized videotape editing system which provides a full range of editing capabilities including off-line editing, on-line editing, text editing and assembly (autoedit) functions.

The DEC LSI-11 computer is programmed to control nearly any

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- ES-302:** Equivalent to ES-301 plus fast-set lever wheel programming. **\$264.00**
- ES-400:** Three digit ten minute timer (9:59) with Start, Stop, Reset. **\$109.00**
- ES-510:** Four digit sixty minute timer (59:59) with Start, Stop, Reset. **\$139.00**
- ES-500:** Six digit, twelve hour combination clock/timer with five controls: Start, Stop, Reset, Fast Advance, Slow Advance. **\$166.00**

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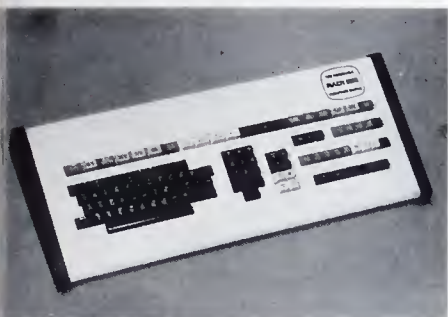
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Circle (180) on Reply Card

configuration of switchers and 2-inch quad, 1-inch or 3/4-inch video-tape recorders.

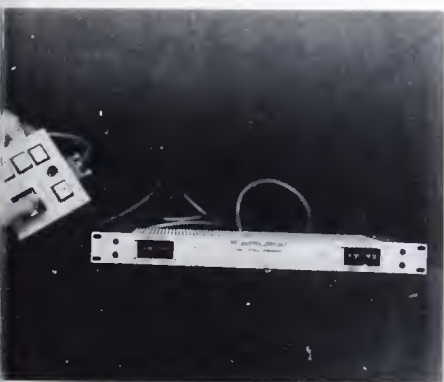


Included in the system is an operator's keyboard, rack-mounted electronics, high-speed paper tape reader/punch and printer and a 11-year package of software updates.

Circle (573) on Reply Card

Video reticle generator

Gray Engineering Laboratories is marketing a video reticle generator which permits precise positioning of a title anywhere in the "safe title" area.



Designated the VR-116, the unit features independent control of both safe action and safe title limits programmable by frontpanel thumb-wheel switches. Two video outputs to monitors are provided and a remote control box allows the control unit to be located up to 18 feet from the base unit.

Circle (574) on Reply Card

Head-worn microphone

A lightweight, head-worn microphone by Shure Brothers features dual monitoring capability for use in

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A full line of modular 1-12 channel on-air and production consoles, designed for unbeatable quality and performance. **Mix and match features** to meet your needs. Standard features include: quiet **electronic switching**, **switch-selectable muting**, **8W cue amp**, and **separate headphone and speaker circuits**. Options include built-in **15 watt headphone amp**, bass and treble **equalization**, and **reverb**. Unequaled ease of operation, installation and servicing. At affordable prices. Write or call for illustrated literature on our full line of broadcast equipment.



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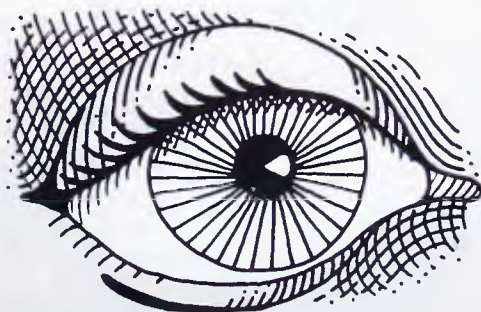
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Circle (183) on Reply Card

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Circle (184) on Reply Card

New products

various studio and remote broadcast applications.



The unit, designated SM14, consists of a headband, unidirectional dynamic microphone and two integral earphone assemblies to permit separate sound source monitoring. The earphone assemblies have separate transformer and phone plug.

Circle (575) on Reply Card

Color camera

The CEI-310 broadcast color television camera system from Commercial Electronics Corporation features a lightweight camera head, modular configuration for field production or studio use and an electronics unit which contains much of the electronics previously contained within the camera head.

The camera, with optional time code generator, supplies time of

day, frame count and other user-specified digital information for recording on videotape.

Operational controls include tint, auto white balance, black stretch



monitor switching, tally/call, master pedestal, manual iris, and a full complement of setup controls.

Circle (576) on Reply Card

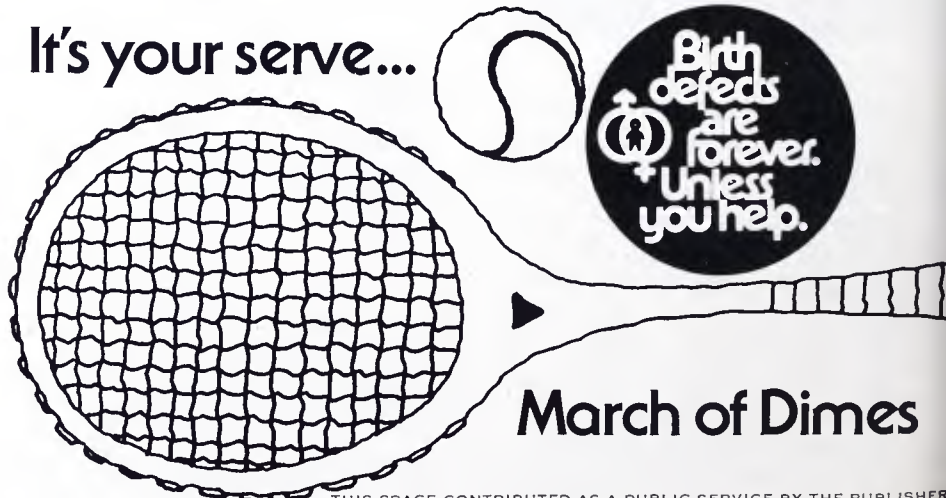
Monitor headphones

Dynamic stereo headphones suited for sound monitoring while recording live performances or off-the-air are available from Sony. Accurate sound clarity and wide frequency response are possible with the lightweight, folding headphones.

The 50 cm cone-type drivers have a 110 dB/mW sensitivity with an impedance of 28 Ω at 1 kHz.

Circle (577) on Reply Card

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Circle (185) on Reply Card

Camera platform

An adjustable balance, quick release camera platform designed to fit all of its model 50-D fluid camera heads has been introduced by O'Connor Engineering.

The adjustable balance feature allows the camera to be shifted back and forth on the head while the quick release feature allows instant removal of the camera from the platform with the camera mounting plate attached.

Circle (578) on Reply Card

Oscilloscope

Tektronix's has introduced a general purpose plug-in oscilloscope that is totally compatible with all standard 7000-series plug-ins.



Technical features include full 1 GHz bandwidth, horizontal (X-Y) bandwidth of dc to 350 MHz, photographic writing speed of 20 cm/ns, full sweep-triggering capabilities to 1 GHz and vertical sensitivity of 10 mV/div to 1 V/div.

Circle (579) on Reply Card

Mark IV-T Metric Weatherminder

The original weather console designed especially for the announcer's table. Now equipped with dials reading Metric or combination U.S./Metric. The basic instrument cluster for local programming. Professional equipment at modest cost.

Department B

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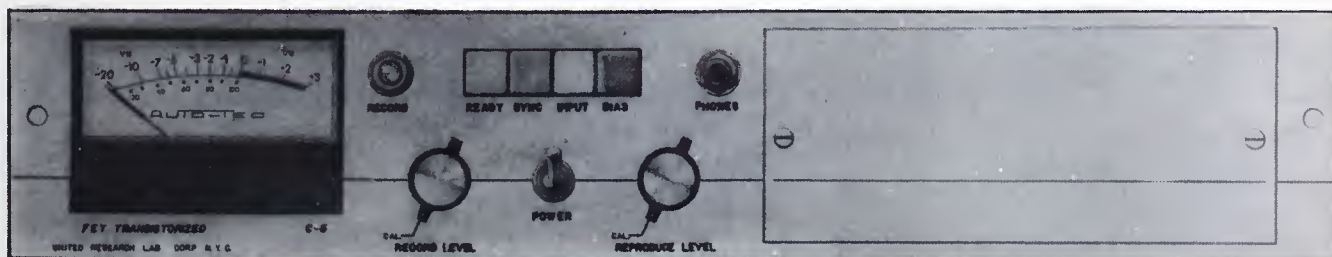


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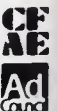
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