

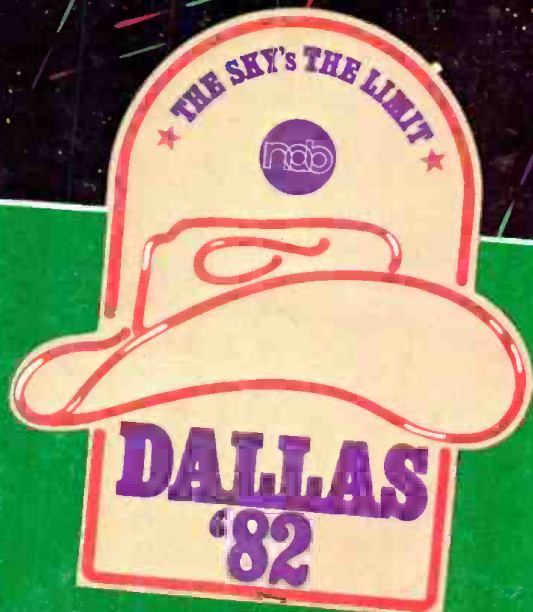
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March 1982/\$3

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# BROADCAST engineering

*The journal of broadcast technology*

March 1982 • Volume 24 • No. 3

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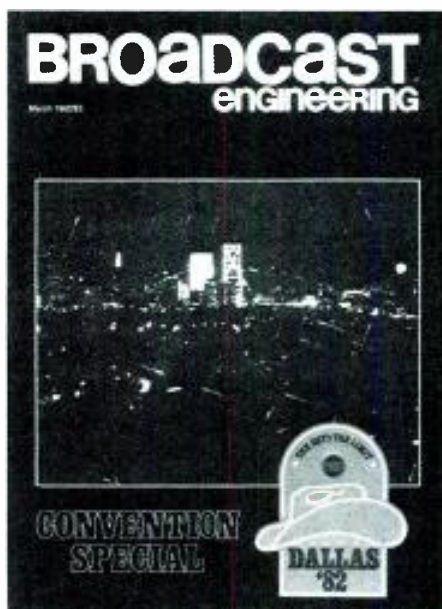
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**THE COVER** this month is adapted from NAB brochures promoting the organization's 60th annual convention and international exposition. The convention's theme is "The Sky's the Limit"...in radio...in television...in engineering...in new technologies...and in government regulations. NAB-'82 will help broadcasters make the transition as new developments in technology and changes in regulations reshape the traditional roles of managers and engineers in broadcast stations.

The cover artwork was copied and reproduced here with the permission of NAB. Special recognition goes to artist Lynne Komai, Watermark Design, Alexandria, VA, for creating the art in cooperation with the NAB.

## NAB-'82/Dallas

- Broadcasters' main convention
- Dallas Convention Center, April 4-7, 1982

## NAB CONVENTION GUIDE

Most of this issue is devoted to pre-show coverage of NAB-'82/Dallas. Extensive research went into compiling data from manufacturers exhibiting at this year's convention to make our exclusive coverage as detailed and complete as possible. The results, in terms of articles and special sections, can be seen in the contents listing to the left. This special coverage will help attendees plan for the show or make it easy to obtain data on new products for those who cannot make it to Dallas. In any event, look for **BE's** extensive show wrap-up in the June issue.

**NEXT MONTH** our issue will include:

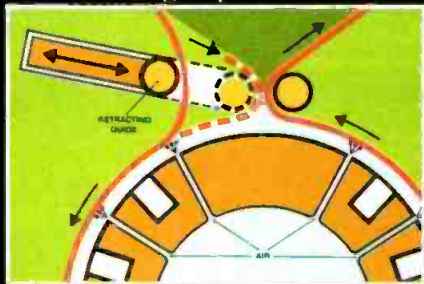
- Audio technology — Radio sound quality
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- INTV Conference highlights
- Special' cable engineering demographics



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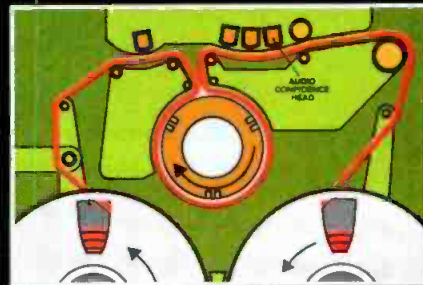
The others only let you *see* what you're taping. We let you *see* and *hear* everything being recorded...simultaneously.

## 5. Non-contact Tape Shuttle System

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resistance, yielding shuttle times of only 80 seconds end to end.

We could go on. With impressive features like microprocessor control; broadcastable slow motion; one-touch shuttle and jog; front access circuit boards; audio spot erase; and on and on. But why run up the score, when it's already no contest? See the Hitachi HR-200, it's equally impressive portable HR-100 model, and companion TC-200 Time Base Corrector.



• Full audio and video confidence  
• "PRO" tape path reduces dropouts



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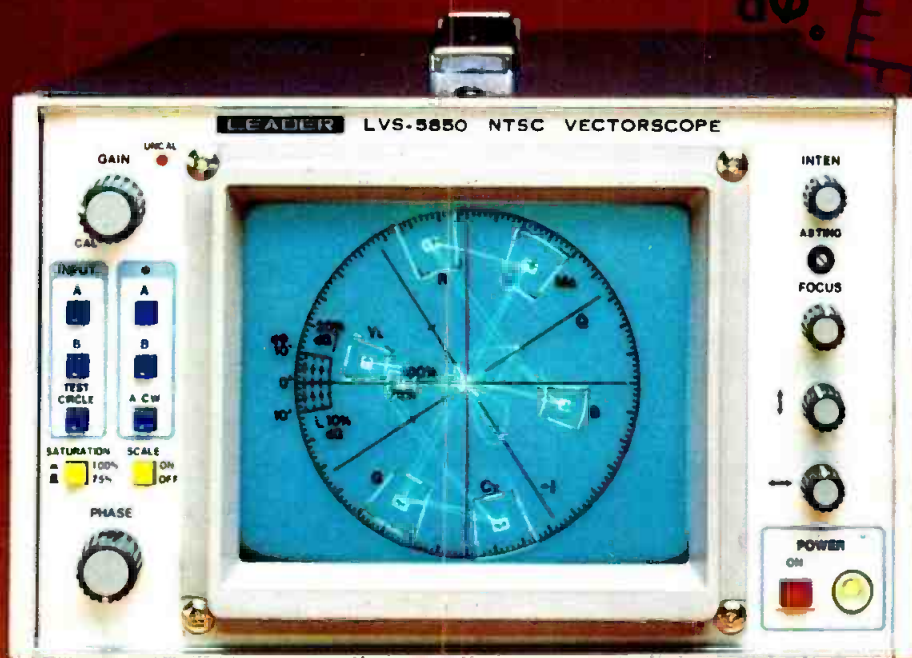


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# Leader announces the brightest idea in Vectorscopes. CRT-generated targets.



## The Leader Vectorscope is unique.

Only the Leader LVS-5850 NTSC Vectorscope offers CRT-generated phase/amplitude targets that are as bright and clear as the vectors themselves. And electronically generating the targets eliminates non-linearity errors caused by CRT aging, so you can be confident that what you see is what you've got.

The LVS-5850 fits directly into your present vectorscope rack. It provides a test circle pattern—75% or 100% saturation—and lets you select the reference phase from either of two video signals or a subcarrier.

## Precise NTSC sync/test pattern generators.

Leader's LCG-400 series provides accurate reference signals for any off-the-air broadcast or non-broadcast use. Available in multiburst or sweep marker configurations, they provide EIA and full-field color bars as well as staircase, raster (in eight colors), window,



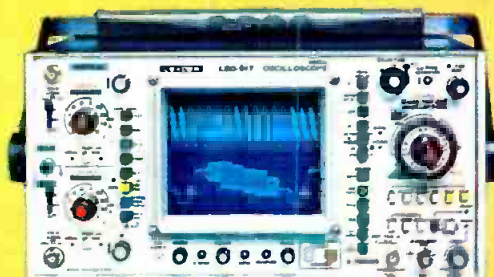
LCG-400 Sync/Test Generator.

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convergence and cross-hatch test signals... plus gen-lock capabilities and a host of auxiliary outputs. As a matter of fact, Leader's sync/test generators do virtually everything the \$4,000 generators do... except cost as much.

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# FCC update

March 1982



## Questions answered by license requirement hotlines

The commission staff is continuing to receive telephone inquiries concerning the changes in requirements for licensed operators at AM, FM and TV broadcast stations, the abolishment of the Radiotelephone First Class Operator License, and the issuance of the General Radiotelephone Operator License. Questions related to radio operator examinations and licensing should be directed to Jay Jackson or Vernon Wilson at 202-632-7240, and questions related to operator requirements and duties at AM, FM and TV broadcast stations be directed to John Reiser at 202-632-9660.

## Fowler receives Thomas Jefferson award

FCC Chairman Mark S. Fowler, who has proposed wide-ranging deregulation of the broadcast industry, has been named 1982 recipient of the national Thomas Jefferson Award honoring a public official concerned with the freedom of the news media.

The award was presented to Fowler at the Thomas Jefferson Award Banquet in February during Mass Communications Week at Texas Tech University.

Fowler has been a leader in the movement to deregulate the broadcast industry. He has questioned the Fairness Doctrine, which requires that broadcasters air contrasting viewpoints on controversial issues, and the "equal opportunity" rule, which forces broadcasters providing air time for one political candidate to provide equal access opportunity to all qualified opponents.

In recommendations to Congress, Fowler has proposed the elimination of the Fairness Doctrine. Proposed legislation submitted to Congress in October with FCC endorsement seeks to deregulate the broadcast industry.

Since 1973 the award has been presented annually to a public official concerned with protecting First Amendment guarantees and ensuring the freedom of the news media to gather and disseminate news.

Fowler was selected from five public officials nominated nationally by local, state or national press and broadcast associations, news media or individuals. To be eligible for the award, nominees must hold elective or appointive office on the local, state or national level.

Previous recipients of the Thomas Jefferson Award are Sen. Sam J. Ervin Jr., North Carolina; Gov. Edwin W. Edwards, Louisiana; Rep. Robert W. Kastenmeier, Wisconsin; Leon Jaworski, Texas; Gov. Ella Grasso, Connecticut; Sen. Hubert Humphrey, Minnesota; FCC Chairman Richard Wiley, Washington; Sen. Lawton Chiles, Florida; and Gov. Bruce Babbitt, Arizona.

## No restriction on public FM subcarrier service proposed (BC Docket No. 82-1)

The commission has proposed to eliminate restrictions on public FM radio stations that prevent their use of subcarrier frequencies for commercial and revenue-generating purposes.

FM stations have the capacity to program one or more subcarriers on a multiplex basis to provide subsidiary communications service without disruption of their regular broadcast programming. Stereo stations use one subcarrier to carry their second channel.

Commercial FM stations are allowed, on specific authorization by the FCC, such uses as transmission of background music for department stores and utility load management data and control signals. Public stations are currently limited to program transmission of a non-commercial nature that furthers an educational purpose.

The commission said that amendments enacted last year to the Communications Act encouraging public stations to develop additional funding sources and authorizing them to engage in a variety of remunerative non-broadcast activities might make it inappropriate to retain the non-commercial limitation on subcarrier uses. The amendments were adopted to allow public stations to raise more

money for themselves, in view of the reduction in federal funding.

The rule change would directly affect the approximately 1200 public FM stations. The commission noted that the change might give many small business and government entities access to subsidiary services for the first time.

The commission also terminated a rulemaking proceeding (Docket 19079) begun earlier to consider a wider range of multiplex channel uses by public FM stations. In view of technological and other changes, the FCC said, the record developed in the earlier proceeding was inadequate.

## Microwave booster use proposed

The commission has proposed to allow use of microwave boosters by TV and radio stations for transmission of program material from studios to remote transmitter sites, in intercity relays and between main TV and auxiliary broadcast stations. Microwave boosters receive on an assigned frequency and retransmit on the same frequency. Most radio relay devices receive on one frequency and "translate" to another frequency for retransmission. Microwave requires direct line-of-sight transmission.

The commission's proposed rule change would permit use of boosters where obstructions prevent direct studio-to-transmitter or intercity relays. The commission acted in response to a petition by Marti Electronics which said present rules do not provide adequately for such situations.

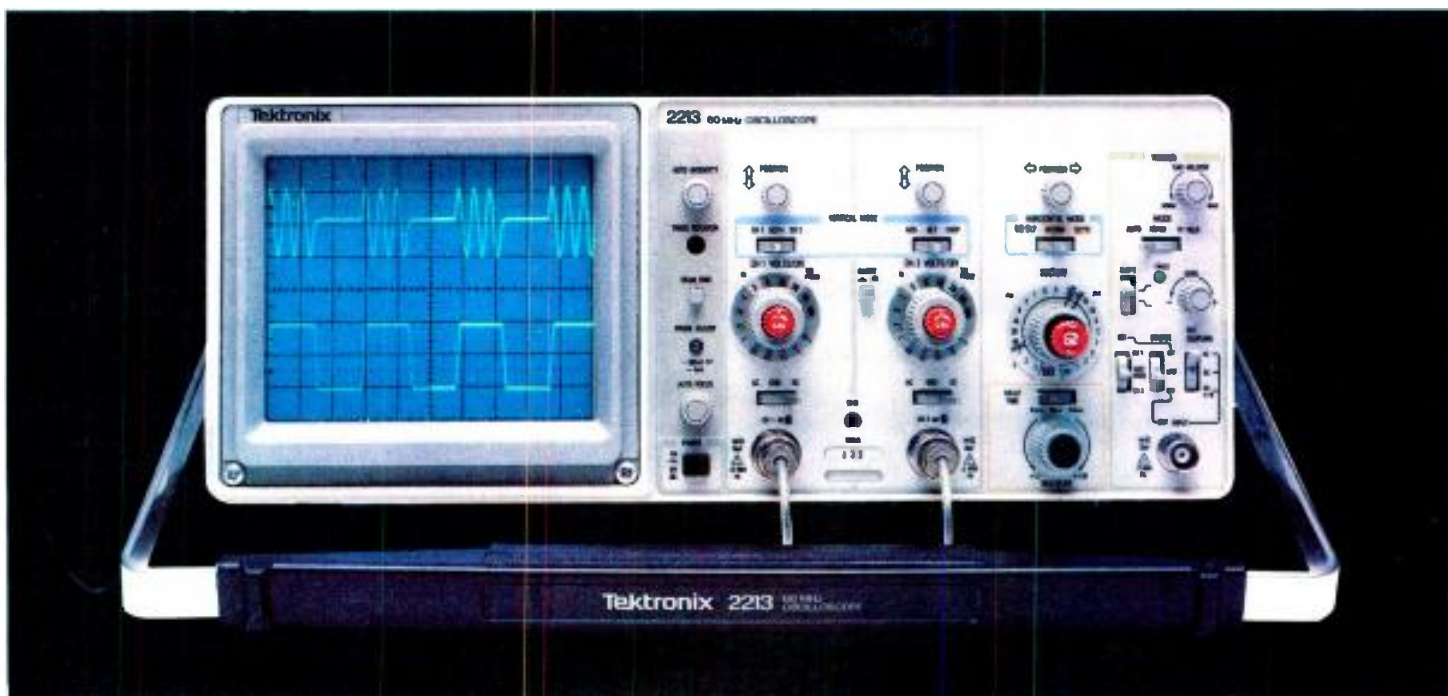
The rules currently allow broadcasters to use "active" or "passive" repeaters or, with specific authorization, to increase the height of their microwave antennas when line-of-sight transmission is obstructed. Active repeaters translate to another frequency, requiring assignment of a second frequency. Because limited channels are available for broadcast relay use, an additional channel may not be available in a metropolitan area where the channels are congested.

The commission proposed to require type acceptance of equipment. Automatic power output and shut-off controls would be required, and a licensee would be required to take full advantage of the focusing capability of directive antennas.

## Harris named broadcast bureau chief

Laurence E. Harris has been appointed chief of the FCC Broadcast Bureau. Harris comes to the commission from MCI where he was vice president for Regulatory and Carrier Relations. □





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**Sweep speeds:** Sweeps from 0.5 s to 50 ns (to 5 ns/div with X10 mag)

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(In Oregon, Alaska and Hawaii: 1-503-627-4502 collect.) Lines are open from 8 am EST to 5 pm PST.

## Polonsky dies

The recent death of Joseph Polonsky has robbed radio and TV broadcasting of one of its most creative pioneers. His career, which spanned more than three decades, included scores of awards from his peer groups in recognition of his significant contributions to TV technology. He was elected a Fellow of both the SMPTE and the Royal Television Society; received the Montreux Symposium

Citation for his work on that world forum; and was a member of the Edward Rhein Foundation. In addition to his work in the electronics field, he was also active in bio-medicine, and was in the process of writing a book on that topic.

Polonsky began contributing to broadcasting in the late '40s with the development of high power transmitters and non-echoic antennas. He began using short (centimeter) waves

in 1952 on some of the first mobile TV links, and eventually pioneered the first monochrome ENG units using Vidicon cameras and a portable backpack transmitter. These camera units were used by CBS in 1956 to cover the major political conventions in the United States, and were the forerunners of today's widespread ENG operations.

In the radar field, Polonsky developed a novel TV conversion technique which, after its introduction in 1958, became a worldwide standard.

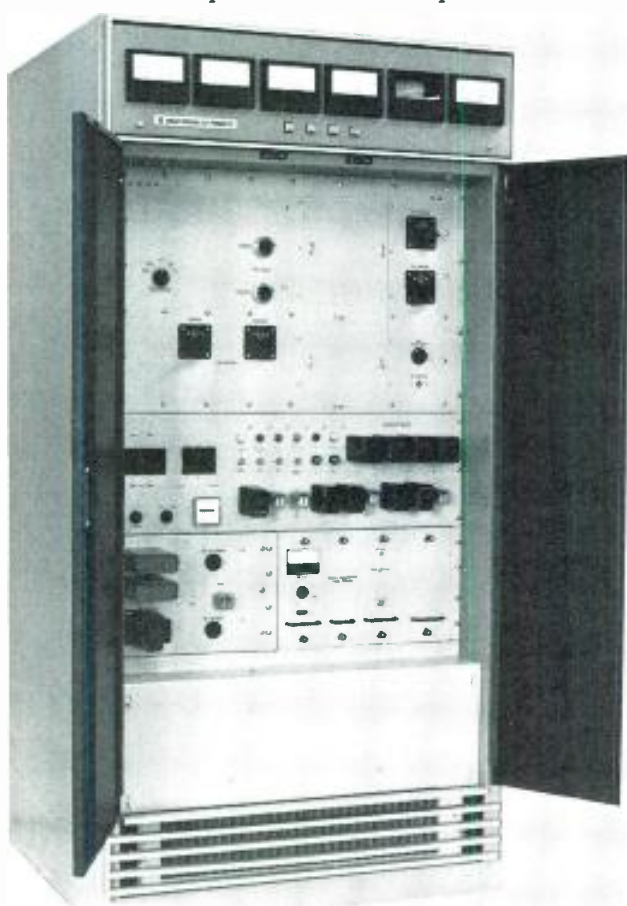
Polonsky's most recent position was with Thomson-CSF, where he rose to be technical director of the Broadcasting Division, and where he, after his official retirement a few years ago, continued to serve as a member of the board of directors and as a consultant on major projects.

Polonsky was also active in various standards groups, most recently in the field of high definition television, where he spoke frequently at major technical conferences advocating a universal standard for this emerging technology. He was the moderator of the Montreux Symposium Round Tables, where he assembled knowledgeable executives from all sides of the TV industry to debate controversial topics.

# Singer Broadcast Model FM 20,000 E

The FM 20,000 E... a proven performer all over the globe... one model from the industry's most complete line of AM and FM Broadcast Transmitters. AM Transmitters from 250 watts to 100 kW; FM from 10 watts to 100 kW.

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## Teletext field trial enters second phase

In January, the Alternate Media Center/WETA teletext field trial in the Washington, DC area moved into its second phase. In the project's initial phase, which began in June 1981, hard news was the featured element of the service. Focus in Phase 2 has been shifted away from hard news to increased experimentation with different content, new formats and quicker access to pages. These changes reflect the project's fundamental goal: to explore the potential of broadcast teletext in providing a service of public interest.

The 40 Washington area residents selected for this pioneer teletext trial, as well as users of the 10 publicly located terminals, named hard news as one of the most frequently accessed parts of the service. Other kinds of information in Phase 1 included weather, entertainment, sports, consumer tips and area community events. Usage information collected by the Alternate Media Center reveals that news pages provided by the Washington Post, as well as entertainment and weather, were among the most widely read in the service.

In the second phase of the trial, the Alternate Media Center has redesigned the teletext service in order to



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Dave Frasier    Technical Operations Manager  
WWBT-Richmond, Virginia

WWBT is a technical leader that installs a lot of equipment. According to Dave Frasier, "The technical quality of our new SatCom Technologies' 9.2-meter antenna is excellent, and it has brought new flexibility and a more competitive edge to our programming."



The Model 920C 9.2-meter antenna incorporates high speed drives (2°/sec.) directed by a micro-processor-based programmable controller. The controller can store and access up to 39 satellite positions. WWBT is using the controller's scheduling function to move the antenna automatically from one

satellite to another at specific times throughout the day to receive syndicated programming, sports events and feeds from its Washington news bureau.

SatCom Technologies' high-technology antennas are available in sizes ranging from 3-meters to 13-meters. We also offer the exclusive Torus multiple-beam antenna in 4.5-meter and 7-meter equivalent sizes. Each antenna combines the extraordinary high surface accuracy of RSi's AccuShape aluminum reflector with an extremely rigid mount. This means greatly

improved sidelobe performance and the ability to upgrade to Ku-band.

Mr. Frasier continues, "We beat our competition, we save ourselves money and headaches. We give our viewers the best service and the best programming, whether it comes from across the state or across the country."

For more information on SatCom Technologies' earth station antennas, call David Speed at (404) 448-2116.



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See the Model 920C  
at the NAB Show!

**WWBT NB CHANNEL 12**



## News

explore the full potential of other kinds of information. One major element of the new teletext service is an expanded focus on analysis of news and events taking place in the Washington area. Other new sections are a bulletin board and an electronic art display.

### Prestel launched in US

Prestel was officially launched as a commercial service in the United States recently from its Boston-based computer center.

"The Boston computer center allows US users and information providers to access Prestel's 210,000-page database via a local telephone call over Telenet, as well as giving US corporations the opportunity to become operators of their own videotext service on proven systems at very low cost," William Shrimpton, president of BVT, the marketing organization for British Videotex and Teletex technology, said.

Prestel, the first commercial videotext service, has been operating in the United Kingdom since the fall of 1979. It provides information retrieval through a modified TV set and telephone lines from a worldwide computerized database, permits electronic messaging and makes possible home banking and shopping. Information on Prestel currently includes hotel and airline availability, stock market reports, commodities listings, shipping movements, weather, news, sports and other information from all over the world of particular interest to business users.

Prestel currently uses the alpha-mosaic system, displaying characters of graphics in mosaic shapes, fitted together to compose a picture. Full

color photographs transmitted via Picture Prestel will be introduced to enhance the electronic shopping and advertising potential of videotext.

Boston was chosen as the site for the Prestel computer (which is called "Jefferson") because Massachusetts provides a leadership role in the field of high technology. The computer will be managed by Avco Computer Services, one of the nation's leading suppliers of large-scale computing power to business, industry and government, based in Wilmington, MA.

For the Boston launch, terminals made by Zenith and decoders made by Wolfdata and Radofin were used.

Zenith had developed a 25-inch diagonal color TV set and a 13-inch diagonal color monitor to receive and display videotext information in Prestel's 40-character by 24-row format. The specially adapted 25-inch set, which also includes TV functions, is equipped with a special Zenith wireless remote control, videotext numeric keypad and a jack for an optional alphanumeric keyboard. The 13-inch monitor has a wired alphanumeric keyboard.

Floppy disc software converting an Apple II home computer to Prestel was also on display.

The Appletel software package consists of a floppy disc (and a spare) plus an instruction manual with details of registration and how to use Prestel. The package enables users to access the entire public Prestel database; fully use the Prestel response and mailbox facilities to send and receive messages; automatically dial up and log into Prestel; automatically call up, examine, amend, store, re-call or delete sequences of Prestel information they regularly need; store pages on their discs and examine them offline at leisure; and locally edit Prestel

frames offline to annotate or comment on the information.

Hardware from these companies is now available to US users, ranging in price from \$85 for the Apple disc to \$1250 for the Zenith terminal.

More than 15,000 users worldwide are currently connected to the Prestel service; most of them business users. About 900 information providers, including American Express, Holiday Inn Hotels, Frost & Sullivan, Merrill Lynch, Newsweek and the Official Airlines Guide are using Prestel as an electronic publishing and message transmission medium. Prestel also allows users to order goods and services at the touch of a button, and is proving a profitable investment as a direct-marketing tool for information providers.

On a closed-user group basis, a number of US companies, including DuPont, ABC-TV, IBM and Digital Equipment Corporation have expressed interest in establishing their own databases. For public use, private telephone and publishing companies are expected to set up videotext services on the Prestel computer in the coming months.

### Atlantic Research offers FCC compliance testing

Atlantic Research Corporation has announced the opening of its FCC Compliance Testing Laboratory. This full service testing and engineering facility features personnel experienced in FCC testing, personnel experienced in equipment design and modification for control of EMI, latest quasi-peak detection test equipment, remotely controlled open field radiation test site, 100dB shielded enclosures, 50μH LISNs, fully equipped electronic laboratories, and a model shop. □

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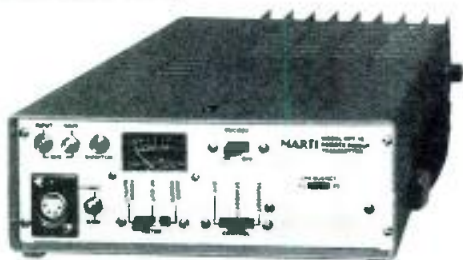
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## associations

### SMPTE

862 Scarsdale Ave.  
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#### Committee on ½-inch video meets

The first meeting of the SMPTE Working Group on ½-inch Video Cassette Recorders for Broadcast Applications was held at the San Francisco Airport Hilton in December. Reflecting great interest on the part of the broadcasters, it was attended by 18 experts in the fields of broadcast operations and video recorder design, and was devoted to the discussions of user requirements for the recorders. Meetings are continuing at a monthly rate. All parties wishing to participate in this working group are welcome to attend the meetings. For further information, contact Alex E. Alden, SMPTE, 862 Scarsdale Ave., Scarsdale, NY 10583; (914) 472-6606.



**National Association  
of Broadcasters**

1771 N Street, NW  
Washington, DC 20036

#### Barnathan to receive engineering award

Julius Barnathan, ABC president of broadcast operations and engineering, will receive the National Association of Broadcasters' 1982 Engineering Award to be presented at the NAB engineering conference luncheon on April 6. The conference will be held in conjunction with the association's 60th Annual Convention April 4-7 at the Dallas Convention Center.

Barnathan was promoted to his present position in December 1976. He had been vice president in charge of broadcast operations and engineering since April 1965. He previously had been vice president and general manager of the ABC Television Network and earlier had served as president of the ABC Owned Television Stations.

Barnathan and others at ABC were instrumental in developing the technology for closed captioning for the hearing impaired. In 1972, he was named chairman of the NAB subcommittee that developed standards for such a system, which has been in operation since March 1980.

#### Bergen, McNeill named to Radio Hall of Fame

Edgar Bergen, radio personality and ventriloquist, and Don McNeill, host of radio's long-running "Breakfast Club," have been elected to the NAB's Radio Hall of Fame. They will be inducted at the radio luncheon during the upcoming convention.

The Radio Hall of Fame was created in 1976 to recognize and honor those individuals who have made a significant and lasting contribution to the radio industry.

Bergen, born in Chicago in 1903, was first heard over-the-air on Rudy Vallee's "Royal Gelatin Hour" in 1936, accompanied by "Charlie McCarthy," the wooden dummy that shared his act since he was 11 years old. In 1937,



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## Associations

Bergen and Charlie became the stars of their own show, "The Chase and Sanborn Hour," which held the top-rated position among radio programs for three years and was famous for the interchanges between Charlie and comedian W.C. Fields. Bergen left NBC in 1948, but returned to radio on CBS in 1949 and continued broadcasting until 1956. He died in 1978.

McNeill, born in December 1907 in Galena, IL, was the originator of one of the longest-running shows in network history. The "Breakfast Club" was on the air for nearly three and a half decades from June 23, 1933 to December 27, 1968. McNeill wrote scripts for the show for the first two months of the program. After that, he began using short pieces of humor sent in by the audience. The program then eased into a spontaneous, unrehearsed format that McNeill continued to use successfully for the next 34 years.

### Cuban interference documentation program begins

The NAB announced recently that it will begin an extensive documentation program tracking the frequency and power used by Cuban stations to broadcast into the United States.

"We will use this data to demonstrate to Capitol Hill, the State Department and the executive branch the urgency of the Cuban interference problem for American radio broadcasters," Edward Fritts, NAB chairman of the board, said in a speech to the Louisiana State Broadcasters Association.

The Cubans are already broadcasting into the United States on a variety of frequencies and at various levels of power causing indiscriminate interference across the nation. NAB will use information supplied by the Federal Communications Commission, consultants and broadcasters to document and project the continuing increase in interference received by US broadcast stations.

The data compilation will be presented as soon as possible in meetings with the State Department, the FCC, the Congress and the executive branch.

### FCC urged to reject frequency proposal for auditory training devices

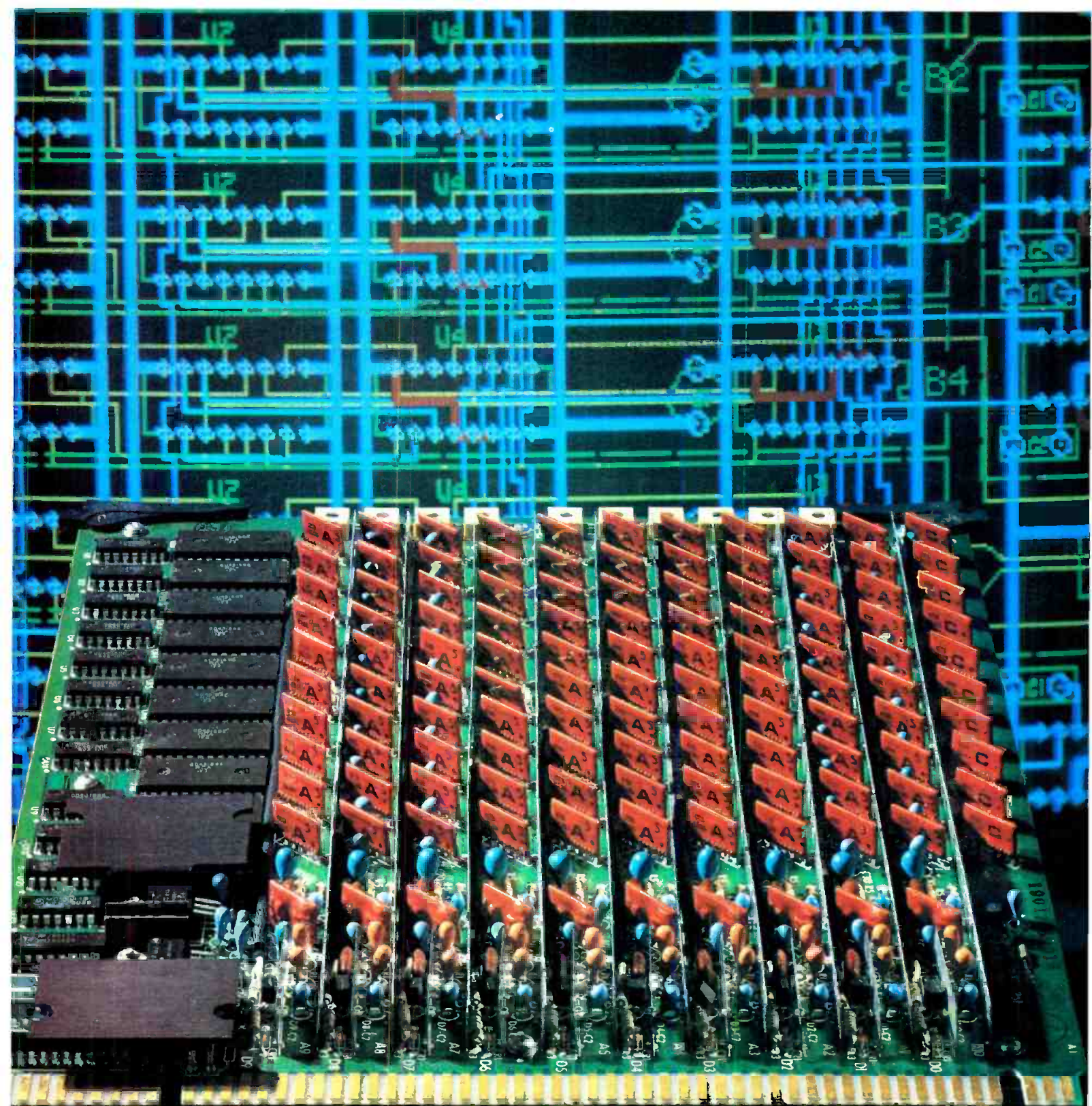
Considerable analysis is required before the Federal Communications Commission can consider allocating alternative frequencies for the use of auditory training devices, the NAB maintains. Therefore, NAB does not believe that allocating 530kHz and 1610kHz, as proposed by Williams Sound Corporation, can be justified at this time and recommends that the petition be rejected.

In its filing, NAB said that because the commission already has allocated spectrum for these devices, it seemed that the needs of the hearing impaired could be accommodated without allocating additional spectrum.

The association raised two major objections to the proposal: The proximity of the AM broadcast band (535-1605kHz) could cause mutual interference; and it could preclude expansion of the AM band to 1705kHz and 525kHz.

NAB said it shared the commission's misgivings that the use of easily available, low cost portable AM receivers might lead to the William's system being used for purposes contrary to commission policy. Also, NAB said that Williams had not demonstrated the need for dual auditory training device systems, operating in different frequency bands, with each system accomplishing the same purpose.





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## Associations

### Commercial minority broadcast ownership increases

Minority ownership of commercial broadcasting stations increased by 7.5% in 1981, according to statistics released by the NAB's Department of Minority and Special Services. There are 164 commercial broadcast facilities (radio and television) owned by minorities, compared to 138 in 1980.

Blacks currently own 128 stations compared to 106 in January 1980. There are 11 black-owned commercial TV stations (seven VHF network affiliates and four UHF), an increase of three stations in one year. Blacks acquired 19 radio stations in 1980, bringing their total to 117.

Hispanics own 28 radio stations and three TV stations (two VHF and one UHF), for a total of 31. In 1980, Hispanic-owned stations totalled 24.

Some group owners (three or more stations) exist among minorities, but the majority are single station owners. The 164 stations represented in the NAB survey are owned by 110 individuals: 82 blacks, 25 Hispanics, two Native Americans, and one Asian-American.

"The Federal Communications Commission has played an important role in the growth of minority ownership. The Tax Certificate and Distress Sale policies are responsible for 40% of all minority-owned stations," Dwight Ellis, NAB vice president for Minority and Special Services said recently.

The Tax Certificate and Distress Sale policies were adopted in 1978 at the suggestion of NAB and received widespread support from minority groups and the broadcasting industry. Tax Certificates and Distress Sales account for all three Native American and the two Asian-American commercial radio stations.

In non-commercial broadcasting, 32 of the 1386 stations on the air are licensed to minorities. Blacks control nine non-commercial radio stations and two TV stations. Hispanics hold licenses on nine facilities (eight radio and one television). Native Americans also control nine stations including one TV facility. The three remaining minority-controlled radio stations are licensed to Asians located in the Pacific Islands.

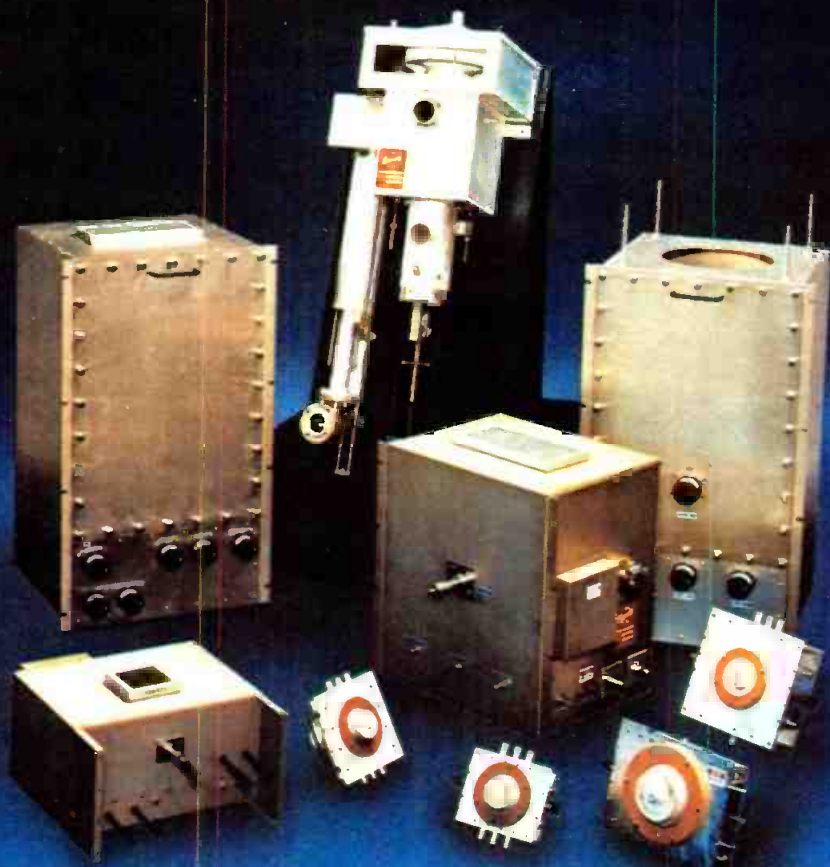
### Umansky promoted to deputy general counsel

Barry D. Umansky, assistant general counsel with the National Association of Broadcasters, has been recently named deputy general counsel.

Umansky joined NAB's Legal Department as an attorney in February 1979 and in March 1980 was promoted to assistant general counsel. Before coming to the NAB he was employed as an FCC attorney. During his six years at the FCC, he specialized in broadcast and cable television regulation. He has also worked at radio and TV stations in Kansas and Missouri. □

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CV-2250	3CX10,000U7	170-227	10 kW†
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\*pulsed power

†peak sync, or 2.5 kW combined in translator service



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# CAPTION CONTEST



"Honest, Vince. I wasn't trying to walk off with one of those new minicams...I just forgot I had it in the palm of my hand."

Rich Little and Vincent Wasilewski were captured in this candid shot at NAB '81/Las Vegas. In our June 1981 issue we ran this photo with a request for reader's humorous captions.

The winner of our Caption Contest is Peter Collinson, Mt. Pleasant, MI, who submitted: "Honest, Vince. I wasn't trying to walk off with one of those new minicams...I just forgot I had it in the palm of my hand."

As promised, the winner is being sent a pocket calculator as a prize. He will receive the Panasonic credit card sized calculator model JE-323 which incorporates a clock with alarm. The clock shows a.m./p.m. and hours, minutes and seconds. With an 8-digit LCD display, the JE-323 has sure-touch rubber keys, memory, percent, sign change and automatic constant functions. It comes with a wallet case and runs for approximately one year on the lithium battery included, and is provided courtesy of Panasonic.

An honorable mention goes to Geoff Liston, Normal, IL, who submitted: "Sorry, Vince, I still don't do AM stereo. Maybe next year..."

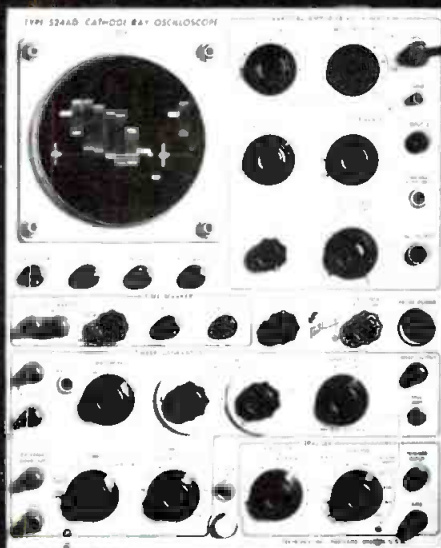


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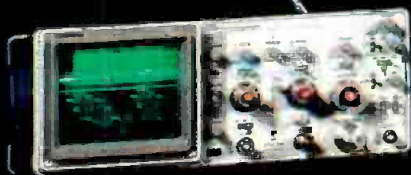
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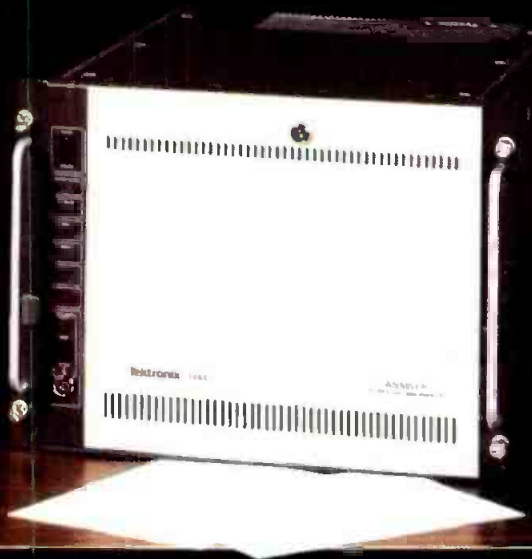
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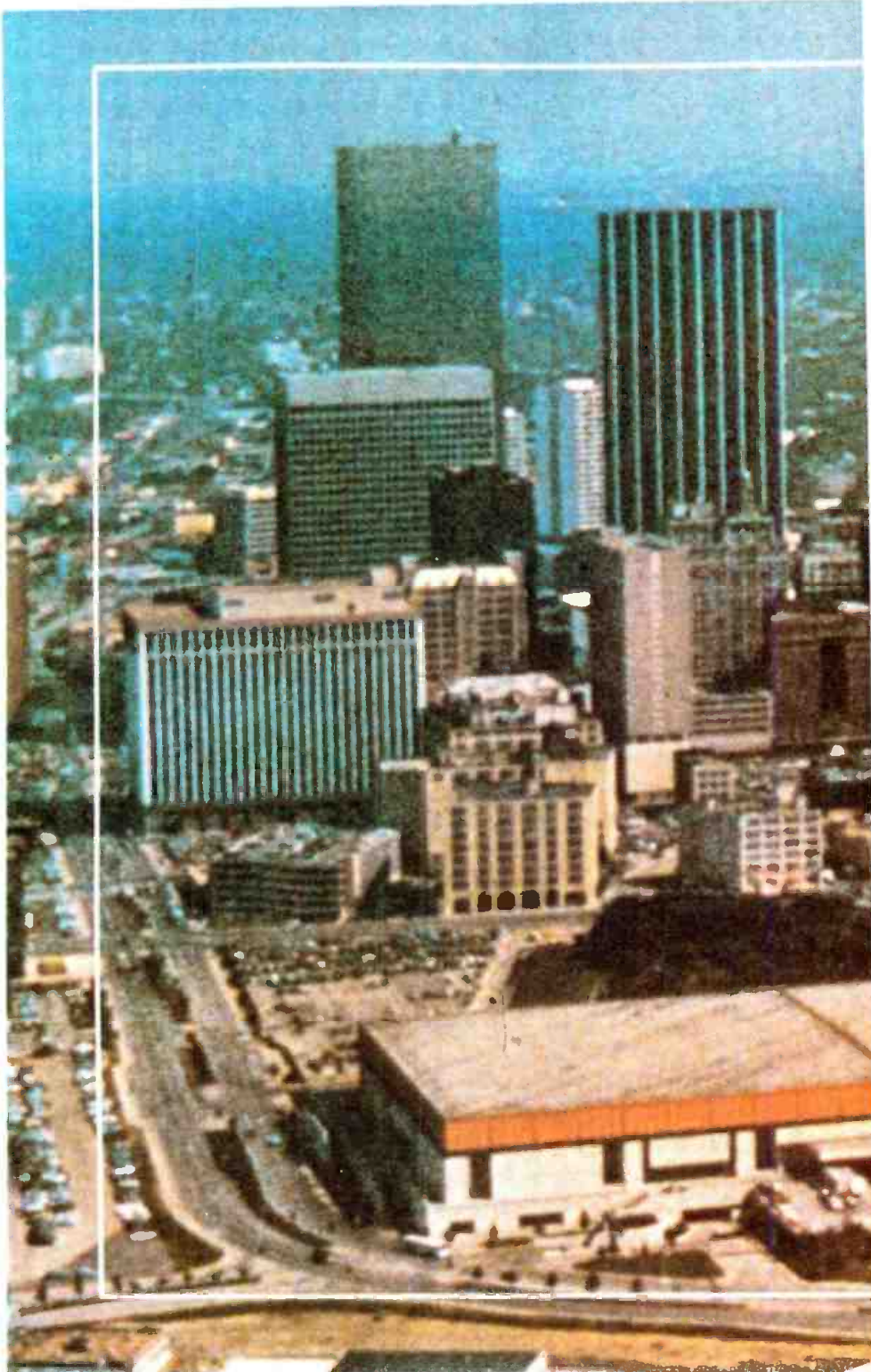
**Exhibit hours:**

- 9 a.m.-6 p.m. Sunday, Monday and Tuesday
- 9 a.m.-2 p.m. Wednesday  
A special feature again this year: "free" time for managers and engineers to visit exhibits without missing technical sessions
- Radio: 1-6 p.m. Monday
- TV: 12:30-6 p.m. Tuesday

**Registration hours:**

- 9 a.m.-5 p.m. Saturday
- 8 a.m.-5 p.m. Sunday, Monday
- 9 a.m.-5 p.m. Tuesday
- 9 a.m.-noon Wednesday

By Bill Rhodes, editorial director



# THE SKY'S

Broadcasters are getting ready to flood Dallas in April for the industry's most prestigious convention: NAB'82/Dallas, the NAB 60th Annual Convention and International Exposition. Exhibitors from around the world are working feverishly on booth displays and special surprises to make this year's show better than ever, even though most companies had to take reduced

booth space to make room for all who wanted in.

This year's NAB convention theme is: *The Sky's The Limit...in radio...in television...in engineering...and in broadcast equipment.* Beginning on page 24, the NAB staff lays out the welcome mat and provides a glimpse of some of the planned activities. This is followed up with **BE's** comprehensive exhibit coverage for NAB'82.





# THE LIMIT

Our coverage includes:

- a comprehensive product directory that lists product categories and exhibitors showing those products;
- a complete listing of exhibitors, alphabetically, with their *established* and new products listed by model number and name or description; and
- late exhibitor data, received just before press time.

Details of the NAB-'82/Dallas show are still being released as **BE** goes to press. Our latest map and exhibitor data will be distributed at the show to help you further. The final program will be available upon registration, but the following is a broad outline of what is being planned for you at this exciting convention. □



# SUNDAY

With spotlights, flags and a flourish of trumpets, broadcasting's first citizen will be presented with the Distinguished Service Award, the most prestigious honor in the broadcasting industry. Following that, we will hear an important message on the state of our industry. Developments are occurring so rapidly in broadcasting that it is sometimes difficult to distinguish the present from the future. Vincent Wasilewski, NAB president, will report on where we are and where we are going.

And then, Glen Campbell will perform for you at the special opening celebration. Join us for a rollicking good time with "the Country Boy who sings." He will sing songs such as *Galveston*, *Wichita Lineman*, *Gentle On My Mind*, *Rhinestone Cowboy* and dozens of favorites from his 12 Gold and seven Platinum Albums.

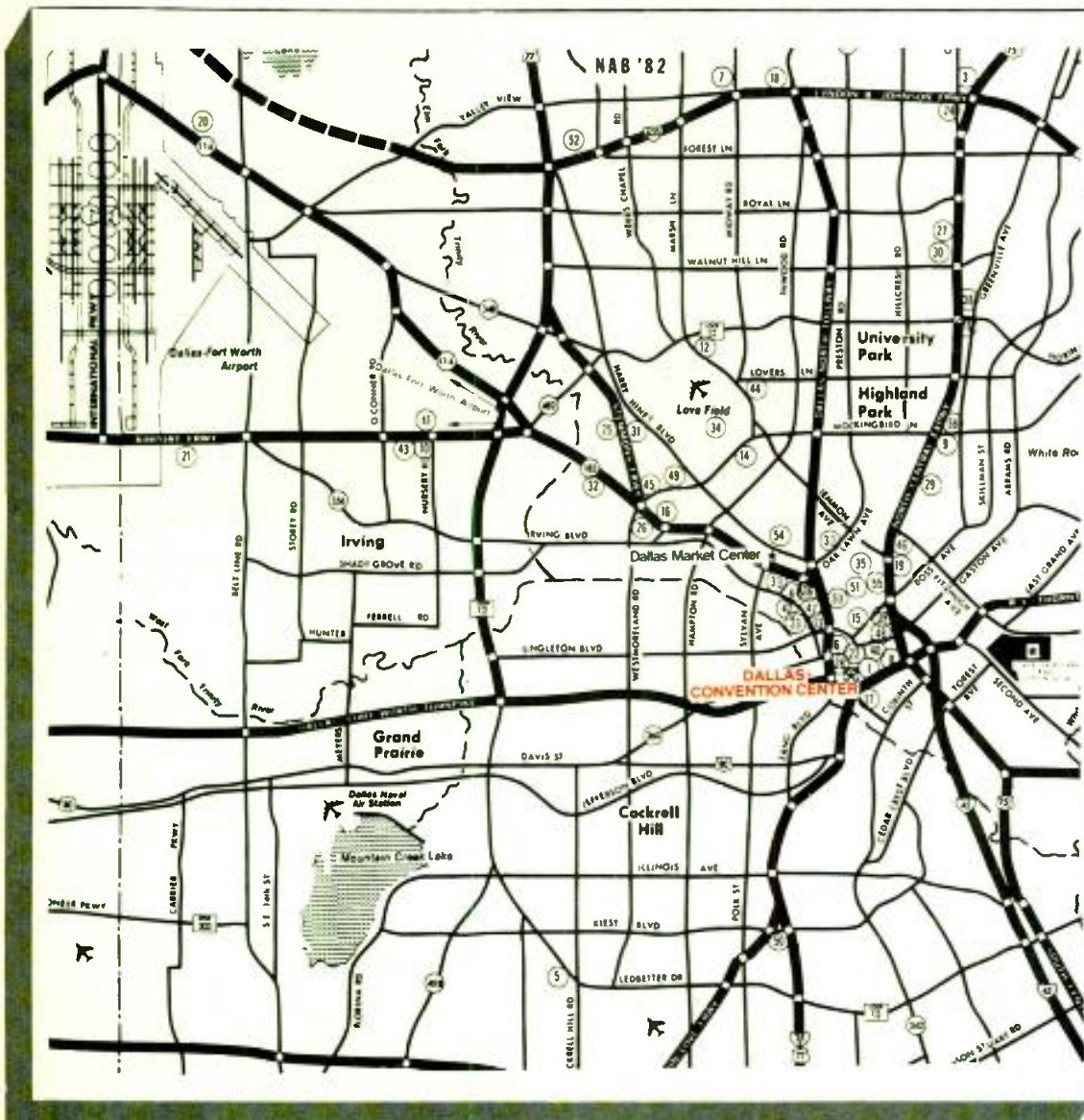
Campbell has never lost the down-home, easy-going manner he developed as the seventh son of a farmer from Delight, AR. You can bet he will feel right at home doing what he loves to do best at the festive opening show in Dallas.

He has entertained the President of the United States and the Queen of England. Don't miss his performance at NAB-'82/Dallas. It is all included in the price of your registration fee.

# DALLAS

## Dallas Area Hotels

1. Adolphus
2. Amfac Resort
3. Best Western, LBJ
4. Best Western, Market Center
5. Best Western, Red Bird
7. Centre Plaza
8. Dallas Hilton
9. Dallas Hilton Inn
10. Days Inn, D/FW
11. Doubletree Inn
12. Dunfey Dallas Hotel
14. Executive Inn
15. Fairmont
16. Greenwood Inn
18. Hilton LBJ
19. Holiday Inn, Central
20. Holiday Inn, D/FW North
21. Holiday Inn, D/FW South
23. Holiday Inn, Market Center
24. Holiday Inn, North
25. Holiday Inn, Regal Row
26. Howard Johnson's, Market Center
27. Howard Johnson's, North
28. Hyatt Regency
29. La Quinta, Central
30. La Quinta, Northpark
31. La Quinta, Regal Row
32. Le Baron
33. Loews Anatole
34. Love Field Inn
35. The Mansion
36. Marriott, Market Center
38. Northpark Inn
39. Plaza of the Americas
40. Plaza Hotel
41. Quality Inn, D/FW
42. Quality Inn, Market Center
43. Ramada Inn, D/FW
44. Red Carpet Inn
45. Regent Hotel
46. Rodeway Inn, Central
49. Sheraton, Mockingbird
50. Sheraton, Southwest
51. Stoneleigh Terrace
52. The Summit
53. Town House
54. Travelodge, Market Center
55. Tropicana Inn
56. Twin Sixties Inn



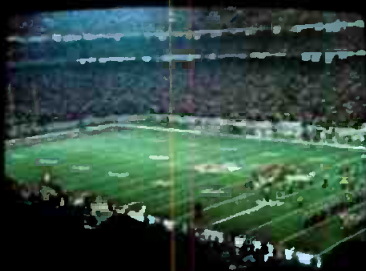


# 40 to 1

## Canon PV40 x 13.5B IE: THE OLYMPIAN

Canon moves you a giant step forward with a 40X broadcast quality zoom lens. An incredible new lens that allows you to cover a stadium at wide angle or fill the frame with the quarterback's eyes.

Never before has a single lens provided this much flexibility and sensitivity, with remarkably little change in effective aperture throughout its entire 13.5mm-540mm\* range. Built-in extenders let you go all the way to 1080mm and each lens is diascoped-equipped for modern microprocessor-



controlled cameras.

We call it The Olympian. Not only because it is ideally suited for sports coverage but also because of the dedication and team effort required of our optical and electronic engineers in making this lens a reality.

Enlarge a dollar bill forty times and it covers an area twenty feet long and eight feet wide. Now think about what you could do with the Canon PV 40 x 13.5B IE!

\*1" cameras. Also available in 30mm plumbicon.



# Canon

Optics Division

Canon USA, Inc., Head Office: One Canon Plaza, Lake Success, N.Y. 11042 (516) 488-6700

Dallas Office: 11311 Stemmons Freeway, Suite 1, Dallas, Texas 75229 (214) 620-2641 Chicago Office: 140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3070

West Coast Office: 123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000

Canon Canada, Inc., 3245 American Drive, Mississauga, Ontario L4V1B8, Canada (416) 678-2730

© 1982 Canon U.S.A., Inc.

### See the Canon 40 to 1 at NAB Booth # 3305

Circle (22) on Reply Card

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

# WEDNESDAY

Wednesday morning's distinguished, blue ribbon panel of experts will discuss broadcasting's best opportunity in many years to cast off the shackles of second class citizenship and secure basic First Amendment rights.

At Wednesday's luncheon, Mark Fowler, FCC chairman, will have some important words for broadcasters. An entertaining and dynamic speaker, Fowler was once a small market broadcaster who knows the challenges and concerns you face as a broadcaster in these trying times. He is sure to provide some enlightening comments on what the future holds for radio and TV broadcasters in the '80s.

And then, the wacky world of Jonathan Winters. He is a 1-man theatrical troupe complete with hundreds of improvisations and sound effects to match every one of them.

Among his credits: he's a former DJ, a film star, TV and nightclub entertainer, poet, painter and concert star whose latest achievements include the character of Mearth on *Mork & Mindy*, a starring role in *The Fish That Saved Pittsburgh*, and an NBC special, *Two Hundred Years of American Humor*.

You may also remember him as the improbable Maude Frickert and the zaniest garbageman ever in the Hefty Bag commercials.

Be there for the hilarious antics of Jonathan Winters.

# ENGINEERING

Engineers come from all over the world to attend NAB's Engineering Conference. If you are concerned with technical efficiency, productivity and competitiveness at your station, your technical staff should be there too. It promises to be one of the most important engineering meetings of the year.

Traditionally offering the most significant advances in broadcast technology and operating techniques, the 1982 conference is no exception. There will be discussion of the state-of-the-art and beyond, including current theories and innovations. Well-known authorities in the field will share their expertise on topics such as digital conversion, technical certification, digital standards, conversion to AM stereo, update on satellites, stereo radio STL problems, high resolution, improved VHF transmitter efficiency, local frequency coordination and many other subjects of concern to the radio and TV engineer.

The focus is on practical, usable information, applicable to broadcast engineers in various markets. Panelists encourage questions and comments from attendees during all of these forums, an excellent opportunity for broadcast engineers to express their viewpoints and to share experiences and information with colleagues from all over the world. Individually tailored sessions reflect problems common to your station, and practical solutions are offered.

## "The Missing Link to Reliable Cart Music Reproduction Has Been the Cart...Not the Cart Machine."

I've been using the Audiopak AA-3 at various stations for over two years, with gratifying results.

The AA-3 is capable of studio master music reproduction with excellent stereo phase stability.

It is durable and reliable in performance throughout its long life.

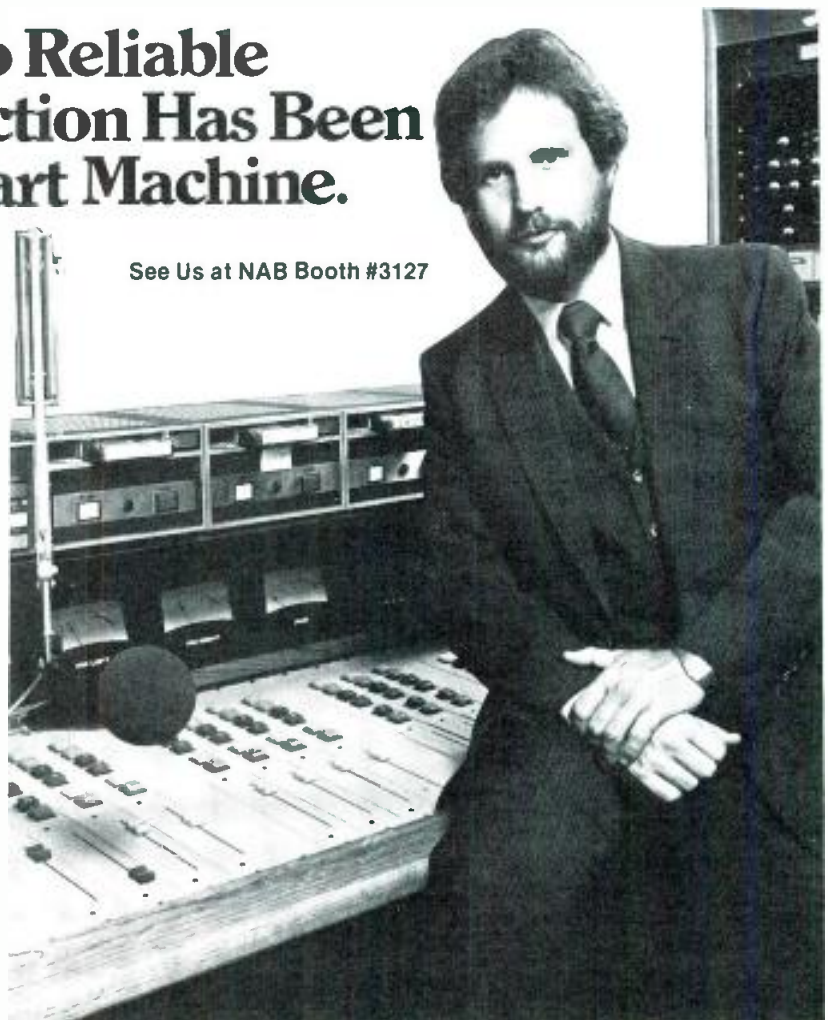
In my opinion, the AA-3 is the best cart we've tested."



**Elliott Klein**

Corporate Director of Engineering,  
Buck Owens Broadcasting Group  
Chief Engineer, KNIX AM & FM,  
Phoenix, AZ  
Consultant to:  
Scripps-Howard Broadcasting Co.  
(Radio Division)  
Sunbelt Communications Ltd.  
The Research Group  
Transstar Network

See Us at NAB Booth #3127



**AA-3 - THE MISSING LINK**  
*For stations who care how they sound*

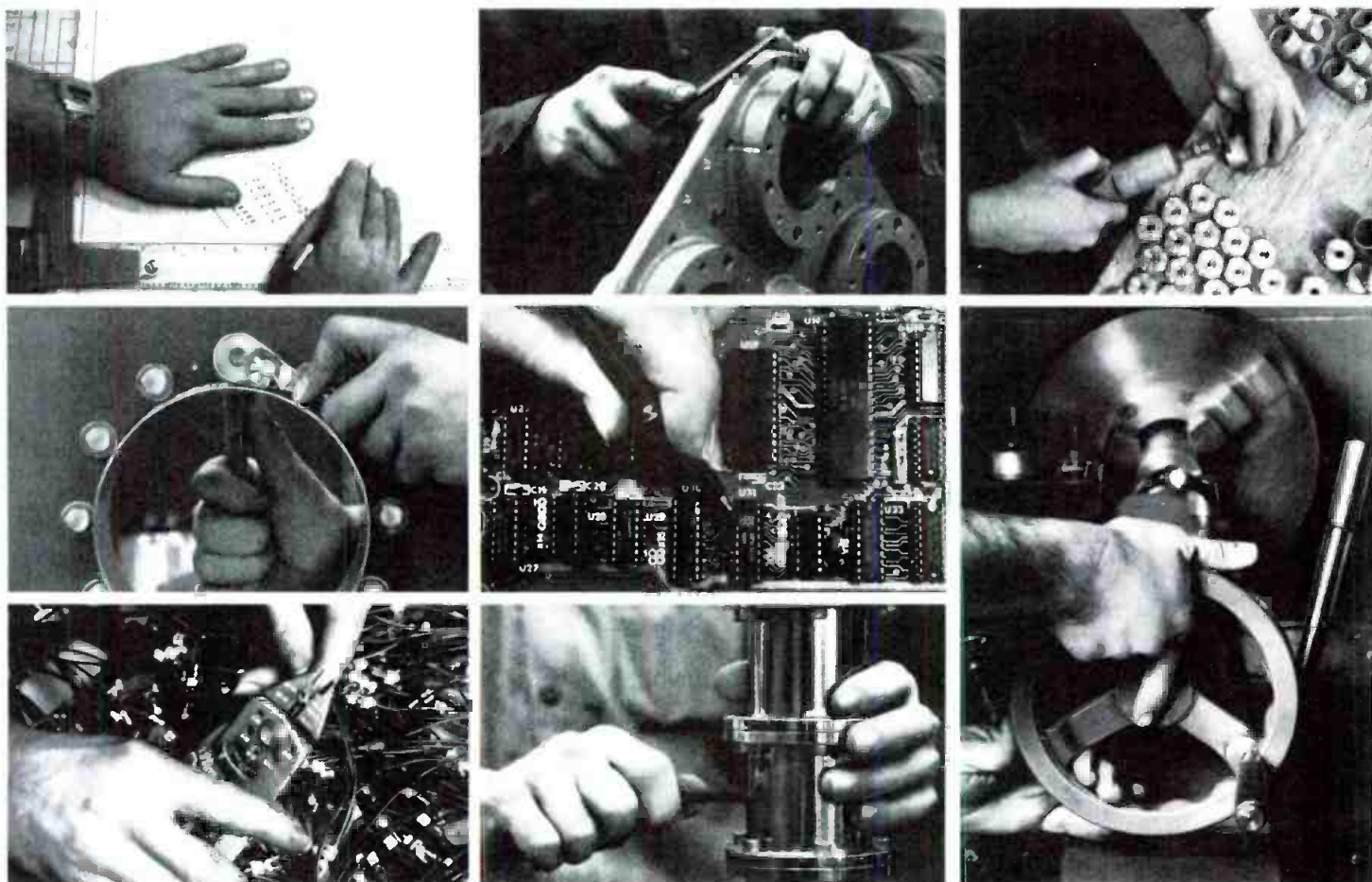


CAPITOL MAGNETIC PRODUCTS  
A Division Of Capitol Records, Inc.  
6902 Sunset Blvd., Hollywood, California 90028 (213) 461-2701  
© 1981 Capitol Records, Inc.



# UHF Systems?

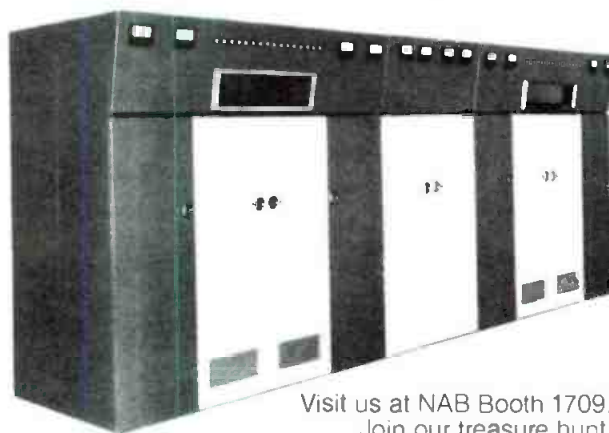
## You're in capable hands with Comark.



At Comark we manufacture more of the components that make up a total UHF TV transmission system than any other name in the business. Experienced technicians with skillful hands measure, fit, connect, test, check and re-check. But that's only part of the reason you should be looking at Comark.

We are in the forefront in creative engineering and practical implementation. We pioneered the concept of maximum transmitter plant efficiency. From initial planning, to total service, our hands-on policy assures you that we live up to our word and workmanship. And because we're in charge we're able to bring our products to you more economically.

Whether you're looking for a turn-key system, or a transmitter or just components, you place yourself in capable hands the moment you contact Comark. Call us at (413) 569-5939 or write: Comark Communications Inc., PO Box 267, Southwick, Mass., 01077. Telex: 955 329.



Visit us at NAB Booth 1709.  
Join our treasure hunt  
where everyone is a winner.

# COMARK

MAKING UHF BETTER. SOONER  
Circle (24) on Reply Card

## NAB convention

### Paper presentations

Here is your chance for a sneak preview of what is just around the corner in broadcast technology. These important theses reflect the most timely advances in technology, equipment manufacturing and engineering development going on in the world today.

### Calling all hams

Come to the Fourth Annual Ham Radio Operators Reception. Join your fellow hams for our gala presented on Monday night. All card-carrying hams admitted.

### Cronkite to receive Distinguished Service Award

Walter Cronkite, CBS News special correspondent, has been named recipient of the National Association of Broadcasters 1982 Distinguished Service Award. The award will be presented April 4 at the opening session of NAB's 60th Annual Convention at the Dallas Convention Center.

The award, established in 1953, is presented to a broadcaster who has made a significant and lasting contribution to the American system of broadcasting by virtue of a singular achievement or continuing service for or on behalf of the industry.

Cronkite has covered almost every major news event during his 31 years with CBS News, which he joined in July 1950. These assignments included exclusive interviews with the major characters in the Mideast drama, the unprecedented 14½-hour Bicentennial broadcast, and all aspects of the American political scene—primaries, conventions, elections and inaugurations. In 1978, his broadcast received an Alfred I. duPont-Columbia University Award in Broadcast Journalism, marking the first time a regularly scheduled daily network news broadcast and its anchorman received this award. He began serving as anchorman of the CBS nightly newscast in April 1962, when it was 15 minutes long, until last year when he stepped down to become a special correspondent.

A veteran journalist for 40 years, whose ability to handle pressure has earned him the affectionate nickname "Old Iron Pants," Cronkite has been on-the-scene for newsmaking events throughout the world. In 1975, 1976 and 1977, he was the only journalist to be voted among the top 10 "most influential decision makers in America" in a leadership survey conducted by *US News & World Report*. Cronkite was also selected as "the most influential person" in the field of television in the same survey.

Cronkite is regarded as an authority on the space program. He received an Emmy Award for his reporting on the flight of Apollo 11, man's first landing on the moon. He received a second Emmy for his reporting on the space flights of Apollo 13 and 14.

In 1969, Cronkite became the first broadcast journalist to receive the William Allen White Award for Journalistic Merit, and was cited for his "30-year record of excellence as a reporter, foreign correspondent and commentator."

He was named Broadcaster of the Year by the International Radio and Television Society in 1971, and that same year received the Freedom of the Press Award from the George Polk Memorial Award Committee for "resisting a White House attempt to discredit CBS News' televised disclosure of an atrocity at Bau Me, South Vietnam."

Bring along your QSL and business card for posting. It is an evening of bad jokes, good food and drink, and door prizes.

### And there's more

Your registration fee also includes a special luncheon for engineers, as well as admission to the giant exhibition hall, all general sessions, and the radio and TV management workshops and forums, many of which have direct applications to engineers. Be sure to check your program for details on these topics.

For the best in technology presentations, informative nuts-and-bolts workshops, exciting general sessions and speakers, you cannot beat NAB's 1982 Engineering Conference.

## TELEVISION

Feeling frustrated? It is not an uncommon ailment among TV broadcasters these days with all the confusing information about uplinks and downlinks, futuristic delivery systems, digital receivers, and all of them being touted as the greatest inventions since pockets.

The business of TV broadcasting is becoming more complex, more confusing, and more challenging. If you intend to compete as a broadcaster in this brave new world, there's no time for standing still. The future is now, it's here, and it's exciting.

NAB-'82/Dallas has the prescription to cure your frustrations and help you meet these future challenges head-on. The 1982 TV Convention is specifically designed to broaden your knowledge of today's technology as it is being used by broadcasters.

First, it zeros in on what has happened, by analyzing the trends in cable and VCR growth, cable viewing patterns, satellite delivery services, DBS proposals, pay TV revenues and video options.

Then, it will focus on mind-stretching demonstrations of videotext/teletext, high definition television, digitally produced special effects and broadcast innovations such as satellite-delivered news feeds and automated equipment.

And based on what has already been discussed, it will get more specific and down to basics with information-packed, hands-on workshops and forums. Some of the topics include:

- Using your local cable channels;
- Effective methods of competing with the new competitors;
- How to develop local programming using the new technologies;
- The future of broadcast automation;
- Network/affiliate relationships in this changing environment;
- Programming an independent;
- Dealing with cable penetration; and
- Long-range development of your personnel.

Plus the latest news on regulation and new rulemakings from Capitol Hill and the FCC; the newest trends in advertising from the experts at TvB; money-making, money-saving ideas to improve your bottom line; and exciting speakers and general sessions.

This is an opportunity to enhance your knowledge of the future.

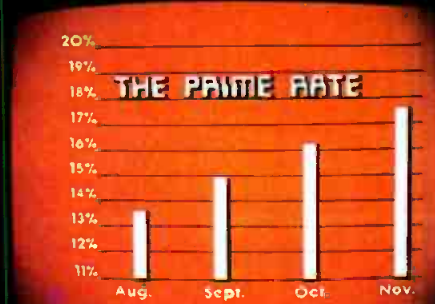




Dual channel mix



Character Flip/Rotation



Charting capability

Channel 55

**Scoreboard**

**NBA Standings W L**

Philadelphia	15	3
New York	12	4
Boston	10	5
New Jersey	8	11
Washington	7	11

Static headline, changing copy

#### Area Forecast

Tues/Wed:



Thur/Fri:



**2 Weather**

Keyboard logo compose



Left and right italics



25% and 50% character reduction

#### State Senate 5th District 20% Pcts.

✓ Ward D	99,876	39%
Roberts R	84,756	34%
Jameson I	67,543	27%

**WEZY-TV Channel 6**

Computer Election Interface



Character reversal

## Many of our capabilities aren't even options on other graphic generators.

Which is the do-all, top-of-the-line graphics generator?

It may not be the one you think it is. Unless you specify the D-8800 Graphics Generator System from 3M.

It's the graphics system that gives you almost every creative capability you could want.

Such as the features you see above, photographed from a monitor using graphics generated from the D-8800 keyboard with no external hardware. Including dual channel mix. Ten roll and crawl speeds. Eight mask positions. Both horizontal and vertical autocentering. Character reduction and



italics that give you hundreds of fonts to create and store.

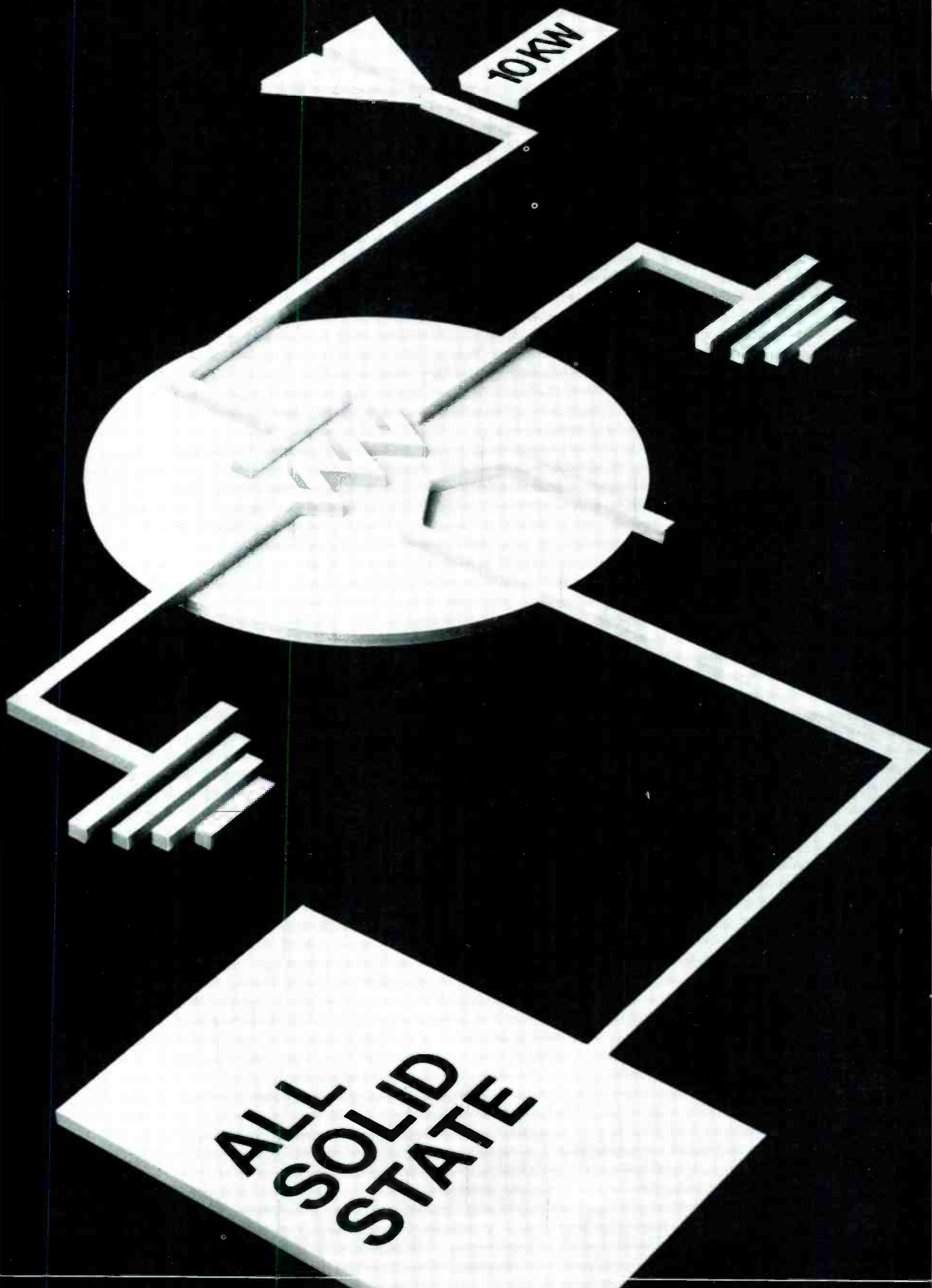
And much more.

Plus the D-8800 talks to you in plain English, at the keyboard. Not in codes that so often take weeks, even months to learn to decipher.

Call 3M today at 612-733-8132 and ask for a demonstration. You'll quickly discover the D-8800 is your only real option. Or write on your letterhead to: Professional Audio Video Equipment/ 3M, Bldg. 223-5E/3M Center, St. Paul, MN 55144. In Canada contact 3M Canada, Inc., P.O. Box 5757, London, Ontario, N6A-4T1.

**3M hears you...**

Circle (26) on Reply Card





# ELCOM/BAUER FM RADIO TRANSMISSION

**The Simplicity and Stability of Grounded Grid and One Tube Design: The Best of Both Worlds in a New, 10,000 Watt FM Transmitter.**

In a power range from 3kW to 10kW, the broadcast engineer can now have the reliability, efficiency and low maintenance that are inherent in a one tube transmitter design. Combine with this the operational benefits of a grounded grid configuration power amplifier stage that requires no neutralization and you have the best of both engineering worlds.

## **Add to This a New Exciter, Solid-State IPA and Exclusive Broadband, Low-Loss Ferrite Combining**

The new 690A Exciter is the heart of all Elcom/Bauer FM transmitters. Its advanced solid-state engineering delivers great frequency stability while assuring you an exceptionally clean signal for further amplification.

Our solid-state IPA consists of four power amplifier modules (2 amplifiers per module) when combined produce 1,000 watts of drive power, with plenty of power in reserve. All of these modules are identical and loss of one of the four driver amplifier modules will not result in an off-air condition. All modules are broadbanded and require no individual tuning over the entire 88-108 MHz FM band. The modular design gives you back-up capability for more reliability in addition to an overall reduction of transmitter tuning requirements.

The exclusive Elcom/Bauer ferrite combiner is also broadband to take full advantage of the new solid-state IPA.

## **Easy Access and Spacious Cabinets for Engineering Maintenance**

Every component in an Elcom/Bauer transmitter is readily accessible; full-length, non-interlocked front doors and side panels, which may be removed if necessary, are provided along with interlocked rear doors. High voltage grounding switches and grounded shorting sticks are provided. In addition to roominess and ease for the engineer, every safety precaution has been re-examined and no compromises made in assurance of operator safety.

## **Extensive Features That Guarantee Performance/Reliability**

All important operating parameters are metered including operating elapsed time and AC line voltage. Solid-state rectification is used exclusively in all power supplies that are conservatively rated and easily accessible. Rugged variable inductors of solid brass (silver plated) are used to provide simple, stable tuning adjustments.

Automatic recycling restarts the transmitter should a momentary fault occur. A tally light memory keeps the appropriate fault indicator lamp lit until it is reset locally.

Interfacing to remote control or ATS systems is simple with all of the standard functions accessible

via terminal strips. Interface for telemetry control equipment is standard, too.

Every transmitter also includes VSWR protection, automatic power output control, AFC status indication, solid-state timing diode logic and relays, tuning controls with counter indicators, multimeter readout on secondary operating parameters and front panel circuit breakers and fusing.

## **The Quality You Can Depend On—Anywhere in the World.**

Your broadcasting requirements need the simplicity and stability of grounded grid and one tube design—the best of both engineering worlds in a new FM transmitter. And, you should investigate the advantages of flexibility and cost-savings that come with the exclusive Elcom/Bauer ferrite combining. A comprehensive two-year warranty and in-depth engineering, available on a 24 hour basis, are your further guarantee that Elcom/Bauer can and will respond to the most stringent requirements for your facility.

A customer list is available upon request. We invite your technical evaluation of new FM transmitters that broadcast professionals are calling: "The Heritage Of The Future."

## **THE HERITAGE OF THE FUTURE Elcom/Bauer Broadcast Products**

6199 Warehouse Way  
Sacramento, California 95826  
Tel: (916) 381-3750 Telex: 377-331

Circle (27) on Reply Card

## NAB convention

# RADIO

It will be a cost-cutting, money-keeping, cash-conscious convention designed to help radio stations in every size market make and keep money in these cash crunching times. For example, there will be creative seminars on:

**Managing Cash Flow**—Is your money working for you or is it on vacation? Smart dollars work hard. Here is how to make cash flow work for you, not against you.

**The New Tax Law**—Projections, payments, estates, depreciation...if you learn the new law, you will learn how to keep more of your hard-earned dollars.

**Budgets—Expense and Sales Projections**—Learn how to build a budget, stick to it and live with accurate expense and sales projections.

**The Art of Negotiating**—How much money do you give away every year by paying retail for office supplies, equipment, money? The total dollar figures may surprise you. Learn how to negotiate like the big money people do.

**Home Computers Work Great At Small Stations**—Hundreds of small market stations are saving thousands of dollars with do-it-yourself computers and customized software. This is a hands-on session you will not want to miss.

**Small Market Special**—We have slated a complete mini-convention chock full of sessions that are custom-made for and by small market radio broadcasters.

The 1982 Edition of *Sales, Sales, Sales*—Tuesday, April 6, is all-day sales-day at the convention. Presented with RAB, it will cover everything for every size market from co-op to closing, from collecting to credit.

**The New Satellite Programming Services**—You asked for it, here it is! How much? How often? Whose drive time? Whose dish? How many spots? Everything you need to know about the new satellite-distributed programming services.

**Jim Newman Wants To Talk With You**—Famous management specialist Jim Newman is your private management trainer/motivator in this exclusive, intensive NAB radio-only session.

**The Great American Arbitron Shoot-out**—Do we have a single service industry? Should we? It's showdown time in the world of radio audience servicing.

**Leasing a Cable Channel**—Doing nighttime sports with a daytimer? A new format for your market? Creating a new profit center? Here is how it's being done by radio stations on cable.

**What The FCC Did Not Deregulate**—Don't throw out your set of FCC Rules and Regulations. You still have heavy dues to pay to the FCC.

**Spanish Language Forum**—Here is a special forum session devoted to the unique challenges of Spanish language radio.

**"Hello, Is This The FCC? Well, I've Got This Problem..."**—Listen in on a phone conversation like you've never heard before. It's about radio, advertisers, lawyers, contests, the FCC and you.

**This Was A Paid Political Announcement**—1982 is an election year. Your knowledge of the rules affects your pocketbook and your license.

There will be all this and much more news for radio attendees. □

# PREAMPS FOR PROFESSIONALS

## ... Who Demand Better Performance

than their present console can offer or need state-of-the-art peripheral capability.

### The QLZ quad microphone preamp delivers!

Equivalent input noise with 150 ohm input impedance @ 60dB gain =  $-128.5\text{dBv}$  (20Hz to 20kHz). Distortion (THD or IM): @ 60dB gain, +20dBm (600 ohm) out = .005% @ 20dB gain, +20dBm (600 ohm) out = .0007%. Frequency Response:  $\pm .25\text{dB}$  20Hz to 20kHz ( $-3\text{dB}$  @ 10Hz, 180kHz).

Each quad preamp offers accessibility to inputs via front panel connectors (XLR on QLZ, tip/ring/sleeve on the QHZ) or at the rear panel of our '800' Series rack. Adjustable gain with clip level indicator is provided for

## ... Who Desire Ease In Interfacing

high impedance sources to line level gear with the added benefit of transformerless brilliancy.

### The QHZ quad preamp delivers!

Equivalent input noise with 50K ohm input impedance @ 20dB gain =  $-104\text{dBv}$  (20Hz to 20kHz). Distortion (THD or IM): @ 20dB gain, +20dBm (600 ohm) out =  $\leq .05\%$  (.007% typical). Frequency Response:  $\pm .25\text{dB}$  20Hz to 20kHz ( $-3\text{dB}$  @ 10Hz, 100kHz).

each input. Excellent RF suppression is incorporated in all inputs and outputs. As an added benefit, 48 volt 'phantom' powering is standard on the QLZ, as is the phase reverse switch for each input.



Each is available at a cost which will surprise you!

From....

a **VALLEY PEOPLE** dealer near you

**VALLEY  
PEOPLE  
INC.**



P.O. Box 40306  
2820 Erica Place  
Nashville, Tenn. 37204  
615-383-4737  
TELEX 558610 VAL PEOPLE NAS

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# Don't Look for System Concepts at NAB.

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QUANTAFONT  
QUANTANEWS  
QUANTAVISION

These names are recognized around the world as professional, cost-effective, high-technology television products.

Fine products and designs are our business. Now our business name is Quanta Corporation. So, at NAB, do look for

**QUANTA<sup>TM</sup>**

the company that's named after its products. We offer the widest choice of teleproduction graphic titlers in the industry. We're premiering our new QUANTAFONT Q-8 with the highest base resolution of any font load system available. We'll have our QUANTANEWS<sup>TM</sup> computer-assisted broadcast newsroom and other QUANTAFONT<sup>TM</sup> titlers plus automated information systems.

Booth 1705 at NAB is Quanta Corporation. We're the company that's moving up to the reputation of its products.

**QUANTA**

Quanta Corporation  
2440 So. Progress Drive  
Salt Lake City, Utah 84119  
(801) 974-0992

<sup>TM</sup>Quanta Corp.

Circle (29) on Reply Card

# NAB-'82/DALLAS PRODUCT DIRECTORY

This special section provides a directory to the NAB-'82/Dallas exhibitor products. Each exhibitor was asked to complete a comprehensive checklist of products to be shown. The following section is a compilation of the data provided. It shows major equipment headings followed by the exhibitor name and booth number (when provided by deadline).

This special section will be an aid in finding the equipment of special interest at the show. But a word of cau-

tion: As **Broadcast Engineering** goes to press, there are still changes being made daily in the exhibitor sign-ups, equipment being displayed and booth assignments. So, although every attempt has been made for accuracy in this section, double check the final program at NAB-'82 to organize show coverage.

For those not attending the NAB-'82/Dallas, the June issue of **BE** will provide a convention replay and will cover both sessions and new products.

## AMPLIFIERS, PRE-AMPS, DAs

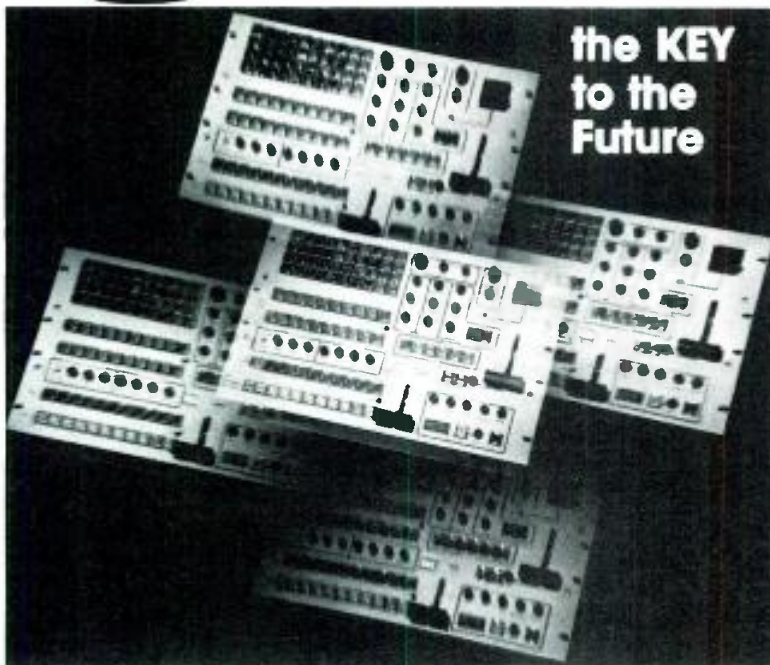
ADM Technology (1714)  
Allied Broadcast Equipment (2920)  
American Data (3208)  
Arrakis Systems (1824)  
Audio + Design (1514)  
Avitel Electronics  
BGW Systems (2841)  
Broadcast Audio (1920A)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Broadcast Technology (2115)  
CMC Technology (1802)

Camera Mart (2010)  
Central Dynamics (3208)  
Cetec Broadcast (3136)  
Clyde Electronics (2417)  
Comex (2829)  
Composite Video  
dbx (2113)  
Datatek (3138A)  
Datatronix (1927)  
Dynair Electronics (3135)  
Dynamic Technology (2912)  
Farrtronics Ltd. (2517)  
Fernseh (3323)

FitzCo Sound (2540)  
Grass Valley Group (3010)  
Gregg Laboratories  
HEDCO (2214)  
Ikegami (3209)  
Industrial Sciences (1600)  
LPB (3114)  
Lenco (3214)  
Link Electronics  
Logitek (2015)  
Marconi Electronics (3320)  
McCurdy Radio (3106)  
Micro-Trak (3115)



## 200 SERIES PRODUCTION SWITCHERS



### PolyKey® Effect System

#### 200 Series Features:

The 200 Series is an advanced, state-of-the-art production switching system, offering one, two or three PolyKey® Effects (PKE) Systems. Each PKE has a 5 level processor with the following features:

- 4 input busses
- Manual or auto transitions
- Video key plus title key over/under
- Black/white/color border edging
- Chroma key standard
- Rotary and spin wipes

Every 200 Series switcher also has a Downstream Transition Unit which includes:

- "Flip-flop" mixer with cut bar
- Fade-to-black with pulse processing
- DSK with border edging and color
- Pointer Generator



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Gainesville, Florida 32602  
U.S.A.

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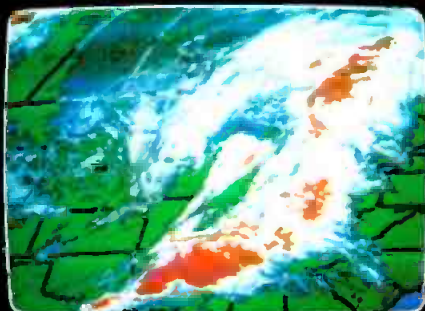
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- Overlay directly over satellite picture for striking effect!

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## EASTERN

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## Product directory

Microwave Power Devices  
Moseley Associates (3103)  
Nurad (1607)  
Pacific Recorders & Engr. (1608)  
QSI Systems (1502)  
RF Technology (2720)  
RTS Systems (1604)  
Radio Systems (2920)  
Ramko Research (1909)  
Rupert Neve (3118)  
Russco Electronics (1806)  
Sescom (1700)  
Shintron (1603)  
Shure Bros. (3110)  
Sigma Electronics (2614)  
Sound Genesis (2026)  
Straight Wire Audio (1724)  
Stanton (3125)  
Studer Revox (3123)  
TV Equipment Associates (3324)  
Telemet (3007)  
Telex Communications (3130)  
UREI (2530)  
Varian Associates/Eimac (3119)  
Varian Associates/Microwave (3119)  
Ward Beck Systems (3301)

## ANALYZERS, AUDIO & VIDEO

AF Associates (3320)  
Amber Electro Design (2016)  
Asaca/Shibasoku Corporation (3308)  
Broadcast Systems (2803)  
Eventide Clockworks (2934)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Inovonics (1610A)  
Leader Instruments (2629)  
Philips Test & Measuring (3215)  
Rohde & Schwarz (3213)  
Sescom (1700)  
Sound Genesis (2026)  
Sound Technology (2636)  
Tektronix (3005)

## ANIMATION/ELECTRONIC GRAPHICS EQUIPMENT

Aurora Systems (2806)  
Chyron (3329)  
Computer Operations (2403)  
Datatron (3327)  
Dubner Computer Systems (2702)  
Echo Sciences (3319)  
Eigen Video (1902A)  
Fernseh (3323)  
Alan Gordon (2406)  
Ikegami (3209)  
Interand (1807)  
Logica Ltd. (1502C)  
Lyon Lamb (2832)  
MCI/Quantel (3306)  
Newscan/McInnis-Skinner (2502A)  
Quantel Ltd.  
Spectra Computer Systems (2415)  
Thomson-CSF (3201)  
UMC (1814)  
Frank Woolley (2930)

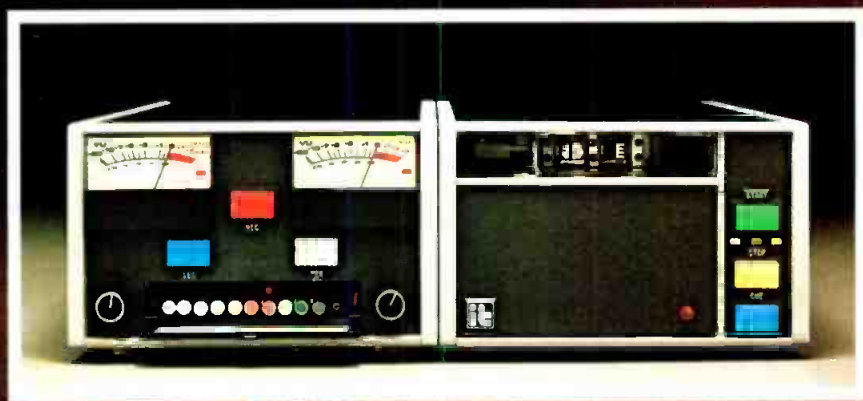
## ANTENNA SYSTEMS AND HARDWARE

Andrew (3012)



# Better listening through better design—Series 99B

...Crisp, Clean, Brilliant Sound



## Superior features!

"ELSA" (Patent 4,142,221) the only Cartridge Preparation System that automatically erases the cartridge, eliminates azimuth error and locates the splice. "ELSA" combines with:

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## Product directory

Bogner Broadcast (1711)  
Broadcast Systems (2803)  
CSI Electronics (1606)  
Cablewave Systems (3206)  
Comark Communications (1709)  
Comex (2829)  
Continental Electronics (3134)  
Harris Broadcast (3101)  
LeBlanc & Royle (2700)  
Marconi Electronics (3320)  
Micro Communications (3312)  
Microdyne (2618)  
Moseley Associates (3103)  
Nurad (1607)  
Phelps Dodge Communications (3116)  
RCA (3000)  
Shively Laboratories (1718)  
Swintek Enterprises (1702)  
Tennaplex (2111)  
Townsend Associates (3311)  
Wilkinson (3117)

### ATTENUATORS

ADM Technology (1714)  
Bird Electronics (3204A)  
Datatronix (1927)  
Leader Instruments (2629)  
Sescom (1700)  
Sound Genesis (2026)  
Sphere Electronics (2604)

### ATS & EQUIPMENT

Hallikainen & Friends (1618)  
Moseley Associates (3103)  
QEI (1919)

### AUDIO AMPLIFIERS & PROCESSORS

ADM Technology (1714)  
ATI-Audio Technologies (2728)  
Advanced Music Systems (1505)  
American Data (3208)  
Aphex Systems (2704)  
Arrakis Systems (1824)  
Audio + Design (1514)  
Audio Technologies (2728)  
Broadcast Electronics (3104)  
Broadcast Technology (2115)  
Camera Mart (2010)  
Central Dynamics (3208)  
Circuit Research Laboratories (2827)  
Comex Corporation (2829)  
Composite Video  
dbx (2113)  
Datatek (3138A)  
Datatronix (1927)  
Dorrough Electronics (2112)  
Eventide Clockworks (2934)  
Gregg Laboratories  
HEDCO (2214)  
Harris Broadcast Products (3101)  
Industrial Sciences (1600)  
Inovonics (1610A)  
Kahn Communications (2028)  
Klark-Teknik (1818)

Logitek (2015)  
McCurdy Radio (3106)  
McMartin Industries (3102)  
MICMIX Audio Products (3142)  
Micro-Trak (3115)  
Moseley Associates (3103)  
Orban (1812)  
RTS Systems (1604)  
Ramko Research (1909)  
Russco Electronics (1806)  
Sescom (1700)  
Shure Brothers (3110)  
Sigma Electronics (2614)  
Sound Genesis (2026)  
Studer Revox (3123)  
TV Equipment Associates (3324)  
Thomson-CSF (3201)  
UREI (2530)  
United Labs Research (3128)  
United Media (2504)  
Ursa Major (1913)  
Videotek (2208)  
Ward Beck Systems (3301)  
Wilkinson Electronics (3117)

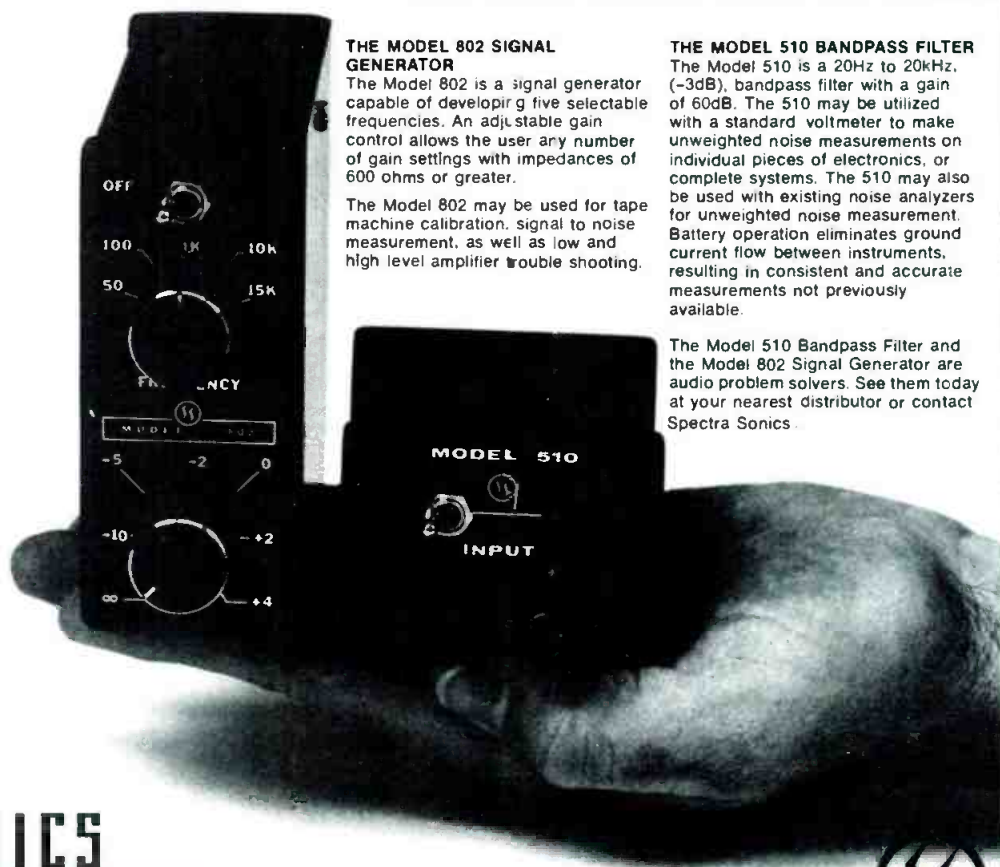
### AUDIO LEVEL INDICATORS

Audio + Design Recording (1514)  
Dorrough Electronics (2112)  
ESE (2305)  
Inovonics (1610A)  
Leader Instruments (2629)  
Logitek (2015)  
McCurdy Radio (3106)  
McMartin Industries (3102)

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Solving audio problems is a daily requirement for the professional. Often, the solution requires the use of accurate test instruments, with a high degree of reliability.

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## Product directory

Ramko Research (1909)  
Real World Technologies (2621)  
Sound Genesis (2026)  
Telemet (3007)  
Thomson-CSF (3201)  
Ward Beck Systems Ltd. (3301)

### AUDIO PRODUCTION CONSOLES & MIXERS

ADM Technology (1714)  
Accurate Sound (1610)  
Ampro/Scully (3307)  
Audio Developments (2002)  
Autogram (2748)  
Broadcast Audio (1920)  
Broadcast Electronics (3104)  
Broadcast Technology (2115)  
Camera Mart (2010)  
Cetec Broadcast (3136)  
Clyde Electronics (2417)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Crosspoint Latch (2408)  
Datatronix (1927)  
Elcom-Bauer (1908)  
Farrtronics Ltd. (2517)  
Gotham Audio (2919)  
Gregg Laboratories  
Hallikainen & Friends (1618)  
Harris Broadcast (3101)  
Howe Audio/BCP (2744)  
Industrial Sciences (1600)

JBL (2013)  
LPB (3114)  
LTM (2721)  
Lang Video Systems  
Logitek (2015)  
MCI (1615)  
McCurdy Radio (3106)  
McMartin Industries (3102)  
Micro-Trak (3115)  
Pacific Recorders & Engr. (1608)  
Panasonic (1621)  
Quad Eight Electronics (2705A)  
Ramko Research (1909)  
Rupert Neve (3118)  
Russco Electronics Mfg. (1806)  
Shure Brothers (3110)  
Soundcraft Electronics USA (2003)  
Sphere Electronics (2604)  
Studer Revox America (3123)  
Tascam Production Products (2734)  
Telex Communications (3130)  
Tweed Audio USA (2303A)  
UMC (1814)  
UREI (2530)  
Vital Industries (3018)  
Ward Beck Systems Ltd. (3301)  
Wilkinson Electronics (3117)

### AUTOMATION EQUIPMENT, AUDIO

Broadcast Electronics (3104)  
Central Dynamics (3208)  
Century 21 Programming (1503)

Cetec Broadcast (3136)  
Columbia Systems (2716)  
Datatronix (1927)  
Fidelipac (3132)  
Gotham Audio (2919)  
Hallikainen & Friends (1618)  
Harris Broadcast (3101)  
IGM Communications (3122)  
Image Video Ltd. (2600)  
Micro-Trak (3115)  
Otari (1611)  
Quad Eight Electronics (2705A)  
Rupert Neve (3118)  
Sono-Mag (3107)  
Telex Communications (3130)  
United Media (2504)

### AUTOMATION EQUIPMENT, VIDEO

American Data (3208)  
Audio Kinetics (1505)  
Central Dynamics (3208)  
Compact Video Technology (1604)  
Control Video (2324)  
Fernseh (3323)  
Grass Valley Group (3010)  
Harris Broadcast (3101)  
Image Video Ltd. (2600)  
NEC America (2528)  
Recortec (3137)  
Ross Video (2310)  
3M (3006)  
UMC (1814)  
Vital Industries (3018)

## News\*



## Sports\*



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### **AUTOMATION SYSTEMS, BUSINESS & LOGGING**

American Data (3208)  
Cetec Broadcast Group (3136)  
Chase Media (1912)  
Compact Video Technology (1604)  
Computer Concepts (2022)  
Custom Bus. Systems (2017)  
Data Communications (3318)  
Hallikainen & Friends (1618)  
IGM Communications (3122)  
Industrial Sciences (1600)  
Interface Data (1925)  
Kaman Sciences/BCS (3216)

### **BATTERY PACKS & CHARGERS**

Anton/Bauer (1802A)  
Camera Mart (2010)  
Christie Electric (1623)  
Cine 60 (1704)  
Cinema Products (3144)  
Colortran (3317)  
Comex (2829)  
Film/Video Equipment Service (2422)  
Frezzolini Electronics (1817)  
Alan Gordon  
Ikegami (3209)  
Moseley Associates (3103)  
Perrott Engineering (2011)  
Portable Energy Products  
Swintek Enterprises (1702)  
Telex Communications (3130)

### **BROADCAST LOGGERS**

Accurate Sound (1610)  
Ampro/Scully (3307)  
Hallikainen & Friends (1618)  
Moseley Associates (3103)  
QSI Systems (1502)  
Telex Communications (3130)

### **CABINETS, CASES & RACKS**

AEG-Telefunken (2536)  
Allied Broadcast Equipment (2920)  
Anvil Cases (2410)  
Broadcast Cartridge Service (2316)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Camera Mart (2010)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Datatronix (1927)  
Environmental Container (2907)  
Fiberbilt (1801)  
Fidelipac (3132)  
FitzCo Sound (2540)  
GKM Mfg.  
Great American Market, The (2103)  
McCurdy Radio (3106)  
Otari (1611)  
Parsons Mfg. (2023)  
Sound Genesis (2026)  
Stantron (2420)  
Storeel (3205)  
Thermodyne (2407)  
Winsted (1703)

### **CABLE (COAXIAL & AUDIO)**

Andrew (3012)  
Broadcast Systems (2803)  
Cablewave Systems (3206)  
Camera Mart (2010)  
Canford Audio (2817)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
LeBlanc & Royle (2700)  
Moseley Associates (3103)  
Phelps Dodge Communications  
(3116)  
Sescom (1700)  
Sound Genesis (2026)  
Tascam Production Products (2734)

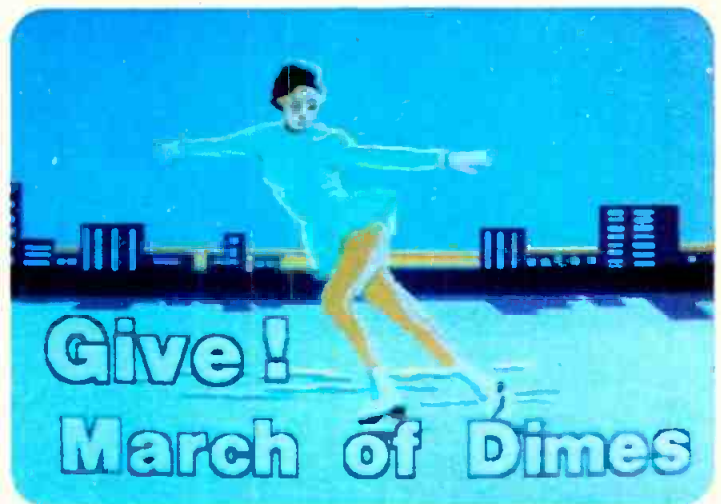
### **CAMERA DOLLIES, STANDS, TRIPODS, HEADS**

Arriflex (2109)  
Bogen Photo (2918)  
Camera Mart (2010)  
Comex (2829)  
Alan Gordon  
ITE—Innovative Television  
Equipment (3309)  
Lee-Ray Industries  
Listec TV Equipment (3325)  
MZB & Associates  
Matthews Studio Equipment (2626)  
Miller Professional Equipment  
O'Connor Engineering Labs (2001)  
Sachtler (3330)  
Telescript (3015)  
Television Products Company

### **Weather \***

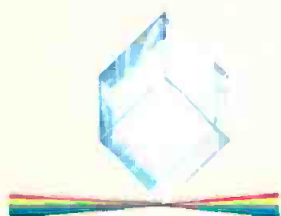


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## Product directory

W. Vinten

### CAMERA LENSES, ACCESSORIES

Angenieux (3316)  
Canon USA (3305)  
Cinema Products (3144)  
Comex (2829)  
EEV (2216)  
Fujinon Optical (3314)  
Karl Heitz (2515)  
Ikegami (3209)  
MZB & Associates (2628)  
Portable Energy Products

Tele-Cine (3016)

### CAMERA/RECORDER COMBINED SYSTEM

Camera Mart (2010)  
Comex (2829)  
Ikegami (3209)  
Panasonic Video (3217)  
RCA (3000)  
Sony (3200)

### CAMERA STABILIZING SYSTEMS

Arriflex (2109)  
Camera Mart (2010)  
Cinema Products (3144)  
Alan Gordon  
Listec TV Equipment (3325)

### CAMERAS, COLOR ENG/EFP & STUDIO

Ampex (3002)  
Camera Mart (2010)  
Cinema Products (3144)  
Comex (2829)  
Commercial Electronics (3321)  
Delcom (2710)  
EEV (2216)  
Fernseh (3323)  
Harris Broadcast (3101)  
Hitachi Denshi (3202)  
Ikegami (3209)  
JVC (1707)  
Marconi Electronics (3320)  
Midwest (2518)  
NEC America (2528)  
Panasonic Video (3217)  
Philips Broadcast Group (3208)  
RCA (3000)  
Sony Corporation (3200)  
Television Engineering (2114)  
Thomson-CSF (3201)  
Toshiba America (2106)

### CAMERAS, FILM CHAIN

AF Associates (3320)  
Camera Mart (2010)  
Comex (2829)  
Fernseh (3323)  
Alan Gordon  
Hitachi Denshi (3202)  
Ikegami (3209)  
Marconi Communications (3320)  
Nytone Electronics (2725)  
RCA (3000)

### CAMERAS, FILM CINE

Arriflex (2109)  
Camera Mart (2010)  
Cinema Products (3144)  
Alan Gordon  
Hitachi Denshi (3202)

### CARTRIDGES & ACCESSORIES

Broadcast Cartridge Service (2316)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
Capitol Magnetics (3127)  
Century 21 Programming (1503)  
Comex (2829)  
Fidelipac (3132)  
Gotham Audio (2919)  
Procart (1816)  
Ramko Research (1909)  
Stanton (3125)  
Telex Communications (3130)

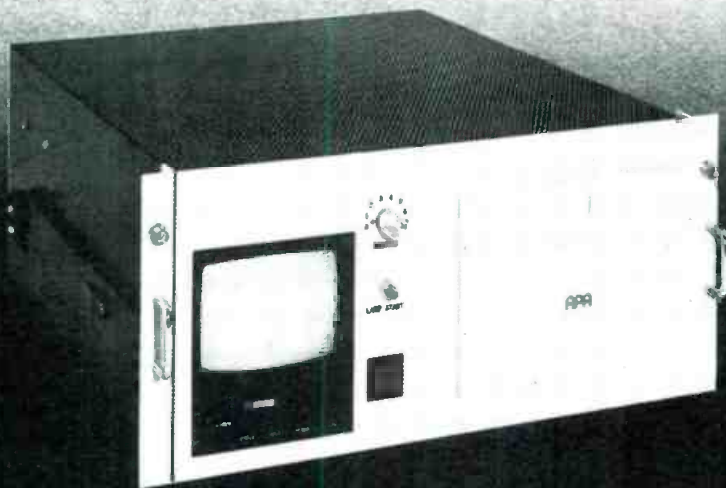
### CARTS, EQUIPMENT

Camera Mart (2010)  
Comex (2829)  
Excalibur (2103A)  
Lee-Ray Industries  
Stantron (2420)  
Star Case Mfg.  
Telex Communications (3130)  
United Research Labs (3128)

### CHARACTER GENERATORS & TITLERS

BEI (Beston Electronics Inc.) (3207)  
CMC Technology (1802)

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### Compact, self-contained title card camera for mobile and studio operations!

- Available as a table-top console or rack-mount unit
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  - Cool light source
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# Announcing...the all new **Philips LDK6** automatic camera.

A revolutionary design...it's a 'thinking' camera  
that is a generation beyond the smart cameras.



Think about that...  
then step into the future at  
NAB when the LDK6 joins the  
other world famous members  
of the Philips camera family.

See the LDK6 at the Central Dynamics  
Exhibit plus new CDL and American Data  
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[www.americanradiohistory.com](http://www.americanradiohistory.com)

## Product directory

Camera Mart (2010)  
 Chyron (3329)  
 Comex (2829)  
 Datametrics-Dresser (1500)  
 Dubner Computer Systems (2702)  
 ESE (2305)  
 Fernseh (3323)  
 For-A (2210)  
 Interand Corporation (1807)  
 Knox Video (2403)  
 Laird Telemedia (1808)  
 MZB & Associates (2628)  
 Midwest (2518)  
 Newscan/McInnis Skinner (2502A)  
 QSI Systems (1502)  
 Shintron Company (1603)  
 System Concepts (1705)  
 Television Engineering (2114)  
 Thomson-CSF (3201)  
 Torpey Controls (2008)  
 3M (3006)  
 United Media (2504)  
 Video Data Systems (2502)  
 Videomedia (2300)

### DELAY SYSTEMS

#### (AUDIO & VIDEO)

AKG Acoustics (2629A)  
 Advanced Music Systems (2904)  
 Allen Avionics (2318)  
 Broadcast Technology (2115)

Comex (2829)  
 Eventide Clockworks (2934)  
 Fidelipac (3132)  
 Gotham Audio (2919)  
 Klark-Teknik (1818)  
 Lenco (3214)  
 Lexicon (2019)  
 Sound Genesis (2026)  
 TV Equipment Associates (3324)

### EDITORS, FILM

Camera Mart (2010)  
 Comex (2829)  
 EECO Inc. (1819)  
 Alan Gordon (2406)  
 Research Technology (1903)

### EDITORS, VIDEOTAPE

Ampex (3002)  
 CMX/Orrrox (3304)  
 Camera Mart (2010)  
 Cezar International Ltd. (1701)  
 Comex (2829)  
 Control Video (2324)  
 Convergence (1902)  
 Datatron (3327)  
 Delcom (2710)  
 Fernseh (3323)  
 Harris Video Systems (3101)  
 JVC (1707)  
 Jatex (2505)  
 MZB & Associates (2628)  
 Panasonic, Video (3217)  
 RCA (3000)

United Media (2504)  
 Videomedia (2300)

### ELECTION REPORTING SYSTEMS

Broadcast Electronics (3104)  
 Fernseh (3323)  
 Newscan/McInnis-Skinner (2502A)

### ENG EQUIPMENT

Artel Communications (2624)  
 Beaveronics (2306)  
 Camera Mart (2010)  
 Christie Electric (1623)  
 Cinema Products (3144)  
 Comex (2829)  
 Comrex (1613)  
 Evershed Power Optics Ltd.  
 Faroudja Laboratories (2814)  
 Fernseh (3323)  
 Harris/Farion Video (3101)  
 ITE—Innovative Television  
 Equipment (3309)  
 Ikegami (3209)  
 Industrial Sciences (1600)  
 Lang Video Systems  
 Lee-Ray Industries  
 Logitek (2015)  
 M/A Com (3303)  
 MZB & Associates (2628)  
 Marti (3109)  
 McMartin Industries (3102)  
 Microtime (3322)  
 Micro-Trak (3115)

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Combines titler & message generator in one small package at one low price.



- Choice of 8 color backgrounds in stand-alone mode
  - Switchable for downstream keying applications
  - 16 page resident memory
  - Character insert & delete
  - Manual & auto sequencing with variable dwell
  - 10x14 character matrix
  - Auto line centering
- Titler and message generator combined for \$2795

### T-1000A

Advanced character enhancements.



- Black and white characters in 2 heights
  - Drop shadow and border in both black and white
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# A VERY MOVING STILL STORY.

Editors, Engineers, Animators, Producers, Special Effects Specialists, Station Managers, Training and News Directors, Read This Ad.

In the beginning, all was stillness. A dark and cumbersome, costly and inefficient sort of stillness accentuated by the *kachunka-kachunka* of the slide chain machinery. Then came a company called Echo Science Corporation — us, actually — with a concept called Electronic Frame-Stor™. And suddenly, all was stillness — and light.

But what excited the engineers at Echo Science wasn't stillness at all, but movement and, yes, re-movement. These were the challenging chapters to be written in the Still Story. How to make all of those electronically stored stills move around in all manner of ways — and do so in a container that was easy to move. For the Still Story, a hero was needed.

Thus was born The Image Maker.\*

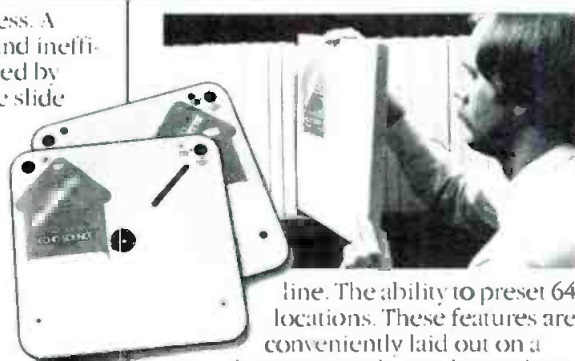
## The Image Maker.

### A Brief Definition.

Here's what The Image Maker is: A high-band color disc recording system that uses state-of-the-art electronics and an exclusive Discassette® recording medium to perform a versatile number of professional television production tasks from still frame storage to special animated effects. It is a highly reliable, very compact and most cost efficient method of acquiring an impressive package of capabilities.

### Loops, Sequences, Special Effects.

The joy of The Image Maker — and the key to its success as a productivity tool — isn't just in its storage of still frames, but also in the manipulation of those stills to serve a variety of needs. In this regard, The Image Maker is a marvel of special effects wizardry, all made possible by a combination of features. Variable speed operation all the way from freeze frame to real time. Random access of as many as 512 frames on



line. The ability to preset 64 locations. These features are conveniently laid out on a fingertip touch panel to make it just that much easier for the operator to do animation sequences, generate backgrounds, superimpose effects or pre-program motion loops.

### From Cold Fronts To Hot Switches: The Plot Thickens.

More advanced features deliver even more broadcast and production benefits. For instance, because The Image Maker boasts variable speed in both directions, weather motion — or motion analysis of any kind is, well, a breeze. And because it also features two independent heads, the operator can preview upcoming video images, then "hot switch" to the next one without going to black.

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

### The Discassette. The Removing Part Of The Story.

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

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

### Going Mobile With The Image Maker.

Movable images. Removable media. Both are important parts of The Image Maker story. A third, though, is The Image Maker itself on the move. Because we deal with some mighty tough customers, we build The Image Maker to be a mighty tough television production tool. The combination of the recording technology (one that eliminates the possibility of head crash), Echo Science craftsmanship, and a compact, road-rugged design makes The Image Maker as versatile on remote shoots as it is in the studio.

### A Moving Conclusion. Buy One.

Perhaps the most moving part of The Image Maker story is the one you read on the bottom line. Because, ultimately, it's the cost efficiency of The Image Maker that will move you to take a closer look. Clearly, it doesn't make a lot of sense to tie up a 1-inch VTR to do routine or special effects work when the feature-rich but modestly priced Image Maker can do that — and more.

There's a happy ending to our Very Moving Still Story. Call us today and we'll write it together.



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In Booth #3319

# ECHO SCIENCE CORPORATION

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March 1982 Broadcast Engineering 45

## Product directory

Microwave Power Devices  
Midwest (2518)  
NEC America (2528)  
Nurad (1607)  
Philips Broadcast Group (3208)  
Porta-Pattern (1803)  
RF Technology (2720)  
Recortec (3137)  
Sescom (1700)  
Sony (3200)  
Sound Genesis (2026)  
Swintek Enterprises (1702)  
Television Engineering (2114)  
Videotek (2208)  
Winsted (1703)

### ENCODERS, COLOR VIDEO (& DECODERS)

Camera Mart (2010)  
Cinema Products (3144)  
Comex (2829)  
Faroudja Laboratories (2814)  
Fernseh (3323)  
For-A (2210)  
Jatex (2505)  
Lenco (3214)  
Marconi Electronics (3320)  
Oak Communications (2206)  
Telemet (3007)

### ENCODERS, TONE AND EBS

Broadcast Electronics (3104)  
Camera Mart (2010)  
ESE (1614)  
Gorman Redlich (2307)  
Jatex (2505)  
McMartin Industries (3102)  
TFT (2838)

### ENGINEERING AND DESIGN SERVICES

Arrakis Systems (1824)  
Broadcast Systems (2803)  
CSI Engineering (1606)  
Cinema Products (3144)  
Comsearch (2416)  
Datatronix (1927)  
Delcom (2710)  
Jenel (2314)  
LeBlanc & Royle (2700)  
MZZ & Associates  
McCurdy Radio (3106)  
Micro Communications (3312)  
Perrott Engineering (2011)  
Real World Technologies (2621)  
Shively Laboratories (1718)  
Shook Electronic Enterprises (2628)  
Sound Genesis (2026)  
Tweed Audio (USA) (2303A)

### ENGINEERING/CONSULTING SERVICES

Comsearch (2416)

Datatronix (1927)  
Delcom (2710)  
Jenel (2314)  
Micro Communications (3312)  
Real World Technologies (2621)  
Tennaplex Systems (2111)  
Tweed Audio (USA) (2303A)

### ENHANCERS, VIDEO IMAGE

Camera Mart (2010)  
Comex (2829)  
Faroudja Laboratories (2814)  
Fernseh (3323)  
For-A (2210)  
Hitachi Denshi (3202)  
Listec TV Equipment (3325)  
Microtime (3322)  
Sony (3200)  
Telemet (3007)  
Thomson-CSF Broadcast (3201)

### EXCITERS (AM, FM, SCA, STEREO)

AEG Telefunken (2536)  
Broadcast Electronics (3104)  
CSI Electronics (1606)  
Comark Communications (1709)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Harris Broadcast (3101)  
Kahn Communications (2028)  
LPB (3114)  
McMartin Industries (3102)

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

## Product directory

Moseley Associates (3103)  
Orban (1812)  
QEI (1919)  
Telemet (3007)  
Wilkinson Electronics (3117)

### EXTENDERS, AUDIO & LF

Comrex (1613)  
Kahn Communications (2028)  
McCurdy Radio (3106)

### FIBER-OPTICS/OPTICAL LINKS

Artel Communications (2624)  
Fernseh (3323)  
Grass Valley Group (3010)  
Jenel (2314)  
Moseley Associates (3103)  
NEC America (2528)  
Telemet (3007)

### FILM & PROCESSING SERVICES

Eastman Kodak (3212)

### FILM CHAIN (SYSTEMS/ EQUIPMENT)

AF Associates (3320)  
BEI (Beston Electronics) (3207)  
Comex (2829)  
Fernseh (3323)  
Alan Gordon  
Ikegami (3209)

JVC (1707)  
Laird Telemedia (1808)  
Marconi Electronics (3320)  
Nytone Electronics (2725)  
RCA (3000)

### FILTERS (ALL TYPES)

Allen Avionics (2318)  
Audio + Design Recording (1514)  
Audio-Video Engineering  
Bird Electronics (3204A)  
Bogen Photo (2918)  
Broadcast Video Systems Ltd. (2706)  
CSI Electronics (1606)  
Camera Mart (2010)  
Cinema Products (3144)  
Comark Communications (1709)  
Faroudja Laboratories (2814)  
Alan Gordon  
Harris/Farion Video (3101)  
Matthey Printed Products  
Shively Laboratories (1718)  
Sound Genesis (2026)  
TV Equipment Associates (3324)  
UREI (2530)

### FRAME SYNCHRONIZERS

ADDA (1712)  
Camera Mart (2010)  
Delcom (2710)  
Digital Video Systems (1904)  
Harris Video Systems (3101)  
Microtime (3322)

NEC America (2528)  
Thomson-CSF Broadcast (3201)

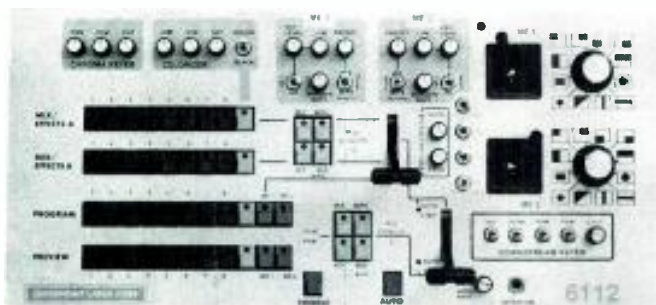
### GENERATORS (FM, SCA, AM, STEREO)

Broadcast Electronics (3104)  
CSI Electronics (1606)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Delta Electronics (3112)  
Harris Broadcast (3101)  
Kahn Communications (2028)  
Marcom  
Marconi Electronics (3320)  
Marti (3109)  
McMartin Industries (3102)  
Micro Control Associates (1813)  
Moseley Associates (3103)  
Orban (1812)  
QEI (1919)  
Sound Technology (2636)  
TFT (2838)

### GENERATORS (TIME CODE & READERS)

Audio Kinetics (1505)  
BTX (2301)  
CMC Technology (1802)  
Camera Mart (2010)  
Control Video (2324)  
Datametrics-Dresser (1500)  
Datatron (3327)  
EECO (1819)

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- TREMENDOUS PRODUCTION CAPABILITY
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Under **6403** control the **6112** accepts commands such as duration times, pattern type, bus selection etc., directly from the editor keyboard. The **6403** also provides additional capability of accurate start and finish, size and position of pattern transitions.

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# The "Studio Optimod"



## The Orban 424A Gated Compressor/ Limiter/De-Esser

There are lots of production limiters out there. Old favorites. Pretenders to the throne. The competition is fierce. So, when Orban set out to design a new production limiter, we knew it had better be superior.

The result of our research is the "Studio Optimod"—a Gated Compressor/Limiter/De-Esser with versatile controls, simple set-up, and a natural, transparent sound that must be heard to be appreciated.

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A bonus is a smooth, natural de-esser. It's independent of the compressor/limiter section so you can simultaneously compress and de-ess vocal material without compromise. You can even de-ess sibilant vocals which have been mixed with other program.

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Telex: 17-1480

## Product directory

ESE (2305)  
Electro (2104)  
For-A (2210)  
Glentronix (2008)  
Jatex (2505)  
QSI Systems (1502)  
Shintron Company (1603)  
Sony (3200)  
Sound Genesis (2026)  
United Media (2504)

### GENERATORS (VIDEO SPECIAL EFFECTS)

Ampex (3002)

Beaveronics (2306)  
Camera Mart (2010)  
Comex (2829)  
Crosspoint Latch (2408)  
Echolab (2932)  
Grass Valley Group (3010)  
Ikegami (3209)  
Image Video Ltd. (2600)  
Industrial Sciences (1600)  
Interand (1807)  
NEC America (2528)  
Shintron Company (1603)  
Television Engineering (2114)  
VGR Corporation (2738)  
Video Associates Labs (1917)  
Vital Industries (3018)

### GENERATORS (VIDEO, SYNC, BURST, PATTERN)

AF Associates (3320)  
Asaca/Shibasoku (3308)  
Broadcast Systems (2803)  
CMC Technology (1802)  
Camera Mart (2010)  
Central Dynamics (3208)  
Comex (2829)  
Crosspoint Latch (2408)  
Digital Video Systems (1904)  
Fernseh (3323)  
For-A (2210)  
Grass Valley Group (3010)  
Industrial Sciences (1600)  
Jatex (2505)  
Lang Video Systems  
Leader Instruments (2629)  
Leitch Video of America (2004)  
Lenco (3214)  
MZB & Associates  
Marconi Electronics (3320)  
Philips Test and Measuring (3215)  
QSI Systems (1502)  
Shintron Company (1603)  
Sigma Electronics (2614)  
Tektronix (3005)  
Telemet (3007)  
Television Engineering (2114)

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Mississauga, Ontario L5L 1x1

### HEAD ALIGNMENT & SPINDLE HEIGHT

Broadcast Electronics (3104)  
Comex (2829)  
Fidelipac (3132)  
Merlin Engineering Works (1706)  
Nortronics (3108)  
Telex Communications (3130)  
Tentel (1605)  
United Labs Research (3128)

### HEADS & REFURBISHING SERVICES, AUDIO

Ampex (3002)  
Accurate Sound (1610)  
Broadcast Electronics (3104)  
Glentronix (2008)  
Nortronics (3108)  
Saki Magnetics (1722)  
Sound Genesis (2026)

### HEADS & REFURBISHING SERVICES, VIDEO

Ampex (3002)  
CMC Technology (1802)  
Glentronix (2008)  
Saki Magnetics (1722)  
United Labs Research (3128)  
Videomagnetics (2320)

### HEADPHONES

AKG Acoustics (2629A)  
Beyer Dynamic (2915)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
CeCo Communications (1804)  
Clear-Com Intercoms (2807)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
FitzCo Sound (2540)  
Glentronix (2008)  
MZB & Associates

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## Product directory

R-Columbia Products (2612)  
Sennheiser Electronic (2101)  
Sound Genesis (2026)  
Stanton (3125)  
Studer Revox (3123)  
Swintek Enterprises (1702)  
Systems Wireless  
TV Equipment Associates (3324)  
Tascam Production Products (2734)  
Telex Communications (3130)

### HELICOPTERS, SALES & RENTAL

Hughes Helicopters (2611)

### INTERCOMS

Broadcast Electronics (3104)  
Broadcast Technology (2115)  
Camera Mart (2010)  
Cetec Vega (3129)  
Clear-Com Intercoms (2807)  
Clyde Electronics (2417)  
Comex (2829)  
Crosspoint Latch (2408)  
Datatronix (1927)  
Farrtronics Ltd. (2517)  
FitzCo Sound (2540)  
HM Electronics (2402)  
MZB & Associates  
McCurdy Radio (3106)  
R-Columbia Products (2612)  
RTS Systems (1604)

Sound Genesis (2026)  
Swintek Enterprises (1702)  
Systems Wireless  
TV Equipment Associates (3324)  
Telex Communications (3130)  
Ward Beck Systems (3301)

### LIGHTING CONTROLS & ACCESSORIES

Walter S. Brewer  
Camera Mart (2010)  
Colortran (3317)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Dynamic Technology (2912)  
Electro Controls (1915)  
Fidelipac (3132)  
Great American Market, The (2103)  
Kliegl Brothers (3014)  
LTM (2721)  
Lowel-Light Mfg. (2302)  
Matthews Studio Equipment (2626)  
Phoebus (1713)  
Skirpan Lighting Systems (1604)  
Strand Century (3328)  
Tech Theatre  
Theatre Service and Supply (1800)  
Utility Tower Company (3105)  
Wilkinson Electronics (3117)

### LIGHTS, PORTABLE & STUDIO

Allied Broadcast Equipment (2920)  
Anton/Bauer (1802A)  
Arriflex (2109)

Walter S. Brewer  
Belden Communications (2737)  
Camera Mart (2010)  
Cinema Products (3144)  
Cine 60 (1704)  
Colortran (3317)  
Comex (2829)  
Cool Light Company (2201)  
Electro Controls (1915)  
Fidelipac (3132)  
Frezzolini Electronics (1817)  
Great American Market, The (2103)  
Kliegl Brothers (3014)  
LTM (2721)  
Lowel-Light Mfg. (2302)  
Phoebus (1713)  
Strand Century (3328)  
Theatre Service and Supply (1800)

### MUSIC LIBRARIES & SOUND EFFECTS

Century 21 Programming (1503)  
Columbine Systems (2716)  
Comex (2829)  
Network (2412)  
Valentino Music Library (1716)

### METERS (ALL TYPES)

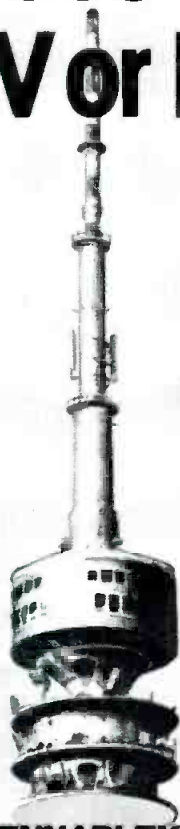
AEG-Telefunken (2536)  
Bird Electronics (3204A)  
Camera Mart (2010)  
Datatronix (1927)  
Dorrough Electronics (2112)  
Fidelipac (3132)

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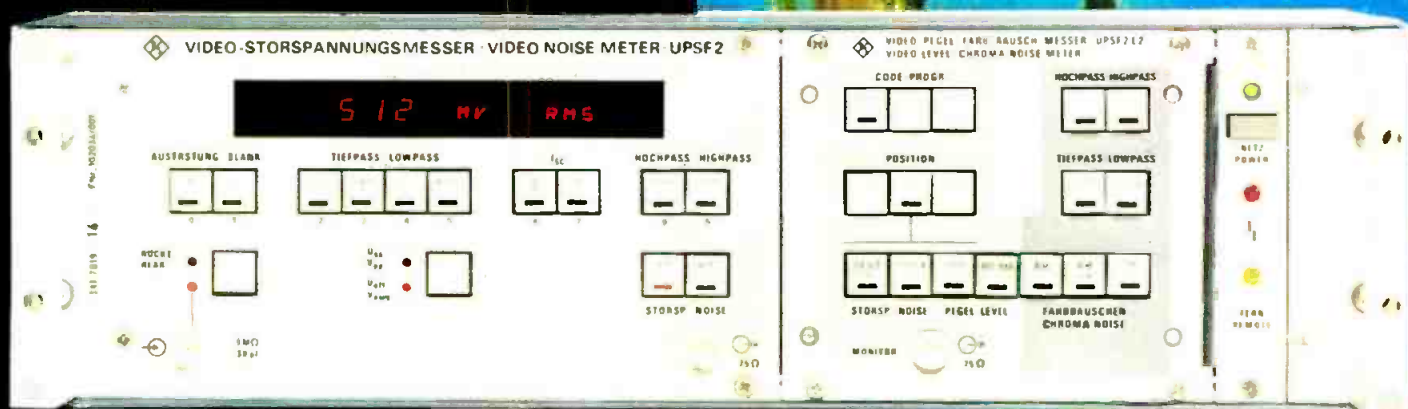
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- **DUAL-STANDARD:** P automatically determines standard (525/625 lines), identifies it on the display, and performs the appropriate measurement.

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## Product directory

LTM (2721)  
Leader Instruments (2629)  
Sound Genesis (2026)  
United Labs Research (3128)

### MICROPHONES AND ACCESSORIES

AKG Acoustics (2629A)  
Accurate Sound (1610)  
Beyer Dynamic (2915)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
CeCo Communications (1804)

Cetec Vega (3129)  
Cinema Products (3144)  
Comex (2829)  
Comrex (1613)  
Continental Electronics Mfg. (3134)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Alan Gordon  
Gotham Audio (2919)  
HM Electronics (2402)  
Karl Heitz (2515)  
Marti (3109)  
Keith Monks (2833)  
Nady Systems (2711)  
Panasonic, Video (3217)

Sennheiser Electronics (2101)  
Sescom (1700)  
Shure Brothers (3110)  
Sound Genesis (2026)  
Studer Revox (3123)  
Swintek Enterprises (1702)  
Systems Wireless  
TV Equipment Associates (3324)  
Tascam Production Products (2734)  
Telex Communications (3130)

### MICROWAVE SYSTEMS

Cablewave Systems (3206)  
Comex (2829)  
Comsearch (2416)  
Continental Electronics Mfg. (3134)  
Harris/Farion Video (3101)  
Ikegami (3209)  
M/A-Com (3303)  
Micro Communications (3312)  
Microdyne (2618)  
Microwave Power Devices  
Moseley Associates (3103)  
Nurad (1607)  
RF Technology (2720)  
TFT (2838)  
Varian Associates/Microwave (3119)  
Wilkinson Electronics (3117)

### MONITORS, AUDIO

Arrakis Systems (1824)  
BGW Systems (2841)  
Broadcast Audio (1920A)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
Comex (2829)  
Comrex (1613)  
Continental Electronics Mfg. (3134)  
Datatronix (1927)  
Di-Tech (2203)  
FitzCo Sound (2540)  
Image Video Ltd. (2600)  
JBL (2013)  
Logitek (2015)  
Marti (3109)  
McCurdy Radio (3106)  
McMartin Industries (3102)  
Merlin Engineering (1706)  
Micro-Trak (3115)  
QEI (1919)  
Sound Genesis (2026)  
Studer Revox (3123)  
TFT (2838)  
Telemet (3007)  
UMC (1814)  
Videotek (2208)

### MONITORS, VIDEO

Broadcast Systems (2803)  
Camera Mart (2010)  
Comex (2829)  
Conrac (3009)  
Delcom (2710)  
Elector (2104)  
Fernseh (3323)  
Hitachi Denshi (3202)  
Ikegami (3209)  
Image Video Ltd. (2600)  
JVC (1707)  
Lenco (3214)  
MZZ & Associates  
Panasonic, Video (3217)

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Circle (51) on Reply Card



# Introducing the New CHYRON® IV.

## The New CHYRON Adds True Graphic Capabilities To The World's Leading Character Generator.

The latest Chyron is the system that the broadcast industry has been waiting for. You have known the Chyron IV as a powerful character generator that's easy to use.

Now, utilizing advanced computer graphics, it has become a flexible graphics tool, as well. The result: a truly versatile graphics generator that provides virtually all of the electronic functions you need. And, it's still easy to use!

### More Artistic Freedom

CHYRON IV's digitizing tablet provides full flexibility for the artist to draw, change select colors and fill. He has,

in effect, a true electronic paint system. *Background graphics* can be created and displayed or stored for later use. In addition to the digitizing tablet, graphic information can be entered with a black and white camera in the font compose mode.

This new background graphics capability gets the artist away from plain text into the generation of "pictures": graphic images, representa-

tions, vignettes with as many as 16 colors or gray scale values, etc.

*Multicolor characters* are available, too. Full color or halftone artwork is digitized and displayed with up to seven different color values per character. The display can be changed from *gray scale values* to *pseudo-color* for ease of trim and area identification. This means that multicolor logos or other artwork can be displayed and treated as a single character to take advantage of all the CHYRON IV animation and character manipulation features.

### New Board is the Key

A state-of-the-art multimode graphics module is the heart of the new capabilities. It replaces the existing font compose module and operates in several differing modes.

In its basic operation, the new module provides an advanced means of camera font compose. A built in A/D converter samples incoming camera video at 10 times sub-carrier and digitizes each sample with four-bit accuracy (thus, the 16-level gray scale). Software then analyzes the data to produce extremely smooth curves and slopes for virtually perfect capture and the elimination of trimming in many cases.

### Many Other Features

Other CHYRON IV features provide even more flexibility. Up to four "vignettes" may be created and independently positioned or animated. Text can be moved out of the safe title area, the color palette has been expanded to 512 choices, character edging can be any color and diagonal typing has been provided. The roll and crawl modes have been improved to allow smooth motion through horizontal and vertical blanking. And there's more. Call or write for all the details.

# The CHYRON® COURIER

An Occasional Newsletter  
Dedicated to the Latest  
Chyron Developments.

Vol. I, No. 1

## Earlier CHYRON IV's Can Be Retrofitted for New Features

The new CHYRON still carries the model number IV. It will not obsolete the many earlier CHYRON IV's still serving nobly out in the field.

Your current CHYRON IV can be retrofitted to provide all of the newly-developed features. Return your IV to the factory, and we will replace the unit's present font compose module with the new multimode graphics module and add the necessary systems modifications to accept the new features. It will convert your old CHYRON IV into a true graphics generator, with all of the many advantages of the new model.

Updated training sessions will be available, too. Classes for operators may be scheduled at Chyron headquarters in Melville, N.Y. or at your place of business.

For details on the retrofitting of your earlier CHYRON IV and on the latest operator training, call or write today.



## Highlights of the New System

In brief review, these are the main features of the new CHYRON IV.

- Background graphics plane
- Advanced font compose with 16 levels of gray scale
- Multicolor characters (7 colors each)
- Digitizing Tablet
- Winchester disc
- 512 color choices
- Four-level animation plane
- Blanking-to-blanking display capability
- Colored edge
- Fader provides 256 levels, with gamma correction (pre-programmable)
- Diagonal typing
- Software-based for future enhancements.

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Amplex International is exclusive distributor for  
Chyron Graphics Systems outside the U.S.A.

Circle (52) on Reply Card



# THE \$250,000 CART MACHINE.

by Ray M. Kohfeld, President, Ramko Research

## ***PhaseMaster, The industry's most advanced broadcast reproduction system.***

From the beginning of the PhaseMaster cart machine project more than two years ago, we were convinced there was an electronic solution to the problem of stereo phase stability. Consistent stereo reproduction and machine-to-machine compatability could be solved. We believed that for many crucial system parameters, performance could be achieved in a cart system that would meet or exceed the best reel-to-reel machines.

What we didn't realize however, is that the development of the "ultimate" cart machine would cost over a quarter of a million dollars and take thousands of man-hours to accomplish. We finally achieved what we were after—no, what you were after—but not without some very trying times.

### **Early on, the goals were clear.**

By employing leading-edge technology throughout each area of the tape system, we felt that the PhaseMaster could out-perform everything in the audio chain. Right on through the transmitter. The signal-to-noise, distortion and wow and flutter performance criteria had to rival reel-to-reel specs while retaining all the conveniences and benefits of the standard plastic tape cart. The major problems of tape skew and guidance had to be overcome in order to deliver a system which would, once and for all, take care of phase problems. This problem was judged by us to be absolutely critical for proper and consistent stereo reproduction. FM now, and AM just around the corner.

The final goal we set for ourselves was to design a cart system that offered automatic machine-to-machine compatability—an important benefit that to our knowledge no other reel-to-reel, cartridge machine or add-on processing

system offers. We believe that it is a significant factor for the broadcaster to be able to pickup anyone's cart at random, record it on any PhaseMaster and then play it back on any PhaseMaster: the program material being precisely locked in-phase. Whatever the phasing of the original source, the signals will be automatically and faithfully reproduced. Ultimately, tape skew, chatter or even head misalignments would no longer be a problem.

Side-to-side stereo shift; holes in the mono mix or worse yet, reception: audio modulation due to tape chatter from the cart: major problems that we've lived with for years. You waste valuable time trying to get around it, cart manufacturers would like you to believe that it's solved in their carts, programming and management don't want to hear about it, and your audiences reach for the dial when your station doesn't sound good because of it.

To have introduced another cart ma-



chine that didn't solve all these persistent problems would have been negligent. To say the least, another mouse-trap. As we've stated, the goals were clear from the onset, but not the solution(s).

**Our attempts at phase correction: shortcuts aren't our way of doing things.**

When we first looked at the problem, there existed only one other means of phase correction. This is an electro-mechanical approach which adjusts head alignment for each cart prior to the initial recording. Although this is certainly an improvement over what had existed (nothing), we felt it had many shortcomings. It can't correct phasing in real-time, the compatibility factor is not high enough, it's overly complex—subject to breakdowns, and it adds valuable, additional time to a producer's already busy schedule of production.

**What about stereo matrix?**

Another approach which initially offered some technical promise at the outset was stereo matrixing. We went down this road early and discovered that a matrix system not only added unwanted electronic noise (something we were taking great pains to get rid-of) but it did very little to accomplish our goal of machine-to-machine compatibility. These fundamental drawbacks are inherent in this design approach and we eventually discarded it after many attempts to make it do things it just couldn't do.

**Cross-correlation and signal injection: not the answers either.**

After discarding the stereo matrix approach, we researched the viability of mixing timing signals onto the Left and Right audio tracks. This was closer to what we had in mind but detracted from the end result in that the audio had to be reprocessed which naturally degraded the high quality audio we were aiming for.

The third technique investigated was a cross correlation scheme that is essentially a form of probability theory with user adjustments. This also was eventually dismissed because of its inability to second-guess many complex waveforms and the necessity to readjust for various types of program material.

Although all of these approaches have some merit and have since shown up in the marketplace, the individual shortcomings were too much of a compromise of the promises to ourselves that we could do it better. Much better.

**The answer! Perfect phase correction via the Q-track.**

The elegantly simple and totally unique answer to the phase-stability problem came because of persistence and, at times, downright obstinance to not accept anything less than what we set out to achieve: picture perfect phase accuracy and stability—an ultimate, real-time correcting solution to the biggest problem the cart system serves up to every broadcaster.

The phasing (or more accurately, time base) correction system in the new PhaseMaster cart machines takes a sample of the upper (Left) audio channel, encodes it and then records it on the cue track without interference to any other information. Upon playback, the encoded signal is reconstructed and compared to its mate on the upper track so that we now have two identical signals to compare with each other. This has been the key. We are now able to compare apples to apples. Dissimilar information normally found in Left and Right audio is no longer a limiting factor. After these two identical signals are compared by a clever signature-determining circuit, a control signal is developed. Any time-base differences between these signals are applied via control signals to timing circuitry in both the Left and Right audio for correction. The result? Phase correction in real-time...measured in microseconds. The heads, the tape or both can be severely out-of-whack and the PhaseMaster's phase compensating electronics don't care. The audio can be complex, sinusoidal or recorded only on one track.

You can record your program material on any PhaseMaster Record/Play machine and rest assured that it will reproduce exactly like the original source no matter it be across the hall or across the world.

Control instrumentation technology helped us find the solution and we're now preparing for patent application.

**Compatibility with your present system.**

The new PhaseMaster also offers you compatibility with all your present, previously recorded carts. An easy transition can be made at your own pace without having to rerecord your station's entire library. To state it simply, PhaseMaster now gives you a professional R/P system without the drawbacks you've grown accustomed to.

**Last, but not least, the best mechanical design you've ever seen.**

The deck is a  $\frac{5}{8}$ " casting for stability, with a stainless steel cover plate for

wear-resistance and EMI shielding. A crystal-controlled D.C. servo motor insures timing accuracy to within  $\pm 0.05\%$  and, practically no heat generation. The speeds are field selectable:  $3\frac{3}{4}$ ,  $7\frac{1}{2}$ , and 15 ips.

Your carts are securely held in position by the edges to prevent distortion, using spring-loaded rollers. Insertion and withdrawal is smooth and positive-feeling. The machined head stack is rock stable, and we've included internal illumination for periodic inspections and maintenance. There are no microswitches to break or jam—and never any start-up wow because the motor is started by an optical sensor as you begin to insert the cart. To keep damaging heat away from the tape, the capstan is ceramic. And bearings have a longer life because the motor doesn't need to run continuously due to the cart sensing design and the ability of the motor to reach full speed by the time the cart is fully inserted. The pinch roller is engaged by an adjustable air-damped solenoid with a teflon coated plunger for friction-free, quiet operation.

On the PhaseMaster R/P machine you get front panel switch selectable inputs; integral diagnostics for faster, easier maintenance; three cue tones are standard. An automatic  $4\frac{1}{2}$  digit timer is standard. Left/Right audio plus phase analysis solid-state meters, motor "out-of-speed" and "already played" indicators are standard, too.

**With the kind of performance we didn't compromise.**

We've set new standards for wow and flutter: .04%-.07%. The amplifier's signal-to-noise is -65dB utilizing dynamic noise reduction without companding or expansion. Frequency Response is  $\pm 1.0$ dB. And, of course, there's balanced I/O's and a +25dBm output capability.

**It's been worth the wait.**

We call it the \$250,000.00 cart machine. That's what we invested on our bottom line to engineer a system that you can have for less than \$1,400.00\*.

Call us collect at (916) 635-3600 or contact your Ramko sales rep for more information and a schedule of when you can have a free, two week trial of PhaseMaster—the industry's most advanced broadcast reproduction system.

\*PhaseMaster playback machine. Prices subject to change without notice.

**Engineered For Your Bottom Line.**



See us at NAB, booth 1909.

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

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## Product directory

Philips Test & Measuring (3215)  
Rohde & Schwarz (3213)  
Shintron (1603)  
Sony (3200)  
Tektronix (3005)  
Television Engineering (2114)

### MONITORS, TEST EQUIPMENT/ METERS

Amber Electro Design (2016)  
Asaca/Shibasoku (3308)  
Bird Electronics (3204A)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
Continental Electronics Mfg. (3134)  
Delta Electronics (3112)  
Fidelipac (3132)  
Gorman Redlich (2307)  
HEDCO (2214)  
Leader Instruments (2629)  
Leitch Video of America (2004)  
MVB & Associates  
McMartin Industries (3102)  
Power-Optics (3113)  
QEI (1919)  
Real World Technologies (2621)  
Videotek (2208)

### NOISE REDUCTION SYSTEMS

Audio + Design (1514)  
Composite Video

Continental Electronics Mfg. (3134)  
dbx (2113)  
Dolby (2405)  
Faroudja Laboratories (2814)  
Fernseh (3323)  
Gotham Audio (2919)  
Inovonics (1610A)  
MICMIX Audio Products (3142)  
Microtime (3322)  
Philips Broadcast (3208)  
Sescom (1700)  
Sony (3200)  
Sound Genesis (2026)  
Straight Wire Audio (1724)  
Thomson-CSF (3201)

### PATCH PANELS, JACKS & PLUGS

ADC Products (1923)  
ADM Technology (1714)  
AF Associates (3320)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Comark Communications (1709)  
Comex (2829)  
Datatronix (1927)  
Dielectric Communications  
Electro Controls (1915)  
Farrtronics (2517)  
Glentronix (2008)  
Image Video Ltd. (2600)  
Lemo USA (2717)  
MVB & Associates  
McCurdy Radio (3106)  
Shively Labs (1718)

Sound Genesis (2026)  
Television Engineering (2114)  
Trompeter Electronics (3310)  
Tweed Audio (2303A)

### POWER SUPPLIES

Anton Bauer (1802A)  
Broadcast Technology (2115)  
Camera Mart (2010)  
Christie Electric (1623)  
Cinema Products (3144)  
Cine 60 (1704)  
Datatronix (1927)  
Frezolini Electronics (1817)  
McCurdy Radio (3106)  
Philips Test & Measuring (3215)  
Sound Genesis (2026)  
Tweed Audio USA (2303A)  
Varian Associates/Microwave (3119)

### PROCESSING EQUIPMENT

American Data (3208)  
Audio + Design (1514)  
Camera Mart (2010)  
Central Dynamics (3208)  
Comex (2829)  
Composite Video  
Continental Electronics Mfg. (3134)  
dbx (2113)  
Dorrough Electronics (2112)  
Elcom-Bauer (1908)  
Eventide Clockworks (2934)  
FitzCo (2540)  
Gregg Laboratories

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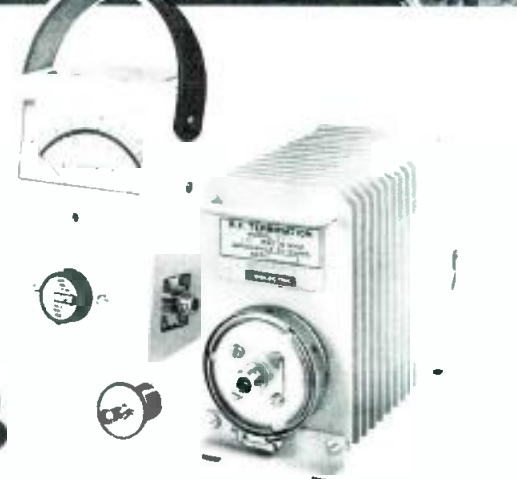
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## Product directory

Harris Broadcast (3101)  
 Howe Audio (2744)  
 Inovonics (1610A)  
 Kahn Communications (2028)  
 Klark-Teknik (1818)  
 Leitch Video of America (2004)  
 Lenco (3214)  
 McCurdy Radio (3106)  
 McMartin Industries (3102)  
 Marcom  
 Microtime (3322)  
 Moseley Associates (3103)  
 NEC America (2528)  
 Orban (1812)  
 Sigma Electronics (2614)  
 Sony (3200)  
 Sound Genesis (2026)  
 Thomson-CSF (3201)  
 UREI (2530)  
 United Media (2504)

### PROGRAM SERVICES

BPI-Broadcast Programming Int'l  
 (1512)  
 Century 21 Programming (1503)  
 Concept Productions (2107)  
 Drake Chenault (1516)  
 Kalamusic  
 Network (2412)  
 Solid State Logic (2308A)  
 Valentino Music Library (1716)

## PROJECTORS, TV LARGE SCREEN

Camera Mart (2010)  
 Elector (2104)

### PROJECTORS, TELECINE & ACCESSORIES

Camera Mart (2010)  
 Comex (2829)  
 Alan Gordon  
 Great American Market, The (2103)  
 Ikegami (3209)  
 Laird Telemedia (1808)  
 RCA (3000)

### PROMOTIONAL MATERIALS & SERVICES

American Image Productions  
 Century 21 Programming (1503)  
 IGM Communications (3122)  
 US Tape & Label (1506)

### PROMPTING SYSTEMS

BEI (Beston Electronics) (3207)  
 Camera Mart (2010)  
 Cinema Products (3144)  
 Comex (2829)  
 Listec Television (3325)  
 Q-TV (3011)  
 Telescript (3015)

### RECEIVERS (ALL TYPES)

Artel Communications (2624)  
 Camera Mart (2010)  
 Comrex (1613)

Delta Electronics (3112)  
 Gorman Redlich (2307)  
 Harris/Farinon Video (3101)  
 Marti (3109)  
 McMartin Industries (3102)  
 Microdyne (2618)  
 Moseley Associates (3103)  
 Nurad (1607)  
 QSI Systems (1502)  
 RF Technology (2720)  
 Studer Revox (3123)  
 Telemet (3007)  
 Tektronix (3005)

### RECORD CARE PRODUCTS

Allsop (2718)  
 Broadcast Electronics (3104)  
 Keith Monks Audio (2833)  
 Stanton (3125)

### RECORDER/CAMERA COMBINED SYSTEMS

Camera Mart (2010)  
 Ikegami (3209)  
 RCA (3000)  
 Sony (3200)

### RECORDER CARE PRODUCTS

Allsop (2718)  
 Asaca/Shibasoku (3308)  
 Broadcast Electronics (3104)  
 Fidelipac (3132)  
 FitzCo Sound (2540)  
 Nortronics (3108)

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Barco's broadcast color monitors put your image on the line—clearly.

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# BARCO

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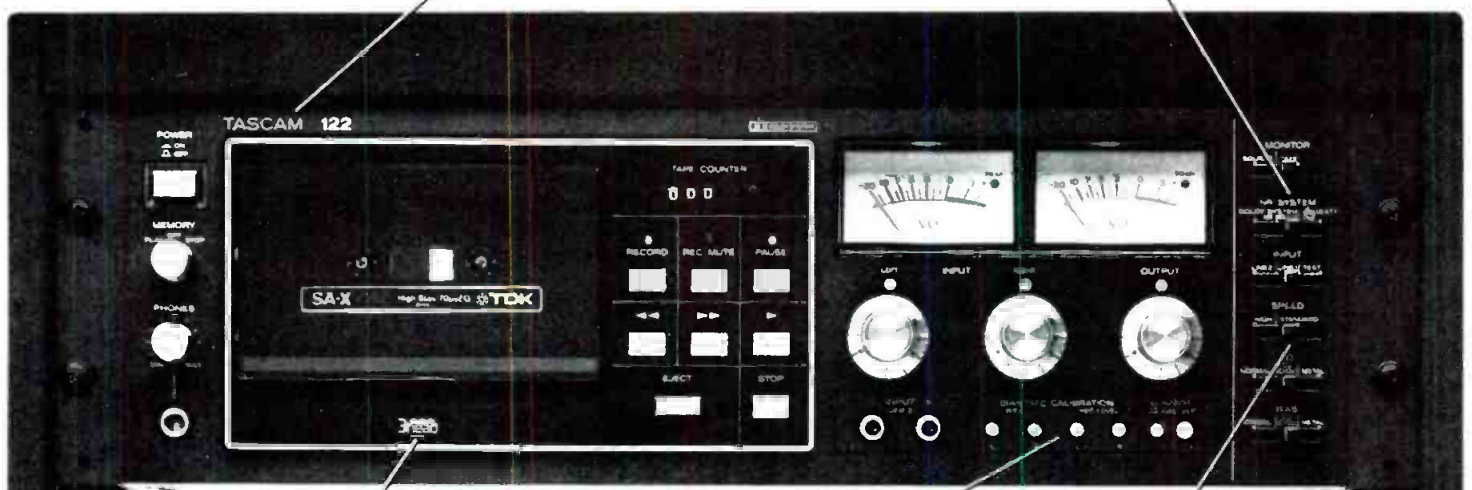
## THE TASCAM 122 STUDIO CASSETTE RECORDER.

**Tascam.** Now we've designed a cassette recorder for the studio. One that has everything you need to reproduce your studio sound faithfully.

Performance plus a combination of features makes the 122 a tool of the trade, not a plaything.

### Dolby Headroom Extension.

Gives you up to 10dB more headroom over 10 kHz. Cassette dubs end up hotter, fuller, cleaner when played back on any standard Dolby\* B deck.



### Three-head System.

Separate record and reproduce heads are mounted in a single housing, eliminating azimuth error.

### Front Panel Trimmers.

The kind of fine-tuning you're used to having on studio machines. Notice the parallel line inputs in place of hi fi microphone inputs.

**Plus Options.** Like full transport remote control and dbx.\* Check out the 122's qualifications at your Tascam dealer. When you want the best you can get, it pays to use a professional.

### Two-speed Transport.

You get 1 $\frac{7}{8}$  ips plus 3 $\frac{3}{4}$  ips, a two-position pinch roller for cueing in the pause mode and a capstan motor that doesn't idle needlessly in the stop mode, for long-term reliability.

SEE THE FUTURE  
AND MORE — BOOTH 2734

**TASCAM**  
TEAC Production Products

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\*Dolby and dbx are registered trademarks.

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## Product directory

Sound Genesis (2026)  
Studer Revox (3123)  
United Labs Research (3128)

### RECORDERS (AUDIO, CARTRIDGE)

Ampro/Scully (3307)  
Audi-Cord (1510)  
AudioTechniques  
Broadcast Electronics (3104)  
Century 21 Programming (1503)  
Comex (2829)  
Continental Electronics Mfg. (3134)

FitzCo Sound (2540)  
Alan Gordon  
International Tapetronics (3145)  
MZB & Associates  
Pacific Recorders & Engr. (1608)  
Ramko Research (1909)  
Sono-Mag (3107)  
Sound Genesis (2026)  
Telex Communications (3130)  
UMC (1814)

### RECORDERS (DIGITAL AUDIO)

Gotham Audio (2919)  
Panasonic Company (3217)  
Sound Genesis (2026)

### RECORDERS (AUDIO, REEL AND CASSETTE)

Accurate Sound (1610)  
Ampex (3002)  
Ampro/Scully (3307)  
Camera Mart (2010)  
Century 21 Programming (1503)  
Comex (2829)  
Alan Gordon  
Inovonics (1610A)  
International Tapetronics (3145)  
MCI (1615)  
Nagra (3146)  
Otari (1611)  
Panasonic Company (3217)  
Ramko Research (1909)  
Sound Genesis (2026)  
Soundcraft Electronics (2003)  
Soundcraft USA (2003)  
Studer Revox (3123)  
Telex Communications (3130)  
Tascam Production Products (2734)  
United Labs Research (3128)

### RECORDERS (VIDEODISC, SLOW MOTION REPLAY)

Echo Sciences (3319)  
Eigen Video (1902A)

### RECORDERS (1-INCH VTRS, QUAD, VIDEOCASSETTE)

AF Associates (3320)  
Ampex (3002)  
Camera Mart (2010)  
Compact Video Technology (1604)  
Delcom (2710)  
Fernseh (3323)  
Alan Gordon  
Hitachi Denshi (3202)  
Ikegami (3209)  
MZB & Associates  
Magna-Tech Electronics  
Marconi Electronics (3320)  
Merlin Engineering Works (1706)  
NEC America (2528)  
Panasonic, Video (3217)  
RCA (3000)  
Sony (3200)  
3M (3006)

### REMOTE CONTROL SYSTEMS, LINKS, STLs

AEG Telefunken (2536)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Comark Communications (1709)  
Comex Corporation (2829)  
Continental Electronics Mfg. (3134)  
Delta Electronics (3112)  
Hallikainen & Friends (1618)  
Harris Broadcast (3101)  
M/A-Com (3303)  
Marti (3109)  
Micro Control Associates (1813)  
Moseley Associates (3103)  
Nurad (1607)  
RF Technology (2720)  
Swintek (1702)  
TFT (2838)  
Townsend Associates (3311)  
Wilkinson Electronics (3117)

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Circle (58) on Reply Card



# A PRODUCTION SWITCHER

## WITH COMPUTER CONTROL AND EDITOR INTERFACES

- 12 INPUTS
- CHROMA KEYER  
(RGB OR ENCODED)
- DOWNSTREAM KEYER  
(WITH MATTE KEY)
- REMOTE CONTROL PANEL

- TWO FULLY INDEPENDENT  
MIX EFFECTS SYSTEMS
- WIPE BEHIND CHROMA KEY
- WIPE OVER CHROMA KEY
- DOUBLE RE-ENTRY FOR EACH  
MIX EFFECTS SYSTEM

### PRICES:

**6124** \$13,700

### AUTO DRIVE™

**7200** \$12,500

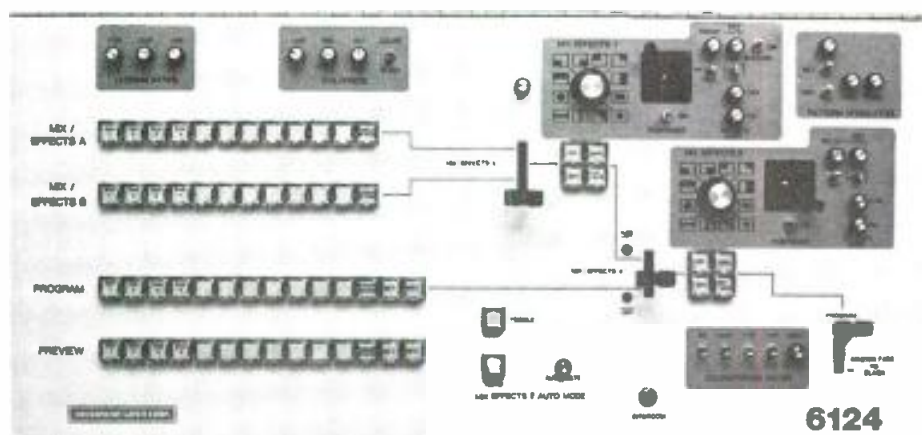
Editor interfaces  
\$3000

**6803** \$2500

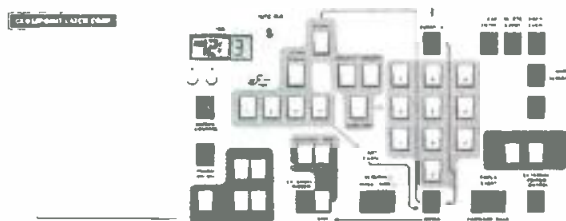
**6800** \$3500

**6124 PAL** \$14,700

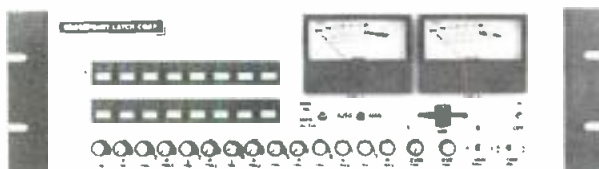
(RGB Chroma Keyer Only)



**AUTO DRIVE™ Model 7200** is a computer which is directly plug compatible with the **6124** switcher. **AUTO DRIVE™** is capable of storing the complete panel configuration of the switcher and then, under full computer control, manipulating the **6124** smoothly from one panel configuration to the next rapidly with frame accurate precision. This converts the **6124** to a very sophisticated special effects generator capable of running several stored sequences of operations, in a way that cannot possibly be achieved manually. **AUTO DRIVE™** is uniquely designed for both production and post production use. For productions, events and sequences can be stored on the preview bus and then RUN on the program bus at the touch of a button. For post-production use, interfaces are available for many editors, allowing the **6124** to be driven directly from the editor keyboard, accepting all commands such as pattern type duration times etc.



The **6803** is an audio follow switcher for the **6124**. The **6803** is slaved to ME1, following the action of the fader arm on the switcher thus producing audio dissolves. The **6803** can be controlled from the editor keyboard. The **6803** handles seven stereo audio inputs at levels between -20 and +10 dbm. The **6800** has all transformer coupled inputs and outputs. The **6800** is similar to the **6803**, with the addition of a tone oscillator and manual front panel override for the inputs.



**CROSSPOINT LATCH CORP.**

95 PROGRESS ST. • UNION, N.J. 07083 • (201) 688-1510 • Telex 181160

Circle (59) on Reply Card

March 1982 *Broadcast Engineering* 63

## Product directory

### REMOTE CONTROL SYSTEMS, VIDEO

AF Associates (3320)  
CMC Technology (1802)  
Comex (2829)  
Compact Video Technology (1604)  
Control Video (2324)  
Dynair Electronics (3135)  
Dynamic Technology (2912)  
Evershed Power Optics (3113)  
Image Video Ltd. (2600)  
Jatex (2505)  
Moseley Associates (3103)  
NEC America (2528)  
Power Optics (3113)  
TFT (2838)

### SATELLITE COMMUNICATIONS (EARTH STATION/ANTENNAS)

Andrew Corporation (3012)  
California Microwave (2105)  
Comex (2829)  
Compact Video (1604)  
Comisearch (2416)  
Leitch Video Of America (2004)  
McMartin Industries (3102)  
Microdyne Corporation (2618)  
Microwave Power Devices  
NEC America (2528)  
Oak Communications (2206)  
Satellite Transmission Systems

Varian Associates/Microwave (3119)  
Wold Communications (2729)

### SEQUENCE CONTROLLER

Broadcast Electronics (3104)  
BTX (2301)  
CMC Technology (1802)  
Compact Video Technology (1604)  
Century 21 Programming (1503)  
Moseley Associates (3103)  
Ross Video (2310)  
United Media (2504)  
Vital Industries (3018)

### SETS AND BACKDROPS

Theatre Service and Supply (1800)  
Uni-Set (2503)

### SOUND SYSTEMS

Camera Mart (2010)  
FitzCo Sound (2540)  
McMartin Industries (3102)  
Micro-Trak (3115)  
RTS Systems (1604)  
Sound Genesis (2026)

### SPEAKERS & ENCLOSURES

BGW Systems (2841)  
Broadcast Audio (1920A)  
Broadcast Electronics (3104)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Elcom-Bauer (1908)  
FitzCo Sound (2540)

McCurdy Radio (3106)  
Micro-Trak (3115)  
Panasonic Company (3217)  
Ramko Research (1909)  
Sound Genesis (2026)  
Studer Revox (3123)  
UREI (2530)

### SPEECH COMPRESSORS

ATI-Audio Technologies (2728)  
Broadcast Electronics (3104)  
Continental Electronics Mfg. (3134)  
dbx (2113)  
Datatronix (1927)  
Eventide Clockworks (2934)  
FitzCo Sound (2540)  
Gregg Laboratories  
Harris Broadcast (3101)  
Lexicon (2019)  
Marti (3109)  
McMartin Industries (3102)  
Shure Brothers (3110)  
Sound Genesis (2026)  
Wilkinson Electronics (3117)

### STANDARDS CONVERTER, VIDEO

Comex (2829)

### STL EQUIPMENT

AEG Telefunken (2536)  
Andrew (3012)  
Artel Communications (2624)  
Broadcast Electronics (3104)

# PUZZLED?

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We're the most complete systems  
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- System Design
- Turnkey Installations
- Remote Trucks

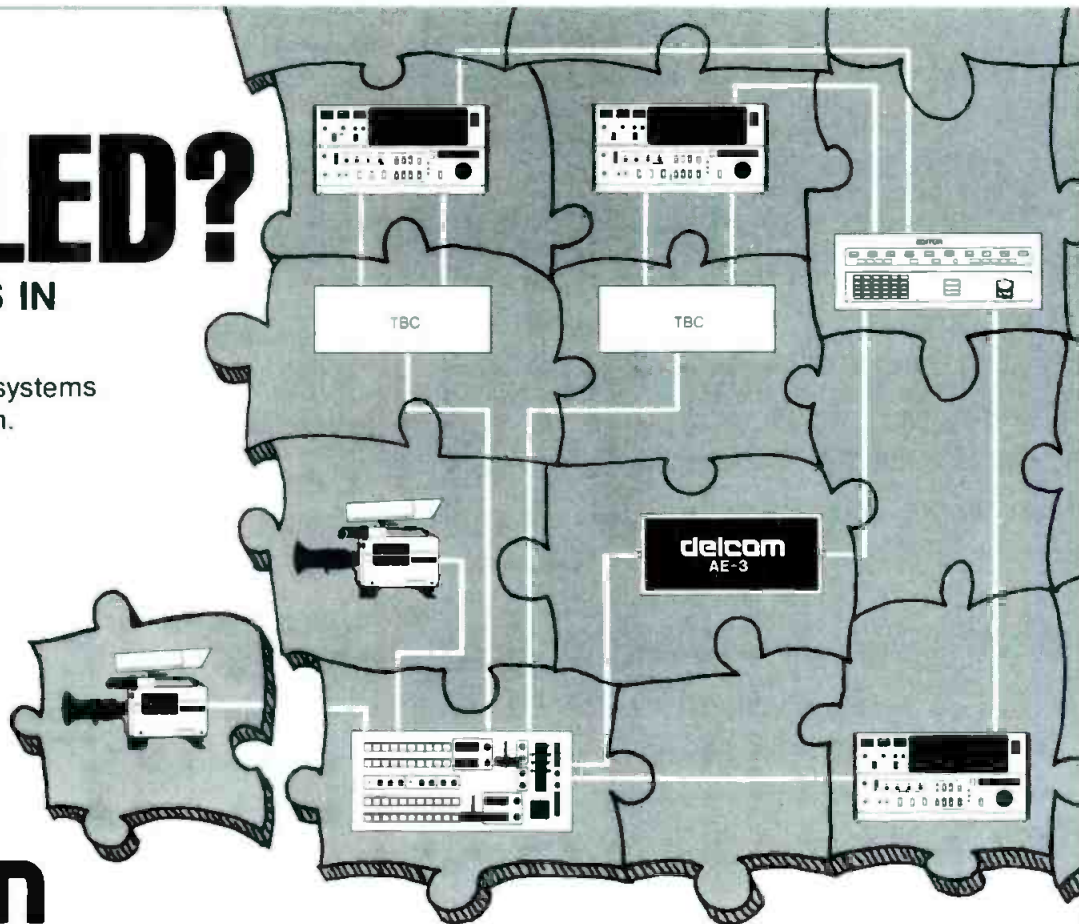
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A/B Rolls
- VO-5850D —  
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St. Louis 314-432-1164  
Oklahoma City 405-942-1339

Circle (60) on Reply Card



The cold,  
hard facts.



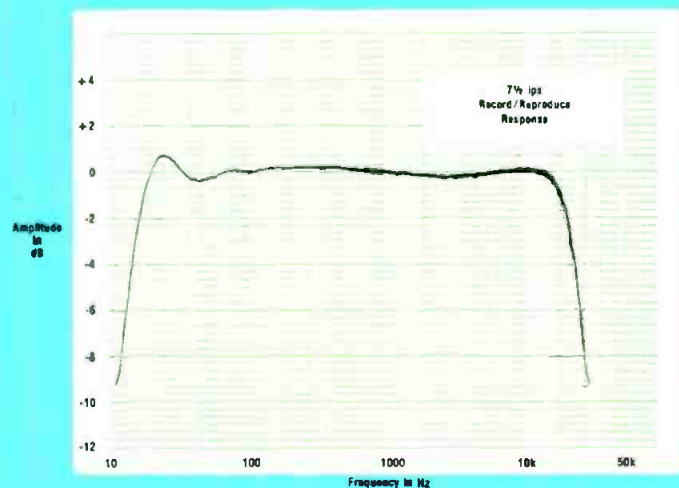
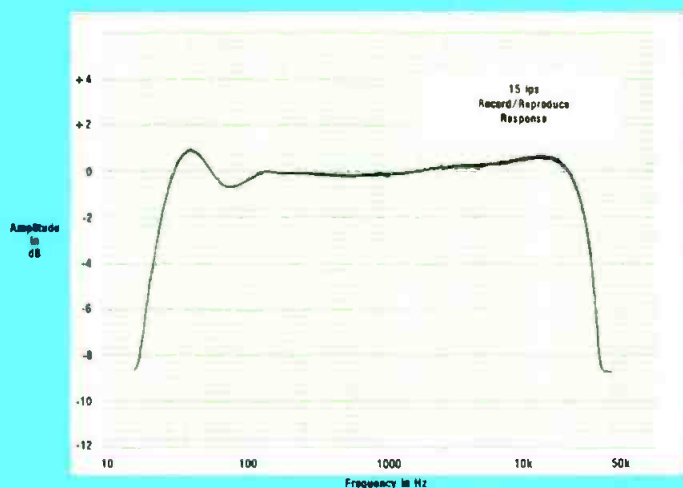
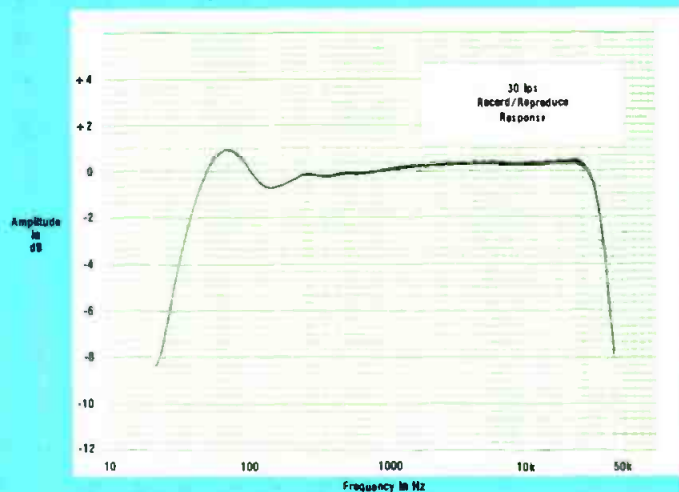
# Specifications speak for themselves

MCI invites you to compare specifications for the JH-110B against those of any other tape recorder on the market today. No pretty pictures, no bright copy, just facts. The JH-110B...unsurpassed in a field of professionals. And that is a cold, hard fact.

Unless otherwise specified, the following conditions apply to all graphs:

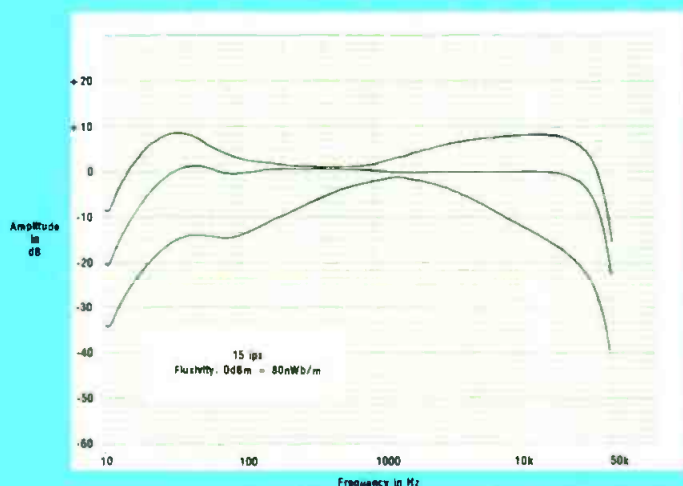
- Speed: 30 ips
  - Overbias: 1.0dB @ 10kHz
  - Fluxivity: 0dBm = 250nWb/m
- Speed: 15 ips
  - Overbias: 3.0dB @ 10kHz
  - Fluxivity: 0dBm = 250nWb/m
- Speed: 7½ ips
  - Overbias: 3.0dB @ 10kHz
  - Fluxivity: -10dBm = 80nWb/m

All tests were performed utilizing Scotch Type 226 Tape.



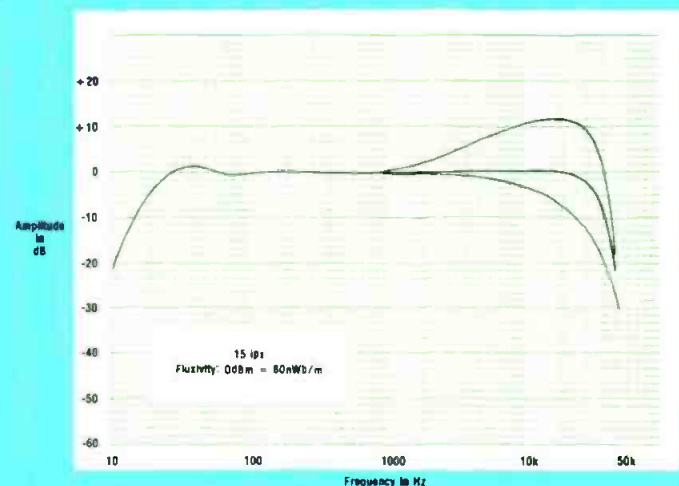
## RECORD/REPRODUCE RESPONSE

These graphs represent the frequency response of the recorder on and off tape, assuming a constant input level. They demonstrate the flat and extended response of the JH-110B Recorder.



## REPRODUCE EQ RANGE

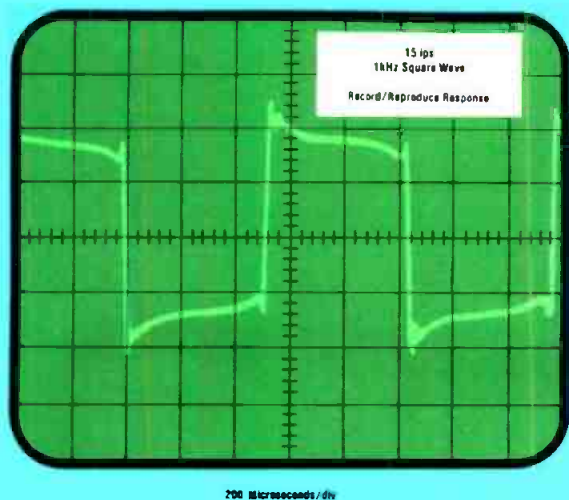
A wide range of reproduce equalization adjustment ensures that the JH-110B will conform to NAB, IEC and AES standard response curves. There is sufficient range to compensate for head wear and to align to reference tones on aged or degraded tape copies.



## RECORD EQUALIZER RANGE

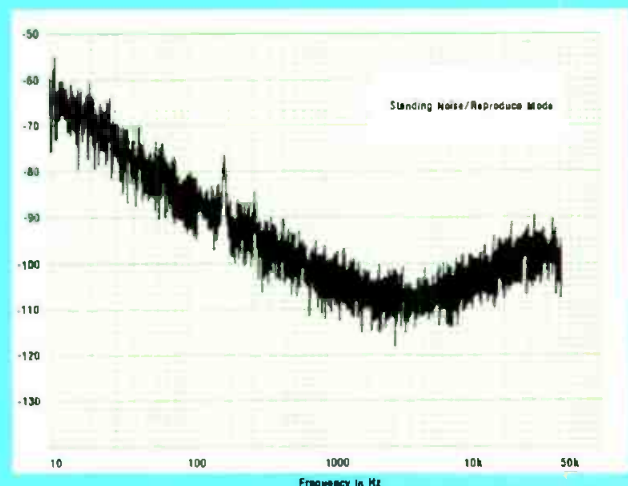
The record circuitry of a recorder is aligned to complement the reproduce response previously aligned to match standard curves. The JH-110B features a wide range of adjustment to allow alignment with any of the range of tapes available today.





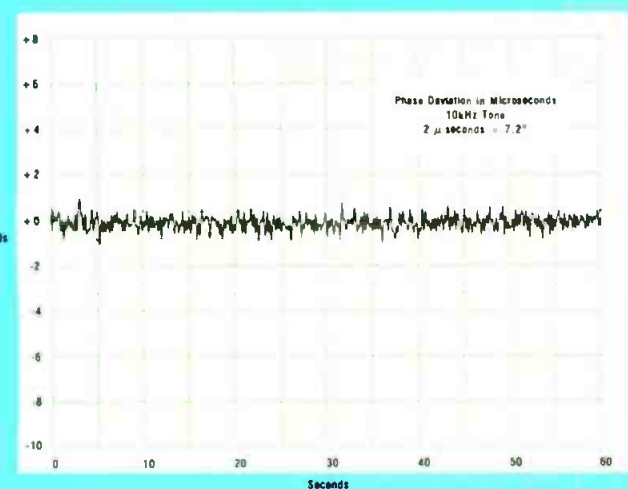
## SQUARE WAVE RESPONSE

are Wave Response demonstrates both transient response and se linearity throughout the recording process. Response such as the JH-110B produces excellent reproduction of live, dynamic erial and reduces copy to copy degradation.



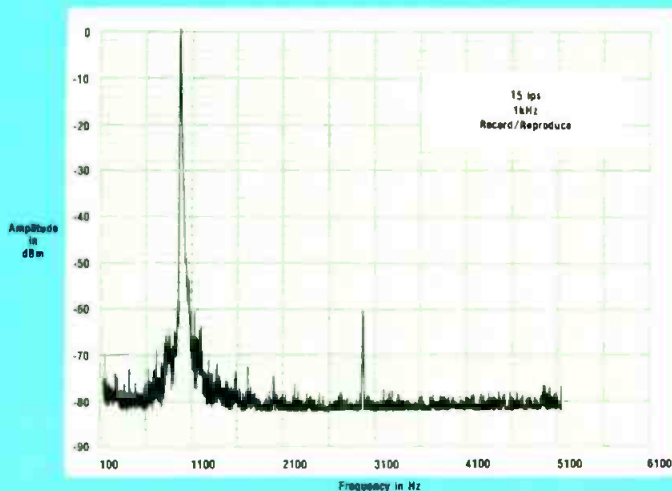
## STANDING NOISE/REPRO MODE

is an amplitude versus frequency plot of the various noise components generated internally by the electronic circuitry. Use of st technology and high specification components ensures low e figures on the JH-110B.



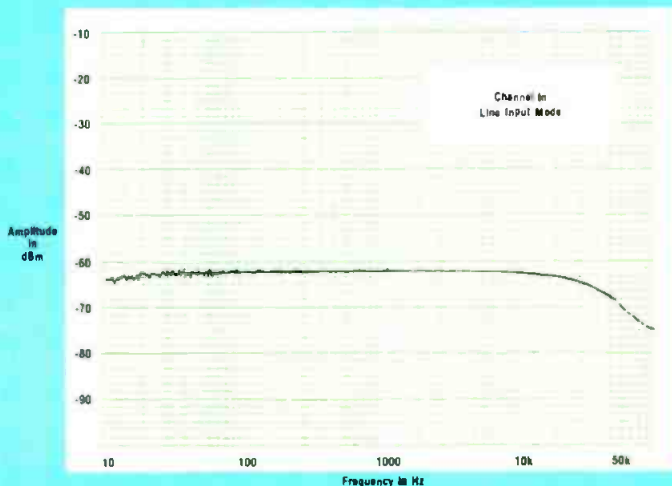
## TAPE WALK

using between tracks is very important and is a function of the chine's tape path stability. The JH-110B transport and head emby design yield a most stable tape path for maximum phase igrity.



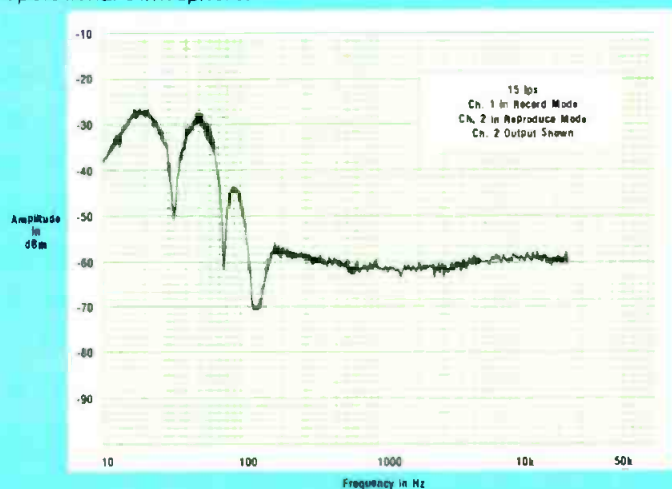
## DISTORTION/PURITY OF SIGNAL

Both flutter, or variations in tape speed caused by transport eccentricities, and distortion degrade the purity of recorded signals. Using latest technology op amp design, the JH-110B minimizes second order distortion, while maintaining a wide dynamic range and very low noise floor. This, in combination with the closed loop servo capstan drive system and standard scrape flutter filter provides purity of signal unsurpassed by any other professional recorder. Odd order harmonic distortion and modulation noise are functions of the tape used.



## COMMON MODE REJECTION RATIO

Common Mode Rejection is the ability of the electronics circuitry to reject any signal applied equally to both sides of its balanced input, signals such as RF, hum, etc. The JH-110B design ensures a high Common Mode Rejection Ratio, making it ideal for use in any operational atmosphere.



## REPRODUCE CROSSTALK

Crosstalk is the leakage from one track or channel to another, and is primarily a function of the heads. The JH-110B exhibits excellent crosstalk figures across the frequency spectrum, including minimizing of the low frequency nodes encountered in typical head design.

# JH-110B Specifications

## Frequency Response

Record/Reproduce

30 ips, AES	40 Hz - 28 kHz	+ .75/ - 2 dB
15 ips, NAB	30 Hz - 24 kHz	+ .75/ - 2 dB
7.5 ips, NAB	30 Hz - 20 kHz	+ .75/ - 1.5 dB

Record/Sync

30 ips, AES	50 Hz - 16 kHz	+ .75/ - 2 dB
15 ips, NAB	30 Hz - 10 kHz	+ .75/ - 2 dB
7.5 ips, NAB	30 Hz - 4 kHz	+ .75/ - 2 dB

## Signal-to-Noise

Record/Reproduce, reference to 510 nWb/m

Unweighted, 20 Hz - 20 kHz

	mono	2TK	4TK
30 ips, AES	70	66	66
15 ips, NAB	68	64	64
7.5 ips, NAB	67	63	63

Weighted, dB(A)

30 ips, AES	74	71	70
15 ips, NAB	70	68	68
7.5 ips, NAB	70	67	67

## Distortion

Harmonic distortion,

510 nWb/m, 1 kHz fundamental

3rd harmonic: 30 ips, AES < .35%

15 ips, NAB < .52%

7.5 ips, NAB < 1.6%

2nd harmonic: 30 ips, AES < .10%

15 ips, NAB < .10%

7.5 ips, NAB < .10%

3% 3rd harmonic: 30 ips, AES 1040 nWb/m

fluxivity 15 ips, NAB 1020 nWb/m

level 7.5 ips, NAB 1000 nWb/m

Distortion is primarily a function of tape formulation and bias setting used. All specifications are typical and may vary.

## Bias and Erase Frequency

120 kHz

## Depth of Erasure

(Ref. 250 nWb/m)

At 1 kHz better than 80 dB

## Amplifier Electronics

Input impedance 10k ohms balanced

Output impedance 120 ohms balanced

Output clipping + 24 dBm

## Transport Speeds

Fixed 7.5, 15 and 30 ips

Variable  $\pm 20\%$  around fixed speeds

## Configurations

1/4 inch Full track

1/4 inch 2 track

1/2 inch 2 track

1/2 inch 4 track

## Reel sizes

Available with NAB A (3.5 or 7 inch), NAB B (10 1/2 or 14 inch), DIN 1000m (11 1/2 inch)

## Tension

5 1/2 oz.  $\pm 1/4$  at all play speeds, beginning to end of reel

## Long term speed stability

Better than .02%

## Wow Flutter

30 ips < .022% DIN 45507 weighted

15 ips < .035% DIN 45507 weighted

7.5 ips < .055% DIN 45507 weighted

## Rewind time

2400 ft. 110 seconds

4800 ft. 170 seconds

## Start time

to 0.1% DIN 45507 flutter, 10 1/2" reels

30 ips

900 msec

15 ips

500 msec

7.5 ips

500 msec

## System Weight

Transport unmounted 34 lbs.

Electronic drawer, dual channel 19 lbs.

Variable profile cabinet (VP) 73 lbs.

High profile cabinet (HP) 115 lbs.

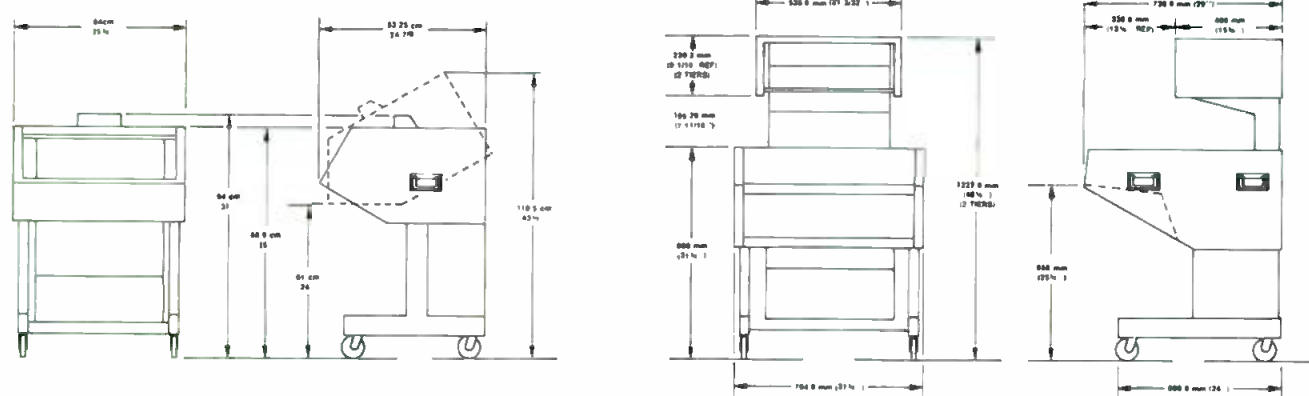
Power supply 23 lbs.



## FLEXIBILITY TO MEET YOUR NEEDS.

The JH-110B is available stock in mono, stereo, 4-track and 8-track formats for use with 1/4", 1/2" and 1" tape on reels from 5" up to 10 1/2" in diameter (14" diameter optional). Ready for mounting in the MCI variable profile (VP) cabinet with electronics under the transport or in the MCI high profile (HP) cabinet with electronics over the transport, it can also be mounted in your 19" rack or custom console.

## JH-110B Dimensional Data



1400 West Commercial Boulevard, Fort Lauderdale, Florida 33309 USA.  
Telephone: (305) 491-0825. Telex: 514362 MCI FTL.

MCI reserves the right to make changes at any time without notice in colors, equipment, specifications, prices and models.  
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MCI-81SB-5



# The first 8-days-a-week logger.



## The Dictaphone Veritrac SL.

Whether charting the hits or checking the spots, Dictaphone's new Veritrac SL voice communications recording system is practically indispensable. Here, in a package you can lease for as little as \$99 a month, is recorded testimony to what you've aired. Uninterrupted by tape changes. 24 hours a day.

What's more, the Veritrac SL is modular. It can be configured to meet your station's specific needs. Providing recording time of up to 8 days. And it has something else going for it. Dictaphone reliability and service.



**Dictaphone**

A Pitney Bowes Company

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Dictaphone Veritrac SL system,  
fill in the coupon or call toll-free:**

**800-431-1708**

Except in Hawaii and Alaska  
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Name

Title  Phone

Station

Address

City  State  Zip

**Mail to: Dictaphone Corporation  
120 Old Post Road  
Rye, New York 10580**

Dictaphone and Veritrac  
are trademarks of Dictaphone Corp. Rye, N.Y.

PBE-32

## Product directory

Comex (2829)  
Continental Electronics Mfg. (3134)  
Harris/Farinon Video (3101)  
Marti (3109)  
Micro Control Associates (1813)  
Moseley Associates (3103)  
RF Technology (2720)  
Straight Wire Audio (1724)  
Studer Revox (3123)  
TFT (2838)  
Wilkinson Electronics (3117)

## STILL STORE/FRAME STORE EQUIPMENT

ADDA (1712)  
Ampex (3002)  
Camera Mart (2010)  
Colorado Video (3140)  
Continental Electronics Mfg. (3134)  
Digital Video Systems (1904)  
Echo Sciences (3319)  
Eigen Video (1902A)  
Harris Video Systems (3101)  
Lyon Lamb (2832)  
NEC America (2528)

## STUDIO EQUIPMENT (MISC.)

ADC Products (1923)

ATI Audio Technologies (2728)  
Accurate Sound (1610)  
American Data (3208)  
Aphex Systems (2704)  
Bogen Photo (2918)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Central Dynamics (3208)  
Comex (2829)  
Comrex (1613)  
Continental Electronics Mfg. (3134)  
dbx (2113)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Great American Market, The (2103)  
HEDCO (2214)  
Howe Audio/BCP (2744)  
"ITE" Innovative Television  
Equipment (3309)  
LPB (3114)  
Leader Instruments (2629)  
Leitch Video of America (2004)  
Matthews Studio Equipment (2626)  
McCurdy Radio (3106)  
Micro-Trak (3115)  
Nady Systems (2711)  
Orban (1812)  
Otari (1611)  
Panasonic, Video (3217)  
Russco Electronics Mfg. (1806)  
Sescom (1700)  
Shure Brothers (3110)  
Straight Wire Audio (1724)  
Tascam Production Products (2734)  
Torpey Controls (2008)  
UREI (2530)  
United Media (2504)  
VGR (2738)  
Wilkinson Electronics (3117)  
Winsted (1703)

# Investigate Comtech Data's Total Capability in Satellite TVRO Systems.

The more you know about Comtech Data's Satellite Video Receiving Systems, the more you will like what you see.

In fact, Comtech is fast becoming a leading single-source supplier of satellite TVRO systems to institutions, commercial operators and cable TV operators nationwide. We can provide complete satellite video receiver systems or individual components including antennas, receivers, LNA's etc.. Our equipment has earned the reputation of providing years of high quality, trouble-free service — all at an affordable price.

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## SWITCHERS, AUDIO

ADM Technology (1714)  
American Data (3208)  
Arrakis Systems (1824)  
Broadcast Electronics (3104)  
Broadcast Technology (2115)  
Camera Mart (2010)  
Central Dynamics (3208)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Crosspoint Latch (2408)  
Datatek (3138A)  
Di-Tech (2203)  
Dynair Electronics (3135)  
HEDCO (2214)  
IGM Communications (3122)  
Image Video Ltd. (2600)  
Industrial Sciences (1600)  
McCurdy Radio (3106)  
Ramko Research (1909)  
Sound Genesis (2026)  
Tascam Production Products (2734)  
Tweed Audio (USA) (2303A)  
Utah Scientific (2602)  
Vital Industries (3018)

## SWITCHERS, ROUTING

American Data (3208)  
Ampex (3002)  
Arrakis Systems (1824)

Circle (63) on Reply Card



# NEC unveils E-FLEX Digital Video Effects System.

**"C" format VTR, Dual Video Transmission System, other technology also revealed.**

Visitors to NEC Booth #2528 at the NAB show will see newest addition to the DVE® family... plus other major technology innovations from NEC America, Inc.

★★★★

## NEC/NAB NEWS

**Final  
Edition**

### E-FLEX system puts Emphasis on Flexibility.

NEC adds to its string of successes in digital special effects with the introduction of the E-FLEX system.

This new generation DVE® brings many NEC optional digital effects into one package with "user friendly" control parameters and some special surprises.

Pocketable digital effects become a reality through the application of Bubble Memory technology. Special demonstrations of the E-FLEX system have been scheduled during the four days of NAB with deliveries of the first units to commence June 1.



**The real show  
in Dallas is at  
BOOTH #2528  
lower level.  
Well worth  
looking for.  
NEC AT NAB.**

### TT-8000/NTC-10B improve tape handling characteristics.

This new Type "C" 1-inch VTR and TBC combination is designed to handle a wide range of production, studio and post-production applications.

Improved performance, simplified operator controls, and new tape handling characteristics combine with optional heterodyne capabilities in the NTC-10B to make the TT-8000 the ideal investment in 1-inch recording.

### 3-chip CCD, Digital VTR prototypes demonstrated.

NEC will demonstrate its world leadership in communications technology design and manufacture through exhibition of the industry's first professional 3-chip CCD color

DV-10 Multiplexed signal horizontally compresses two images into a single picture.



camera and completely digital 1-inch VTR prototypes.

Both systems are at the forefront of the broadcast technology revolution.

### DV-10 doubles video capacity.

Unlike systems that restrict you to one signal per channel, the new DV-10 Dual Channel Video Transmission system accommodates two full video signals on each video path.

Broadcasters, users of CATV, security systems or satellite transponders can now double signal capacity without increasing present video channel space.

ENG field crews can feed two live cameras, camera and VTR, or any other combination of two signals into a single channel microwave link or other interconnect with the DV-10. Built-in U-Matic TBC is an additional feature of the system.

The multiplexer is modularized in a compact package for full field flexibility. The demultiplexer and power supply rack-mount in just 12 inches of space.

### NEC RF Group shows TVRO system/VHF Transmitter.

Visitors to the outside exhibit area at the Convention Center will have the first opportunity to see a new 4GHz<sub>z</sub> TVRO earth station with NEC electronics and an ALCOA aluminum antenna. This system is a complete 4.5 meter satellite antenna and receiver for broadcast downlink applications. An NEC 20 kW VHF TV transmitter will provide a centerpiece for RF Group functions within the Convention Center in booth 2528.

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

Circle (64) on Reply Card

## Product directory

Broadcast Systems (2803)  
Central Dynamics (3208)  
Camera Mart (2010)  
Comex (2829)  
Datatek (3138A)  
Dielectric Communications  
Fernseh (3323)  
For-A (2210)  
Glentronix (2008)  
Grass Valley Group (3010)  
HEDCO (2214)  
Image Video Ltd. (2600)  
Industrial Sciences (1600)

McCurdy Radio (3106)  
NEC America (2528)  
Pacific Recorders & Engr. (1608)  
Telemet (3007)  
3M (3006)  
Tweed Audio (USA) (2303A)  
Utah Scientific (2602)

### SWITCHERS (VIDEO, PRODUCTION, EDITING)

American Data (3208)  
Ampex (3002)  
Asaca/Shibasoku (3308)  
Beaveronics (2306)  
Camera Mart (2010)  
Central Dynamics (3208)

Comark Communications (1709)  
Comex (2829)  
Convergence (1902)  
Crosspoint Latch (2408)  
Delcom (2710)  
Dynair Electronics (3135)  
Echolab (2932)  
Glentronix (2008)  
Grass Valley Group (3010)  
HEDCO (2214)  
Ikegami (3209)  
Image Video Ltd. (2600)  
Industrial Sciences (1600)  
Lang Video Systems  
MZZ & Associates (2628)  
Midwest (2518)  
Panasonic, Video (3217)  
Ross Video (2310)  
Shintron (1603)  
Vital Industries (3018)

## END STV PIRACY

Whether you're going into STV for the first time or you have an existing system which has a high subscription theft rate, check out the new, secure Dynacom system.

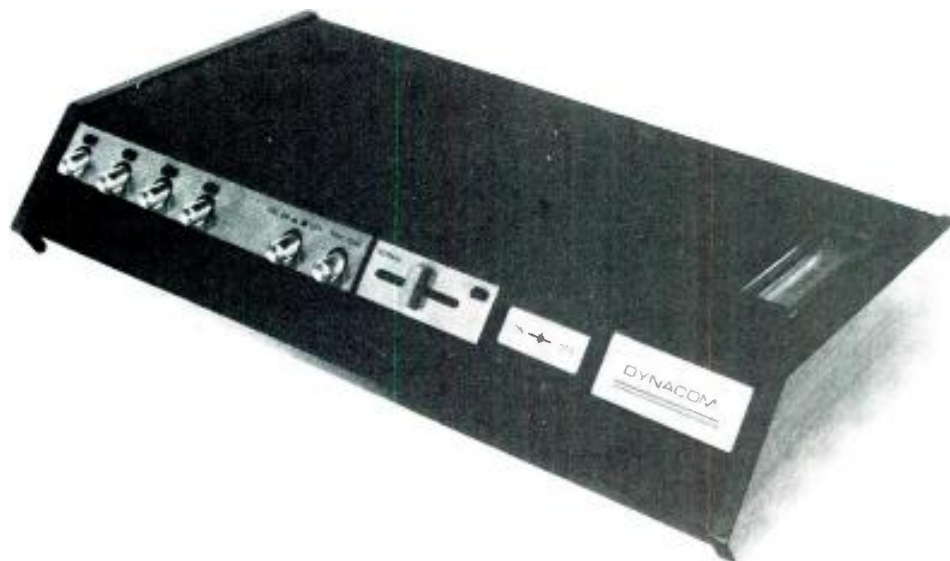
We have provided "ticket module" decoders to small international markets and fully addressable systems to larger U.S. markets.

Some key features to our system are:

- \* Effective, secure, scrambling technique
- \* Fully addressable or ticket module billing
- \* Available with up to six push button controls covering all UHF and VHF channels.
- \* Available in all television formats, NTSC, PAL, SECAM

Call Robert Payne today at (404) 428-3100, and start STV paying off for you.

**BOOTH 2424**



Dynacom Electronics Limited/590 Commerce Park Dr./Marietta, Georgia 30060

### TBCS, TIME CODE EQUIPMENT

ADDA (1712)  
Audio Kinetics (1505)  
BTX (2301)  
Camera Mart (2010)  
Comex (2829)  
Datametrics (1500)  
Datatron (3327)  
Delcom (2710)  
Digital Videl Systems (1904)  
EECO (1819)  
ESE (2305)  
Fortel (2106A)  
Harris Video Systems (3101)  
Hitachi Denshi (3202)  
Marconi Electronics (3320)  
Merlin Engineering Works (1706)  
Midwest (2518)  
NEC America (2528)  
Sony (3200)  
Thomson-CSF (3201)  
3M (3006)

### TAPE ERASERS

Broadcast Electronics (3104)  
Cetec Broadcast Group (3136)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Garner Industries (2304)  
Glentronix (2008)  
Sound Genesis (2026)  
United Labs Research (3128)

### TAPE DUPLICATING EQUIPMENT

Accurate Sound (1610)  
Continental Electronics Mfg. (3134)  
Garner Industries (2304)  
Merlin Engineering Works (1706)  
Otari (1611)  
Telex Communications (3130)

### TAPE, EVALUATORS/CLEANERS/ GAUGES

Accurate Sound (1610)  
Broadcast Electronics (3104)  
Chyron (3329)  
Fidelipac (3132)  
Glentronix (2008)  
Nova (2411)

Circle (65) on Reply Card



# Ampex Announces the Practical End of Video Jitters.



Video Jitters can drive you up a wall.

It happens when you've repeated an edit over and over. You want it perfect. Now, everything's cued up just right. You hit the edit button, and what do you get? A glitch. A shaky picture. A sour stomach. Video Jitters.

The culprit is stiction—friction build-up so bad that the tape actually jerks across the heads and scanner. Humid conditions can make it worse.

But not if you use Ampex 196 One-Inch Broadcast Video Tape.

Every batch of Ampex 196 has to pass the toughest test in the industry—stiction-free operation at the extreme environments of 90% RH and 90°F, to guarantee that you have consistent stiction-free operation under all conditions.

Ampex 196. Less friction, because who needs it?

**Ampex 196 One-Inch Video Tape.**

## AMPEX

Ampex Corporation • One of The Signal Companies

### SPECIAL OFFER FREE \$400 1" REFERENCE TAPE

Send me the details on how to get my free \$400 reference tape for buying 10 hours of Ampex 196 One-Inch Broadcast Video Tape.

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE ( ) \_\_\_\_\_

Offer expires May 31, 1982.

Send to: Ampex Corporation, Magnetic Tape Division,  
401 Broadway MS 22-02, Redwood City, CA 94063

BE

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## Product directory

Research Technology (RTI) (1903)  
TV Equipment Associates (3324)

### TAPE, MAGNETIC RECORDING (AUDIO)

Ampex (3002)  
Broadcast Cartridge Service (2316)  
Broadcast Electronics (3104)  
Camera Mart (2010)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Fidelipac (3132)  
FitzCo Sound (2540)

Maxell Corporation of America (2212)  
Stephens Electronics (2511A)  
TDK Electronics (2726)  
United Lab Research (3128)

### TAPE, MAGNETIC RECORDING (VIDEO)

Ampex (3002)  
Audico (2501)  
Broadcast Audio (1920A)  
Camera Mart (2010)  
Comex (2829)  
Fidelipac (3132)  
Fuji (3313)  
JVC (1707)

Maxell Corporation of America (2212)  
TDK Electronics (2726)  
United Labs Research (3128)

### TELETEXT & CAPTIONING EQUIPMENT

Antiope & Telematics (2110)  
EEG Enterprises (2507)  
Logica Ltd. (1502C)  
Unitel

### TEST EQUIPMENT, MONITORS & METERS (AUDIO)

Artel Communications (2624)  
Asaca/Shibasoku (3308)  
Autogram (2748)  
Broadcast Electronics (3104)  
Broadcast Systems (2803)  
Broadcast Video Systems Ltd. (2706)  
Camera Mart (2010)  
Central Dynamics (3208)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Eventide Clockworks (2934)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Harris Broadcast (3101)  
Inovonics (1610A)  
Real World Technologies (2621)  
Rohde & Schwarz (3213)  
Sescom (1700)  
Sound Genesis (2026)  
Sound Technology (2636)  
UREI (2530)

### TEST EQUIPMENT, MONITORS & METERS (VIDEO)

AF Associates (3320)  
Amber Electro Design (2016)  
Artel Communications (2624)  
Asaca/Shibasoku (3308)  
Broadcast Systems (2803)  
Camera Mart (2010)  
Datatek (3138A)  
Hitachi Denshi (3202)  
Jensen Tools (2719)  
Leader Instruments (2629)  
Leitch Video of America (2004)  
Lenco (3214)  
Philips Test & Measuring (3215)  
Rohde & Schwarz (3213)  
Tektronix (3005)

### TEST EQUIPMENT, RF

Bird Electronic (3204A)  
Broadcast Electronics (3104)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Delta Electronics (3112)  
Dielectric Communications  
Leader Instruments (2629)  
Micro Communications (3312)  
Rohde & Schwarz (3213)  
Shively Laboratories (1718)  
Tektronix (3005)  
Telemet (3007)

### TELEMETRY EQUIPMENT

Artel Communications (2624)  
Hallikainen & Friends (1618)  
Marti (3109)  
Microwave Power Devices  
Moseley Associates (3103)

## VALUE-PACKED MODULAR DESIGN

From 104mm input faders to stereo/mono combining networks, Quantum now offers modular production/on-air series broadcast consoles fully equipped with professional features found previously only on those consoles priced beyond your budget.



60th Annual Convention  
& International Exposition  
April 4 - 7, 1982  
Dallas, Texas

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at NAB Booth 2006**

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Studio/Company \_\_\_\_\_

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**QUANTUM**  
AUDIO LABS, INC.

1905 RIVERSIDE DRIVE  
GLENDALE, CALIFORNIA 91201  
PHONE: (213) 841-0970





Production Studio, WRBR-FM, South Bend, Indiana

## Electro-Voice's Greg Silsby talks about the SENTRY 100 studio monitor

When I first described to Electro-Voice engineers what I knew the SENTRY 100 had to be, I felt like a "kid in a candy store." I told them that size was critical. Because broadcast environment working space is often limited, the SENTRY 100 had to fit in a standard 19" rack, and it had to fit *from the front, not the back*. But the mounting hardware had to be optional so that broadcasters who didn't want it wouldn't have to pay for it.

The SENTRY 100 also had to be both efficient and accurate. It had to be able to be driven to sound pressure levels a rock 'n roll D.J. could be happy with by the low output available from a console's internal monitor amplifier.

The SENTRY 100 also had to have a tweeter that wouldn't go up in smoke the first time someone accidentally shifted

into fast forward with the tape heads engaged and the monitor amp on. This meant high-frequency power handling capability on the order of five times that of conventional high-frequency drivers.

Plus it had to have a 3-dB-down point of 45 Hz, and response that extended to 18,000 Hz with no more than a 3-dB variation.

Since it's just not practical for the engineer to always be directly on-axis of the tweeter, the SENTRY 100 must have a uniform polar response. The engineer has to be able to hear exactly the same sound 30° off-axis as he does directly in front of the system.

I wanted the SENTRY 100 equipped with a high-frequency control that offered boost as well as cut, and it had to be mounted on the front of the loudspeaker where it not only could be seen but was accessible with the grille on or off.

I also didn't feel broadcasters should have to pay for form at the expense of function. The SENTRY 100 had to be attractive, but another furniture-styled cabinet with a fancy polyester or die-cut foam grille wasn't the answer to the broadcast industry's real needs.

And for a close I told E-V's engineers that a studio had to be able to purchase the SENTRY 100 for essentially the same money as the current best-selling monitor system.

I'm happy to report that we've achieved all our objectives.

Market Development Manager,  
Professional Markets



600 Cecil Street, Buchanan, Michigan 49107

In Canada:

Electro-Voice, Div. of Gulton Industries (Canada) Ltd.,  
345 Herbert St., Gananoque, Ontario K7G 2V1.

Circle (68) on Reply Card





# If you're ready to move up to a specialized mixer, you're ready for Ramsa.

## The Sound Reinforcement Specialist: Ramsa WR-8716

When your sound says you're professional but your mixer doesn't. When you're wasting your subtlety and style on "make-do" boards. When you're creating compromises instead of clear-cut distinctions. Then you're ready for Ramsa—the new mixers that are specialized so you won't have to compromise.

The WR-8716 is a fully modular sound reinforcement console with 16 input

modules, 4 group modules, and 2 masters. It features 16 input pre-fader solo buttons, 4 group modules with pre-fader insertion patch points, and lockable post-fader solo buttons. There are 6 illuminated VU meters with peak LED's for easy outdoor

reading and a separate stereo variable frequency EQ for monitor sends. Pan pot controls allow panning to the left or right masters while level controls permit 16 x 6 board operation. The left and right direct channel assign function lets you bypass the group modules for individual sources. Portable operation is a snap with easy access connectors.

And the WR-8716 features plastic conductive faders for greater reliability and smooth, low-noise operation; external power supply for light weight, and switchable 48V DC phantom power for condenser mics.





# RAMSA

## The Recording Specialist: Ramsa WR-8816

The WR-8816 recording console includes the same modular construction, input modules, power supplies, and faders as the WR-8716 plus many important recording advantages. Like direct outputs for 4, 8, or 16 track recording and peak-reading LED meters that let you monitor any 4 out of 24 signals with clear, quick response.

You'll command a variable frequency EQ section with 3 frequency settings for the high and low frequencies plus continuously variable

midrange. Stereo echo send replaces the separate mono controls you'll find on competitive boards. And you get two independent stereo monitor controls—one for musician's headphones, one for control room monitors—a special feature for any mixer in this class. And there are other important features

like low noise electronically balanced mic inputs with new high-speed IC's, 16 switchable post-fader solo controls and XLR-type mic connectors.

Ramsa offers a full line of specialty mixers including the more compact WR-8210 recording mixer and WR-130 sound reinforcement mixer. So don't hold down your professional sound, call (201) 348-7470, because you're ready for Ramsa.



See us at NAB Booth 1621

**Panasonic**  
PROFESSIONAL AUDIO DIVISION

Circle (69) on Reply Card

## Product directory

### TEST PATTERNS, CHARTS

Asaca/Shibasoku (3308)  
Camera Mart (2010)  
Comex (2829)  
Glentronix (2008)  
Marconi Electronics (3320)  
Porta Pattern (1803)

### TIMERS & CLOCKS (PROGRAM)

Beaveronics (2306)  
Broadcast Electronics (3104)  
ESE (1614)  
Gregg Laboratories (2009)

Jatex (2505)  
Leitch Video of America (2004)  
Logitek (2015)  
McCurdy Radio (3106)  
Radio Systems (2920)  
Ramko Research (1909)  
Sound Genesis (2026)  
Torpey Controls (2008)

### TOWERS & TOWER EQUIPMENT

Atlas Tower Corporation  
Broadcast Electronics (3104)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Fort Worth Tower Company (3326)  
LeBlanc & Royle (2700)

Magnum Towers (2005)  
Fred A. Nudd (2021)  
Philadelphia Resins (1715)  
Stainless (2418)  
Telex Communications (3130)  
UNR-Rohn (3138)  
Utility Tower Company (3105)  
Wilkinson Electronics (3117)

### TRANSFORMERS (ALL TYPES)

Beyer Dynamic (2915)  
Datatronix (1927)  
Sescom (1700)  
Shure Brothers (3110)  
Sound Genesis (2026)

### TRANSMISSION LINES & SERVICES

Andrew (3012)  
Artel Communications (2624)  
Cablewave Systems (3206)  
Comark Communications (1709)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Dielectric Communications  
LeBlanc & Royle (2700)  
Micro Communications (3312)  
Phelps Dodge Communications (3116)  
Shively Laboratories (1718)

### TRANSMITTER SWITCHERS/ CONTROLLERS/DETECTORS

Broadcast Electronics (3104)  
CSI Electronics (1606)  
Continental Electronics Mfg. (3134)  
Delta Electronics (3112)  
Harris Broadcast (3101)  
McMartin Industries (3102)  
Micro Communications (3312)  
Varian Associates/Microwave (3119)  
Wilkinson Electronics (3117)

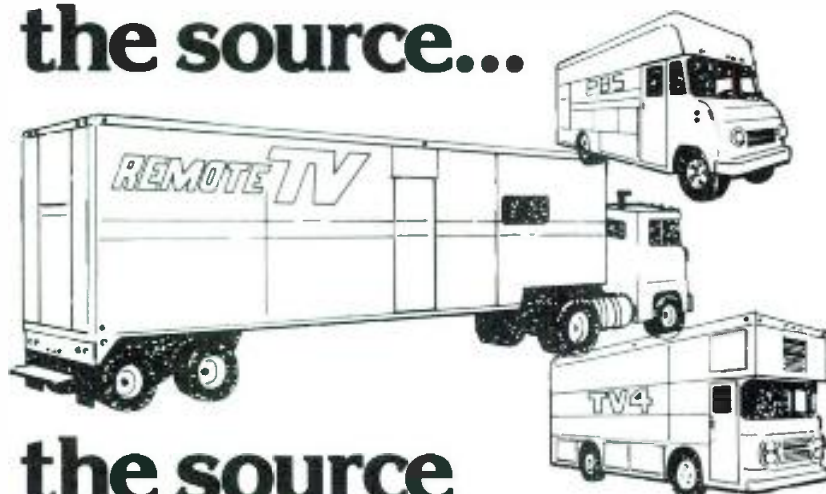
### TRANSMITTERS (AM & FM)

AEG Telefunken (2536)  
Broadcast Electronics (3104) FM only  
Larcan Comm. (2736)  
CSI Electronics (1606)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Elcom-Bauer (1908)  
Harris Broadcast (3101)  
LPB (3114)  
Marconi Electronics (3320)  
McMartin Industries (3102)  
Microwave Power Devices  
NEC America (2528)  
QEI (1919)  
RCA (3000)  
Singer Broadcast Products (3120)  
Wilkinson Electronics (3117)

### TRANSMITTERS (TV AND TRANSLATORS)

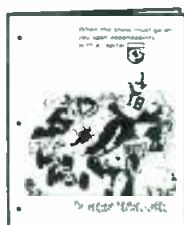
Acrodyne (3315)  
Larcan Comm. (2736)  
CeCo Communications (1804)  
Comark Communications (1709)  
Comex (2829)  
Emcee Broadcast Products (3331)  
Harris Broadcast (3101)  
Marconi Electronics (3320)  
McMartin Industries (3102)

# When you cover the action from the source...



# the source for mobile studios should be Gerstenslager.

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



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



## GERSTENSLAGER

The Gerstenslager Company, Wooster, Ohio 44691

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# "JUST PLUG IT IN AND IT MAKES MONEY"



It's not just how it works. But how long it works.

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That's one General Manager's comment about his station's new EMCEE® translator. He's not far off the mark, either.

EMCEE 1, 100 and 1,000 watt UHF and VHF translators do install easily and require virtually no maintenance. EMCEE can even provide complete translator turnkey packages. Including system design, documentation and construction.

The result is fringe areas turn solid. Brand new markets open. Numbers and billing increase. And your dependence on local cable systems ends for good.

EMCEE translators could create one additional expense for your station, though. Overtime in accounts receivable.



(EMCEE TU-100)  
100 watt UHF translator

## EMCEE

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Ans: EMCEE WHHV

Equipment manufactured in U.S.A.

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## Product directory

Microwave Power Devices  
NEC America (2528)  
Philips Broadcast Group (3208)  
RCA (3000)  
RF Technology (2720)  
Television Technology (3117)  
Thomson-CSF (3201)  
Townsend Associates (3311)  
Wilkinson Electronic (3117)

**TURNTABLES, TONE ARMS &  
PHONE CARTRIDGES**  
AKG Acoustics (2629A)

Broadcast Electronics (3104)  
Cetec Broadcast Group (3136)  
Clyde Electronics (2417)  
Comex (2829)  
Continental Electronics Mfg. (3134)  
Fidelipac (3132)  
FitzCo Sound (2540)  
Gotham Audio (2919)  
Harris Broadcast (3101)  
Micro-Trak (3115)  
Panasonic Company (1621)  
Ramko Research (1909)  
Russco Electronics Mfg. (1806)

Shure Brothers (3110)  
Sound Genesis (2026)

**VACUUM TUBES  
(VIDEO CAMERAS)**  
Amperex Electronics (3210)  
Camera Mart (2010)  
EEV (2216)  
RCA (3001)  
Thomson-CSF (Components) (1609)

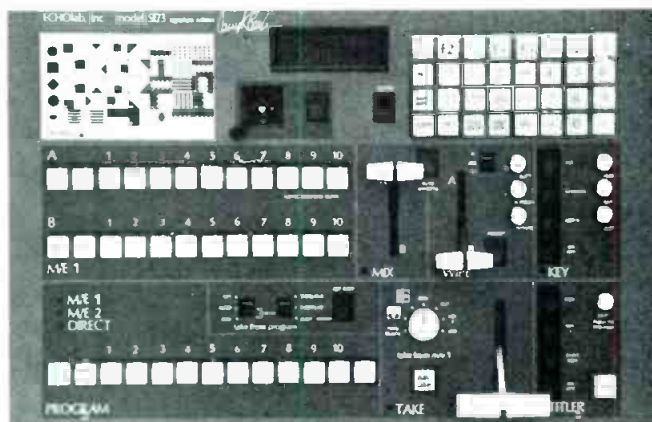
**VACUUM TUBES  
(TRANSMITTING/TWTs)**  
Amperex Electronic (3210)  
EEV (2216)  
RCA (3001)  
Thomson-CSF (Components) (1609)  
Varian Associates/Eimac (3119)  
Varian Associates/Microwave (3119)

**VANS AND ACCESSORIES**  
Harris/Farion Video (3101)  
Jenel (2314)  
Midwest (2518)  
Shook Electronic Enterprises (2628)  
Television Engineering (2114)

**WAVEGUIDES**  
Andrew (3012)  
Cablewave Systems (3206)  
Comark Communications (1709)  
Comex (2829)  
Dielectric Communications  
LeBlanc & Royle (2700)  
M/A-Com (3303)  
Micro Communications (3312)

**WEATHER SYSTEMS**  
Colorgraphics Weather Systems  
(2913)  
Dubner Computer Systems (2702)  
Echo Sciences (3319)  
Gorman Redlich (2307)  
Nagra (3146)  
NewsScan/McInnis-Skinner (2502A)  
Spectra Computer Systems (2415)

## NOW...from ECHOlub A sophisticated, computer-controlled PRODUCTION SWITCHER



The SE/3 is a new-generation, programmable Switcher/Special Effects Generator that offers extremely sophisticated control, editing and effects capabilities at an astonishingly low price. The secret of both price and performance lies in a powerful micro-computer that replaces most of the digital logic found in other switchers, and in an innovative, transition-centered approach to the system architecture. Providing full computer control of all switching and effects, the SE/3 has 12 inputs, full BC crosstalk and distortion specifications and an RS-449 port for editing. Two-and-a-half separate pattern generators and

three mix/effects amplifiers can simultaneously air five different sources and three wipe patterns without lock-outs. It provides for the programming, storage (of up to 200 shots) and instant re-creation of any desired sequence of patterns, pictures and transitions.

A contact-closure editing interface is available for initiating any pre-programmed event. The slim-profile control panel (only 1 3/4" deep) can be installed remotely from the main chassis for maximum flexibility. Yet the SE/3 costs only \$14,000.

Send for complete details.

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Higher resolution is an important reason, but did you know that EEV 30mm Advanced P8400 series Leddicons feature all these advantages?

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**LEDDICONs are BETTER LONGER**  
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In Europe: English Electric Valve Co. Ltd., Chelmsford, Essex CM1 2QU, England, Tel. 0245 61777, Telex 851-99103

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

See Us at NAB Booth #2216



# NAB-'82/DALLAS EXHIBITS ROUNDUP

This special section alphabetically lists the NAB-'82 exhibitors and previews products to be displayed in Dallas. Following each exhibitor listing is a number by which the reader service card may be used to provide exhibitor data. Also, if the exhibitor is advertising in this issue, the location of the ad is indicated for additional details about the company's NAB-'82 exhibit products.

Although this section will be a valuable aid in planning NAB-'82 activities, caution should be exercised. The listing here is comprehensive as of press time, but changes are still occurring in exhibitor sign-up, products being shown and booth assignments. Check the final program at NAB-'82 to make final plans. Look for the BE wrap-up of this convention in the June issue.

## ADC Products

Booth 1923

Established products \_\_\_\_\_

Series: Audio and video jack fields

Series: Audio connectors

New products \_\_\_\_\_

To be announced \_\_\_\_\_

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see ad on page 207

## ADM Technology

Booth 1714

Established products \_\_\_\_\_

2400 Series II: TV production audio console

1600 Series II: TV production audio console

ST 160 II: Radio production console

3282 Series II: Teleproduction audio console

800/1200 Series II: Post-production audio console

ST 100 Series III: On-air radio control room package

Circle (400) on Reply Card

see ad on inside front cover

AEG-Telefunken/Bayly Engr Div.

Booth 2536

Established products \_\_\_\_\_

S3161: 100W VHF broadcast transmitter

R1W6: Remote control wattmeter

Series: Dummy loads

Series: Card frames/packaging system

FM25V: 25W VHF mobile 2-way radio

FM15V: 5W portable VHF 2-way radio

AC12: Desktop ni-cad drop-in battery charger

New products \_\_\_\_\_

FM25VU: 25W mobile UHF 2-way radio

FM12VU: 2W portable UHF 2-way radio

FM45V: 45W mobile VHF 2-way radio

FM25VM: 25W manpack VHF 2-way radio

FM14VU: 4W portable UHF 2-way radio

Circle (401) on Reply Card

# 8000 FROM CETEC

Cetec's new 8000 Series console was designed and built especially for broadcasters. You get all the features you need without paying for things you don't use. This means you get a luxury console — including precision Penney and Giles faders — at a moderate price. Features include five

lighted meters, two peak indicators, five advisory enuciators, and a built-in LCD timer. In addition to the 25-watt RMS monitor amp, there is a separate headphone amp with enough gain to keep

everyone happy. Just pull the monitor control knob and you get instant mono sum for quick A/B comparison. You can even feed all

three stereo busses and the mono

buss at the same time without interaction. Great specs include low distortion and noise, with plenty of head-room. Strong RF fields do not affect the 8000. Broadcasters helped us design the 8000, and the results are just outstanding.

Isn't it time you talked to Cetec?



See for yourself  
at NAB Booth 3136

 **Cetec**

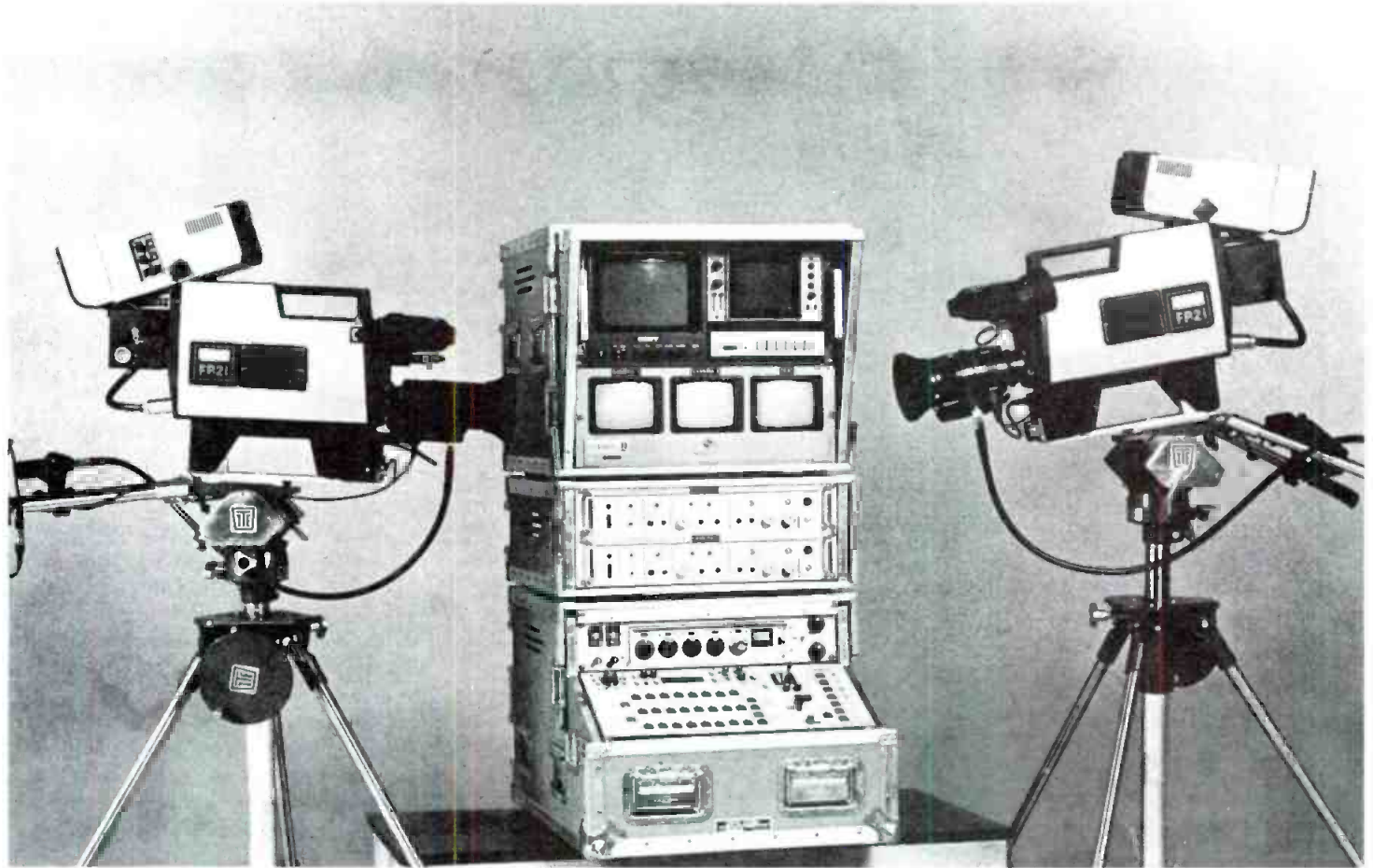
Cetec Broadcast Group of Cetec Corporation 1110 Mark Avenue, Carpinteria, CA 93013 (805) 684-7686 Telex: 658-461

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www.americanradiohistory.com



# HITACHI

## FP21 COLOR CAMERA SYSTEM



2-FP21-3 Tube Saticon cameras  
 2-A10 x 11 BRW 10-1 lens power zoom F1.6  
 2-Operation panels with 50' camera cable  
 2-5" View Finders  
 2-I.T.E. Tripod sets H9PH, T6H, D6G  
 2-Lens drive kits  
 2-Battery-charger systems  
 1-PVM-8200T 8" color monitor

1-Triple 5" mono monitor WV-5203  
 1-M-67 Shure audio mixer  
 1-BPM-1 Burst Phase Meter  
 1-6114 Crosspoint production switcher  
 1-6006 Sync generator  
 1-528 Tektronic Waveform monitor  
 1-McMartin amplifier and speaker  
 3-Modular cases with covers

Modular three piece portable studio, packaged in protective cases with front and real hard shell covers.  
 Single cable interconnect between modules for quick and simple set-up.

**\$39,500 COMPLETE**

Price includes delivery, set-up and training.  
 Standard manufacturers' warranty applies.

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**215-223-8200 Ask for John Neri or Ed Zwicker**

Full line distributor for all Hitachi video products.

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March 1982 *Broadcast Engineering* 83

## Exhibits roundup

### AF Associates

Booth 3320

Established products

MR-2: 1-inch type C VTR

HV-100: Blanking analyzer

New products

Series: Line array telecine B-3410

AFA SC-300: Slate camera system

RCC200: Joystick camera control panel

HL-79 and HK-357: Remote camera controls

Series: Audio/video jack fields

Circle (433) on Reply Card

see ads on pages 42, 166

### AKG Acoustics

Booth 2629A

Established products

C-451: Modular condenser microphone system

C-535: Vocalist hand-held condenser microphone

D-130: Reporter's microphone

Series: Stereo headphone models

Series: Reverberation units

Series: Phonocartridges

Series: Mic stands and accessories

New products

NEUTRIK: XLR-type connectors

BX-25: Reverb unit with digital delay

Circle (402) on Reply Card

### ATI-Audio Technologies Inc.

Booth 2728

Established products

EM1000: Emph'aSizer audio processor

DA2016, DA1008: 1x8 and 2x16 distribution amplifiers

DA1000: High output 1x8 distribution amplifier—mass feed

MA1000: Dual/stereo 10W/CH stereo, 25W mono miniature power amp.

P1000: Precision turntable amplifier—stereo

M1000: Dual microphone amplifier

L1000: Dual line amplifier

New products

P100: Encore series low cost precision turntable amps.

DA2008: High output mass feed dual 1x4 distribution amp.

Circle (434) on Reply Card

### Accurate Sound Corporation

Booth 1610

Established products

AS-100: Duplicator, magnetic tape, high speed

Series: Reel and loop bin master

Formats: Cassette and reel-to-reel

Starbird: Microphone boom

New products

AS-100: Recorder, audio, reel-to-reel

Circle (403) on Reply Card

### Acrodyne Industries

Booth 3315

Established products

TT-348VH: 5kW VHF TV transmitter

TT-3480U: 5kW UHF TV transmitter

New products

TT-3401U: 1kW UHF transmitter

TT-3500VH: 12.5kW VHF TV transmitter

Circle (435) on Reply Card

see ad on page 99

### ADDA Corporation

Booth 1712

Established products

VW-1: TBC/Frame synchronizer

VW-2: TBC/Frame synchronizer

ESPEC: Electronics still storage system

VIP: Video compressor/positioner

New products

DTBC: Dual channel editing TBC

Circle (404) on Reply Card

### Advanced Music Systems

Booth 2904

Established products

DMX 15-80: Digital delay and effects processor

DMX 15-80S: Stereo digital delay and effects processor

New products

RMX 16: Digital reverberation system

DMX 15 Sync: Audio delay compensator

Circle (405) on Reply Card

### Allen Avionics Inc.

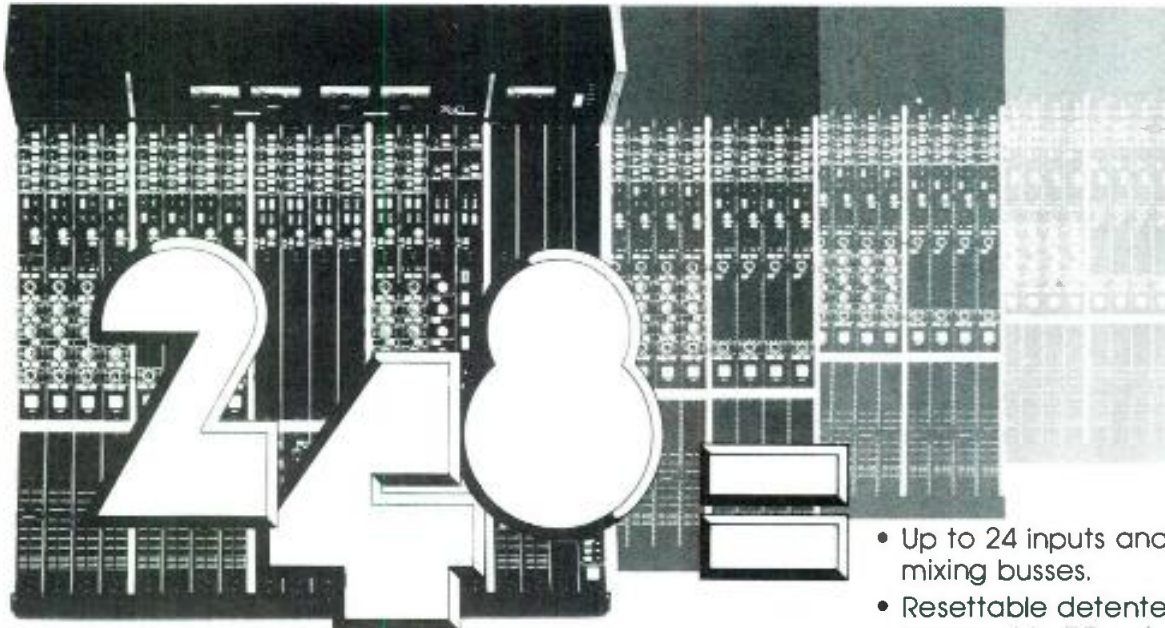
Booth 2318

Established products

Series: Video delay line, index filler, VAR units

Circle (801) on Reply Card

see ad on page 242



**Component Series**—finally, a professional quality console system that changes as your requirements change. 248 gives you custom console performance and features in an expandable system that you design.

Select from a choice of fader, input, assign and output modules—mix and match to suit your application. 248 adapts—whether you're into radio, TV, pre/post production, sound reinforcement, recording, film or anything in between. And only the 248 Component Series offers big console features in this size and price range. Look at the features and flexibility.

The future in compact console design is here, now. Call Quad-Eight for the name of your dealer. And see us at NAB Booth 2705A. Dealer inquiries invited.



### Quad-Eight Electronics

11929 Vose Street, North Hollywood, California 91605

Telephone: (213) 764-1516

Telex: 662-446

- Up to 24 inputs and 2, 4 or 8 mixing busses.
- Resettable detented 3-band parametric EQ w/peaking and "Q" controls.
- Variable Hi-Pass and Lo-Pass filters.
- Studio console performance specifications.
- Full stereo/mono capability.
- Exclusive building block housing system.
- Field expandable, from 8 x 2 to 24 x 8.



# A picture worth a thousand hours.



Everything about our new video animation system is designed to save you many hours of costly production time. This means you can now use animation for perhaps the very reason you never used it before . . . time.

Now, topical animation can be produced quickly to accompany news, sports, weather or similar short deadline projects. Then, when you have more time, use the AniVid System for more entertaining station or advertising production.

Besides having time on your side, you'll also enjoy full color, broadcast quality first generation animation on video tape. Suddenly you have all the advantages of film animation with the time and cost savings of video tape.

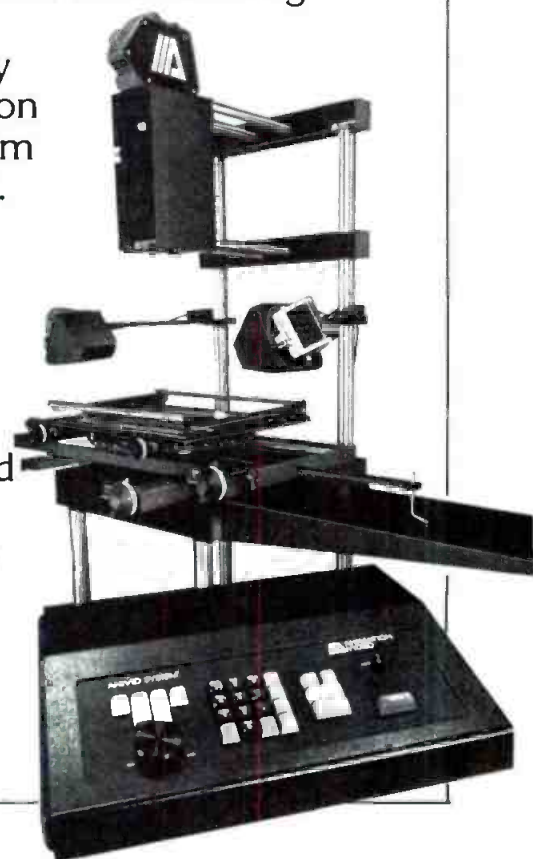
Altogether, it's everything you would want in an animation system. The AniVid System consists of a microprocessor based VTR Controller, a three tube color camera, and a full featured animation stand.

The system accepts any kind of artwork from pencil tests, cel artwork, three dimensional subjects, animatics, pixillation, timelapse, titling, still storage and filmograph to computer generated graphics.

For further information contact Animation Video, Convergence Corporation, 1641 McGaw, Irvine, CA, USA, 92714, (714)549-3146, TWX (910)595-2573.

See Us at NAB Booth 2818

**ANIMATION  
VIDEO**  
A DIVISION OF CONVERGENCE CORPORATION



Circle (76) on Reply Card

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

## Exhibits roundup

### Allied Broadcast Equipment

**Booth 2920**

Established products \_\_\_\_\_

Series: Kustom Kraft Studio Furniture

New products \_\_\_\_\_

33: Allied architectural series on-air/warning lights

AK8100: Shock absorber turntable mounting system

1: Telemix telephone talk show interface

T-1: Audiometrics timer

PA-1: Audiometrics preamp

PW 100A: Audiometrics preamp

Circle (351) on Reply Card

### Allsop

**Booth 2718**

Established products \_\_\_\_\_

71100: Ultra line audiocassette cleaner

60100: VHS VCR cleaning system

65100: Beta VCR cleaning system

Allsop: U-matic VTR cleaning system

Circle (407) on Reply Card

### Alpha Audio

**Booth 2309**

Established products \_\_\_\_\_

Sonex: Acoustic materials for studios and control rooms

Circle (408) on Reply Card

### Amber Electro Design Ltd.

**Booth 2016**

Established products \_\_\_\_\_

3500: Distortion measurement set

4400A: Audio test set

New products \_\_\_\_\_

4500: Automatic distortion and noise measurement system

Circle (409) on Reply Card

### American Data Corporation

A division of Central Dynamics Corporation

**Booth 3208**

Established products \_\_\_\_\_

3104A: Production switcher

3101: Production switcher

3101-20: Production switcher, an expanded version of 3101

2104: Small production switcher

2103: Small production switcher

2102: Small production switcher

900: Routing switcher

860: Downstream keyer

3200: Microprocessor-controlled, distribution and machine control system

New products \_\_\_\_\_

860: Downstream keyer

3101-20: Production switcher; chroma-keyer

Circle (432) on Reply Card

see ads on pages 43, 187

### American Image Productions

**Booth 2735**

Established products \_\_\_\_\_

Formats: Money Machine; Country Punch; Wizard and Best of Everything sales/production library services.

New products \_\_\_\_\_

Format: Country TV promo campaign, "Plays It Country"

Format: "Electronic contemporary" TV promo campaign

Circle (410) on Reply Card

### Amperex Electronic Corporation

**Booth 3210**

Established products \_\_\_\_\_

XQ1410/15: 30mm Plumbicon TV camera tubes

XQ1070/75: 25mm Plumbicon tubes

XQ2070/75: 25mm diode gun Plumbicon tubes

XQ1427: 18mm Plumbicon tubes

XQ3427: 1/2-inch high resolution diode gun, low capacitance Plumbicon tubes

80XQ: 1/2-inch Plumbicon

New products \_\_\_\_\_

73XQLOC: 25mm diode gun low capacitance Plumbicon tubes

78XQ: 30mm narrow angle 25mm scan low capacitance diode gun Plumbicon tubes

Circle (411) on Reply Card

see ad on page 89

### Ampex Corporation

**Booth 3002**

Established products \_\_\_\_\_

Series: Type C and quadraplex VTRs and accessories

Series: Broadcast cameras

Series: Production switchers

Series: Editing systems

Series: Digital special effects systems

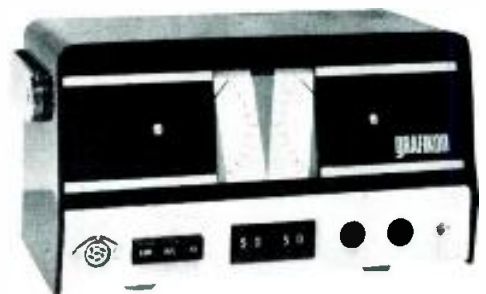
# Standardize your color monitors to a true D<sub>65</sub> at all luminance levels, with **GRAFIKON** instruments



TV Light Meter for rapid, precise check of luminance.



Optical Color Comparator for setting color temperature at all luminance levels, to D<sub>65</sub> or other standards.



Electronic Color Analyzer for transferring color temperature readings from a master to other monitors. Digital pre-settable compensation for phosphor batches.



## POWER-OPTICS, INC.

1055 WEST GERMANTOWN PIKE

FAIRVIEW VILLAGE

PENNSYLVANIA 19409

TELEPHONE 215-539-5300

TELEX 84-6314

Circle (77) on Reply Card

See us at NAB Booth # 3113



# CP\* provides the best TV signal. Harris provides the best CP system.

Harris' Cyclotran is the first complete TV broadcast system designed specifically for circular polarization. It's the most economical way to enjoy the benefits of CP without major expense for a new tower and transmitter building.

The system includes Harris TV transmitters with power ratings up to 100 kilowatts; Harris CP antennas designed

with low windloading specifications or multiplexed to permit multi-channel operations on the same tower; and Harris' 9100 Facilities Control, offering un-manned operation. Cyclotran improves picture quality, increases fringe area coverage and maintains maximum output without violating FCC standards.

Upgrade your TV broadcast

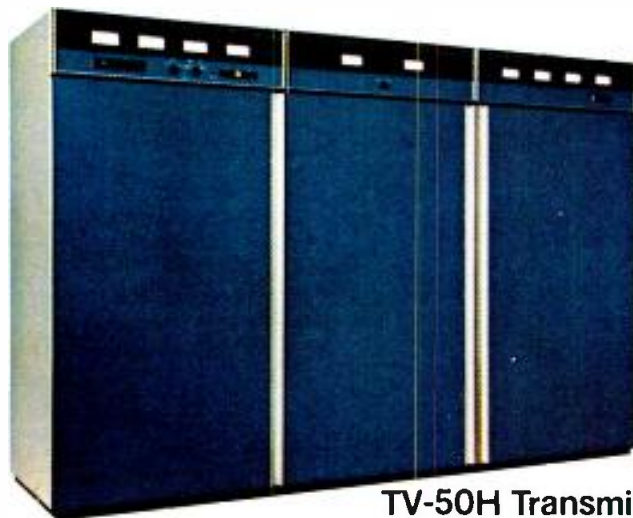
performance. Turn first to Harris — the company that delivers state-of-the-art equipment and high quality service at a competitive price. Contact Harris Corporation, Broadcast Products Division, P.O. Box 4290, Quincy, Illinois 62301.



**HARRIS**  
COMMUNICATION AND  
INFORMATION PROCESSING

\*Circular Polarization

Visit the Harris TV and radio equipment display  
at the 1982 NAB, Dallas.



TV-50H Transmitter



9100 Facilities Control



CP Antenna

Circle (78) on Reply Card

## Exhibits roundup

### Ampex (continued)

**Series:** Electronic still store system  
**Series:** TBCs  
**Series:** Audio recorders and accessories  
**Series:** Magnetic tape products  
**New products** \_\_\_\_\_  
**UNISYN:** Versatile synchronizer for audio and video post-production  
 Other new products to be announced  
**Circle (412) on Reply Card**  
 see ads on pages 73, 110

### Ampro/Scully

**Booth 3307**  
**Established products** \_\_\_\_\_  
**8300:** 3-deck cartridge reproducer

**280B, 285B, 284B-8:** Scully reel-to-reel recorder/reproducer  
**270:** Scully bi-directional reel-to-reel reproducer  
**250:** Scully economy reel-to-reel recorder/reproducer  
**255:** Scully economy reel-to-reel reproducer  
**AC:** Ampro rotary fader consoles  
**LC:** Ampro slide fader consoles  
**MT:** Ampro microtouch consoles  
**Circle (413) on Reply Card**

### Amtron Corporation

**Booth 2102**  
**Established products** \_\_\_\_\_  
**Series:** High resolution color monitors  
**New products** \_\_\_\_\_

**AG-341:** Video display generator  
**Circle (414) on Reply Card**  
 see ad on page 294

### Andrew Corporation

**Booth 3012**  
**Established products** \_\_\_\_\_  
**Heliac:** Coaxial cables  
**Heliac:** Elliptical waveguides  
**Series:** STL microwave antenna systems  
**Series:** UHF-TV transmitting antennas  
**Series:** Earth station antennas  
**Circle (415) on Reply Card**  
 see ad on page 133

### Angenieux

**Booth 3316**  
**Established products** \_\_\_\_\_  
**42X16:** Zoom range (42-1) lens for TV  
**12X16:** High resolution lens for TV cameras  
**15X9:** ENG (f/1.5) zoom lens for ⅓-inch prism cameras  
**New products** \_\_\_\_\_  
**15X7:** ENG zoom lens for ⅓-inch prism recorder-cameras  
**15X9:** ENG/EFP zoom lens with diascope for automatic cameras  
**25X10:** EFP zoom lens with diascope for automatic cameras  
**12X12.5:** Zoom lens for automatic studio cameras  
**42X12.5:** Wide angle zoom for automatic studio cameras  
**Circle (416) on Reply Card**

### Animation Video

A division of Convergence Corporation  
**Booth 2818**  
**Established products** \_\_\_\_\_  
**1000:** AniVid system  
**1100:** AniVid controller  
**1200:** AniVid stand  
**1300:** AniVid InteLens  
**Circle (417) on Reply Card**  
 see ad on page 85

### Antiope and Telematics Corporation

**Booth 2110**  
**New products** \_\_\_\_\_  
**Series:** Broadcast and decoding equipment complying with the teletext specifications  
**Circle (418) on Reply Card**

### Anton/Bauer

**Booth 1802A**  
**Established products** \_\_\_\_\_  
**Series:** Snap-On ni-cad batteries  
**SQ-4N:** 4-position overnight charger  
**QRSV:** Mounting brackets for cameras and VTR  
**LG-30:** 12/30V portable lighting head  
**LB-30D:** 30V lighting belt  
**SNDS:** Diagnostic discharger with up-counter  
**FC-L:** Fast/slow charger for Super-D batteries  
**SCD:** Silver zinc batteries-equalizer  
**DB-13:** 8AH 13.2V ni-cad video belt  
**New products** \_\_\_\_\_  
**PS-2:** ac camera supply in Snap-On package  
**MC-W:** Wide range microcharger  
**U-FC:** Programmable universal fast/slow charger  
**M-FC:** Mobile fast charger  
**B-19 K:** Ni-cad Snap-On system  
**Circle (419) on Reply Card**

## BATTERY/AC PORTABLE MIXER



### MODEL 200B

Latest in the 200 Series, the Model 200B is a professional quality eight input stereo mixer built in a portable case and designed to operate either from the included 12 volt Gel-Cell battery or from an optional 110 volt AC power supply and is suitable for remote recording or any application where highest performance is required in a rugged portable mixer. Battery is external but can optionally be had in a special lid assembly if desired for greater portability; standard battery will operate mixer 8 to 10 hours on a full charge (larger batteries and/or spare batteries available), and charger is included. Other options include the Intercom Module, limiters, and output transformers. Mixer is fully modular, and any module can plug into any slot. Mixer comes with lid and measures 13 x 17.5 x 7" with lid, and weighs about 30 pounds.

**INPUT MODULES** include input pads, input transformer, phase reverse, mike power (12 v "T" or 48 v phantom), gain adjust pot, three equalizers with selectable frequency on the mid equalizer, low cutoff, two cue sends with pre/post slider switches, panpot with in/out, solo, +15 VU danger indicator, on/off switch, and optional Penny & Giles or standard Duncan conductive plastic sliders.

**MASTER MODULE** provides a stereo slider master and two Cue Masters, two standard VU meters which can also be switched to read cues or monitor or battery level, stereo monitor phones level and phones jack, and output, power, and echo return connectors. The monitor phones switch automatically to an input when a solo button on a module is depressed.

**INTERCOM MODULE** (optional) provides for monitoring in a headset (such as the DT109), intercom to second operator (who can also monitor), test tones, slating takes, listening to playback, and a one watt 8 ohm stereo power output. The 9th slot can house either the Intercom Module or a 9th input module.

**PERFORMANCE** is near state of the art, and equals or exceeds comparable professional equipment. Interface equipment carries a one year limited warranty.

**INTERFACE ELECTRONICS** has been making high performance low cost professional mixers for all purposes since 1971. For more information or a quote, contact Louis or Rich at (713) 660-0100.

Dealer inquiries invited.

## INTERFACE ELECTRONICS

6710 ALDER • HOUSTON, TEXAS 77081 • (713) 660-0100  
 See Us at NAB Booth 1620A

Circle (79) on Reply Card



# Unlock HAWKEYE's Performance with this Plumbicon\* tube, the new 1/2-inch 80XQ.



## It gave RCA what they needed to create the HAWKEYE.

RCA's HAWKEYE, introduced at NAB in 1981, is a new breed of lightweight, modular recording camera systems that go just about anywhere...producing broadcast-quality video tapes.

Key to HAWKEYE's performance is the revolutionary 1/2-inch Plumbicon 80XQ (with its specially designed deflection coil) the world's first broadcast quality electrostatic focus 8mm pickup tube.

A radical approach to pickup tube technology, the 80XQ offers performance equivalent to that of the larger Plumbicon tubes that have led the broadcast industry since 1964.

**But be careful**—HAWKEYE is also offered in an optional Saticon version. HAWKEYE cameras cannot be modified to accept Plumbicon tubes after Saticon tubes have been installed. Compare these RCA published comparisons of the HAWKEYE with Plumbicon and Saticon tubes:

But that's not all. The electrostatic focus of the 80XQ insures excellent resolution in the corners—virtually the same as in the picture center. And the published registration performance is met without the need for computer matching into triplets of coils and tubes. So if you ever have to replace a tube you can be confident of holding registration. With a Saticon version you may be faced with changing tube and coil assemblies, and fitting them to the optical block.

If you are considering buying HAWKEYE, then you have weight, power, sensitivity and resolution on your mind. It makes sense to specify the 80XQ Plumbicon—the tube **designed** with these things in mind.

To learn more, contact:  
Amperex Electronic Corporation,  
Slatersville Division, Slatersville,  
Rhode Island 02876. Telephone:  
401-762-3800.

	with 80XQ Plumbicon	with 1/2-inch Saticon
Weight	8.8 lb	9.6 lb
Power	18.0 w	23.0 w
Sensitivity	46.0 fc	70.0 fc

**80XQ...**  
**An Eye Opener For Hawkeye**

\* Registered trademark of N.V. Philips of the Netherlands

## Amperex®

... dedicated to product excellence

A NORTH AMERICAN PHILIPS COMPANY

Circle (80) on Reply Card

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



# We've got you covered!

## Cetec CP Antennas mean superior signal coverage throughout your service area!

Television Antennas, both circularly and horizontally polarized, including The Spiral omnidirectional CP/TV and ring-panel directional CP/TV; horizontally polarized slot antennas, and corner reflectors.

FM/CP Radio Antennas of every type and power, including very low and very high-power antennas, the all-purpose JSCP Series B, and many others, all customized to your specifications.

JSCP Series B



Slot HP/TV



Ring Panel CP/TV



JHCP High Power



## Cetec Antennas

6939 Power Inn Rd. Sacramento, CA 95828  
(916) 383-1177 Telex: 377321

Circle (81) on Reply Card

## Exhibits roundup

### Anvil Cases

Booth 2410

Established products \_\_\_\_\_

**ATA 300:** Category 1 transit cases for the video and broadcast markets

**Series:** Rack-mount enclosures and cases

New products \_\_\_\_\_

To be announced \_\_\_\_\_

Circle (420) on Reply Card

### Apert-Herzog Corporation

Booth 2929

New products \_\_\_\_\_

**Series:** Digital video processor

Circle (421) on Reply Card

see ad on page 204

### Aphex Systems Ltd.

Booth 2704

Established products \_\_\_\_\_

**AXIIB:** Broadcast aural exciter

**AXIIS:** Studio aural exciter

**EQF-2:** Modular parametric equalizer/filter

**CX-1:** Modular compressor/expander

**1537A:** Voltage controlled attenuator IC

**VCA505:** Voltage controlled attenuator PC card

**VCA500A:** Retrofit for MCI 500 console VCA

**2521:** Op-amp block-retrofit for API 2520

New products \_\_\_\_\_

**CX-1S:** Stereo rack-mount version of above

**EQF-2S:** Stereo rack-mount version of above

Circle (802) on Reply Card

### Arrakis Systems

Booth 1824

Established products \_\_\_\_\_

**250SC:** Audio console

**500SC:** Audio console

**500R:** Audio console

**1000R:** Audio console

**2000SC:** Audio console

New products \_\_\_\_\_

**150SC:** Audio console

**100RS:** Routing switcher

**2000SC:** Audio console

Circle (422) on Reply Card

see ad on page 281

### Arriflex Corporation

Booth 2109

Established products \_\_\_\_\_

**Series:** ARRI daylight HMI lights, 200 to 6000W

**Series:** Arriflex image stabilizers

**Series:** Arriflex motion picture equipment

New products \_\_\_\_\_

**Series:** 6000W ARRI daylight HMI lights

**Series:** ARRI fluid head tripods

Circle (803) on Reply Card

### Artel Communications Corporation

Booth 2624

Established products \_\_\_\_\_

**SL-2000:** Fiber-optic video/audio transmission system

**EN-1000:** Fiber-optic ENG/EFP transmission system

**C-1000:** Fiber-optic ENG/EFP field cable

New products \_\_\_\_\_

**Series:** Miniaturized ENG/EFP

transmission system

**Series:** Audio/data subcarrier modules

**ACU-2000:** Fiber-optic alarm control unit

**Series:** Fiber-optic video/audio on-line test meter

Circle (423) on Reply Card

### Asaca/Shibasoku Corporation of America

Booth 3308

Established products \_\_\_\_\_

**Series:** Color video monitors, video signal generators and analyzers, camera and VTR-analyzers

New products \_\_\_\_\_

**CB53A1:** Color bar generator also provides red field, black and multiburst, crosshatch or dot signals

**#725:** Automatic distortion analyzer uses digital techniques for harmonic separation

Circle (804) on Reply Card

see ad on page 103

### Atlas Tower Corporation

Booth 1918

(Also see V&B Tower Construction)

Established products \_\_\_\_\_

**Series:** AM, FM and TV broadcast towers

Circle (424) on Reply Card

### Audico

Booth 2501

Established products \_\_\_\_\_

**System III:** Videocassette tape loader/reloader

**751:** Audio loaders

**200-9:** Audiocassette timer/exerciser/rewinder

**MF6b:** Professional impulser Hockey Puck Splicer

New products \_\_\_\_\_

**Module:** U-matic pay-off for spooling tape

Circle (425) on Reply Card

### Audi-Cord Corporation

Booth 1510

Established products \_\_\_\_\_

**100 series:** Recorders and reproducers, NAB Cartridge

**"A" series:** Recorders and reproducers, NAB Cartridge

Circle (426) on Reply Card

see ad on page 156

### Audio + Design (Audio & Design Recording)

Booth 1514

Established products \_\_\_\_\_

**TD:** Transdynamic tri-band processing system

**EXP:** Ex-press limiter stereo compressor-limiter-expander

**F760X:** Complex-limiter

**F769X:** Stresser combination complex-limiter and 4-band sweep equalizer

**EZ:** Easy-Rider compressor-limiter

**E580:** Selective limiter

**E900:** Sweep equalizer

**E950:** Paragrophic equalizer

**Scamp:** Card Modular system

New products \_\_\_\_\_

**F801:** Broadcast limiter

Circle (427) on Reply Card

see ad on page 131

### Audio Kinetics (UK) Ltd.

Booth 1505



**Slow Motion  
Sync Roll Coincidence Disk  
Splits Math Tag Comments  
S/O Circle SPEED Lines Sync Video Seg Pad CRT**

**HELP**

**is available at  
NAB  
Booth #3327**

**datatron, inc.**  
**VIDEO SYSTEMS DIVISION**

2942 Dow Avenue, Tustin, California 92680 (714) 544-9970 • TWX 910-595-1589

Circle (82) on Reply Card

March 1982 *Broadcast Engineering* 91

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

In an era of new technology and changing social values, the Royal Wedding is a throwback to another century. And for a few unhurried hours, the entire world will take the time to enjoy this real life fairy tale.

Satellites will carry the signals around the globe. But for many, including those in America, the Royal Wedding will be seen on tape. The scheduling is tight. The ceremony will go on the air while the procession is still being recorded. There is no time for second chances.

That's why Scotch® Video Tape was there when the Royal Wedding was first recorded. And again when the Moon Walk was first recorded. And again when the Space Shuttle Landing was first recorded.

U.S.-Russia Hockey Game. The Return of the Hostages. The Eruption of Mount St. Helens. Whenever there was one chance to get it, chances are they got it on Scotch Video Tape.

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

Magnetic A/V Products Division/3M.



"Scotch" is a registered trademark of 3M.





**HISTORY IS RECORDED ON SCOTCH VIDEO TAPE.**

3M hears you ...

**3M**

## Exhibits roundup

### Audio Kinetics (continued)

#### Established products

**Q-LOCK:** SMPTE time code synchronizer

**310:** Generator and remote transport control

#### New products

**Series:** Custom designed post-production operating software

Circle (428) on Reply Card

### Audio Techniques

**No booth at press time**

See MCI listing

#### Established products

**MCI:** Tape recorders and consoles

Circle (429) on Reply Card

### Audio-Video Engineering Company

**No booth at press time**

#### Established products

**HSC-1:** Hum stop coil

Circle (805) on Reply Card

see ad on page 196

### Aurora Systems

**Booth 2806**

#### Established products

**Aurora 100:** Digital videographics system

Circle (430) on Reply Card

### Autogram Corporation

**Booth 2748**

#### Established products

**AC-6:** 6-channel audio console

**AC-8:** 8-channel audio console

**IC-10:** 10-channel audio console

**T-8:** Frequency response test set

Circle (431) on Reply Card

### BCS/Kaman

See Kaman Sciences

### BEI (Beston Electronics Inc.)

**Booth 3207**

#### Established products

**CG2000:** High resolution video production titler

**DP1000:** Data-prompter/character generator

**709:** Automatic light controls

#### New products

**CG3000:** High resolution video production titler

Circle (436) on Reply Card

see ad on page 269

### BGW Systems

**Booth 2841**

#### Established products

**75:** 25W/channel stereo power amplifier

**150:** 50W/channel stereo power amplifier

**250:** 100W/channel stereo power amplifier

**750:** 225W/channel stereo power amplifier

**SRM10:** Tannoy monitors

**SRM12:** Tannoy monitors

**M1000:** Tannoy monitors

Circle (437) on Reply Card

### BPI (Broadcast Programming

International

**Booth 1512**

#### Established products

**Format:** Album rock

**Format:** Classic rock

**Format:** Adult contemporary (announced or unannounced)

**Format:** Bright 'n beautiful

**Format:** Country living (announced or unannounced)

**Format:** Easy listening (announced or unannounced)

**Format:** Traditional MOR

**Format:** Beautifully yours

**Format:** Concert overtures & encores (announced short classical selections)

#### New products

**Format:** Heritage concerts (announced full-length classical selections)

Circle (438) on Reply Card

### The BTX Corporation

**Booth 2301**

#### Established products

**BTX Shadow:** Fully intelligent interface for multimachine control of audio, video and film transports

**Models 5100, 5200, 5300 and 5400:**

SMPTE/EBU time code generators/readers and character inserters

#### New products

**Series:** SMPTE/EBU/VITC time code products, based on a modular, microcomputer design. Compatible with longitudinal and VITC formats, complete RS232C interface makes it

**preamps**

**turntables**

**amps**

**tone arms**

**mixers**

**equalizer-couplers**

## Money in the bank!

When you increase efficiency, cut down time and improve the quality of your broadcast, you put money in the bank. RUSSCO does it and shines with the quick-starting MARK V Vari-Speed turntables, our audio mixers, phono preamps and power and distribution amplifiers. What's NEW is the RUSSCO all metal Tone Arm...Solid, Smooth & Reliable! The NEW 4 channel TEL-A-MOTE Remote Mixer is the sportscaster's small dream machine that ties up perfectly with the NEW T112 Studio Equalizer / Coupler that greatly improves the sound of remotes & talk shows. The NEW MA220 Stereo Monitor Amp gives you separate level & tone controls for each channel. Call Barbara Gaudin for catalog sheets with great specs and Low prices.

See Us at NAB Booth 1806

You can Rely on **RUSSCO**

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# EXCITED?



**SURE WE  
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HERE'S THE  
REASON WHY...**

We Have:

**New** Fresnels

**New** Color Track Expanded Capacity

**New** Channel Track II Memory System

All Designed to Save You Time and Money

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**NAB Booth No. 3317**

## **Colortran.**

1015 Chestnut Street, Burbank,  
California 91506, Tel. 213 843-1200

P.O. Box 5, Burrell Way, Thetford  
Norfolk, IP24 3RB, U.K., Tel. Thetford 2484

## Exhibits roundup

### BTX (continued)

compatible with all editing computers.

Circle (451) on Reply Card

see ad on page 267

### Bayly Engineering

See AEG-Telefunken

### Beaveronics

#### Booth 2306

Established products

**712:** 4-bus, 12-input video production switcher with EFF/KEY Amp and MIX Amp

**BI-154:** 4-bus, 15-input video production switcher with MIX/EFF/KEY Amp and MIX/KEY Amp

**BI-156:** 6-bus, 15-input video production switcher with two MIX/EFF/KEY Systems

**QMS:** FAVAC precision master clock systems

New products

**DSK-6-DL:** Stand-alone downstream keyer, specifically designed for character generator inserts

Circle (452) on Reply Card

### Belden Communications

#### Booth 2737

Established products

**Series:** Lee filters Colormedia

New products

**HMI:** High wattage unit that replaces Brute arc lights

Circle (439) on Reply Card

### Beyer Dynamic

#### Booth 2915

Established products

**DT 48:** Audio metric monitoring headphone

**DT 108:** Single muff/mic intercom headphone

**DT 109:** Double muff/mic intercom headphone

**DT 480:** Sound reinforcement monitoring headphone

**M 69:** General applications moving coil microphone

**M 88:** General applications moving coil microphone

**M 400:** Live vocal moving coil microphone

**M 500:** Live vocal ribbon microphone

**M 600:** Living vocal moving coil microphone

New products

**MCE5.11:** TV broadcast mini clip-on microphone

**US 85:** Hand-held wireless microphone

Circle (446) on Reply Card

see ad on page 185

### Bird Electronic Corporation

#### Booth 3204A

Established products

**8630 Series:** MODULOAD self-cooled line terminations

**8730 Series:** Water-cooled load resistors

**4380 Series:** RF power analyst

**3127:** RF power monitor/alarin

**3171:** Hi-speed transmission line monitor/alarin

**4712-4802:** Thruline RF wattmeters

### 8800-8900 Series: Air-cooled loads

New products

**8630-601 Series:** Moduload RF calorimeter/load system

**4391:** RF power analyst

**4388:** RF power analyst

**4384:** RF power analyst

**8730-677:** Dolly-mounted, water-cooled load resistor series

Circle (441) on Reply Card

### Blonder-Tongue Laboratories

#### Booth 2312

Established products

**Series:** BTVision fully addressable encoder and decoder STV system

Circle (442) on Reply Card

### Bogen Photo Corporation

#### Booth 2918

Established products

**Series:** Bogen Tripods

**Auto Pole:** Background Support System

**Series:** Super Boom

**Series:** Camera stands

**Series:** Light stands

**Series:** Metz electronic flash units

**Series:** B&W filters

New products

**3063:** Mini fluid head

**3066:** Cine/video fluid head

**3067:** Cine/video dolly

**3061:** Bogen heavy-duty tripod

**3068:** Bogen universal tripod

**3115:** Super "C" swivelling clamp

**2965:** Ball leveller for mini fluid head

**Series:** Bogen quartz lights/kits

Circle (443) on Reply Card

### Bogner Broadcast Equipment Corporation

#### Booth 1711

Established products

**B Series:** High-power UHF TV broadcast antenna

**B4UA:** UHF low-power TV broadcast antenna

**B2VO:** VHF low-power TV broadcast antenna

**BVP:** VHF-TV & FM dipole broadcast antenna

**B8SO:** MDS/ITFS TV broadcast antenna

**BLP1E:** FM circularly polarized broadcast antenna

New products

**LPS4:** LPTV broadcast antenna

**DK21:** MDS receiving antenna

Circle (444) on Reply Card

### Robert Bosch GmbH

See Fernseh

### Walter S. Brewer Company

#### Booth 1915

Established products

**Series:** Lighting equipment

**Series:** Curtains

**Series:** Control systems

New products

**Series:** Telescoping hanger

**Series:** Short form product catalog

Circle (453) on Reply Card

### Broadcast Audio Corporation

#### Booth 1920A

## WHERE TO FIND SONY WIRELESS SYSTEMS.

### AUDIO VIDEO RECORDERS/ARIZONA

Phoenix

Floyd Ramsey (602) 277-4723

### ROH'S INC.

Tucson

Bill Roh (602) 795-8573

### AMERICAN ELECTRONIC SUPPLY/CALIFORNIA

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Maurly Rosenthal (213) 464-1144

### AUDIO SERVICES CO.

N. Hollywood

Mark Chatinsky (213) 980-9891

### HOFFMAN VIDEO SYSTEMS

Los Angeles

Ken Williamson (213) 749-3311

### SOUND GENESIS

San Francisco

Dave Angress (415) 285-8900

### FIDELITY SOUND CO./DISTRICT OF COLUMBIA

Washington, DC

Ed Lacomis (202) 296-9110

### HARRIS AUDIO SYSTEMS/FLORIDA

No. Miami

Mike Harris (305) 944-4448

### FALCONE INTERNATIONAL INC./GEORGIA

Marietta

Fred Orton (404) 427-9496

### ROSCOR CORP./ILLINOIS

Morton Grove

Lee Ruber (312) 966-3010

### NICHOLS ELECTRONICS/KANSAS

Overland Park

Grady Golden (913) 492-2151

### PIERCE PHELPS/MARYLAND

Bethesda

Fred Bergstrasser (301) 984-7979

### TECHNIARTS

Silver Springs

Bill Moore (301) 585-1118

### CRAMER VIDEO INC./MASSACHUSETTS

Needham Heights

Dan Mulhern (617) 449-2100

### GENERAL TV NETWORK/MICHIGAN

Oak Park

Doug Mumley (313) 548-2500

### HY JAMES ENTERPRISES

Ann Arbor

Henry Root (313) 994-0934

### WESTERN MEDIA ENTERPRISES/NEVADA

Las Vegas

Pete San Filippo (702) 362-4170

### ALTEL SOUND/NEW YORK

New York

Ozzy Reiter (212) 889-9700

### CAMERA MART

New York

Jeff Wohl (212) 757-6977

### MARTIN AUDIO VIDEO

New York

Mike Bogen (212) 541-5900

### MASQUE SOUND

New York

Jack Shearing (212) 245-4623

### PIERCE PHELPS/PENNSYLVANIA

Philadelphia

Frank Brady (215) 879-7000

### RIO RADIO/TEXAS

McAllen

Mark Garcia (512) 682-5224

### AVEC ELECTRONICS CORP./VIRGINIA

Richmond

Lee Merritt (804) 359-6071

### CUSTOM VIDEO SYSTEMS/WASHINGTON

Seattle

Al Harwood (206) 365-5400

### FULL COMPASS INC./WISCONSIN

Madison

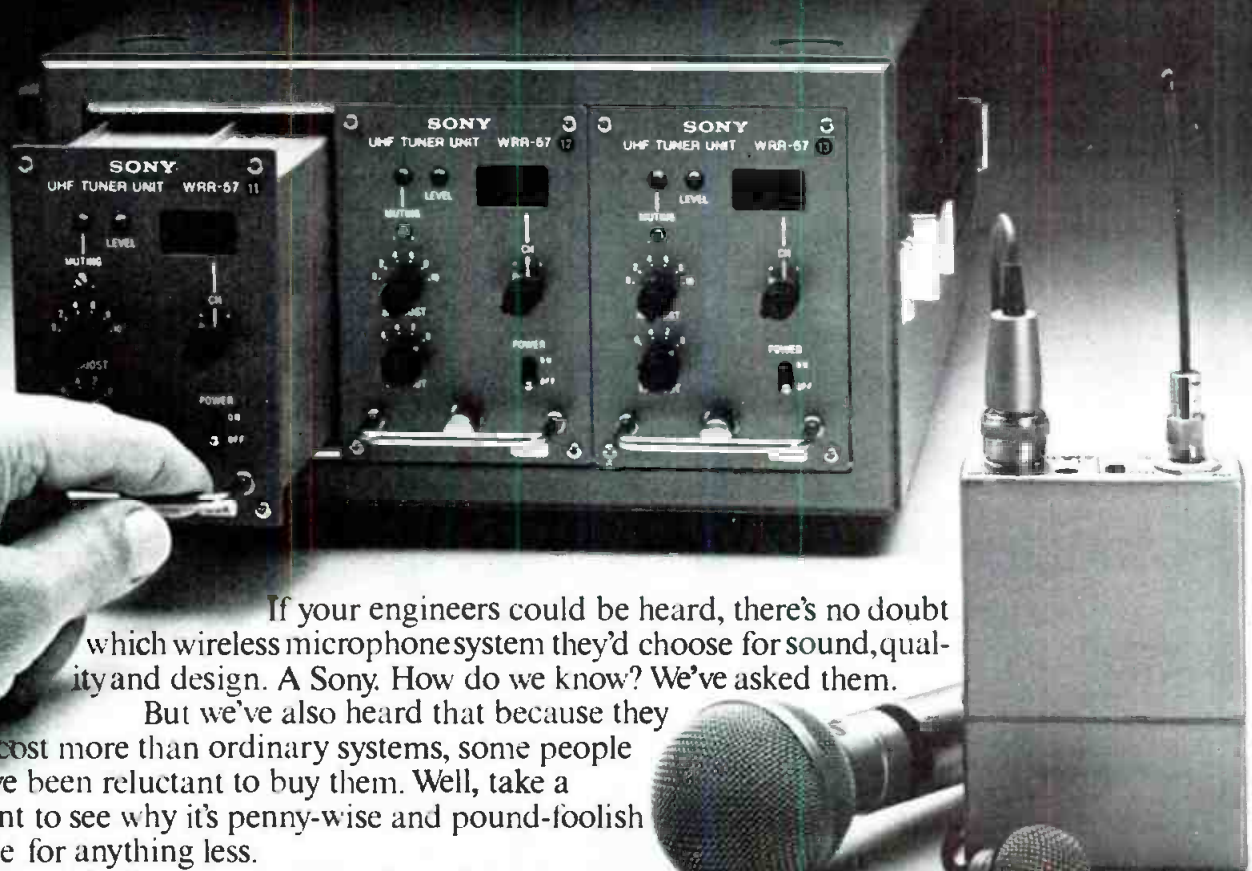
Jonathan Lipp (608) 271-1100

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# THE SYSTEM EVERY SOUND ENGINEER WOULD BUY IF HE CONTROLLED THE PURSE STRINGS.



If your engineers could be heard, there's no doubt which wireless microphone system they'd choose for sound, quality and design. A Sony. How do we know? We've asked them.

But we've also heard that because they cost more than ordinary systems, some people have been reluctant to buy them. Well, take a moment to see why it's penny-wise and pound-foolish to settle for anything less.

First, the modular combination of Sony receivers and diversity units makes it the most flexible system you can buy. The portable rack can be used with either three receivers as shown above or two receivers and a diversity unit. So it satisfies virtually any production requirement. Second, it's the *only* modular system. Not a hodgepodge like competitive systems. Which means it can be set up and rearranged in a mere fraction of the time it takes to set up other systems. And finally, because it's a Sony, you're assured of something else: superior sound quality and worry-free operation.

So if you're in the market for a wireless microphone system, remember, if it costs less than a Sony, you're getting exactly what you bargained for. For the facts about the state of the art in wireless microphone systems, including 19" rack mounting for studio installation, con-

**SONY**  
Professional Audio

sult our dealer listing. ©1982 Sony Corp. of America, 9 W. 57th St., New York, NY 10019. Sony is a registered trademark of the Sony Corp.

Circle (86) on Reply Card

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

## Exhibits roundup

### Broadcast Audio (continued)

#### Established products

**System 20/16/12/8/5:** Audio consoles

**BA-235/435:** Monitor amplifiers

#### New products

**System 14:** Digital audio console

**BA-6x4:** Distribution amplifier

**BA-205:** Phono preamp

Circle (449) on Reply Card

see ad on page 256

### Broadcast Cartridge Service

**Booth 2316**

#### Established products

Fone Box

**Series:** Aristocart, Capitol Audiopak and

Fidelipac Audio Cartridges.

**Series:** Storage Systems, alignment tools and accessories

Cartridge Reloading Service

Circle (445) on Reply Card

### Broadcast Controls

Exhibiting with Broadcast Audio

### Broadcast Electronics

**Booth 3104**

#### Established products

**FM-30:** 30kW FM transmitter

**FX-30, FS-30, FC-30:** Operating demonstration of FM exciter, stereo generator and SCA generator.

**Series:** 4-, 5-, 8- and 10-mixer mono

and stereo console

**Series:** Single-, 3-, and 5-deck tape cartridge record/play, mono/stereo equipment

**12/C:** 3-speed turntable; Galaxy turntable;

EP-1 phono preamp; S-320 tone arm

**Series:** Telephone answering systems

**Control 16:** Program automation system

#### New products

**SAT 16:** Satellite-programmed automation system

Circle (352) on Reply Card

### Broadcast Marketing Associates

**No booth at press time**

#### Established products

**Service:** Distributor for Amtel, Cezar Int'l., Fernseh, Harris Video Systems, ITE, Lowel-Light, Philips Test & Measuring Equip., Q-TV, Tektronix, Winsted, Videotek and others

#### New products

See at booth

Circle (454) on Reply Card

### Broadcast Systems Inc. (BSI)

**Booth 2803**

#### Established products

**Series:** Dynatech video jack panels & accessories

**Series:** Electrohome monochrome broadcast video monitors

**Series:** Leader audio-video test equipment (full line)

**Series:** Canadian Amphenol Precision video cable

**Series:** Westpin audio cable

**Series:** Lenco video terminal equipment

**Series:** Stantron cabinet racks

#### New products

**BJ-240:** Prewired audio jack panel system

Circle (447) on Reply Card

### Broadcast Technology

**Booth 2115**

#### Established products

**AM 3001:** Microphone preamplifier

**AU 3101:** Universal line amplifier

**AD 3108:** 8-output distribution amplifier

**AP 3210:** 10W monitor amplifier

**AS 3316:** 16x1 audio switchcard

**MA 110:** Meter amplifier

#### New products

**OA 400:** Operational amplifier

**PS 3400:** Power supply card

**PR 3402:** Power supply regulator card

**AE 3002:** Equalizer film preamplifier

**AG 3501:** Remote-controlled graphic equalizer card

**CF 9101:** Card frame

**DD 9307:** On-air digital profanity delay

Circle (450) on Reply Card

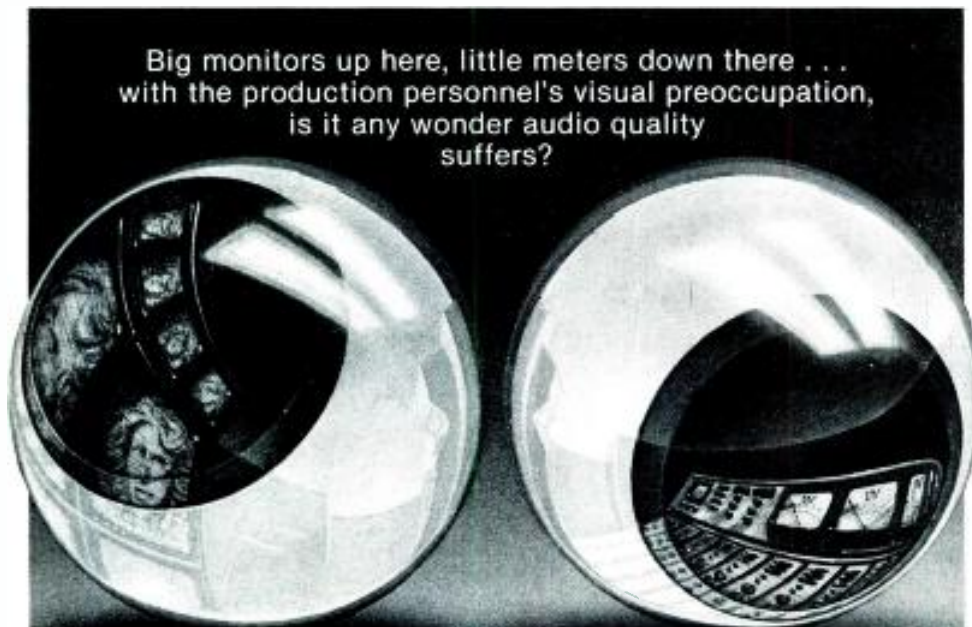
### Broadcast Video Systems Ltd.

**Booth 2706**

#### Established products

**BVS:** Video and pulse delay lines

**BVS:** Low pass video filters and CCIR



# The <sup>uni</sup>VUer puts it all together!

*Dynamic bar graph display over monitor video!*

- 2-channel for stereo monitoring
- Display size and position variable
- Selectable PPM/VU ballistics
- Peak flasher
- Adjustable silence sense
- Transparent to monitor video
- **RACK MOUNT OR PORTABLE**
- Compatible with European standards
- Master control monitoring
- Editing suites
- Production control rooms
- VTR bridges
- Boss' office
- Anywhere in the program monitoring chain
- **ENG/EFB — in line with monitor video return provides camera operator with audio CONFIDENCE**

See you in Dallas NAB booth 2621

## THE REAL WORLD TECHNOLOGIES GROUP, INC.

Santa Ana, CA (714) 957-1061

Technology Development Services by Microsystems Institute



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# HERE IS YOUR **NEW** UHF 5 KW STANDBY



**The ACRODYNE TT-3480U  
is THE ONLY single tube, 5 kW UHF TV transmitter that is:**

- **FCC type accepted**
- **in continuous production for over two years**
- **field proven in standby service throughout the U.S.**

This transmitter combines the latest in solid-state and tetrode technology. Low level diplexing, pioneered by Acrodyne, and IF modulation insures many outstanding features for UHF broadcasters. These features include: 10 second instant-on from a cold start; all solid-state, broadband, hybrid-combined drivers and integrated forced air cooling.

The TT-3480U is also ideal as a primary transmitter

in full service broadcast applications licensed to operate at minimum power. A pair of TT-3480U's will provide 10 kW in a redundant configuration that eliminates your need for a standby transmitter. Acrodyne manufactures a complete line of TV transmitters, utilizing tetrodes, up to 10 kW UHF and 25 kW VHF. Acrodyne means innovation in TV transmitter technology.

**SEE US AT NAB BOOTH #3315**

# ACRODYNE

Acrodyne Industries, A Unit of Whittaker Corporation  
516 Township Line Rd., Blue Bell, PA 19422  
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**Whittaker**

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## No one can match The Complete Lightning Protection Systems from LEA.

- ANTENNA DISSIPATION ARRAYS FOR AM, FM, TV, MICROWAVE TOWERS
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- TRANSIENT ELIMINATORS FOR DATA LINES, PHONE LINES, COMMUNICATIONS EQUIPMENT WITH A FREQUENCY RESPONSE FROM D.C. TO 1 GIGAHERTZ.
- LIGHTNING WARNING SYSTEMS PROVIDING 1/2 HOUR ADVANCE WARNING OF AN APPROACHING STORM.
- SURGE AND TRANSIENT GENERATORS
- GROUND SYSTEMS
- CONSULTING SERVICES
- PERFECT POWER VOLTAGE REGULATORS

### LIGHTNING ELIMINATION ASSOCIATES



12516 Lakeland Road  
Santa Fe Springs, CA 90670

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TWX: 910-586-1381

See Us at NAB Booth #1616

Circle (89) on Reply Card

## Exhibits roundup

### Broadcast Video (continued)

noise measurement filters  
COX 203: NTSC encoder  
COX 339: Color balance corrector  
BVS PW-200: Pulse width test set  
BVS LS 300: Line selector  
New products \_\_\_\_\_  
EV4060: Color signal monitor  
BVS VMA-400: Dual video mix amp with companion audio-follow mixer  
BVS BB-1200: "Bang Box," passive video switcher

Circle (448) on Reply Card

### CEI

See Commercial Electronics

### CMC Technology Corporation

Booth 1802

Established products \_\_\_\_\_  
Service: Tape head refurbishing  
AE1200: Auto equalizer  
AE2000: Auto equalizer  
VEC1200: Velocity error corrector  
VEC2000: Velocity error corrector  
DG1200: Differential gain channel amplifier  
New products \_\_\_\_\_  
Videotape leader generator

Circle (456) on Reply Card

### CMX Systems, ORROX Corporation

Booth 3304

Established products \_\_\_\_\_  
340X: Computer-assisted editing system  
The "Edge": Microprocessor editing system  
New products \_\_\_\_\_  
Series: Software features for 340X  
Series: New enhancements for the "Edge"

Circle (489) on Reply Card

see ad on page 13

### CSI Electronics

Booth 1606

Established products \_\_\_\_\_  
T-1-A: Single cabinet high level modulated AM transmitter  
T2.5A1: Single cabinet high level modulated AM transmitter  
T-10-A: Dual cabinet high level modulated AM transmitter  
T-1-F: Single cabinet solid-state IPA FM transmitter  
FM3000E: Single cabinet grounded grid FM transmitter  
FM5000E: Single cabinet grounded grid FM transmitter  
FM12000E: Single cabinet grounded grid FM transmitter  
T-25-F: Dual cabinet grounded grid FM transmitter

EX-20F: Solid-state synthesized FM exciter

New products \_\_\_\_\_  
T-25-A1: Dual cabinet high level modulated AM transmitter: directional antenna phasing equipment

Circle (457) on Reply Card

see ad on page 225

### Cablewave Systems

Booth 3206

Established products: \_\_\_\_\_  
Series: Coaxial and elliptical waveguide

transmission line systems

Series: Parabolic antennas

Series: RF connectors

Series: Pressurization equipment

Series: Mounting hardware

New products \_\_\_\_\_

Coaxial transmission line

Circle (458) on Reply Card

see ad on page 231

### California Microwave

Booth 2105

Established products \_\_\_\_\_  
SAT10: Radio program receive-only earth station  
New products \_\_\_\_\_  
AD2A: Dual-frequency downconverter

Circle (459) on Reply Card

### Cambridge Products

Booth 1916

Established products \_\_\_\_\_  
Series: RF and UHF coaxial connectors

Circle (460) on Reply Card

### The Camera Mart

Booth 2010

Established products \_\_\_\_\_  
Product lines: Ikegami, Sony, Panasonic, Sharp, JVC, Videotek, Microtime, Vinten/Listec, O'Connor, Ronford, Peter Lisand.

Series: Test and processing equipment

New products \_\_\_\_\_

Ikegami EC-35: New electronic cinematography camera

Circle (490) on Reply Card

### Canford Audio (North America) Ltd.

Booth 2817

New products \_\_\_\_\_  
Range audio cables  
Range foil shielded snake cable

Circle (461) on Reply Card

### Canon USA

Booth 3305

Established products \_\_\_\_\_  
Studio lens: B18X16B and PV18X12B  
ENG lens: J13X9BIE Type 2, J25X11.5B  
Accessories for above  
New products \_\_\_\_\_  
PV40X13.5BIE: OB lens for 1-inch tube camera: focal length 13.5 ~ 540mm; f/1.7. This lens will have a pattern projector and built-in 2X extender or combination of 1.5X extender and 2X extender  
J15X8.5BIE: Lens for 3/4-inch studio camera: focal length 8.5 ~ 928mm; f/1.6 with built-in 2X extender  
J15X9.5B: For 3/4-inch ENG camera: focal length 9.5 ~ 143mm; f/1.8

Circle (491) on Reply Card

see ad on page 25

### Capitol Magnetic Products

Booth 3127

Established products \_\_\_\_\_  
A-2: Broadcast cartridge for mono/music  
AA-3: Broadcast cartridge designed for music broadcasting

Circle (462) on Reply Card

see ad on page 26

### CeCo Communications

Booth 1804

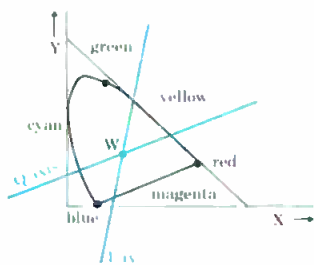
Established products \_\_\_\_\_



# HIGH I/Q

## **ASACA/ Shibasoku's CMM Series monitors decode color on the I/Q axis.**

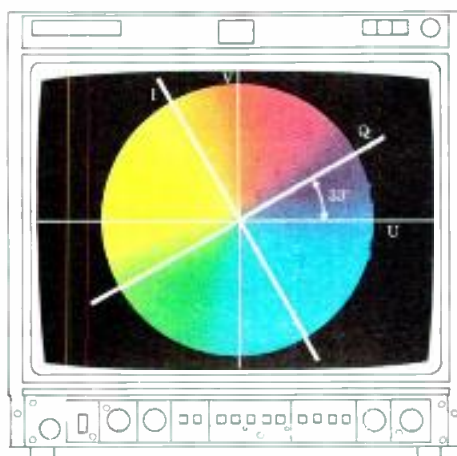
Asaca/Shibasoku's new high resolution monitors have the I-Q to deliver color performance other monitors simply cannot produce. Using R-Y, B-Y decoding no longer meets the demands of today's professional standards.



*I-Q axes in color triangle.*

The Asaca/Shibasoku monitor like the human eye resolves certain colors best; reds, oranges, yellows, and flesh tones. The I-Q decoding system enables the monitor to display these colors at a higher resolution using wide band demodulation of 1.3 MHz rather than 0.5 MHz as in R-Y, B-Y systems.

We cared enough to give you a monitor with the I-Q to reproduce the best possible pictures. We know you're smart enough to buy it.



**ASACA**  
**ASACA/SHIBASOKU**  
**CORP. OF AMERICA**

1277 Rand Road, Des Plaines, Illinois, 60016  
Telephone (312) 298-4380  
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### **FEATURES**

- 20" and 14" models available—high resolution delta CRTs.
- I-Q wide band demodulation system.
- Complete board interchangeability between models.
- Switchable high performance comb filter and aperture correction.
- Multi-standard capabilities (NTSC, PAL, SECAM) on all models. Switchable from the front panel (20" model). No adjustments necessary because of digital sync circuitry.
- Dynamic focus insures perfect focus on all areas of CRT. Adjustable from the front panel.
- Special feedback circuits guard against color changes due to variations in temperature.
- Active convergence—40 controls allow precise adjustment on all areas of CRT.
- Pulse cross with expanded vertical blanking interval.
- OPTIONS... Built-in color bar or cross hatch patterns. Built-in safe title marker generator. Multi-standards. RGB inputs.
- TWO YEAR WARRANTY ON ALL PARTS AND LABOR INCLUDING THE CRT.

## Exhibits roundup

**CeCo (continued)**

**Series:** Tubes and semi-related broadcast components

**Circle (463) on Reply Card**

**Central Dynamics Ltd.**

See also American Data and Philips

**Booth 3208**

**Established products** \_\_\_\_\_

**CD480/4/16:** Compact Video production switcher

**CD480-10/24:** Video production switcher

**CAP2XL:** Computer-assist production accessory

**MC990-7/24:** Master control switcher

**APC-910:** Machine control

**VS-14RB:** Small production switcher

**New products** \_\_\_\_\_

**APC-920:** True time broadcast automation system

**2170:** 1-bus quadplexer-digital test signal generator

**2300A:** Full range video and audio distribution

**8000:** Amplifiers

**CD480-65:** Video production switcher

**Circle (464) on Reply Card**

see ads on pages 43, 187

**Century 21 Programming**

**Booth 1503**

**Established products** \_\_\_\_\_

**Series:** Radio automation programming and equipment

**Circle (465) on Reply Card**

**Cetec Broadcast Group**

**Booth 3136**

**Established products** \_\_\_\_\_

**7000:** Level II program automation system

**2007:** 2000 series 8-mix stereo console

**2003:** 2000 series 5-mix stereo console

**8630:** 8000 series 16-channel studio control console

**New products** \_\_\_\_\_

**7000 GLS:** Redefined program automation system targeted at satellite and program services with less demanding source requirements

**1100R:** M.A.P.S. radio business/accounting system

**Circle (492) on Reply Card**

see ad on page 82

**Cetec Vega**

**Booth 3129**

**Established products** \_\_\_\_\_

**77:** Wireless transmitter

**58:** Receiver

**63:** Diversity receiver

**66:** Portable wireless receiver

**80:** Hand-held transmitter with built-in antenna

**EV61:** Microphone element

**Q-Systems** wireless intercom

**New products** \_\_\_\_\_

**QX-1:** Q-system base station

**QX-2:** Q-system base station

**Circle (493) on Reply Card**

**Cezar International Ltd.**

**Booth 1701**

**Established products** \_\_\_\_\_

"The Super Controller"

"The Controller"

"The Editing Center"

"The Decision Maker"

**Circle (466) on Reply Card**

**Chase Media**

**Booth 1912**

**Established products** \_\_\_\_\_

**System:** Broadcast station system for traffic and billing, financials, music format control and word processing

**Circle (467) on Reply Card**

**Christie Electric Corporation**

**Booth 1623**

**Established products** \_\_\_\_\_

**REFLEX-20:** 20-minute burping chargers

**Series:** VTR ni-cad battery packs

**Series:** Camera-mounted battery packs

**Series:** Belt packs

**Series:** Automatic sequencer for eight intermixed batteries

**New products** \_\_\_\_\_

**KSH, KS1:** Super-miniaturized camera-mounted power supply (ac adaptor) for RCA Hawkeye and other cameras

**ER8:** 20-minute recharge ni-cad battery replacement for Sony BP60

On-board battery mounts for Ikegami

HL-83, Hitachi FP21 and FP22

**Circle (494) on Reply Card**

see ad on page 224

**Chyron Corporation**

**Booth 3329**

# DEEJAYS LOVE IT!

**DeeJays love Auditronics' 200 Series on-air console because it** has a slot to plug in their own custom-tailored voice EQ module. They love the 200's variable-threshold compressor/voice-actuated noise gate that allows hands-off processing of live announce or remote signals. DeeJays love the 200's self-contained logic system that starts carts, reel recorders and turntables and permits simple one-button two-way communication between control room and Studios A and B. To learn what else DeeJays love about Auditronics' 200 Series on-air consoles, circle reader service number or call



**auditronics, inc.**

3750 Old Getwell Road  
Memphis, TN 38118/(901) 362-1350



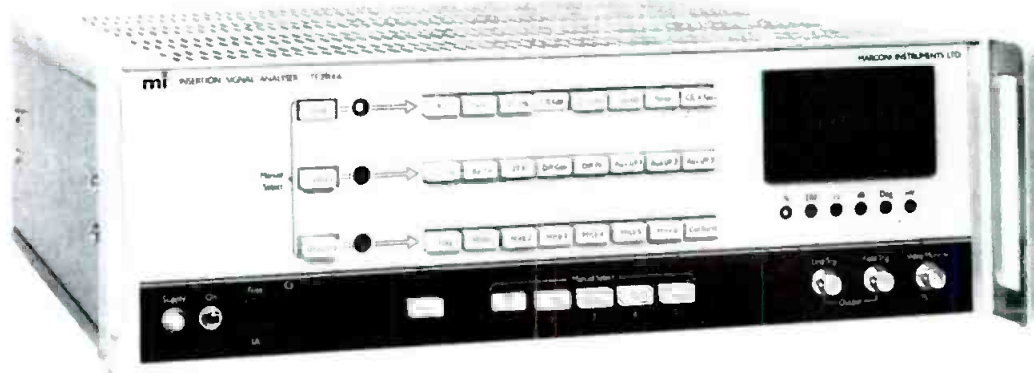
**Circle (91) on Reply Card**



# MARCONI HAS BROADCAST TRANSMISSION TEST UNDER CONTROL

**QUICKLY IDENTIFY VIDEO DISTORTIONS**  
in your transmitter, studio or tape production facility!

SEE US AT  
**NAB**  
BOOTH 3320



**MARCONI 2914A INSERTION SIGNAL ANALYZER**

**VIDEO QUALITY**

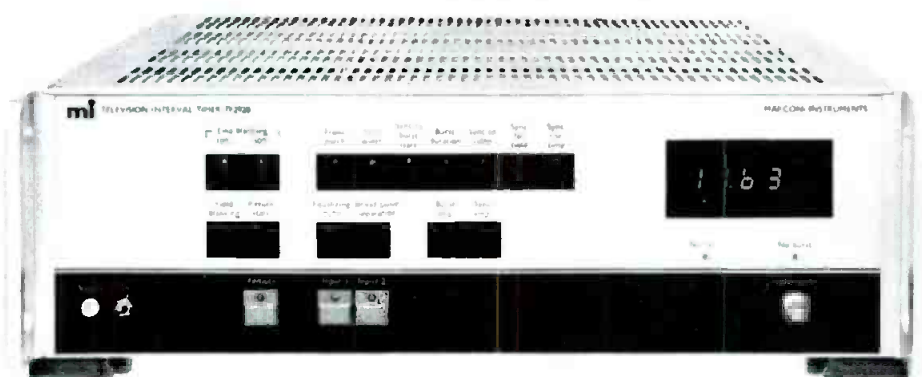
**TRACE AUDIO TRANSMISSION FAULTS**  
end to end, in seconds!



**AWA S1100 AUDIO TRANSMISSION TEST SYSTEM**

**AUDIO QUALITY**

**CATCH EXCESSIVE H & V BLANKING**  
before transmission!



**MARCONI 2920 TELEVISION INTERVAL TIMER**

**VIDEO TIMING**

**marconi**  
instruments

100 STONEHURST COURT, NORTHVALE, NEW JERSEY 07647 • (201) 767-7250  
P.O. BOX 16577, IRVINE, CALIFORNIA 92713 • (714) 857-2326

Circle (92) on Reply Card

## Exhibits roundup

### Chyron (continued)

**Established products**  
**Chyron IV:** Graphics and titling system  
**Chyron RGU:** Graphics and titling system  
**Chyron CCE-UIA:** Cassette cleaner and evaluator  
**New products**  
**M.G.M.:** Multimode Graphics Module/background graphics generator  
 Circle (468) on Reply Card  
 see ad on page 55

### Cine 60

#### Booth 1704

**Established products**  
**Series:** Battery belts and battery packs  
**Series:** VTR batteries  
**Series:** On-camera batteries  
**Series:** Sun-guns  
**Series:** Battery cables  
**Series:** Car chargers  
**Series:** Dememorizers  
**Series:** Shoulder pods  
**Series:** Snaploks, quick-release camera mounts  
**Series:** Multichargers  
**New products**  
**Series:** ac adapters for cameras, VTRs and camera recorders  
 Universal fast charger  
**System:** Emergency battery  
**System:** Mounting system for on-camera batteries  
 Circle (469) on Reply Card  
 see ad on page 236

### Cinema Products Corporation

#### Booth 3144

**Established products**  
**System:** Steadicam film/video camera stabilizing system  
**System:** Camraprompter  
**System:** CP coaxial digital remote control  
**Series:** RDS/HMI Fresnel spot lights  
 CP microphone boom  
 EFP Matte Box  
**New products**  
**Ikegami EC-35:** Video camera  
**System:** CP coaxial digital remote control  
 Zip-Pak  
 GSMO 16mm cameras  
 see ad on page 193

### Circuit Research Laboratories (CRL Systems)

#### Booth 2827

**Established products**  
**AM-4:** AM audio processor  
**AM-1:** AM audio processor  
**FM4C:** FM audio processor  
**FM4:** FM audio processor  
**FM2:** FM audio processor  
**FM1:** FM audio processor  
 Circle (471) on Reply Card

### Clear-Com Intercom Systems

#### Booth 2807

**Established products**  
**RS100A:** Beltpack remote station  
**CS200K:** Main station  
**PS451:** Power supply unit  
**KB115:** Remote speaker station

### CC75B: Single-muff headset

#### CC740B: Double-muff headset

**New products**  
**PS452:** Power supply unit  
**AC12:** Universal interface  
**SB4121FB:** 4-channel switchboard main station  
**MS400:** 4-channel main station  
**RM400:** 4-channel remote station  
**CP100:** Beltpack remote station  
**RS201:** 2-channel remote station  
**CH41/42:** Headset  
 Circle (472) on Reply Card

### Clyde Electronics

#### Booth 2417

**New Products**  
**Alpha series:** Modular mixing consoles  
 Circle (495) on Reply Card

### Colorado Video

#### Booth 3140

**Established products**  
**290:** Monochrome slow-scan TV transceiver  
**New products**  
**250:** Monochrome slow-scan TV transceiver  
**290C:** Color slow-scan TV system  
**930:** Digital disc video storage system  
 Circle (473) on Reply Card

### ColorGraphics Weather Systems

#### Booth 2913

Introducing the Auburn Instruments

## TWO-WIRE MACHINE CONTROL SYSTEM

- Delegate at control room, machine, or routing switcher.
- Economical, modular, easy to install.

See us at NAB booth 2311

### AUBURN INSTRUMENTS

34 Lodge Road  
 Newton, Massachusetts 02165  
 (617) 332-7747

MC/1-IU

INTERFACE UNIT

VT2

RWD

STOP

STBY

PLAY

AI

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

# **HITACHI HEARD YOU.**

## **AUTO SETUP**

Don't want much, do you?

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

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

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

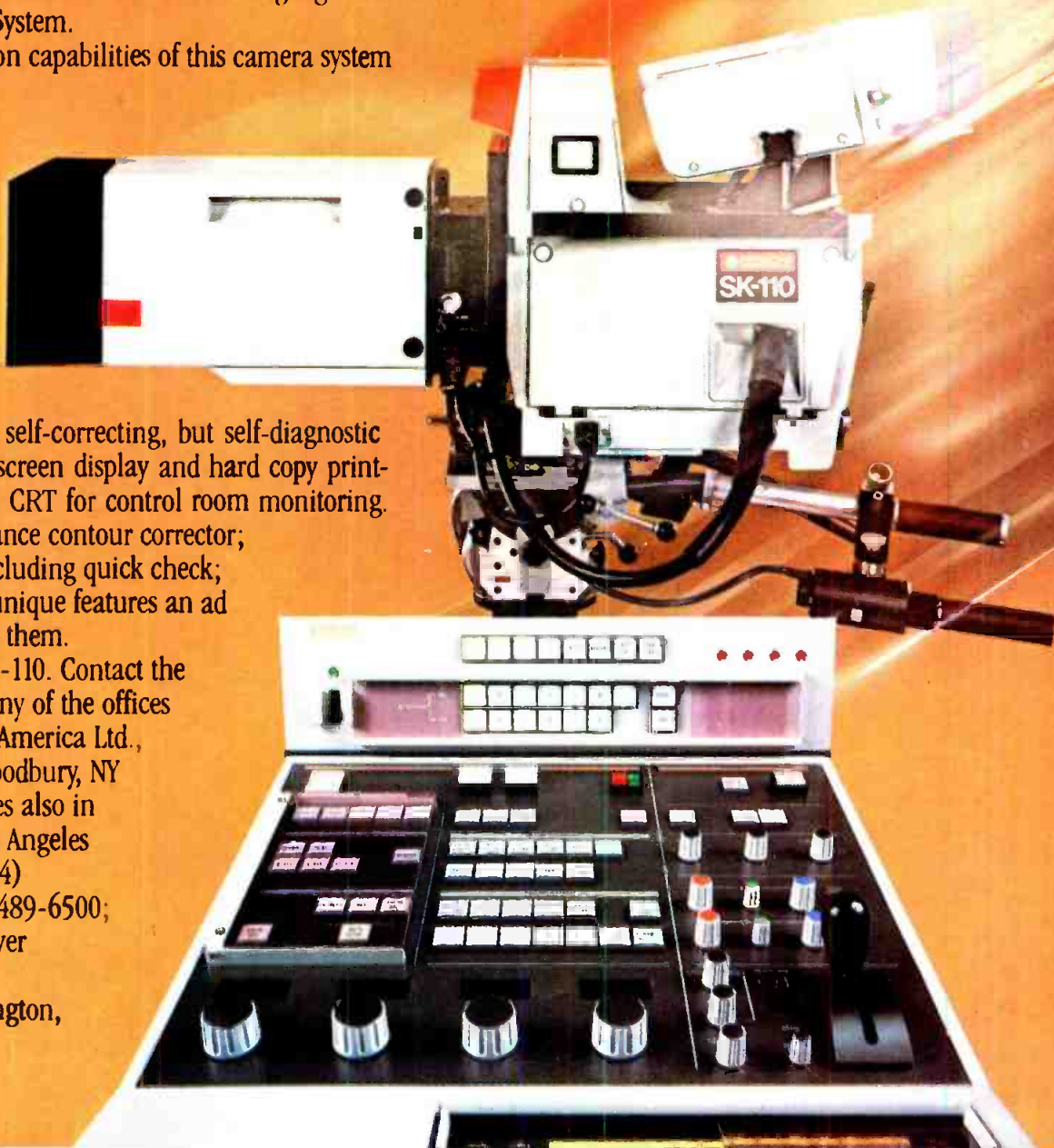
The computer registration capabilities of this camera system  
produce pictures of a  
clarity and resolution  
previously unheard of.

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

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

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

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



## Exhibits roundup

### ColorGraphics (continued)

#### New products

High resolution weather display system  
**Circle (474) on Reply Card**

see ad on page 35

#### Colortran

##### Booth 3317

#### Established products

**100-142:** 6-inch Fresnel  
**100-182:** 10-inch Fresnel  
**100-192:** 12-inch Fresnel  
**213-212:** 8-inch Fresnel  
**530-008:** Pantographs  
**108-382:** Far cyc  
**104-182:** Soft Lite  
**104-171:** Mini Soft Lite  
**104-232/242:** Focusing scoops  
**150-012:** Mini pro kit  
**167-000:** High density dimmer rack  
**168-000:** Channel track  
**165-000:** Control console  
**213-062:** Ellipsoidal  
**213-162:** Zoom ellipse  
**213-102:** Ellipsoidal

#### New products

High performance Fresnels for studio and location lighting.

Lighting control systems

**Circle (475) on Reply Card**

see ad on page 95

#### Columbine Systems

##### Booth 2716

#### Established products

**Systems:** Traffic/Billing, Sales Analysis, Accounting, Film Inventory and Amortization, Media Inventory, Music Inventory and Rotation and Automation Interface.

**Circle (476) on Reply Card**

#### Comark Communications

##### Booth 1709

#### Established products

**CI-1310:** Sound notch  
**CI-1400:** Aural notch  
**CI-2400:** Demodulator  
**CI-2600:** Coaxial tuner  
**CI-2910:** Broadcast demodulator  
**CI-3000:** VHF duplexers  
**CI-5000:** Remote control system  
**CI-6000:** Circular polarized antennas  
**CI-7300:** Hybrid coupler

#### New products

**CI-7300:** Directional coupler  
**CI-7540:** Patch panel  
**CI-7700:** Power divider  
**CI-9000:** Waveguide switch  
**CI-9000:** Coaxial transfer switch  
 TV transmitter cabinets  
 Anode pulser  
 Variable bias supplies

**Circle (477) on Reply Card**

see ads on pages 27, 232

#### Comex Corporation

##### Booth 2829

#### Established products

**Ultamate:** Video matting system

#### New products

**Shively:** FM antennas

**Circle (478) on Reply Card**

see ad on page 246

#### Commercial Electronics Inc. (CEI)

##### Booth 3321

#### Established products

**310:** Modular broadcast color TV camera system

**330:** Modular broadcast color TV camera system

**340:** Self-contained broadcast color TV camera system featuring microprocessor automatics

**Americam:** Broadcast-quality studio camera

**Circle (479) on Reply Card**

#### Compact Video

##### Booth 1604

#### Established products

**Service:** Complete production and post-production facilities as well as a complete range of satellite services

**Circle (470) on Reply Card**

#### Compact Video Technology

Subsidiary of Compact Video

##### Booth 1604

#### New products

**CTS-800:** Computer-assisted videotape playback system as a viable alternative to 2-inch quad cassette VTR systems.

**Circle (806) on Reply Card**

#### Composite Video

No booth at press time

#### Established products

**DA-100:** Audio-video distribution amplifiers

**VP-200:** Video processing amplifiers

**AD-500:** Audio enhancer

#### New products

**PC-425:** Video processing center

**BG-600:** Blackburst generator

**VC-460:** Image enhancer

**Circle (807) on Reply Card**

#### Comprehensive Video Supply

##### Corporation

##### Booth 2322

#### Established products

**Series:** Comprehensive cables, connectors and adapters

**Series:** Comprehensive Video accessories

**Series:** Unicol products

**Series:** PAG products

**Series:** Bilora products

#### New products

**Video Scribe:** Low cost character and animated graphics generator

**Series:** Quartz location lighting

**Series:** PAG ni-cad, speed charge 6000 speed charges all standard

**Series:** Quality ni-cad batteries

**Series:** Video test center system

**Series:** Professional quality microphones

**Circle (808) on Reply Card**

#### Computer Concepts Corporation

##### Booth 2022

#### Established products

The Broadcast System

Word Processing

#### New products

Music Management System

**Circle (480) on Reply Card**

#### Computer Operations

##### Booth 2403

#### New products

**System:** High resolution, real time video animation

**Circle (809) on Reply Card**

#### Comrex Corporation

##### Booth 1613

#### Established products

**PLX, RLX, TLX:** Frequency extender

**AGA:** Auto gain adjuster

**CTA, LPQRA:** RF IFB system for ENG cueing

**CRA:** TV aural monitor

**HHT -1KA:** ENG transmitter

**450RATA:** Wireless microphone system

**202:** Studio telephone conferencer/integrator talk show system

#### New products

New frequency extenders to be announced

**Circle (810) on Reply Card**

#### Comsearch

##### Booth 2416

#### Established products

**Service:** Frequency coordination for earth stations

**Service:** Frequency assignment and path surveys for point-to-point microwave

**Service:** CARS-band, STL and DTS frequency

#### New products

**Service:** LPTV broadcast

**Service:** FAA offset analysis

**Circle (481) on Reply Card**

#### Concept Productions

##### Booth 2107

#### Established products

Voice-tracked automation programming

**Format:** Concept 1; Adult contemporary

**Format:** Concept 2; Adult rock

**Format:** Concept 3; Album rock

**Format:** Concept 4; Country

#### New products

**VMS:** Voice/Music Synchronizer

**Circle (482) on Reply Card**

#### Conrac Corporation/Conrac Div.

##### Booth 3009

#### Established products

**6142:** Master color monitor

**5742:** High resolution 13V color monitor

**5322:** Cost-effective color monitor

**SNA 14:** High resolution monochrome broadcast monitor

**DZB:** 15-inch monochrome CRT

#### New products

**7211:** Ultra-high resolution RGB monitor

**Circle (483) on Reply Card**

see ad on page 109

#### Continental Electronics Mfg. Company

##### Booth 3134

#### Established products

**317C-2:** AM transmitter

**316F:** AM transmitter

**315R-1:** AM transmitter

**314R-1:** AM transmitter

**817R-1,2:** FM transmitter

**816R-2,3:** FM transmitter

**814R-1,2:** FM transmitter

**Mark 8:** 8-channel audio console

**Rock 10:** 10-channel audio console

#### New products

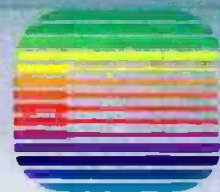
**816R-1A:** FM transmitter

**Circle (484) on Reply Card**

see ad on page 240



## INNER VIEW: A closer look at Conrac Monitors



### Active Convergence: Registration made simple.

Conrac's Active Convergence System gives you complete control over color registration adjustments and greatly streamlines convergence checks.

It uses 36 independent controls to individually adjust nine separate areas on the CRT screen—including corners!

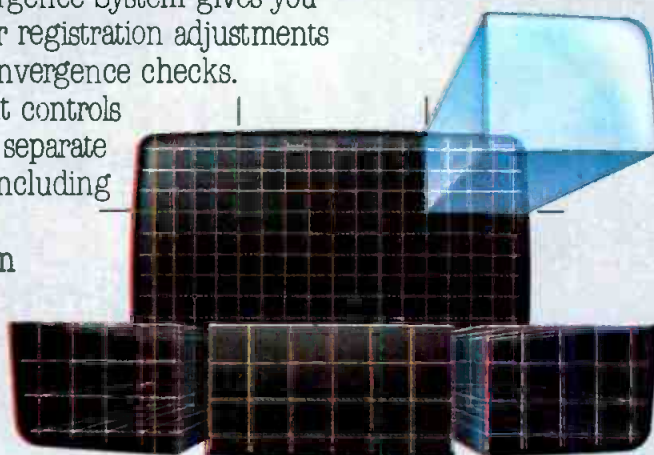
You spend less time on convergence checks—and the adjustments you make will be much more accurate.

Conrac's system uses 24 operational amplifiers to independently control red, green, and blue in each screen area. Vertical and horizontal waveforms are referenced for shaping the signals that excite the convergence yoke assembly. Dynamic blue lateral convergence is achieved with operational amplifiers.

### Beam Current Feedback: The Ultimate in Black Level Stability.

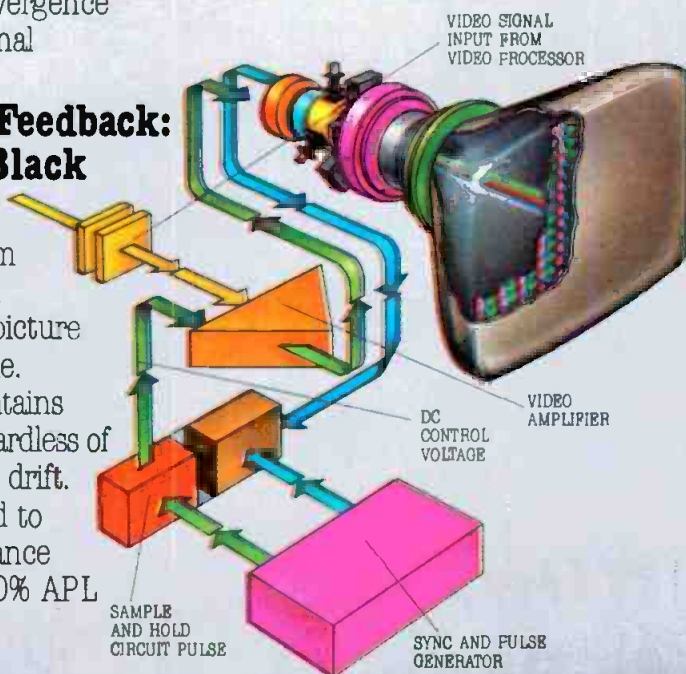
Conrac's unique Beam Current Feedback system maintains a more stable picture for a longer period of time.

It automatically maintains black level stability—regardless of CRT aging or component drift. In fact, black level is held to within 1% of peak luminance level between 10% and 90% APL (Average Picture Level).



Conrac's Active Convergence system lets you adjust color registration on nine separate areas of the CRT.

Conrac's exclusive Beam Current Feedback system automatically maintains black level stability.



Conrac's unique system uses a keyed back porch video amplifier and beam current sensing that occurs during the vertical interval.

The video signal is ac coupled to the video amplifier, thus eliminating the dc component and retaining the level between black and white. It is then amplified and applied to G1 of the CRT. The feedback loop is completed when a sample cathode current (gated by the brightness pulse) is applied to a sample and hold circuit.

If the cathode current changes for any reason, the video amplifier's dc level is automatically adjusted. Result: reference black level will remain constant.

### Conrac Technology: 30 years of leadership.

Conrac's track record of technical innovation stretches back nearly three decades.

And what we've learned since then goes into every monitor we make today. That's important to you. Because the more technology we pack into each monitor, the more performance you'll receive from it.

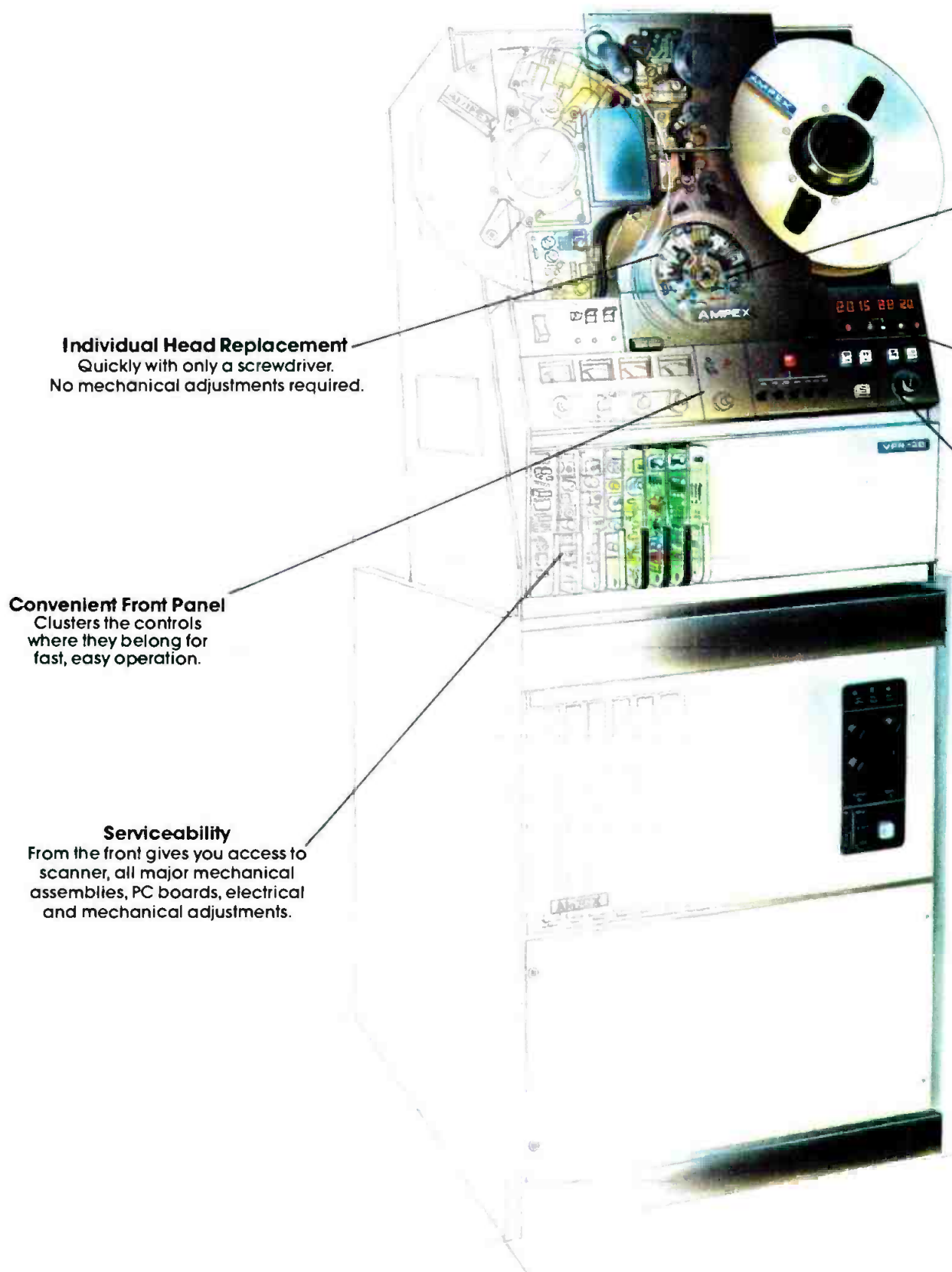
Active Convergence and Beam Current Feedback are just two ways Conrac technology can save you time and money.

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

**Quality you can take for granted.**

Circle (95) on Reply Card

# PROVEN PE



**Individual Head Replacement**  
Quickly with only a screwdriver.  
No mechanical adjustments required.

**Convenient Front Panel**  
Clusters the controls  
where they belong for  
fast, easy operation.

**Serviceability**  
From the front gives you access to  
scanner, all major mechanical  
assemblies, PC boards, electrical  
and mechanical adjustments.



# PERFORMANCE

## Why the Ampex VPR-2B is the world's most popular video tape recorder.

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

Ampex leadership began with technical innovation. You'll find the highest standards of design, production and quality control in every VPR-2B. And today, after more than 25 years of dedicated service to the television industry, Ampex continues to lead the way in providing high quality, reliable tools to the video marketplace.

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

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

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

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



## AMPEX TOOLS FOR TOMORROW

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Ampex Corporation • One of The Signal Companies 

**AST® Automatic Scan Tracking**  
Delivers disturbance-free transitions between play, slow motion and still frame modes.

**Frame-Accurate Editing**  
Results from the VPR-2B's precise tape timer and search systems, AST® and simple edit controls.

**Operational Convenience**  
With continuously variable slow motion instantly available.

## Exhibits roundup

### Control Video Corporation

**Booth 2324**

*Established products*

**LF1000:** Lightfinger editor, touch activated CRT computerized editing system

*New products*

**Super Sync:** Video to audio synchronizer that locks to any incoming tach pulse, control track or SMPTE source and synchronizes this source machine with machines being controlled by the Control Video Intelligent Controller.

Circle (811) on Reply Card

### Convergence Corporation

See also Animation Video

**Booth 1902**

*Established products*

**ECS-104:** List management editing system

**ECS-103:** Multisource editing system

**ECS-90:** Editing system

*New products*

**Series:** Interfaces to peripheral video equipment

Circle (485) on Reply Card

see ad on page 142

### Cool Light Company

**Booth 2201**

*Established products*

**A14-003:** Ninelight

**A51-003:** Starlite

**A51-005:** Starlite

**A60-003:** Mini Cool including handle

**A60-004:** Mini Cool including handle

*New products*

**A23-003:** Triple Trilite

**A23-006:** Triple Trilite

**A41-003:** Focusing Single Handi

**A41-006:** Focusing Single Handi

Circle (486) on Reply Card

### Crosspoint Latch Corporation

**Booth 2408**

*Established products*

**6107:** 2-bus 6-input post-production switcher

**6118:** 3-bus 6-input production switcher gen-lock

**6112:** 9-input 4-bus production switcher

**6124:** 4-bus 12-input switcher

**6142:** 3-bus 8-input production switcher

**6800:** 7-input stereo programmable audio mixer

**6403:** Switcher-editor active interface

**7200:** Computer controller for 6124 & 6112 switchers

**6104A:** Portable video and audio production

*New products*

**6139A:** 6-bus 8-input 3-ME production switcher

**6139C:** Computer-controlled 6139A with serial data link

Circle (487) on Reply Card

see ads on pages 48, 63

### Custom Business Systems

**Booth 2017**

*Established products*

**Radio Broadcast Business Computer System**

*New products*

**Music Library Software**

Circle (488) on Reply Card

### dbx

**Booth 2113**

*Established products*

**900 Series:** Modular signal processors

**160 Series:** Compressor limiters

**500 Series:** Signal enhancers

**Type 1 and Type 2:** Noise reduction systems

*New products*

**907:** When combined with the dbx 903 mono compressor limiter, provides the broadcast user with a stereo tracking over-easy compressor limiter featuring user defined stereo gating parameters.

**610:** Complete microprocessor-controlled equalization system for monitor systems.

Circle (506) on Reply Card

see ad on page 128

### Data Communications Corporation/ Broadcast Div.

**Booth 3318**

*Established products*

**MCA:** Master Control Automation

*New products*

**MMCA:** Micro Master Control Automation

Circle (496) on Reply Card

see ad on page 199

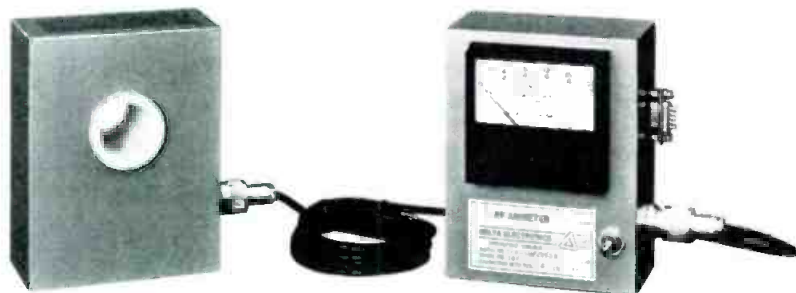
### Datametrics. Dresser

**Booth 1500**

*Established products*

**722A:** SMPTE code reader/generator

# DELTA does it accurately



TCA-10/20-EXR Dual Scale Remote Output  
On/Off and Hi/Lo Switching.

## RF Ammeter Systems

- MEETS FCC REQUIREMENTS OF 2% ACCURACY •
- MINIMUM MODULATION EFFECT •
- ALL COMPONENTS CAN BE GROUNDED FOR SAFETY •
- ON/OFF SWITCH FOR GREATER LIGHTNING PROTECTION •
- PATENTED TEMPERATURE COMPENSATED RECTIFIER CIRCUIT •
- WIDE TEMPERATURE RANGE  $-40^{\circ}\text{F}$  to  $+150^{\circ}\text{F}$  •

The Delta series of TCA RF Ammeter systems utilize a toroidal current transformer (TCT) to obtain a sample voltage proportional to the RF current flowing in a conductor. This sample is then connected to a special temperature compensated rectifier circuit via a 50 ohm coaxial cable. The rectifier converts the RF sample voltage to a DC current to drive an indicating instrument.

Every TCA system is calibrated at our laboratory at an RF frequency in the broadcast band—corelated to the National Bureau of Standards. Correction curves are supplied when more than 2% accuracy is required.

We have a wide range of models, scales and optional items which are illustrated and explained in our RF Ammeter Products catalog. Just call or write us for more information.

See Us at NAB Booth #3112

**DELTA ELECTRONICS**

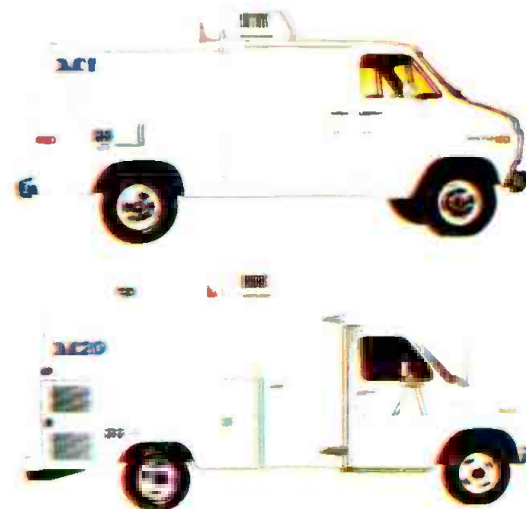


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P.O. Box 11268 • ALEXANDRIA, VIRGINIA 22312  
TELEPHONE: 703/354-3350 TWX: 710-832-0273

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**Midwest  
and JVC  
put you where  
the action is!**



*JVC Provides Rugged Quality and Dependability. Midwest Gives Them To You Fast ... And For A Great Price!*

JVC cameras, recorders and editors are famous for their reliability and their ability to take the bumps and jolts of mobile unit installations. That's why they're the choice of so many cable companies.

If you need a mobile unit that can take the punishment that on location productions dish out, you need to talk to Midwest about their complete line of JVC equipped units. Midwest maintains an in-depth stock of the full JVC line.

Let Midwest put you where the action is, with rugged JVC production equipment in an M 1 or an M 20 mobile unit.

For information on the complete line at Midwest, call toll-free today.  
**1-(800)-543-1584**

Circle (98) on Reply Card



**1021 West 8th Street  
Cincinnati, OH 45203**



A UNR Company

Authorized Distributor  
for JVC Products  
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313-689-9730  
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502-491-2888  
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606-277-4994  
Charleston, WV  
304-722-2921  
Virginia Beach, VA  
804-464-6256  
Washington, DC  
301-577-4903  
Charlotte, NC  
704-399-6336  
Miami, FL  
305-592-5355

## Exhibits roundup

### Datametrics (continued)

**718:** SMPTE code jam-sync generator

**733:** Portable code reader

**710A:** Low-cost SMPTE code reader/  
character inserter

#### New products

**700:** Multikeyer video character inserter

**760:** SMPTE code/VITC code reader-  
character inserter

**766:** SMPTE code/VITC code generator

**Circle (497) on Reply Card**

see ad on page 205

### Datatek Corporation

**Booth 3138A**

#### Established products

**D-2000:** Video-audio routing switchers

**D-4300:** Video-audio routing switchers

**D-701:** TV transmitter color phase  
equalizers

Video, audio and time code  
amplifiers

#### New products

**D-2050:** CRT supervisory display terminal  
for routing switchers

**Circle (498) on Reply Card**

### Datatron/Video Systems Div.

**Booth 3327**

#### Established products

**System:** Vanguard with Smart Scan

**System:** Editt/Plus

#### New products

**Series:** Videotape editing peripherals

**ITP:** Intelligent time processor

**Circle (499) on Reply Card**

see ad on page 91

### Datatronix

**Booth 1927**

#### Established products

**1604:** Broadcast console

Equalizers; line amps, mic/preamps,  
distribution amps; compressor/  
limiters; sine wave generators;  
faders; patch fields; VU  
meter amps

#### New products

**8160:** Programmable personality equalizer

**300PR:** Powered equipment enclosure

**Circle (500) on Reply Card**

### Delcom Corporation

**Booth 2710**

#### Established products

**AE-3:** Auto effects interface

#### New products

**VO-5850D:** Delcom/Sony advanced  
U-matic VTR

**Circle (507) on Reply Card**

see ad on page 64

### Delta Electronics

**Booth 3112**

#### Established products

**RCS-1V:** Transmitter remote control  
system/ATS system

**Series:** RF ammeter systems (TCAs)

**DAM-1:** Digital antenna monitor

**AAM-1:** Analog antenna monitor

**6740:** Coaxial transfer switch

**OIB-1:** Operating impedance bridge

**RG-3:** Receiver/generator

**Series:** Phase sampling transformers  
(TCTs)

**AMC-1:** Amplitude modulation controller

### New products

**FMC-1:** Frequency modulation controller

**Circle (501) on Reply Card**

see ad on page 112

### Dielectric Communications

**No booth at press time**

#### Established products

**Series:** RF waveguide

**Series:** Coaxial transmission line

**Series:** RF switches

**Series:** RF loads and wattmeters

**Circle (502) on Reply Card**

see ad on page 58

### Digital Video Systems

**Booth 1904**

#### Established products

**Phaser:** Frame store TBC synchronizer

**Phaser IV:** Synchronizer

**Phaser IIA:** Frame store TBC  
synchronizer

**DPS-100:** 162 sync generator, 165  
sync/test generator, 175 test/calibration  
generator

#### New products

**Digital Phaser V:** Framestore  
synchronizer

**Digital Phaser VI:** Frame-field  
synchronizer

**DSP-103:** Component TBC

**Circle (508) on Reply Card**

see ad on page 291

### Di-Tech

**Booth 2203**

#### Established products

**5840:** Audio-video routing switcher

**5800:** Audio-video routing switcher

**5412:** Audio-video routing switcher

**5413:** Audio-video routing switcher

**170:** Audio DA

**120:** Video DA

**110:** Video DA

#### New products

**2100:** Audio-video routing switcher logger

**Circle (509) on Reply Card**

### Dolby Laboratories

**Booth 2405**

#### Established products

**221:** 2-channel audio noise reducer  
module for Sony BVH-1000 and 1100

**255:** 2-channel audio noise reducer amp  
VPR2

**361:** Single-channel audio unit

**SP24:** Multi-track audio noise reducer

**334:** Dolby FM processor for encoding  
audio signal FM, TV and cable TV

**Circle (510) on Reply Card**

### Dorrrough Electronics

**Booth 2112**

#### Established products

**DAP310:** Discriminate audio processor

#### New products

Discriminate audio processor, Dorrough  
loudness meter

**Circle (812) on Reply Card**

### Drake-Chenault

**Booth 1516**

#### Established products

**Service:** Programs including Great  
American Country, Contemporary 300  
(adult contemporary), Contemporary  
MOR, SuperSoul and XT 40

#### New products

**Service:** Program designed for AM radio,

40+ demographics including a detailed  
marketing plan.

**Circle (503) on Reply Card**

### Dubner Computer Systems

**Booth 2702**

#### Established products

**CBG-2:** Computer graphic system

**CCC-12:** Color corrector computer

**Circle (504) on Reply Card**

### Dynair Electronics

**Booth 3135**

#### Established products

**System 21:** Routing switcher, audio-video

**System 23:** Machine control

**System 23:** Data/control switching

**Series 10:** Routing switcher, audio-video

**Series 5300:** Distribution equipment

**Series 1500:** Distribution equipment

#### New products

To be announced

**Circle (505) on Reply Card**

see ad on page 15

### EECO

**Booth 1819**

#### Established products

**MQS100A:** SMPTE/EBU time code system

**VCG-750:** Video character generator

**MTG-550 Series:** Time code generator

**TCR-650:** Time code reader

#### New products

**VIG-850:** Longitudinal and vertical  
interval time code generator/reader

**VIR-950:** Vertical interval time code  
reader

**Circle (511) on Reply Card**

see ad on page 179

### EEG Enterprises

**Booth 2507**

#### Established products

**EN210:** Line 21 simple encoder for  
closed captioning

**EN230:** Line 21 smart encoder

**DE101:** Line 21 video decoder

**UBI21:** SMPTE time coder user bit  
inserter

**EN212:** Line 21 user bit encoder

Turn-key closed captioning system

#### New products

Tele-copy floppy system

Turn-key text editing and encoding system

**DE201:** Line 21 video decoder

**Circle (512) on Reply Card**

### EEV

**Booth 2216**

#### Established products

**K3277H:** Amplifier klystron

**E727:** Character display tubes

**E728:** Character display tubes

**E729:** Character display tubes

**P8400:** Leddicons

**P8022:** Leddicons

**P8160:** Leddicons

**P8038:** Vidicons

**N1072:** Traveling wave tube

**N10018:** Traveling wave tube

**4CX 5000A:** Power tetrode

**4CX 10,000D:** Power tetrode

**4CX 15,000A:** Power tetrode

#### New products

**P8460:** Diode gun Leddicons

**P8190:** Diode gun Leddicons

**EXP/LED:** Magnetic Leddicons



# RCA FM power tubes. 15 to 55kW outputs at high efficiency.

RCA is now in the FM power tube business with a series of four tubes and cavities designed specifically for high-gain, high-efficiency broadcast service:

Tube Type	Output	Gain	Efficiency	Cavity Model
8986	15kW	20db	80%	Y1393D-V1
8985	25kW	20db	80%	Y1393D-V2
9011	30kW	21db	80%	Y1393D-V3
8984	55kW	16db	78%	Y1369

There's a very persuasive reason for using a tube with high efficiency: lower operating costs. Over the lifetime of a transmitter this can mean considerable savings.

And RCA tubes are designed for long life.

Our cavities complement our tubes. They provide high-gain, grid-driven circuits which take full advantage of the tubes' high Gm electron optics, high efficiency, ease of neutralization and ease of cooling.

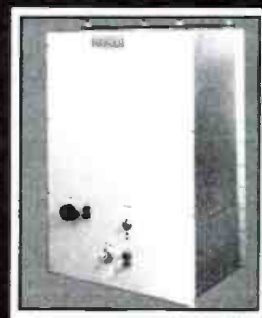
Along with our power tubes, and the cavities that bring out their best performance, we also supply service and application engineering.

Find out more today. Contact RCA Power Tube Marketing, New Holland Avenue, Lancaster, PA 17604.

Call (717) 397-7661. Or get in touch with RCA, Brussels, Belgium.

Sao Paulo, Brazil. Sunbury-on-Thames, Middlesex, England. Paris, France. Munich, West Germany.

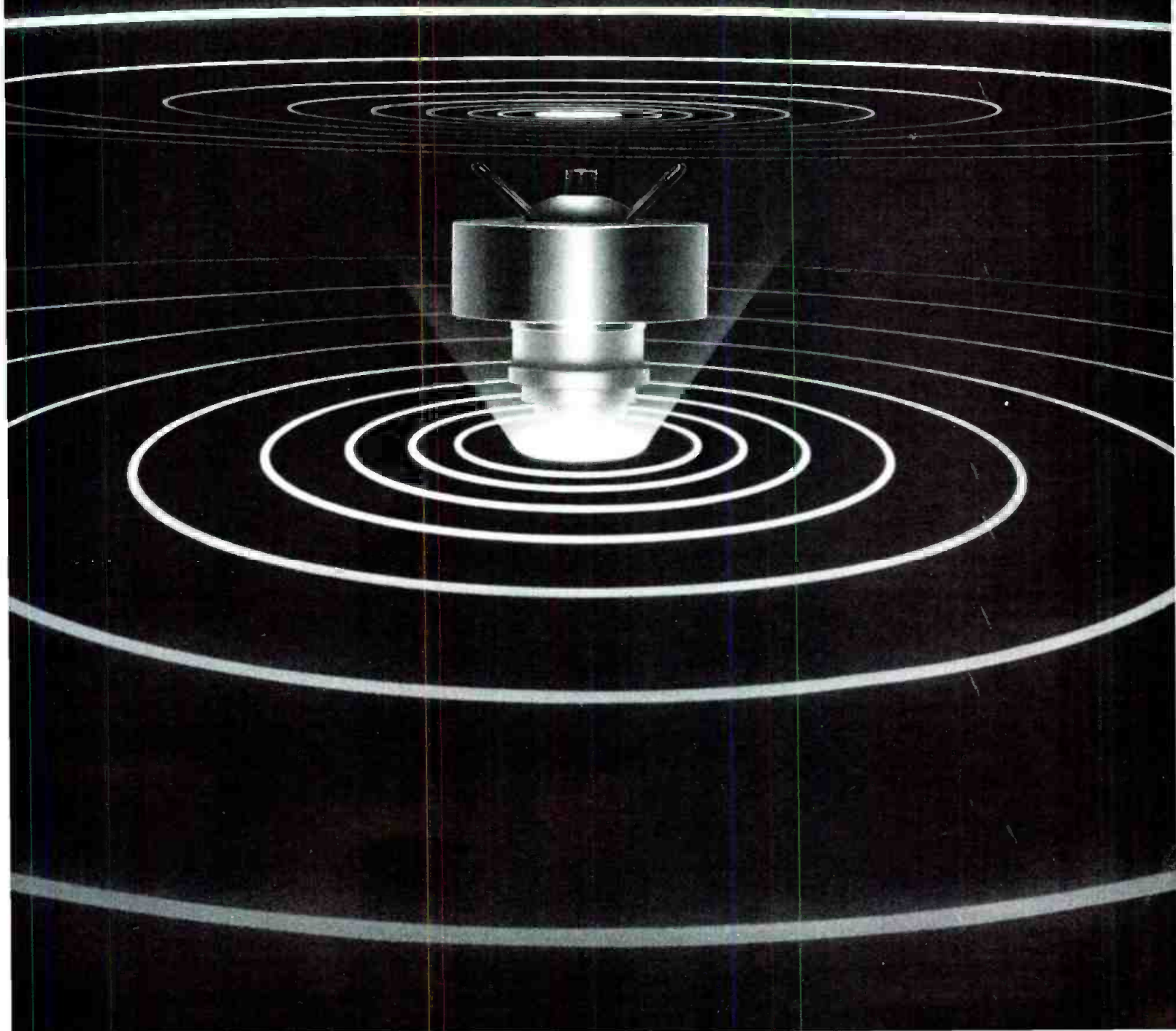
Mexico 16 D.F., Mexico. Hong Kong.



We supply both the power tube and the cavity. In our pictured Y1393 cavity, the 9011 tube delivers a measured gain of 20 db with an efficiency of 80%.

# RCA

Circle (99) on Reply Card



## CREATIVE LIGHTING

An OPEN...



... and SHUT Case



Next time you go on location travel first class with the new **Video Matb-Pak** from **Matthews**.

We've taken the most widely needed gadgets and widgets used every day in video lighting control and designed the package just for you. Light, compact and effective.

Try the new **Video Matb-Pak** on for size. You'll be impressed.



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(213) 843-6715 or 849-6811  
Telex: 691599 (MATTHEW)

**EAST COAST:**  
143 West 20th Street  
New York, New York 10011  
(212) 937-7454

**EUROPEAN OFFICE:**  
Middenweg 49b  
1394 Ad Nederhorst Den Berg  
Netherlands  
(2945) 3988 Telex: 10254 (GRIMA NL)

Visit Our Booth, #2626, at the 1982 NAB Convention  
in Dallas, April 4th thru 7th.

Circle (100) on Reply Card

## Exhibits roundup

EEV (continued)

**P8147:** High resolution hop Leddicon  
Circle (513) on Reply Card

**EG&G, Electro-Optics Div.**  
**Booth 1820**

Established products \_\_\_\_\_  
**SS-122:** Controller  
**SS-111:** Power supply  
**SS-112:** Power supply  
**SS-107:** Flashhead  
**SS-123:** Single enclosure obstruction light  
**LS-159:** 300mm antenna beacon with power supply  
**LS-161:** 300mm twilight/night marker beacon

New products \_\_\_\_\_  
**LS-162:** 155mm self-contained beacon  
Circle (514) on Reply Card

**ESE**

**Booth 2305**  
Established products \_\_\_\_\_  
**ES206:** Video time and date generator  
**ES255:** SMPTE reader/video generator  
**ES254:** SMPTE reader/video generator  
**ES160:** Master clock system  
**ES241:** Digital thermometer, displaying °F/°C

**ES214:** Audio level indicator  
**ES302:** Up/down presettable timer  
**ES510:** 60-minute timer  
**ES562:** Clock/timer with memory

New products \_\_\_\_\_  
**ES790:** 1000-event programmable timer  
**ES260:** SMPTE generator  
Circle (523) on Reply Card  
see ad on page 295

**Eastman Kodak**

**Booth 3212**  
New products \_\_\_\_\_  
**5293/7293:** Color high speed negative film  
Circle (824) on Reply Card

**Echolab**

**Booth 2932**  
Established products \_\_\_\_\_  
**SE/3:** Computer controlled S.E.G.  
Circle (515) on Reply Card  
see ads on pages 18, 80, 202

**Echo Science Corporation**

**Booth 3319**  
Established products \_\_\_\_\_  
**EFS-2:** Image Maker recorder, video discassette recorder; 512 full frames of NTSC video  
**EFS-1AP/S:** Video discassette recorder  
New products \_\_\_\_\_  
**EFS-1B:** Latest in ESC line of video discassette recorders offering 400 full frames of NTSC color video.  
Circle (524) on Reply Card  
see ad on page 45

**Eigen Video**

**Booth 1902A**  
Established products \_\_\_\_\_  
**16-10:** Videodisc recorder (10 sec)  
**16-20:** Videodisc recorder (20 sec)  
**DSR4:** Digital field/frame grabber  
New products \_\_\_\_\_  
**16-10/10:** 10MHz bandwidth videodisc recorder  
**18-10:** Videodisc recorder  
Circle (525) on Reply Card

**Elcom-Bauer**

**Booth 1908**  
Established products \_\_\_\_\_  
**701B:** 1000/250W AM transmitter  
**705C:** 5000/1000W AM transmitter  
**AGC:** Level guard AGC  
**WBL:** Wideband composite limiter  
New products \_\_\_\_\_  
**690B:** FM exciter  
**600C:** Solid-state FM transmitter  
**601B:** Solid-state FM transmitter  
**610B:** 10,000W grounded grid single-tube transmitter  
**VIVA 5:** Audio console  
**SEVILLE:** Series cartridge equipment  
**AP-50B:** Insta-Peak III peak limiter  
Circle (516) on Reply Card  
see ads on pages 30, 31

**Elector**

**Booth 2104**  
Established products \_\_\_\_\_  
**AVD 33:** TV demodulator-Barco  
**CM 33B:** High resolution color monitor-Barco  
**CM 51B:** High resolution color monitor-Barco  
**CRM51B:** High resolution color receiver monitor-Barco  
**MK II:** SMPTE time code reader  
**MK III:** Portable SMPTE time code generator/reader  
New products \_\_\_\_\_  
To be announced  
Circle (517) on Reply Card  
see ad on page 60

**Electro Controls**

**Booth 1915**  
Established products \_\_\_\_\_  
**Series:** Studio lighting and control systems such as Lite Cue, Plexus 1000, ILS, Lite Patch, Plexus 2000  
New products \_\_\_\_\_  
To be announced  
Circle (518) on Reply Card  
see ad on page 286

**Electro Impulse Laboratory**

**Booth 1805**  
Established products \_\_\_\_\_  
**Series:** Loads  
**Series:** Calorimeters  
**Series:** Wattmeters  
**Series:** Attenuators  
Circle (519) on Reply Card

**Electro-Voice**

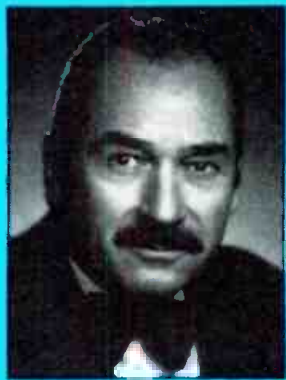
**Booth 1905**  
Established products \_\_\_\_\_  
**Sentry 100A:** Studio monitor  
**Series:** Broadcast microphones  
New products \_\_\_\_\_  
**Sentry 500:** New broadcast/recording studio monitor  
**Series:** Microphone products  
Circle (813) on Reply Card  
see ads on pages 75, 235

**EMCEE Broadcast Products**

**Booth 3331**  
Established products \_\_\_\_\_  
**Series:** LPTV transmitters/translators  
New products \_\_\_\_\_  
All solid-state 10W MDS transmitter  
Single-bay 1kW UHF amplifier  
Circle (520) on Reply Card



# UTAH SCIENTIFIC ACQUIRED BY Dynatech



To Our  
Broadcast &  
Teleproduction  
Friends:

You've probably already heard the news of Utah Scientific being acquired by Dynatech Corporation, and are perhaps wondering why we sold and what this means to the future of the company.

First, our reasons for selling had to do with tax considerations and our desire to be owned by a highly successful, high-technology company having publicly-traded stock. We found such a company in Dynatech, whose record of growth in sales and earnings is complementary to our own.

As to changes, there are none planned. We will continue to operate in Salt Lake City with no changes in personnel or operations and our name will remain Utah Scientific. While we do expect to expand into other broadcast products either through internal development or acquisitions, we will continue to devote substantially all of our time and efforts to our highly-successful routing switcher business.

Sincerely,

Lyle O. Keys, President

Home Office & Western Sales:  
Call toll free: (800) 453-8782  
Gary LaMunyan or Lyle Keys  
Eastern Sales: (804) 384-7001  
Eric King

## New From Utah Scientific FIVE-YEAR WARRANTY ON PARTS & LABOR



on all Utah Scientific-  
manufactured  
products

From the day we opened our doors, the products of Utah Scientific have been backed by a two-year warranty covering both parts and labor.

Nearly five years have passed and we have yet to charge a customer for service.

In light of the excellent reliability record our products have established, we are now extending our warranty to five full years, parts and labor\*.

This new warranty policy covers not only new systems, but all systems previously shipped or on order.

We are most appreciative of those faithful customers who have helped push us to the top of our field, and are providing this warranty extension as a measure of our gratitude to them and our faith in the ongoing reliability of our products.

\*Subject to limitations as to misuse, willful damage, etc.

## TRY THAT ON YOUR GRASCOMDYNAMFERNSATEK SWITCHER.

**UTAH SCIENTIFIC, INC.**  
THE ROUTING SWITCHER PEOPLE.  
a DYNATECH company

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PHONE (801) 973-6840  
TWX: 910-925-4037

Circle (101) on Reply Card

## Exhibits roundup

### Environmental Container System

Booth 2907

Established products \_\_\_\_\_

**Series:** Rack-mount enclosures and cases for video and broadcast equipment

New products \_\_\_\_\_

**Series:** In-stock cases to protect A-V, video and broadcast equipment.

Circle (521) on Reply Card

### Eventide Clockworks

Booth 2934

Established products \_\_\_\_\_

**H949:** Harmonizer; pitch change, special effects unit

**BD 955:** Broadcast digital audio delay line

**RD780:** Monsternat; mono/stereo matrix unit

**2830:** Omnipressor; compressor, expander, noise gate and limiter

New products \_\_\_\_\_

Computerized Timesqueeze System

Timesqueeze Jr. System

**SP2016:** Programmable digital reverb/ effects processor

**Specsystem:** Spectrum analyzer

Circle (522) on Reply Card

see ads on pages 158, 159

### Excalibur

Booth 2103A

Established products \_\_\_\_\_

Custom cases

New products \_\_\_\_\_

New design of video case-VTR 1/4-inch monitor case. All sizes—combination monitor case and studio cart

Circle (814) on Reply Card

see ad on page 186

### Faroudja Laboratories

Booth 2814

Established products \_\_\_\_\_

**Series:** Video enhancers and noise reducers

**Series:** Comb filter separators for color monitors

Circle (526) on Reply Card

### Farrtronics Ltd.

Booth 2517

Established products \_\_\_\_\_

**M750:** Audio patchfields

**M76:** Distribution amplifiers and D A packages

**M74:** Intercom systems

**M70:** Audio editing consoles

New products \_\_\_\_\_

**M82:** Intercom systems

Audio production consoles

Circle (527) on Reply Card

see ads on pages 176, 188

### Fernseh

Booth 3323

Established product \_\_\_\_\_

**FDL-60:** CCD digital film telecine

**TCF-3000 Plus:** Telecine

**Compositor I:** Character generator

**Mach One:** Computerized editing system

**TVS/TAS-1000:** Routing switcher system

**TVS-1:** Machine control system

**BCN-51:** B format 1-inch VTR

**KCA-100:** ENG camera

**KCP-60:** Automated studio camera

**MC-37BA:** Color studio monitor

New products \_\_\_\_\_

**FGS-4000:** Graphics system

**BCN-100:** B format 1-inch automated cassette VTR

**KCI-90:** Production outside broadcast camera

**BFS-9B:** VTR slow motion programmer

**MC51BAB:** Color studio monitor

Circle (532) on Reply Card

### Fiberbilt

Booth 1801

Established products \_\_\_\_\_

**Series:** Cases for audio-video and broadcast equipment

New products \_\_\_\_\_

**808:** Supercase

**847:** Supertrunk

Circle (528) on Reply Card

### Fidelipac Corporation

Booth 3132

Established products \_\_\_\_\_

**Series:** NAB broadcast tape cartridges

**Series:** Studio warning lights

**Series:** Cart storage racks

**390:** Wow and flutter meter

**Series:** Alignment tapes and gauges

**395:** Blank-it bulk tape degausser

**Series:** Delay cartridges

**Series:** Audio-Technica professional phonograph cartridges

## INTRODUCING . . . THE NEW ISC VIDEO TAPE EDITING SYSTEMS

- Proven Super Edit software.
- Advanced VTR and switcher interfaces.
- Plug-compatible with CMX® interfaces.
- Multiple disk files, directory.
- Exclusive Auto-Track and Match.
- Reliable hardware, full warranty.
- Compact, simple installation.
- Modular, fully expandable.
- Superior performance — from the leader in editing system software.
- Also Available — Super Edit, 409, and Trace to enhance CMX and Mach One® system performance.

**SEE US AT NAB**  
**Booth No. 2008**  
David Bargaen



**ISC**

Interactive Systems Co.  
2425 6th St., Boulder, CO 80302  
(303) 447-2013

Circle (102) on Reply Card



Here's another fine message about SHOK-STOP™

# Thermodyne cases team-up with any equipment you have.



You name it, AMPEX, JVC, HITACHI, SONY, PANASONIC, SHARP, IKEGAMI, TOSHIBA, VIDEOTEK, MICROTINE or TEKTRONICS. If you have state-of-the-art equipment, we have the only cases of comparable quality.

In addition to our standard line including 98 "blank foam" cases, Thermodyne has hundreds of custom foam cutting patterns for video recorders/players, cameras, monitors, time base correctors, remote control units and more.

We're ready to team-up your equipment with the ultimate case at prices you can afford, and with a delivery date that's easy to live with.

For our latest product and price information send us the quick response coupon or call Thermodyne International Ltd. at (213) 603-1976.

## — QUICK RESPONSE —

Send me your latest catalogs and price sheet. I'm interested in cases for:

Call me. I need a price and delivery quote for these items:

Send to:  
THERMODYNE INTERNATIONAL LIMITED  
20850 S. Alameda, Long Beach, CA 90810

**T THERMODYNE**  
**INTERNATIONAL LTD**  
*Superiority in every case.*

## Exhibits roundup

### Fidelipac (continued)

**Series:** Cart labels

**New products** \_\_\_\_\_

**550:** Master Cart II

Circle (533) on Reply Card

see ad on page 209

### Film/Video Equipment Service Company Booth 2422

**Established products** \_\_\_\_\_

**Service:** Complete optical repair on all video lenses, Fujinon warranty repair. Sales and service and rental of support equipment for motion picture and video productions.

**New products** \_\_\_\_\_

**Wide Eye I:** Wide angle adapter for video lenses

**Wide Eye II:** Wide angle adapter for video lenses

Circle (534) on Reply Card

### FitzCo Sound

**Booth 2540**

**Established products** \_\_\_\_\_

**AAE-1:** Automator

**44:** Audioarts console

**Wheatstone:** Audioarts console; Hannay wire reels; Ivie analyzers; shipping cases; BGW-Tannoy; furniture (record cabinets, etc.)

Circle (529) on Reply Card

see ad on page 214

### For-A Corporation of America

**Booth 2210**

**Established products** \_\_\_\_\_

**ALC-4100:** Automatic level controller

**CCS-4200:** Color corrector

**FVW-910:** Video writer

**CC-910:** Video writer

**VD-Series:** Video distribution amplifier

**TSG-5000:** Sync generator

**CB-5000:** Color bar generator

**BC-5000:** Back color generator

**VITC:** Generator/reader

**Series:** VTR remote controllers

**VTW-600:** Video typewriter

**New products** \_\_\_\_\_

See at booth

Circle (535) on Reply Card

### Fortel

**Booth 2106A**

**Established products** \_\_\_\_\_

**CCD 1H:** TBC

**CCD 2H:** TBC

**Y-688 32:** TBC

**New products** \_\_\_\_\_

Introducing new digital products

Circle (815) on Reply Card

### Fort Worth Tower Company

**Booth 3326**

**Established products** \_\_\_\_\_

**Series:** Earth stations

**Series:** Towers

**Series:** Prefabricated equipment buildings

Circle (530) on Reply Card

### Frezzolini Electronics

**Booth 1817**

**Established products** \_\_\_\_\_

**BP14:** Ni-cad on-board batteries

**FBP90:** Ni-cad in-board batteries

Complete line of portable lighting and power systems

**MBC4:** Universal multiple battery fast charge stations

**BC77UB:** Complete line of universal ac input fast charge systems

**New products** \_\_\_\_\_

**SP650:** "Lightweight" ac/dc portable Lighthouse

**RPS1:** "Lightweight" on-board ac adapter/battery eliminator

Circle (531) on Reply Card

see ad on page 132

### Fuji Photo Film

**Magnetic Tape Div.**

**Booth 3313**

**Established products** \_\_\_\_\_

**H701E:** 2-inch videotape

**H621:** 1-inch videotape

**BERIDOX:** ¼-inch videocassettes

VHS and Beta head cleaners

**New products** \_\_\_\_\_

Super High Grade, for VHS format

Circle (817) on Reply Card

see ad on page 253

### Fujinon

**Booth 3314**

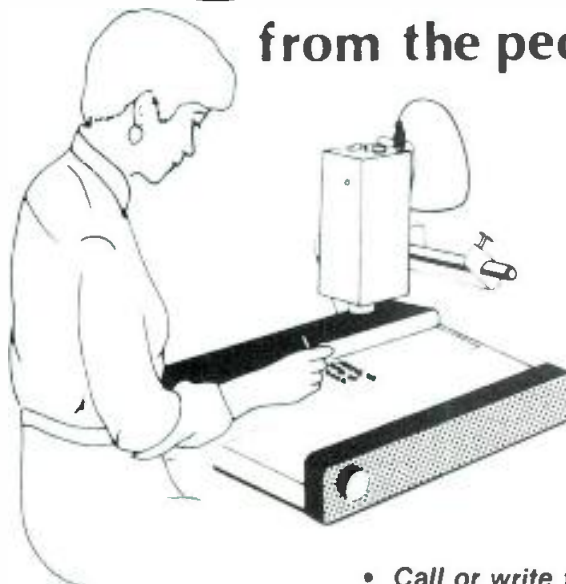
**Established products** \_\_\_\_\_

**A3.5X6.5:** ⅜-inch format EFP lens; focal length 6.5~23mm; f/1.7

**A17X8.5 ESM:** ⅜-inch format EFP lens;

# Digivision<sup>®</sup> MONITOR PROMPTING SYSTEM

## from the people who bring you Vinten.



- Lightweight
- Totally Independent of Camera and Lens
- Directly Compatible with all Vinten Heads and easily adapted to others.
- Can be used with ENG and film cameras.
- Complete systems in stock.

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1619 COSMIC WAY / GLENDALE, CALIFORNIA 91201 / (213) 247-9247 / Telex: 182686

Circle (104) on Reply Card



# INTRODUCING

## THE HAWKEYE'S EYE.

RCA's revolutionary new handheld HAWKEYE ENG camera was built around a revolutionary new RCA tube—the ½ inch SATICON\*. Its superior performance is the direct result of enlightened design techniques and the inherent characteristics of the Selenium-Arsenic-Tellurium photoconductor.

The SATICON tube offers outstanding resolution, and handles high-contrast scenes without unpleasant distortion or discoloration. Color pictures come through spot-free, without flare. For these and many other reasons, SATICON tubes are now used in over 50% of the new color cameras sold in North America and Japan.

On the basis of performance, reliability and general user acceptance, they

will soon predominate in color television cameras worldwide.

SATICON tubes are now available as new or replacement equipment for most ENG, studio and remote cameras. For more information, please write RCA Camera Tube Marketing, New Holland Avenue, Lancaster, PA 17604. Telephone: (717) 397-7661. Or RCA Brussels, Belgium. Sao Paulo, Brazil. Sunbury - on - Thames, Middlesex, England. Paris, France. Munich, W. Germany. Hong Kong. Mexico 16 D.F., Mexico.

# RCA

\* Used by permission of trademark owner.

Circle (105) on Reply Card

## Exhibits roundup

### Fujinon (continued)

focal length 8.5 ~ 145mm; f/1.5  
**A14X9.5 ERM:** ¾-inch format ENG/EFP lens; focal length 9.5 ~ 133mm; f/1.7  
**A30X11ESM:** ¾-inch EFP lens; focal length 11 ~ 330mm; f/1.6

### New products

**P28X11 ESM:** Studio EFP 1¼-inch format; 11 ~ 310mm; f/1.6  
**R17X12.5 ESM:** Studio 1-inch format; 12.5 ~ 212mm; f/1.6  
**P17X16.5:** Servo adaptable 1¼-inch format; 16.5 ~ 280mm; f/2.1

**Circle (816) on Reply Card**

see ad on page 229

### GE/Canada

See Larcam Communication Equipment in "Late Exhibitor" section

### GKM Mfg. Corporation

**Booth unassigned at press time**

**Established products**

**Series:** Broadcast racks

**Series:** Monitor racks

**Circle (536) on Reply Card**

### Garner Industries

**Booth 2304**

**Established products**

**70:** Audiotape eraser

**105:** Audiotape eraser

**114:** Audiotape eraser

**116:** Audiotape eraser

**270:** Videotape eraser

**1100:** Videotape eraser

**3056:** Audio duplicator

**Circle (537) on Reply Card**

see ad on page 144

### Glentronix

**Booth 2008**

**Established products**

**Series:** Time code equipment; clocks, clock drivers; machine control system; message generator; video production switchers; tape synchronizers; delay lines (video and pulse); sideband analyzer; logic analyzer; headsets

**New products**

To be announced

**Circle (538) on Reply Card**

### Alan Gordon

**Booth cancelled at press time**

**Established products**

**Series:** Video animation equipment

**Series:** Battery packs and chargers

**Series:** Camera equipment

**Series:** Film editors

**Series:** Microphones and accessories

**Series:** Projectors

**Series:** Video recorders

**New products**

See at booth

**Circle (545) on Reply Card**

### Gorman Redlich Mfg. Company

**Booth 2307**

**Established products**

**CED:** EBS encoder decoder

**CE:** EBS encoder

**CD:** EBS decoder

**CRW:** Weather radio

**CM:** Digital antenna monitor

**CMR:** Digital antenna monitor

**Circle (539) on Reply Card**

### Gotham Audio Corporation

**Booth 2919**

**Established products**

**U 89:** Neumann microphone

**KMR82:** Neumann microphone

**EMT 948:** EMT turntable

**EMT 266:** EMT transient limiter

**C4D:** Telefunken Telcom noise reduction system

**New products**

**EMT 450:** Digiphon digital disc system

**10.02:** EMT mixing console

**Circle (540) on Reply Card**

### Grass Valley Group, The

**Booth 3010**

**Established products**

**440 series:** Routing switcher

**1600-4S:** Master control switcher

**M-200:** Modulation automation system

**3240&41:** Video processing amplifiers

**3400 series:** Video DAs

**3250 series:** SC/H phased sync generators

**1600 series:** Production switchers

**1600-1X:** Post-production switcher

**New products**

**440 series:** Video status display system

**440 series:** Full-function X-Y control panel

**10x1 utility routing switcher**

**M200:** automation system

**3400:** Utility video DA

**3258:** SC/H phase meter with sync generator series

"WAVELINK" fiber-optic audio and video communications system

**300 series:** Production switchers

**300 series:** Post-production options

**300 series:** Options including auxilliary matrix

**Mark II:** Digital video effects

**Circle (541) on Reply Card**

### Great American Market, The

**Booth 2103**

**Established products**

The Great American Scene Machine

Starstrobe

Lighthesizer programmable sequencer and control console

Special effects generator/fire simulator

RDS/HMI lights

Great American patterns

Excalibur custom cases

**New products**

Colormax - The Rolling Color Changer

RDS/Fresnels

Cameralite

**Circle (542) on Reply Card**

### David Green Broadcast Consultants Corporation

**Booth 2014**

**Established products**

Sperry Weather Radar for radio stations

IBM computer package for radio stations

Eventide time squizzer

Broadcaster brand supply items

**Circle (543) on Reply Card**

### Gregg Laboratories

**Booth cancelled at press time**

**Established products**

**2540:** AM audio processing system

**2510:** Wide-band gain controller

**Telemix:** Hands-free telephone interface system

**New products**

**2020:** 12-channel control room audio console

**2040:** 14-channel control room audio console

**2060:** TV audio processing system

**Circle (544) on Reply Card**

### HM Electronics

**Booth 2402**

**Established products**

**Series:** HME professional wireless microphone systems

**New products**

**150E series:** Professional wireless intercom system

**Circle (551) on Reply Card**

see ad on page 263

### Hallikainen & Friends

**Booth 1618**

**Established products**

**LOG112:** Program logging decoder

**LOG113:** Crystal time base

**LOG121:** Program logging encoder

**TVA132:** Audio output module

**TVA142:** Audio mixer

**TAX161:** Time announce controller

**TEL171:** Digital telemetry adapter for Moseley TRC-15A

**TEL172:** Digital telemetry adapter for Moseley PBR-30A

**New products**

**PCC181:** Transmitter control computer for Moseley TRC-15A

**PCC182:** Transmitter control computer for TFT 7610

**PCC183:** Transmitter control computer for Moseley DRS-1A

**Circle (552) on Reply Card**

see ad on page 176

### Harris Corporation (Broadcast Products)

**Booth 3101**

**Established products**

**AM transmitters:** Models MW-10A,

MW-50B with the AM-90 modulation monitor

**FM transmitters:** Models FM-100K,

FM300K, FM-25K with FMH, FML and CBR antennas

**TV transmitters:** Models TV-30L, TV-50H, TV-10H, TV-55U

**Audio consoles:** Models M90, MicroMac, Executive, Gatesway 80, Stereo 80, Stereo 5

**Audio processors:** MSP-90, MSP-95 with MSG-95 SCA generator and CB-1201 phono turntable

**Automation systems:** Models 9003 (program), Autotron Star (business), 9000X satellite system and 9100 facilities controller

**TV camera:** Models TC50B and TC-85 with computer control

**New products**

**SX-1, SX-2.5, SX-5:** Solid-state AM transmitters

**9165:** Earth station controller

**Infowriter:** Word processing computer 55kW UHF TV transmitter

**Circle (546) on Reply Card**

see ads on pages 87, 125





## Does the Revox PR99 remind you of something?

It should.

It's inexpensive to buy, easy to maintain, practical, reliable, made in West Germany, and built to keep on going through years of demanding use.

No gadgets, no frills. Merely a solid machine equipped with everything a professional needs to get the job done efficiently—and with high quality results.

What's more, the PR99 now comes in three versions: all-steel console, transport case

with snap-off cover, and rack mount. All three may be ordered with the new monitor panel: speaker, amp, volume control, and track selector.

Other features include:

- Die-cast chassis
- Precision machined headblock
- Balanced line in and out switchable for calibrated or uncalibrated mode
- Servo-controlled capstan motor
- Edit mode switch
- Tape dump
- Self-sync
- Choice of 3.75/7.5 or 7.5/15 ips
- Remote control and vari-speed available.

In short, the PR99 is so versatile, so dependable, and so downright sensible that you could almost call it a "volksorder."

Except, well...the shape isn't quite right.

**STUDER REVOX**

Studer Revox America, Inc.  
1425 Elm Hill Pike, Nashville, TN 37210 (615) 254-5651  
Offices: Los Angeles (213) 780-4234  
New York (212) 255-4462  
Canada: Studer Revox Canada, Ltd.

Circle (106) on Reply Card

## Exhibits roundup

### Harris Broadcast Microwave Formerly Harris/Farinon Video Booth 3101

Established products \_\_\_\_\_

**FV-F:** Fixed radio for STL/TSL operation

**FV-MP:** Miniature portable microwave receivers and transmitters

**FV-MF:** Helicopter radio

**FV-CR:** Multichannel ENG central receivers

New products \_\_\_\_\_

**Global IX:** Universal portable video microwave transmitter

Circle (553) on Reply Card

see ads on pages 87, 125

### Harris Video Systems, Harris Corporation Booth 3101

Established products \_\_\_\_\_

**IRIS:** Digital still store

**EPIC:** Harris EPIC computer-controlled video editor

**CVS 506:** CCD TBCs

**CVS 516:** Digital TBCs

**CVS 516WB:** Digital TBCs

**CVS 590:** Digital TBCs

**630:** Digital frame synchronizer

New products \_\_\_\_\_

**IRIS II:** Digital still-store system

**690:** Digital frame synchronizer

Circle (554) on Reply Card

see ads on pages 87, 125

### Karl Heitz

Booth 2515

Established products \_\_\_\_\_

**KINOPTIK:** Lenses cine/video

**GITZO:** Cine/video tripods,

Combi tripods,

tripods with counter-balanced heads,

leveling balls, dollies, microphone

booms, lightstands, projection stands,

platforms.

New products \_\_\_\_\_

**GITZO:** Spring-balanced video heads, tripods

**GITZO:** Fluid heads, fluid base, tripods

**GITZO:** Monopods with soft grips

Circle (555) on Reply Card

### Hitachi Denshi

Booth 3202

Established products \_\_\_\_\_

**SK-110:** Computer automatic setup studio camera

**SK-91:** Ultra-light ENG/EFP hand-held 3-tube camera

**SK-81:** Low cost broadcast ENG/EFP camera

**SK-96:** Convertible studio hand-held 3-tube camera

**FP-60:** 3-tube 1-inch studio camera

**FP-50:** Low cost 3/4-inch studio camera

**FP-10:** High resolution single-tube camera

**FP-22:** 3/4-inch 3-tube ENG/EFP camera with computerized auto centering and diagnostics

**FP-21:** Same as FP-22 without computer

**HR-100:** 1-inch type C battery operated VTR

**HR-200B:** Type C studio VTR with slow motion

**HR-210:** Type C VTR in full production console

**HR-300:** 3-hour type C VTR

**TC-200:** Digital TBC

**SB-20:** Slow motion controller

New products \_\_\_\_\_

To be announced

Circle (547) on Reply Card

see ad on page 3, 107

### Howe Audio/BCP

Booth 2744

Established products \_\_\_\_\_

**7012:** 12-channel stereo console

**702P:** Turntable preamp

**600:** Mini-600 mic mixer

New products \_\_\_\_\_

**2020:** Phase-chaser—stereo active phase corrector

**7512:** 12-channel slide-fader stereo console

Circle (556) on Reply Card

see ads on pages 152, 153

### Hughes Electronic Devices Corporation (HEDCO)

Booth 2214

Established products \_\_\_\_\_

**SRA 16/1:** AFV with Breakaway 1RU switcher

**MRA 8/8:** Video and audio routing switcher

**SRU 16/1:** Delay switcher for Ultimate

**MRC 16/4:** Video and audio routing switcher

## sachtler video 25

the state-of-the-art  
video fluid head  
designed to supporting your  
ENG- and EFP-cameras

Now ready to go into operation.

### sachtler video 25

featuring:

Center of Gravity Compensation

4 step Dynamic Counterbalancing Control

2 times 7-step on/off drag control for pan and tilt

Touch & Go wedge plate

The rock-steady, silky-smooth cameramen's fluid head, doing everything in news gathering and field-production.

The all-in-one-piece camera support system.

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MARCONI — NEC — PANASONICS —  
PHILIPS — RCA — SHARP — SONY —  
THOMSON — TOSHIBA  
...and other fine makes  
of professional cameras.



Circle (107) on Reply Card



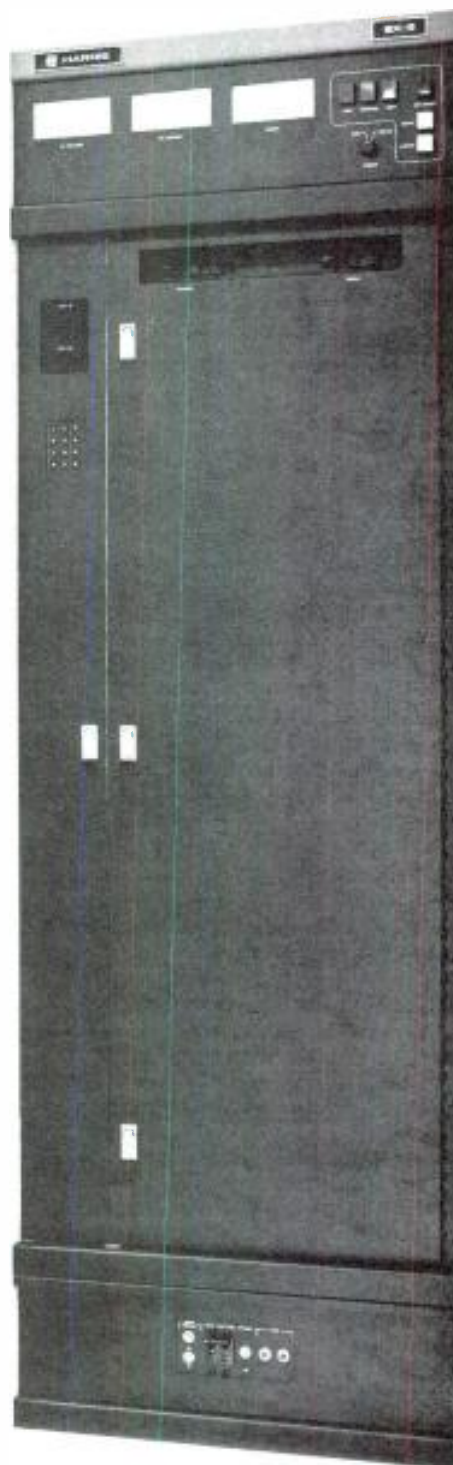
# Harris' New SX Series of All-Solid-State AM Transmitters

Now a high technology blend of broadcast and computer science has created the SX-1 (1000 watts), SX-2.5 (2500 watts), and SX-5 (5000 watts)—Harris' new family of all-solid-state high performance, high reliability AM transmitters!

Harris' solid-state experience brings you energy-saving efficiency. A typical SX-5 equipped station can expect an annual power bill reduction of 15 to 36%.

Exciting new technology is employed throughout the line, including Polyphase Pulse Duration Modulation\* for exceptional audio performance. Plus microprocessor control and status monitoring, sophisticated diagnostic techniques, and a unique cooling system that protects components from dirt build-up. All SX transmitters are designed for AM Stereo operation.

Find out what this new generation of Harris transmitters can do for you. Contact **Harris Corporation, Broadcast Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.**



\*Polyphase PDM — Patented.



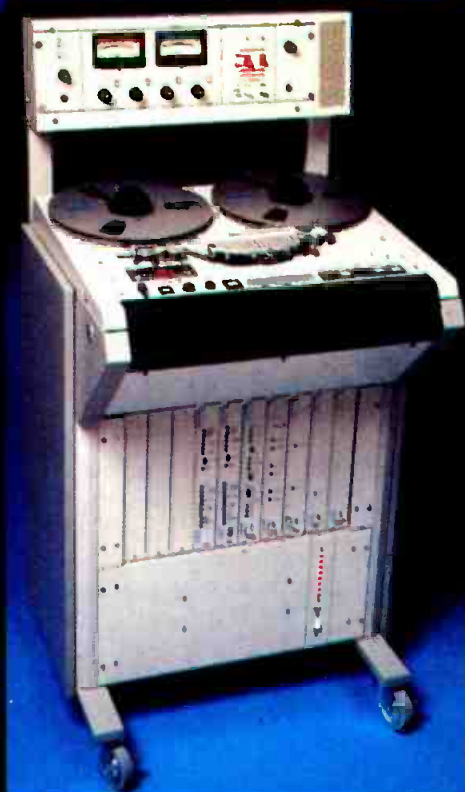
## HARRIS

Visit the Harris TV and radio equipment display at the 1982 NAB, Dallas.

Circle (108) on Reply Card

March 1982 *Broadcast Engineering* 125

***The Performance  
a Broadcaster Expects,  
The Features and  
Reliability He Demands.***





## THE NEW OTARI MTR-10 SERIES PRODUCTION RECORDERS

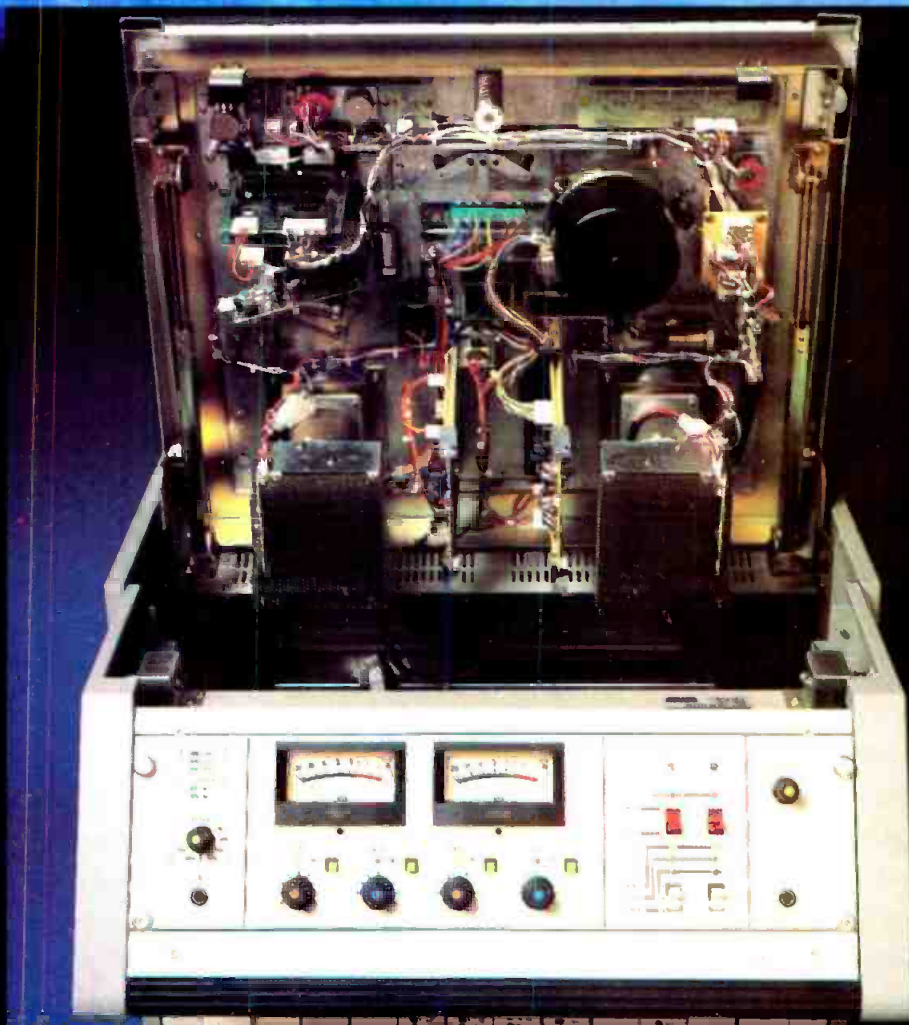
We engineered them to be the ultimate in broadcast production. They embody the innovative technology and the highest reliability that has made us The New Workhorse in audio production.

### THE ULTIMATE IN PRODUCTION EFFICIENCY

- Three speeds:  $3\frac{3}{4}$ ,  $7\frac{1}{2}$ , 15 or  $7\frac{1}{2}$ , 15, 30 ips.
- Full, two and four track formats.
- Flexibility in cabinet choice: desk type, overbridge or rack mount for custom installation.
- Full servo, D.C. PLL transport governed by an on-board microprocessor—an industry first.
- $\pm 20\%$  vari-speed with ips or percentage display.
- Built-in, no overshoot return-to-zero with optional 10 memory/one stroke and keyboard access autolocator.
- Internal multi-frequency square/sine wave generator.
- Preset master bias switching.
- Electronically balanced I/O with direct-coupled, high current outputs.
- Automatic reel size sensing with single hand, bi-directional tape rocking.
- Cue control with lifter defeat and controlled wind.
- Dump edit and shuttle edit control.
- Integral, precision splicing block.
- Cue speaker and headphone monitoring.
- Direct access playback head.
- Modular, single card electronics with high slew-rate integrated circuits.

### THE ULTIMATE IN ANALOG AUDIO

- Dynamic Range:  $> 75\text{dB}$  measured from noise floor to 3% THD (30 ips, #226 tape).
- Frequency Response: 0 VU (+4) 35Hz-29kHz, +1.0, -3.0dB @ 30 ips.



- Wow & Flutter: Less than 0.04%, DIN 45507
- Distortion: Less than 0.1% @ 1kHz, 250nWb/m.
- Maximum Output: +28 dBm.
- Adjustable record phase compensation.

These features and more will allow you to do your job faster while delivering every last dB of performance. It's the productive and efficient solution to the demanding new realities of the contemporary broadcast facility.

### ENGINEERED TO BE EASILY SERVICED

Access to all components makes maintenance straightforward. The audio, transport, master CPU and power supply electronics are all of modular, card frame design; the entire transport assembly is top-hinged to allow wide-open access while the deck is in operation.

### ENGINEERED TO THE HIGHEST STANDARD OF RELIABILITY

Reliability is paramount in Otari's approach to doing business. We've earned an enviable reputation for quality and value that has made us the

world leader in broadcast automation (Model ARS-1000) and compact production recorders (the 5050 Series). With the new MTR-10, we have successfully bridged the gap between the new technology and reliability.

Evaluate the MTR-10 recorder for yourself by contacting your authorized MTR-10 Series professional audio dealer. It will become evident that Otari is several steps ahead of the competition—again. Audition the performance, features and engineered reliability that will meet the needs of all broadcasters for years to come.

If you're really thinking of buying broadcast precision, there's only one logical decision.

THE NEW WORKHORSE

**OTARI**

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

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**ALL NEW,** We took an industry work-  
**WITH** horse—the dbx Model 160  
—and made it even more versatile. We  
**OVER EASY** gave it Over Easy® so you can choose  
soft knee or hard  
**TOO.** knee compression  
at the touch of a button. We've also made  
it strappable for dual channel compression.  
**\$420.\*** Added dual LED meters, Infinity +™  
compression, and the provision for a  
Jensen output transformer. And, we've put it all into a  
new slim-line rack mount package with phone jack and  
barrier strip connectors. Voila! The new Model 160X.  
See your dbx Pro dealer, or write for information.

\*Manufacturer's suggested retail price.



Model 160X Compressor/Limiter

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

**dbx®**

Circle (110) on Reply Card

## Exhibits roundup

### HEDCO (continued)

**AVF-150:** Distribution frame audio and video

**DAs:** Audio, video, pulse, subcarrier, equalization

**RLB-1:** Return loss bridge

**B7501:** Precision terminations

**New products** \_\_\_\_\_

**Transpath I:** Routing switcher audio and video

High performance central system

Circle (557) on Reply Card

### Hughes Helicopters

**Booth 2611**

**Established products** \_\_\_\_\_

**500D:** Helicopter

**300C:** Helicopter

Circle (558) on Reply Card

### IGM Communications

**Booth 3122**

**Established products** \_\_\_\_\_

**Basic A:** Program automation system

**Instacart:** Instant access cartridge playback system

**Go-Cart 24-42-78:** Random access cartridge playback system

**New products** \_\_\_\_\_

**Basic A:** CRT logging encoder

**Basic A:** CRT remote control station

**Soundbar:** Information system for promotional use

Circle (566) on Reply Card

### ITE—Innovative Television Equipment

**Booth 3309**

**Established products** \_\_\_\_\_

**Series:** Dollies, tripods, pedestals, pan/tilt heads and accessories

**New products** \_\_\_\_\_

**H6A:** Increased load capacity and smoothness with hydrocam head/fluid

**H9A:** 30% increase in size of hydrohead/fluid

**H10:** Availability of adjustable load hydrohead/fluid

**H16:** Adjustable load and fluid head

**T2A:** EFP tripod

**T8:** Lightweight ENG tripod

**T13:** Lightweight EFP duty elevation column tripod

**P7A:** Pedestal for small studio application

**QR:** Quick release adapter for rapid camera removal

Circle (567) on Reply Card

### Ikegami Electronics (USA)

**Booth 3209**

**Established products** \_\_\_\_\_

**HK-357:** Field/studio color camera system

**HK-302:** Color camera system

**HL-790:** Convertible field/studio camera system

**HL-79DAL:** EFP configuration with triax

**TKC-970:** Telecine camera system

**Series 8:** Standard resolution broadcast quality color monitors

**RH Series:** High resolution broadcast quality color monitors

**New products** \_\_\_\_\_

**HK-322:** Full-sized computer setup field/studio color camera system

# ROHN

## Broadcast Towers

Write For Free  
Broadcast Tower  
Catalog and Price List.



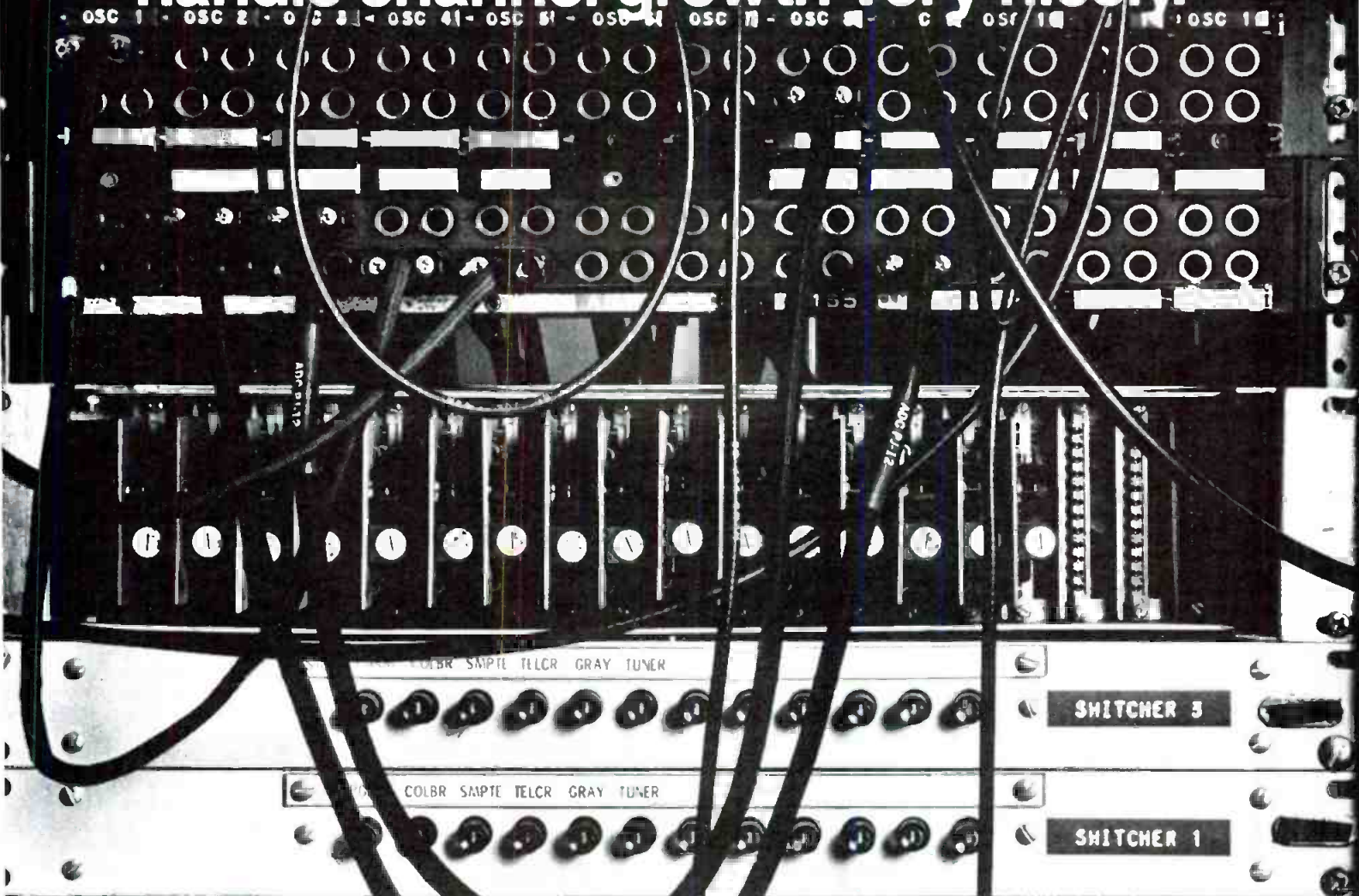
**UNR-Rohn**

Division of UNR, Inc.  
6718 West Plank Road, P.O. Box 2000  
Peoria, Illinois 61658  
U.S.A.

Circle (111) on Reply Card



# On the other hand, our routing switchers handle channel growth very nicely.



A patch panel will work just fine in your system. If you plan to limit yourself to only ten channels.

But in the fast moving world of cable-vision, more than likely you'll be programming a lot more than ten.

That's where 3M Routing Switchers come in.

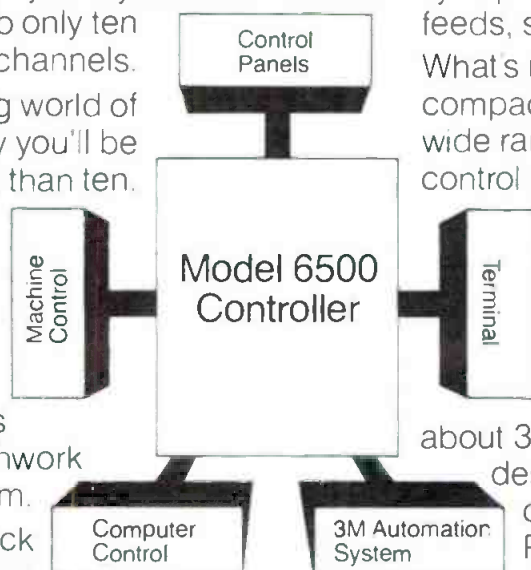
Because our switchers allow you to start small, and expand gradually. As your needs grow.

Without the bulky wire mess and inconvenience of a patchwork routing system.

They allow for more VTR's, quick and easy switching, as well as multi-channel programming.

And they're perfect for switching in network feeds, satellite relays, and live remotes. What's more, 3M Routing Switchers are compact and fully electronic. They offer a wide range of capabilities. From simple control panels like thumbwheel, touchpad, universal pushbutton, and LED pushbutton, to completely automated, computer-controlled systems. From 15 x 12 to 40 x 40 and larger.

For more information about 3M Routing Switchers, or a custom design consultation for your studio, call collect 612-736-1032. Or write: Professional Audio Video Equipment/3M, Building 223-5E/ 3M Center, St. Paul, MN 55144.



**The routing switchers that grow  
as your needs grow.**

**3M hears you...**

Circle (112) on Reply Card

**3M**



## Protect yourself against the high cost of static

Electrostatic discharge, in addition to causing problems like the one above, can damage delicate electronic control and logic circuits. It takes so little voltage that you might not even feel the spark.

As little as 500 volts can send erroneous data, alter "memory", write incorrect data on a disk, or cause printers to run wild, throwing paper into the room. All of which means expensive service calls and even more expensive system down time.

Only 500 volts, yet you can easily generate over 12,000 volts of static charge just walking across a carpet. Even on a vinyl floor, 4000 volts is not uncommon.

## The solution is simple

3M Brand Static Control Floor Mats can create an inexpensive "island of protection" around your delicate electronic equipment, harmlessly draining the static charge from operators and other personnel.

For as little as the cost of a single static-related service call, you can say goodbye to all these problems. 3M Brand Static Control Floor Mats come in hard mats for easy movement of casters chairs, and soft mats for comfortable standing.

For information about how you can purchase 3M Static Control Floor Mats, call toll free

**1-800-328-1300**  
(In Minnesota, call collect 612-736-9625.)  
Ask for the Data Recording Products Division

3M Hears You...



Circle (113) on Reply Card

## Exhibits roundup

Ikegami (continued)

ITC-730: ENG/EFP color camera system

HL-83: Camera system

EC-35: Electronic cinematography camera

TKC-990: Completely automated setup telecine camera system

Portable microwave systems

Line of production switching and distribution equipment

Series 9: In-line gun CRT broadcast color monitors

Circle (568) on Reply Card

Image Video Limited

Booth 2600

Established products

8100: Automated master control

4100: Machine assignment system

6200: Broadcast routing switcher

8105: Border generator

AJF: Prewired jackfield

6010: 10x1 self-contained broadcast routing switcher

7105: Silence monitor

Custom-designed control panels

New products

VMP-1: Voltage monitor panel

Broadcast routing switcher

Circle (569) on Reply Card

Industrial Sciences

Booth 1600

Established products

901: Video production switcher

902: Video production switcher

1002: Audio console

821: Master control switcher

660-4: RGB chroma keyer

210: Video production switcher

200-3: Video production switcher

904: Video production switcher

659: Quad split generator

Circle (570) on Reply Card

see ad on page 34

Inovonics

Booth 1610A

Established products

201: Average and peak limiter

215: Multifunction broadcast audio processor

231: "MAP-II" multiband broadcast audio processor

241: "DYNEX" noise suppression system

370/380: Audiotape recorder replacement electronics

376: Dual-channel audiotape recorder reproduce-only electronics

377: Stereo tape playback amplifier

405: "TENTROL" tape tensioning kit for audiotape recorders

500: 1/2-octave real time and reverberation acoustic analyzer

"GHM" The Gordon Headroom Meter—peak program meter

Circle (571) on Reply Card

see ad on page 140

Interand Corporation/

Telestrator Div.

Booth 1807

Established products

440: Telestrator products

New products

100: Basic Telestrator with high resolution

microprocessor-based/controlled digital memory

440: Telestrator

880: Telestrator

Circle (572) on Reply Card

Interface Data Systems

Booth 1925

Established products

PDP-11: Digital computer system

VAX: Digital computer system

Service: Maintenance for mixed vender systems

New products

TV station automation system

Circle (574) on Reply Card

see ad on page 283

International Tapetronics Corporation

Booth 3145

Established products

SP series: Single-play audiotape cartridge machine

RP series: Recorder/reproducer audiotape cartridge machine

3D series: 3-deck, reproducer audiotape cartridge machine

WRA series: Record amplifier for 3D series audiotape cartridge machine

PD-II series: Economy playback and recording audiotape cartridge machine

ESL-IV: Cartridge eraser/splice locator

770 series: Reproducer, reel-to-reel

770 series: Recorder/Reproducer, reel-to-reel

New products

Series 99B

Circle (573) on Reply Card

JBL-James B. Lansing

Booth 2013

Established products

Series: Broadcast electronics and loudspeakers

7510A: Automatic mic mixer

4301 & 4312: Monitors

New products

Debut 4411: Broadcast monitor—3-way design

Circle (581) on Reply Card

see ad on page 247

JVC, Professional Video Division

Booth 1707

Established products

BP-5300U: Professional VHS

Videocassette player

BR-6400U: Professional VHS

Videocassette recorder/player

HR-2200UB: VHS portable recorder/player

G-71: Single tube color camera

S-100U: Single tube color camera

CP-5500: Videocassette player

CR-6600: Videocassette recorder/player

CR-8200: Videocassette editor

KY-2700: 3-tube color camera with 14:1 zoom lens

RM-88U: Edit controller

CP-5000U: Videocassette player

CP-5200U: Videocassette player with freeze frame

CR-6060U: Videocassette recorder/player

7280U: Color monitor/receiver

7860U: Color monitor/receiver

TM-41AU: Color monitor

TM-14PSN: 4-standard color monitor



# CLEAR THE AIR WITH THE **NEW** TRANSDYNAMIC PROCESSOR

## THE SUPER CLEAN SOUND THAT WINS MORE LISTENERS.

VERSATILITY, RELIABILITY AND LOW DISTORTION. THAT'S WHAT THE TRANSDYNAMIC™ PROCESSOR IS ALL ABOUT. IT TEAMS WITH AUDIO & DESIGN'S EXPRESS OR COMPLEX LEVEL CONTROL AMPLIFIERS TO CREATE A SUPERIOR TRI-BAND SYSTEM. IT FEATURES:

- TWO INDEPENDENT PROGRAM CHANNELS, FOR STEREO OR DUAL MONO PROCESSING.
- FIELD TUNABLE BAND-SPLITTING FILTERS (6 OR 12 dB PER OCTAVE PHASE COMPENSATED CURVES).
- SEPARATE CONTROL OF THE COMPRESSOR ATTACK, RELEASE AND RATIO FOR EACH BAND.
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- SELECTABLE 0, 25, 50 OR 75  $\mu$ S PRE-EMPHASIS IN THE CONTROL CIRCUITS (NOT THE SIGNAL PATH) OF THE OUTPUT LIMITER.

- ADJUSTABLE PEAK MODULATION ASYMMETRY FOR AM OPERATIONS.
- SWITCHABLE HIGH AND LOW PASS FILTERS THAT ATTENUATE EXTRANEOUS INPUT SIGNALS AND CONTOUR THE SYSTEM BANDWIDTH.
- SENSIBLE SET-UP ADJUSTMENTS WITH LED BAR GRAPH PPM METERS.
- TAMPER-PROOF SOLID STATE AUDIO SWITCHING CIRCUITRY.
- NO MYSTERIOUS EPOXY "BRICKS" OR "SECRET PARTS".

NO MATTER WHAT YOUR FORMAT, THE TRANSDYNAMIC SYSTEM IS THE CLEAR CHOICE FOR YOUR SOUND.

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SYSTEM INSTALLATION BY FACTORY PROFESSIONALS IS ALSO AVAILABLE.

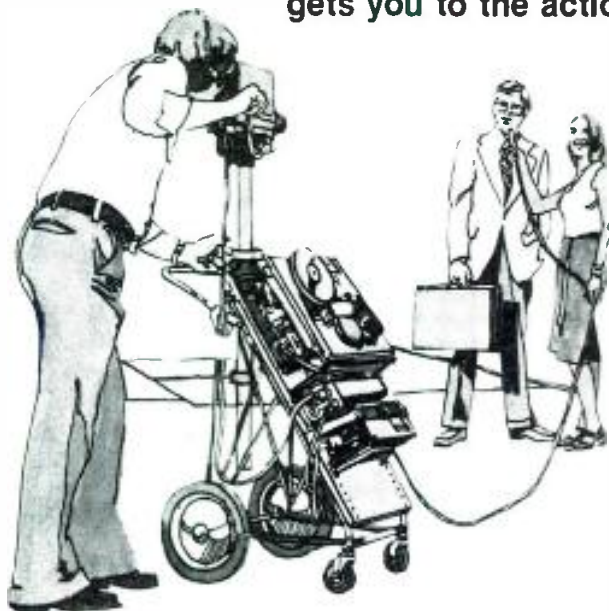


AUDIO & DESIGN RECORDING, INC. • P.O. BOX 786 • BREMERTON, WASHINGTON U.S.A. 98310 • TELEPHONE 206-275-5009 • TELEX 15-2426  
AUDIO & DESIGN RECORDING, LTD., • NORTH STREET READING RG1 4 DA • BERKSHIRE, ENGLAND • TELEPHONE (0734) 53411 • U.K. TELEX 848722

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# New Wheelit ENG-1 Folding Camera Cart

For fast, efficient ENG operation, Wheelit gets you to the action.



## Features

- Fast, ready ENG operation
- Operate camera from cart
- Safe transportation
- 14" x 29" equipment board
- Adjustable equipment mounts for control unit, recorder, battery
- 5 3/4" x 14" camera platform
- Light weight, heavy duty
- 12" wheels & locking swivel casters
- Folds to only 12" width
- Elevator and universal head, optional
- Receptacle and cord reel, optional



Write or Telephone for Information & Prices.



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## PREMIUM NICKEL-CADMIUM "FREZZI"™ direct-replacement for

Made in U.S.A.



## SONY BP-90 battery

### FREZZOLINI® Model FBP-90 Battery Pack offers

- lower price
- full 4AH capacity.
- rugged serviceable plastic case.
- fuse & thermal protection.
- internal spare fuse—field-replaceable.
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Reliable battery packs for commercial and military applications.

For information call (201) 427-1160



**Frezzolini Electronics Inc.**

7 Valley St. Hawthorne, N.J. 07506 USA • TWX: 710-988-4142

Circle (116) on Reply Card

## Exhibits roundup

JVC (continued)

New products

VE-90: Microprocessor

KY-1900: 3-tube color camera

Circle (582) on Reply Card

Jatex

Booth 2505

Established products

VSEC 42TD: Automatic editing control unit

VGEN IV: Generator/reader

New products

VSEC 62TMX: Editing controller

Circle (583) on Reply Card

Jenel Consultants Corporation

Booth 2314

Established products

Service: Consulting and engineering design

Circle (584) on Reply Card

Jensen Tools

Booth 2719

Established products

Series: Tool kits and tool cases

Circle (585) on Reply Card

see ad on page 246

KR Manufacturing

Established products

Dynacase: Rack-mount and carrying cases

Circle (586) on Reply Card

see ad on page 190

Kahn Communications

Booth 2028

Established products

STR77: AM stereo

NSM125: Non-Symmetra-Mod

modulation enhancement equipment

LP-2L: Lines-Plus quality enhancement equipment

SP581A: Symmetra-Peak

New products

LP-2L: Lines-Plus

Circle (353) on Reply Card

KalaMusic

Booth unassigned at press time

Established products

Format: A beautiful music service targeted to adults 25-54.

Circle (587) on Reply Card

Kaman Sciences/BCS

Booth 3216

Established products

Series: Computerized traffic/billing system

Series: News inventory program

Series: Demographic system

Series: Film inventory, amortization and programming program

Series: Audio-video cart inventory and allocation program

Series: Auto-switching interfaces

New products

See at booth

Circle (589) on Reply Card



# Quality Reliability Performance

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

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

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Wayne Smith  
Chief Engineer  
Channel 66, Chicago



Robert Porter  
Director of Engineering  
Spanish Int'l. Network

Circle (117) on Reply Card



**With flexible,  
field-proven,  
electrically  
transparent  
Phillystran®  
high-  
performance  
tower guys . . .**



**the next time you re-guy  
will be the last time  
you re-guy!**

**Phillystran HPTG for**

- ☐ new towers ☐ re-guying  
☐ insulating sections

"The leading edge on cloud banks generated static discharge on the metallic guys of our AM/FM tower. This caused on-and-off cycling of our transmitter.

"Phillystran eliminated that cycling problem. It also changed our D-shaped pattern into a preferred omnidirectional by eliminating the directional aspects common to steel guys."

Don Russell, Chief Engineer  
WDAN-AM & WDNL-FM  
Danville, Illinois

Phillystran HPTG, made  
with DuPont's Kevlar® . . .

- 1.** simplifies installation or re-guying of AM, FM, AM directional and TV towers. Lightweight, flexible, yet as strong as EHS galvanized steel. Negligible creep and elongation for tension-once and walk-away installations.
- 2.** eliminates EMI and RFI associated with steel guys . . . improves FM signals, while also eliminating UV degradation, chipping, water-intrusion and the breaking problems associated with fiberglass insulating sections.
- 3.** maintenance-free. Nonconducting, noncorroding, nonmetallic. No painting or greasing required. Eliminates problems caused by severe chemical/industrial pollution. No insulators required. No problems with fire or vandalism because each socketed assembly includes a steel lead line.

"With Phillystran insulating sections, we had a 25% gain in our FM signal. Electrically-transparent Phillystran was our best investment in 1980."

Manuel Sanguinetti, General Mgr.  
FRECUENCIA MODULADA S.R.L.  
Radio FM 99, Lima, Peru

**PHILADELPHIA RESINS CORP.**



20 Commerce Drive  
Montgomeryville, PA 18936  
(215) 855-8450

call write for new literature  
and proven solutions to your  
tower-guy problems.

Circle (118) on Reply Card

## Exhibits roundup

### Kings Electronics Company

Booth 1907

Established products \_\_\_\_\_

Series: RF coaxial and triaxial connectors

Series: Video patch panels and accessories  
Circle (588) on Reply Card

### Kliegl Brothers

Booth 3014

Established products \_\_\_\_\_

Kliegpac 9

Performer II

Command performance

Fresnels

Scoops

1550 Series: Klieglights

New products \_\_\_\_\_

K96: SCR intelligent digital dimmers

Circle (590) on Reply Card

see ad on page 224

### Kodak

See Eastman Kodak

### Knox Video Products

Booth 1900A

Established products \_\_\_\_\_

K128B: High resolution alpha-numeric character generator

KD128: 400-page floppy disc programmable memory for the K128B

KX50: Low-cost titler/4-page

New products \_\_\_\_\_

Color Box: Variable color backgrounds and characters plus full edging for the K128

Circle (818) on Reply Card

### LPB

Booth 3114

Established products \_\_\_\_\_

Monogram: Audio consoles

Signature: Audio consoles

Citation: Audio consoles

AM-50/250: AM (MW) modular transmitters

New products \_\_\_\_\_

Benchmark: Audio consoles

B-2000: Up to 16 stereo input modules

B-3000: Up to 24 stereo input modules

Circle (591) on Reply Card

see ad on page 161

### LTM Corporation

Booth 2721

Established products \_\_\_\_\_

Full line of HMI lights and studio lighting fixtures

Series: Video accessories, audio mixers, sound accessories, microphone poles and microphone suspensions

New products \_\_\_\_\_

MSL 250: Fiber-optic lighting

LUXARC 600: HMI light using 6000W

HMI bulb; largest Fresnel lens available, 24-inch diameter

Circle (604) on Reply Card

### L-W International

Booth 1601

Established products \_\_\_\_\_

Athena 4000: Telecine projector

Athena 6000: Telecine projector

Circle (592) on Reply Card

see ad on page 264

### Laird Telemedia

Booth 1808

Established products \_\_\_\_\_

5300: Multiplexer and associated projectors

5400: Multiplexer

3600: Character generator

1040: Video "Q" board

1060: Video pointer

7200: Character generator

New products \_\_\_\_\_

3300: Message generator

1500: Character generator

1600: Character generator

Circle (593) on Reply Card

see ad on page 182

### Lang Video Systems Corporation

Booth unassigned

Established products \_\_\_\_\_

Source identifier

New products \_\_\_\_\_

1-Shot ENG source identifier, audio and video mixer, 12V, 28Vdc or 115Vac

Circle (605) on Reply Card

see ad on page 256

### Lansing, James B.

(See JBL)

### Leader Instruments Corporation

Booth 2629

Established products \_\_\_\_\_

LBO-517: Delayed sweep, quad trace oscilloscope

LCG-400M/S: NTSC color bar generator with multiburst or sweep

LCG-396: NTSC color bar generator

LBO-515B: Delayed sweep oscilloscope

New products \_\_\_\_\_

LFC-945: CATV, MATV (VHF, UHF) level meter

LVS-5850: NTSC vectorscope

Others to be announced

Circle (594) on Reply Card

see ad on page 5

### LeBlanc & Royle Communications

Booth 2700

Established products \_\_\_\_\_

K2H: Chemical ground rod

LR450: Broadcast tower and radiator

LR24: Broadcast tower and radiator

LR33: Broadcast tower and radiator

LR1000: Broadcast tower and radiator

LR1400: TV and FM tower

LR84: TV and FM tower

Circle (595) on Reply Card

### Leitch Video of America

Booth 2004

Established products \_\_\_\_\_

VPA330: Video processing amplifier

DTG1000: Digital test signal generator

SCH730: Sync/subcarrier phase monitor

CSD510: Master clock system driver

CLK: Impulse clocks

UDC: Digital clocks

DCD: Digital clocks

P.A.L.: Sync generators and processing amplifiers

FR660: Video and pulse distribution amplifiers

New products \_\_\_\_\_

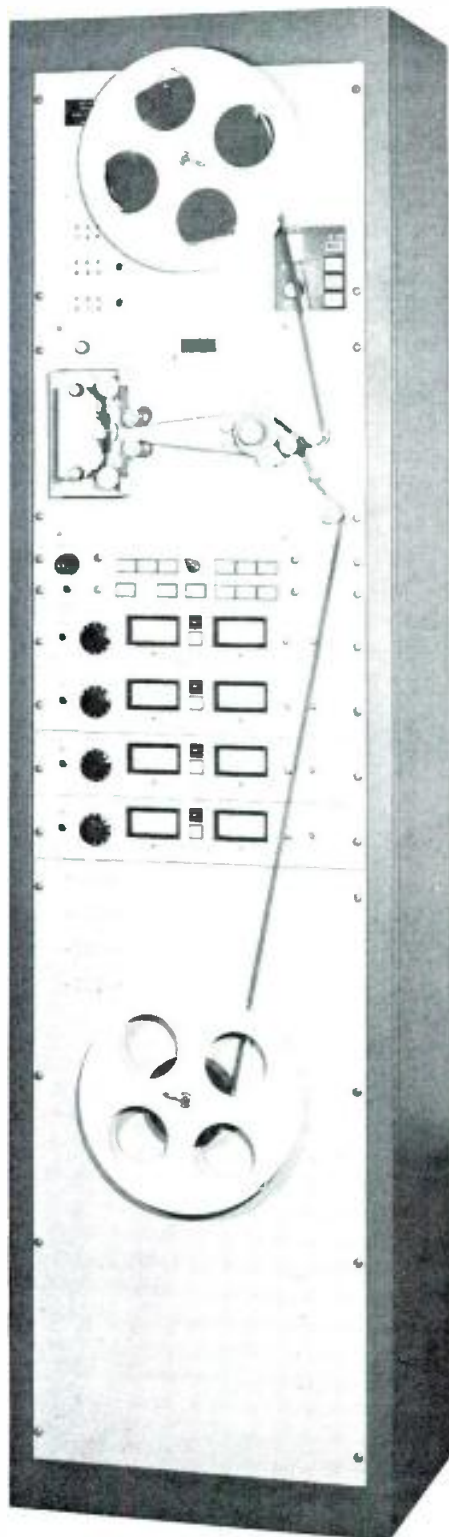
DTG1100: Single-rack unit test signal generator

Satellite audio-video scrambling system

Circle (596) on Reply Card

see ad on page 219





# **MAGNA-TECH**

## **THE SOUND HEARD AROUND THE WORLD**

**Magnetic Film  
Recorders and Reproducers  
for Television and Film  
Sound Post-Production**

### ***HIGH SPEED***

Telecine Magnetic Followers  
Video Tape-Film Interlock  
Electronic Looping  
Dubbing Systems  
16 and 35mm Electronic Projectors  
Total Facility Engineering

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75009 Paris, France

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Crows Nest NSW 2064  
Australia — Telex 24655

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General Optical Co., Ltd.  
15 Hulbert Road  
Johannesburg 2001,  
South Africa

**Rome**  
Alberto Sciarretta  
Via Siria 24  
Rome 00179  
Telephone 7943618

**Brussels**  
A.R.C.  
Rue de Boisdé Linthout 45  
1200 Brussels Belgium

**Hong Kong**  
Paul Yang and Associates  
901 Star House  
3 Salisbury Road  
Kowloon, Hong Kong

**Bombay**  
Capt. P.K. Vishwanath  
234/4 Rama Baug,  
Deodhar Road  
Bombay 400 019, India

**Kehl West Germany**  
Zenon GMBH  
Postfach 1743  
Hauptstrasse 128  
Kehl am Rhein  
Tel: 07851/2991  
Telex: 753537

**London**  
Branch & Appleby  
42 High Street  
Harrow-on-the-Hill  
Middlesex HA1 3LL,  
England

**Kuala Lumpur**  
Kinematronika Sdn. Bhd.  
2852, Jalan Selangor/  
Persekutuan,  
Federal Hill  
Kuala Lumpur, Malaysia

**Caracas**  
Cine Materiales srl  
Apartado Postal 61.098  
Caracas 106 Venezuela

## **MAGNA-TECH ELECTRONIC CO., INC.**

630 Ninth Avenue, New York, N.Y. 10036

Telephone (212) 586-7240

Telex 126191

Cables "Magtech"

Circle (119) on Reply Card

**TO FIND OUT  
WHAT EVERYONE  
ELSE WILL BE  
STRIVING FOR  
NEXT YEAR,  
COME SEE SONY  
THIS YEAR.**



**SONY UNVEILS TECHNOLOGY SO  
ADVANCED IT MAY NEVER FIND ITS WAY INTO  
OUR COMPETITORS' PRODUCTS.**

If by chance you visit all the other exhibits at NAB before coming to Sony, you'll get two things: sore feet, and a clear understanding of just how far ahead of the rest of the industry Sony really is.

After all, where else will you find the future of 1" recording—the BVH 2000? It contains virtually every technological innovation in 1" Type C video recording known to man. And we've arranged no fewer than 14 of them for you to come and play with.

And what other exhibit features the most sophisticated and cost-effective editors and peripherals in the business? All plug-compatible, all based on Sony's total system approach, and all technologically superior.

And where else will you find the incredible Betacam™ system? The most compact, the most lightweight, and the highest performance combination of recorder and cameras (one-tube and three-tube) of its kind anywhere. And most important of all, it's the greatest value for your money in the industry.

The answer: only at Sony.

So after wading through an endless array of ordinary exhibits, come watch Sony turn up the lights on the most significant broadcast innovations of 1982.

**SONY**

Broadcast

Sony is a registered trademark of Sony Corp.

Circle (120) on Reply Card

## Exhibits roundup

### Lemo USA

Booth 2717

Established products

Series: Triaxial TV camera connectors

Series: Stereo and six contact patch panel connectors

Series: Cylindrical, self-locking connectors in coaxial, triaxial and multicontact configurations

Circle (597) on Reply Card

### Lenco

Booth 3214

Established products

Terminal products: Test and generation equipment

Series: Pulse distribution modules

Series: Sync generators

Series: Videoscope

Series: Monochrome and color monitors

New products

PGL-413: Gen-lock generator

PCE 462: NTSC color encoder

Series: Video demodulators

Series: Decoders

Series: Industrial monitors

Circle (606) on Reply Card

see ad on page 157

### Lexicon

Booth 2019

Established products

224: Digital reverberation system

New products

1200: Audio time compressor

97: Super prime time, digital audio delay processor/mixer

Circle (598) on Reply Card

see ad on page 197

### Lightning Elimination Associates

Booth 1616

Established products

Series: Dissipation arrays for antenna lightning protection

Series: Power line surge eliminators

Series: Kleanline electronic filtering systems

Series: Guy charge dissipation chokes

Series: Transient eliminators

Series: Coaxial surge eliminators

Series: Lightning warning systems

Series: Surge and transient generators

New products

Power source-combination voltage regulator

Kleanline electronic filtering system

Circle (599) on Reply Card

see ad on page 100

### Lipsner-Smith Company

Booth 1903

Established products

CF-200: Ultrasonic film cleaning machine

New products

CF-100: Film cleaning machine

Circle (600) on Reply Card

### Listec Television Equipment Corporation

Booth 3325

Established products

3702: Fulmar pedestal

3084: Mark VII fluid cam head

3088: Raven lightweight extended range pedestal

3179: Plover remote pneumatic pedestal

3741: Tern standard range pedestal

3078: Swan fluid post head

3089: Cygnet fluid mini-post head

Digivision monitor prompters; 17- and 12-inch

3067: Dolphin crane arm with remotely controlled pan and tilt head and periscope lens

New products

3197: Teal lightweight pneumatic studio pedestal

3199: Avocet ENG/EPF fluid spring head Complete remote controlled TV camera system including all camera functions with remotely controlled pan and tilt head, zoom lenses and pedestals.

Circle (607) on Reply Card

see ad on page 120

### Logitek Electronic Systems

Booth 2015

Established products

Custom audio series broadcast consoles

BPA-100: Balanced-input phono preamplifier

ADA-8: Audio distribution amplifier

T-100: Presettable program timer

Audio power amplifiers

Bright-VU LED audio level displays

Large numeric display systems

New products

TV-6: Audio mixer designed specifically for TV ENG and EPF and TV editing booths

Circle (601) on Reply Card

see ad on page 252

### Lowel-Light Mfg.

Booth 2302

Established products

01-10: Omni-light

T1-10: Total-light broad light

V44A: Variflector II light reflector

SC-10: Space Clamp clamping device

LFT: Lightflector light reflector

KS: Stand

New products

D2-10: DP light

S2-10: Softlight

Circle (602) on Reply Card

### Lyon Lamb Video Animation Systems

Booth 2832

Established products

VAS IV: Video animation controller

VAS III: VHS video animation testing system

New products

3300: Professional video animation stand

CCS: 4-axis motion control system

Circle (603) on Reply Card

### M/A-COM Video Systems

Formerly Microwave Associates Communications

Booth 3303

Established products

Series: High efficiency 7M/9.2M steerable satellite systems, computer color graphic ENG/transmitter facility/satellite scheduling remote control system, sky scan auto track ENG central receive system, high gain disc array manual track ENG receiver systems, 2, 2.5, 7, 13GHz ENG portable systems,

2, 7, 12GHz intercity microwave systems

Series: Airborne helicopter ENG system

Series: Camera-mounted ENG microwave system

Series: Lightweight 2GHz ENG suitcase

Series: Indestructible fiberglass ENG antennas with interchangeable feeds

Series: 2.5GHz/2.5 MX ENG transmitter/receiver

Series: High gain interferometer antenna systems

Series: 40GHz microwave systems

Series: 23GHz point-to-point microwave systems

Series: Interference free ENG and fixed link fiber-optic transmission systems

Circle (631) on Reply Card

see ad on page 151

### MCI

Booth 1615

Established products

JH-110BX: Audiotape recorder/reproducers

JH-110B: Audiotape recorder

JH-110C: Audiotape recorder

JH-24: Audiotape recorder

JH-600: Audiotape production mixing console

JH-45: SMPTE/EBU synchronizer

New products

JH-800: General purpose audio console

Circle (611) on Reply Card

see ads on pages 65, 67

### MCI/Quantel

Booth 3306

Established products

DLS-6000: Digital library system

DPE-5000: Digital production effects device

DPE-5000 + : Digital multiple input digital effects

DSC-4000: Digital standards converter

DFS-3100: Framestore synchronizer

DFS-1750: Framestore synchronizer

DFS-1550: Digital synchronizer

New products

DPB-7000: Digital fine arts system

Circle (612) on Reply Card

### MZB & Associates

Exhibiting at Shook booth

Established products

22-foot mobile TV van

RS170-A: Sync generator

Series: Character generator

Series: Switching, monitoring, mounting, and audio equipment

Circle (613) on Reply Card

### Magna-Tech Electronics

Booth unassigned at press time

Established products

Series: Magnetic film recorders/reproducers

Series: Telecine magnetic film followers

Series: Time code interlock systems

New products

Series: Time code generator, reader, synthesizer

Circle (632) on Reply Card

see ad on page 135

### Magnum Towers

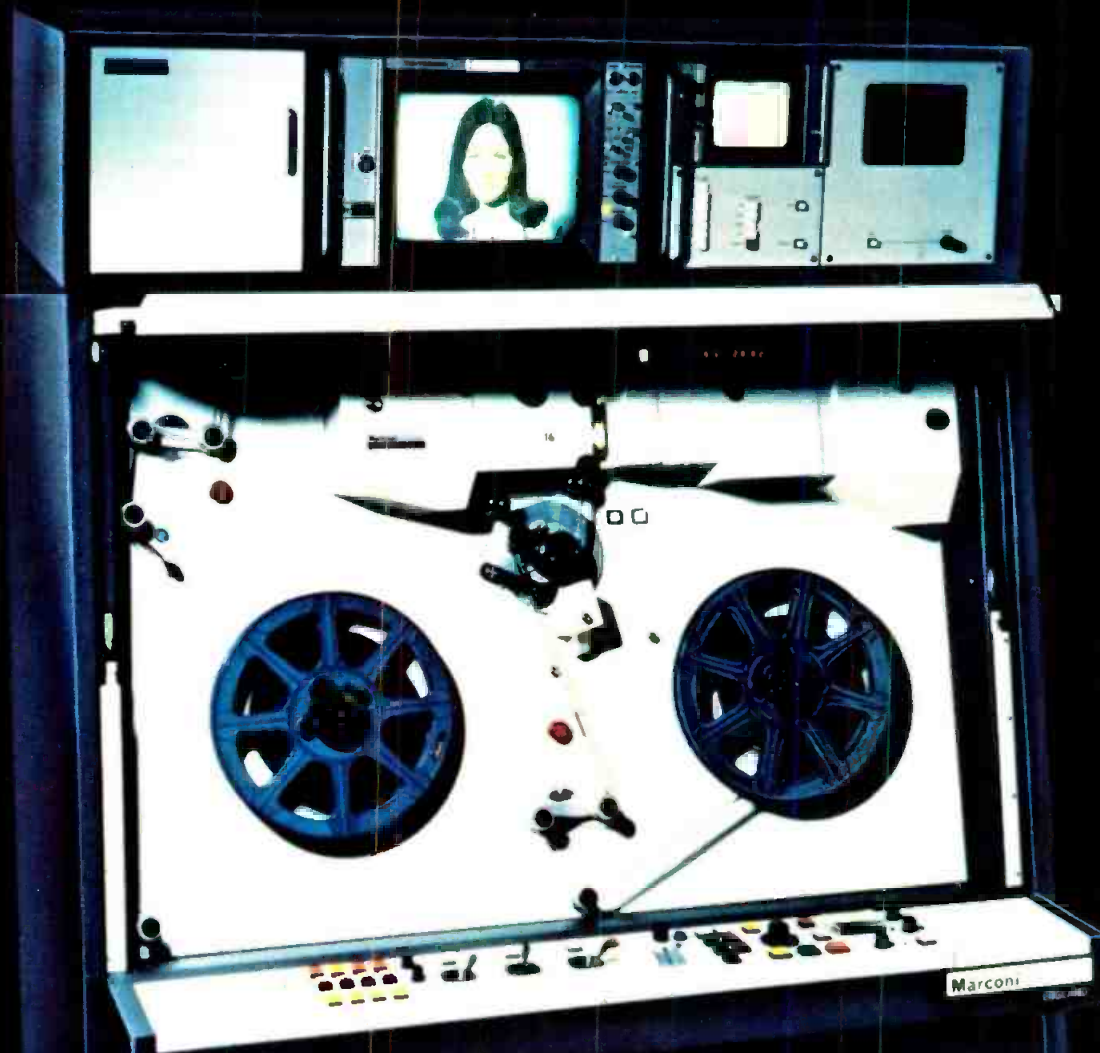
Booth 2005

Established products

18M: 18-inch (face) tower section



# Marconi deserves an Oscar



**Smooth, silent, reliable.**

## **The New Marconi Line Array Telecine B3410**

For a remarkable contribution to film in TV, Marconi's new Line Array Telecine B3410 fully deserves its great reputation.

The unique combination of full digital processing with micro-processor control and CCD sensors means exceptional picture quality, shorter set-up times, rapid change of TV standards, long life and minimum maintenance. No tubes, no replacements!

Also offering fast change of film gauge and full resolution cinemascope, this most outstanding newcomer is available for swift delivery at a highly competitive price.

For full details contact: Marconi Electronics Inc. (John White or Simon Frazer)

Tel: (201) 767-7250 or A.F. Associates Inc. (Lou Siracusano or Bill Ebell)

Tel: (201) 767-1000.



**Marconi Electronics Inc./A.F. Associates Inc.**

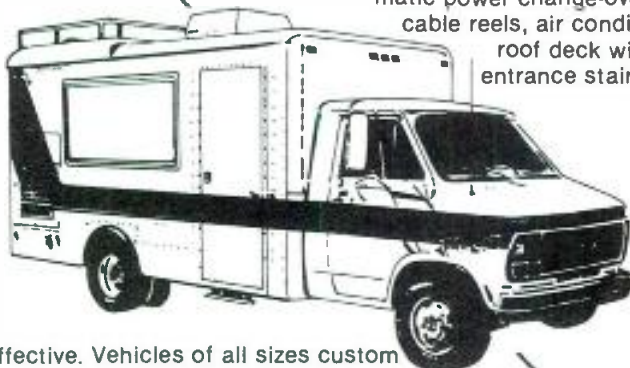
100 Stonehurst Court, Northvale, New Jersey 07647, U.S.A. Tel. 767-7250/ Telex. 710-991-9752.

**SEE IT AT NAB DALLAS BOOTH 3320**

Circle (121) on Reply Card

# Mobile Television Production Systems

Totally custom designed with a 14-foot production area, this 22-foot (4 camera) mobile television production system has superb quality construction with automatic power change-over, electric rewind cable reels, air conditioner/heat pump, roof deck with ladder, electric entrance stair, and much more.



Cost effective. Vehicles of all sizes custom designed and manufactured. Ready for equipment or turn-key jobs.

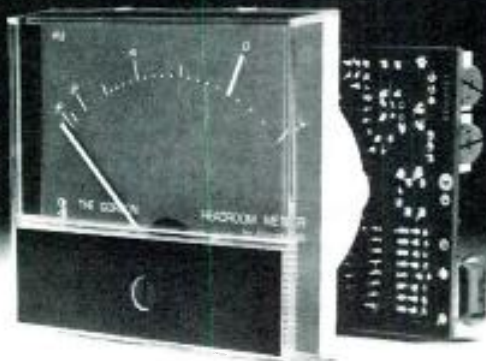
## Shook Electronic Enterprises, Inc.

10630 Rimcrest • San Antonio, Texas 78217  
Phone (512) 653-6761

Booth 2628 • 1982 NAB Convention • Dallas, Texas

Circle (122) on Reply Card

# The Gordon Headroom Meter:



## a better idea in program monitoring.

We've combined the best aspects of the traditional VU meter and the precision of the European Programme meter. The result is a meter that meets the UK/EBU standard for

response to program peaks while maintaining a more conventional and artistically desirable "syllabic" response to music and speech.

Get the complete package for \$122.00, or our VU-conversion option for \$69.00. Quantity discounts are available. For further information, contact:

See Us at NAB Booth #1610A

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

Send for copy of AES  
preprint.



Circle (123) on Reply Card

## Exhibits roundup

### Magnum Towers (continued)

24M: 24-inch (face) tower section  
36M: 36-inch (face) tower section  
42M: 42-inch (face) tower section  
60M: 60-inch (face) tower section

Circle (614) on Reply Card

### Marcom

Booth unassigned at press time

Established products \_\_\_\_\_

SC-203: Stereo generator

New products \_\_\_\_\_

HPA4536B: FM exciter

SMD-203: Stereo measuring decoder

SC-204: Stereo generator

Programmable audio processor

Circle (633) on Reply Card

### Marconi Electronics

Booth 3320

Established products \_\_\_\_\_

MR2B: VTR

New products \_\_\_\_\_

B3410: Line array telecine

Circle (615) on Reply Card

see ads on pages 105, 139

### Marti Electronics

Booth 3109

Established products \_\_\_\_\_

RPT2: Hand-carried RPU transmitter;  
2.5W

RPT15: Aircraft/mobile RPU transmitter;  
15W

RPT25: Remote pickup transmitter UHF;  
25W

RPT40: Remote pickup transmitter VHF;  
40W

RR-50: Remote pickup receiver for mobile  
or fixed operation

CLA-40: Broadcast compressor-limiter

STL-8: Studio-transmitter link

RMC-15: Digital remote control

SCG-8: Subcarrier generator

New products \_\_\_\_\_

TSL-15: Telemetry return link; 15W

TSL-2: Telemetry return link; 2.5W

TR-15: Base station transmitter-receiver

ARS-15: Automatic repeater station

STL-10: Studio-transmitter link

Circle (634) on Reply Card

see ad on page 12

### Matthews Studio Equipment

Booth 2626

Established products \_\_\_\_\_

Mafer Clamp

Mini-Vator

Mini-Jib

Crank-O-Vator

Scissor Clamp

New products \_\_\_\_\_

To be announced

Circle (616) on Reply Card

see ad on page 116

### Maxell Corporation of America

Booth 2212

Established products \_\_\_\_\_

Series: Blank magnetic audio and video  
recording tape

New products \_\_\_\_\_

Series: 1-inch blank video recording tape

Circle (617) on Reply Card

see ad on page 239



# "At half CMX's price, how good can the Commander be?"



## "Better!"

**says Andy Maisner, owner of the American Film Factory,  
Venice, California**

"I was prepared to pay whatever it took to bring American Film Factory's facilities up to state-of-the-art standards. But I wasn't willing to just sign a blank check—so we thoroughly evaluated all the leading computer-assisted videotape editing systems on the market. I was really surprised to discover the United Media's new Commander II was capable of everything CMX could do and more—and at half the price. Half the price!

"Let me get specific—the biggest Commander advantage is complete computer control of multiple mix-effect banks for double re-entries. Sure, CMX can do that with a Grass Valley Switcher, but equipping it with E-MEM costs almost as much as the entire Commander II system.

"The other big advantage is Commander's tremendously flexible list management. Everybody has it, but

Commander's degree of sophistication far exceeds the others.

"Commander offers a lot of useful features—like sync step, independent audio and video dissolve, and split audio/video edits in and out in one pass. Again, most other systems can cope with these editing needs somehow, but Commander handles them with true automation.

"Reliability is excellent—in a year of operation, we've never had a hardware failure. In fact, we've already bought our second Commander II system. Commander II is fully CMX-compatible, which reassures my clients—and it's easier to use and much more versatile, which excites my editors.

"With the Commander's built-in total capability and realistic price, it's certainly the *best* system you can buy."

# COMMANDER II

## United Media

4075 Leaverton Court, Anaheim,

CA 92807 • 714/630-8020

Circle (124) on Reply Card



## Exhibits roundup

### McCurdy Radio

Booth 3106

See at booth

Circle (618) on Reply Card

see ad on IBC

### McInnis/Skinner

(See Newscan)

### McMartin Industries

Booth 3102

Established products

BA50K: 50,000W AM transmitter

BA10K: 10,000W AM transmitter

BA1K: 1000W AM transmitter

BF3.5M: 3500W AM transmitter

FM monitors

SCA receivers

Satellite receivers

Audio consoles

Remote pickup transmitters

New products

BF30M: 30,000W FM transmitter

BF300M: 300W solid-state FM transmitter

BFM2001: FM SCA generator

TR2001: FM SCA receiver

Circle (635) on Reply Card

### Merlin Engineering Works

Booth 1706

Established products

258: Ultra-wide band VTR

238: Extended play kits for 1-inch type C VTRs

Service: Refurbished 2-inch quad VTRs

Circle (619) on Reply card

### MICMIX Audio Products

Booth 3142

Established products

XL-515: Full stereo reverberation system

XL-305: Full stereo reverberation system

XL-210: Full stereo, low-cost reverberation system

XL-121: Monaural reverb with a built-in preamplifier

New products

D-2B: Non-encode/decode noise reduction system

Circle (620) on Reply Card

### Micro Communications

Booth 3312

Established products

System: UHF rectangular waveguide RF; coax RF systems

Series: Coaxial transfer switches; circular and horizontally polarized antennas

Microwave antennas and

interferometers

Diplexers, combiners and filters

New products

Series: Circular waveguide transmission line

Waveguide hangers

Circle (621) on Reply Card

see ad on page 178

### Micro Control Associates

Booth 1813

Established products

PTS-10C: Composite studio transmitter link

RRC-9: Radio remote control system

PLG-10: Subcarrier generator

PLR-10: Subcarrier receiver

New products

PTS-250N: Narrowband studio-transmitter link

Stereo demodulator

Circle (622) on Reply Card

### Microdyne Corporation

Booth 2618

Established products

PR-23: 7-meter satellite receiving antenna with motor drive

PR-16.4: 7-meter satellite receiving antenna

1100 TVR-X24(B-2): 24-channel broadcast-quality satellite receiver

1100 TVM: Satellite uplink modulator

1100 TVE: Satellite uplink exciter

Circle (623) on Reply Card

see ads on pages 255, 257

259, 261, 263, 265

### Microtime

Booth 3322

Established products

2525: Video signal synchronizer

Smart Proc Amp expansion accessory

2520: TBC frame synchronizer

2020: Video signal processor



**T-120:** Time base corrector  
**2100:** Video image processor  
**2080:** Time base corrector PAL/SECAM  
**2080M:** Time base corrector PAL-M  
 New products \_\_\_\_\_  
 To be announced \_\_\_\_\_  
 Circle (624) on Reply Card

**Micro-Trak Corporation**  
**Booth 3115**  
 Established products \_\_\_\_\_  
**6618:** 6-channel audio console  
**6509:** 5-channel audio console  
**6411:** Stereo phono preamp  
**6445:** Audio console  
**7116, 7213, 7116:** Audio distribution amp  
 New products \_\_\_\_\_  
**6510:** Audio console, 10-channel series  
**TF1:** Telefile  
 Circle (625) on Reply Card

**Microwave Associates**  
 See M/A-Com

**Microwave Power Devices**  
**Booth unassigned at press time**  
 Established products \_\_\_\_\_  
**TVA4789-51:** UHF power amplifier; peak sync output power to 1.5 kW available in low and high VHF-TV band and to 100W in the UHF-TV band  
 Circle (626) on Reply Card  
 see ad on page 201

**Midwest Corporation-Unarco**  
**Booth 2518**  
 Established products \_\_\_\_\_  
**M-1:** ENG mobile unit  
**M-20:** Production van  
 Circle (627) on Reply Card  
 see ad on page 113

**Miller Professional Equipment**  
**Booth 388**  
 Established products \_\_\_\_\_  
**25:** Mileqip Fluid Head (camera support equipment)  
 New products \_\_\_\_\_  
**25:** Mileqip Fluid Head (camera support equipment)  
 Circle (628) on Reply Card

**Keith Monks Audio Ltd.**  
**Booth 2833**  
 Established products \_\_\_\_\_  
**Series:** Range microphone stands  
**RCM II:** Professional record cleaning machine  
**RCM III:** Professional record cleaning machine  
**LS18:** Powered monitor loudspeaker  
 New products \_\_\_\_\_  
**CR501:** RCM for radio station—production  
**MT 2:** High tripod microphone stand  
 Circle (629) on Reply Card

**Moseley Associates**  
**Booth 3103**  
 Established products \_\_\_\_\_

**MRC-1:** Microprocessor remote control system  
**MRC-2:** Microprocessor remote control system  
**TCS-2A:** Microprocessor remote control system  
**PCL-505A/C:** Aural STL for high density markets  
**PCL-505/C:** Aural composite STL  
**TRL-1:** Telemetry return link  
**RPL-4:** OB or remote pickup link  
**TFL-280B:** FM limiter  
**TGR-340:** Audio gain rider  
 New products \_\_\_\_\_  
**ACU-1:** Automatic control unit for use with MRC-2 remote control system  
**PCL-606/C:** Composite aural studio-transmitter link  
**PCL-606:** Mono aural studio-transmitter link  
 Circle (630) on Reply Card  
 see ad on page 148

**NEC America/Broadcast Equipment Div.**  
**Booth 2528**  
 Established products \_\_\_\_\_  
**DME-1:** Digital mix effects/digital video effects system  
**TT-7000:** Type C 1-inch VTR  
**204:** 4GHz TVRO system  
**TKA-105:** Routing switcher  
**TMC-105:** Machine control  
**DSA-15:** Actiontrak  
**MNC-81:** ENG/EPF camera  
 New products \_\_\_\_\_  
 To be announced \_\_\_\_\_  
 Circle (636) on Reply Card  
 see ad on page 71

**We  
 put it all  
 together.**

From Emmy award-winning coverage of the 1980 Winter Olympics to historic coverage of the Space Shuttle, and in hundreds of Network and Independent feature productions, Convergence video editing systems are the number one choice because of their speed, reliability and ease of operation.

Since 1975, Convergence has led the way with numerous product innovations. We produced the first ENG editor and were the first to incorporate Joystick Control. Most recently we pioneered the modular editing system design concept.

Today we're working on further innovations to assure that you'll always find more functions and features for your editing investment.

**CONVERGENCE CORPORATION**  
 Convergence Corporation... The modern art of video editing systems.

1641 McGaw, Irvine, CA 92714 Tel: (714) 549-3146, Tlx: (910) 595-2573 • 250 W. 57th Street, Fisk Building, Suite 815, New York City, NY 10019  
 1 Lochaline Street, London W6 9SJ U.K. Tel: 01-741 7211, Tlx: 851-27950 MONREF G

Circle (125) on Reply Card

## Exhibits roundup

### Nady Systems

Booth 2711

#### Established products

**Series:** Wireless microphone systems for film, video and stage using FM and diversity techniques

#### New products

See at booth

Circle (643) on Reply Card

see ad on page 216

### Nagra Magnetic Recorders

Booth 3146

#### Established products

**4.2:** Full track mono recorder

**SNN:** Full track mini recorder

**E:** Full track mono recorder

**TRVR:** 2-track logging recorder with time code

**FAXTHF:** Professional meteorological recorder

#### New products

**TA:** Professional studio-style recorder, 2- or 4-track

Circle (637) on Reply Card

see ad on page 279

### Network Production Music Library

Booth 2412

See at booth

Circle (638) on Reply Card

### Neve

(See Rupert)

### NewsScan/McInnis-Skinner & Associates Booth 2502A

#### Established products

**Weathergraphics:** High performance graphics system

**NewsScan:** Modular family of newsroom computer systems

**Weatherscan:** Weather information services for broadcast and industry  
Circle (639) on Reply Card

### Nortronics Company

Booth 3108

#### Established products

**Series:** Alignment tapes, head cleaners, demagnetizers, bulk erasers, splicing blocks and tabs, magnetic track developer, head lapping kits, broadcast gauges

#### New products

**VCR130:** Non-abrasive drop-in wet system cassette cleaner

**VCR101:** Liquid spray head cleaner  
Circle (640) on Reply Card

### NOVA Corporation

Booth 2411

#### Established products

**NOVA Blocks:** Universal tape cleaner  
Circle (641) on Reply Card

### Fred A. Nudd Corporation

Booth 2021

#### Established products

Monopole for mounting of FM antennas.

Angle-braced guyed tower with hardware  
Circle (642) on Reply Card

### Nurad

Booth 1607

#### Established products

**45SQ3:** 2 + 7GHz dual band Superquad II receive antenna system

**225SQ3:** 2 + 2.5GHz Superquad II receive antenna system

**20QP1:** Quad receive antenna system

**MC3:** Digital remote control system

**MINI POD:** Airborne ENG system

**AUTO TRANSMIT:** Automatic antenna selector

**MINIPAC:** Airborne transmitter receiver

**20ST1 Supertrack:** Receive antenna system for airborne ENG operations

#### New products

**20PR2:** Power Rod—a Dualrod with a built-in power amplifier

**NU45R:** 2 + 7GHz dual band frequency agile tuner

**NU20R:** 2GHz frequency agile tuner

**NU225R:** 2 + 2.5GHz dual band frequency agile tuner

**NU20R:** 2GHz fixed frequency tuner

**NU70T:** 7GHz transmitter

**NU713T:** 7 & 13GHz dual band transmitter

**NU130T:** 13GHz transmitter

Circle (644) on Reply Card

see ad on page 287

### Nytone Electronics

Booth 2725

#### Established products

# The Machines of the 80's.

## THE GARNER 1100

One-inch has already gained nationwide acceptance as the video tape of the 80's. And a lot of people who depend on one-inch have invested in the Garner 1100 degausser so they can get the maximum use out of their tape.

With Garner's one-pass, endless-belt operation, you get complete erasures at the rate of 13 reels per minute. Once you try it, you'll agree that the Garner 1100 is the machine of the 80's.



## THE MODEL 270

If your operation uses 3/4" cassettes, then take a look at the Garner Model 270. It completely erases all prior video and audio in one five-second pass. Put it to work in your studio and watch it pay for itself in a short amount of time.



**TEST GARNER YOURSELF!** Put either one of our machines to the test for 30 days. If they don't live up to your standards, just return them to us. We're confident that after testing Garner, you'll want to put our machines to work for you.  
...And a complete line of audio erasers.

**Dependability...Guaranteed**

**GARNER INDUSTRIES, INC.**

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



Circle (126) on Reply Card



## DYNAPHASE 55/600 Ohms



# A New 600 Ohm Headphone From Stanton—The Choice of the Professionals

Now the great performance enjoyed by recording professionals worldwide in the Stanton 881S cartridge is also available in a brand new, lightweight headphone... the Stanton Dynaphase 55/600 ohms. Professional quality sound is the result of superior Stanton driver design that includes 1½" dynamic high velocity elements with a specially formulated synthetic film diaphragm assembly (Pat. Pend.) and samarium cobalt magnets... allowing for low distortion and

exceptionally wide frequency bandwidth.

The tuning of the air cavities behind and in front of the diaphragm is a unique design of Dynaphase 55/600 ohms. It results in the flattest response and finest acoustical behavior of the driving element. Includes adapter plug.

*For further information, contact Stanton Magnetics, 200 Terminal Drive, Plainview, N.Y. 11803*

Visit us at NAB Conference Booth #3125



# STANTON

THE CHOICE OF THE PROFESSIONALS™

Circle (127) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)

**If we had set out to give you only  
the features our competition gives you,  
this is where we'd be today.**





---

Most VTR units give you only a fraction of the features you might want from a video tape recorder. So we didn't stop where our competition did. We kept on adding features. Until we developed the most versatile 1" machine on the market.

Compare the 3M TT-7000 VTR and NTC-10 Time Base Corrector to the competition. Nobody puts together more of the features you want than 3M. And once you see our unit, we think you'll agree that buying anything else is like getting half a machine.

The 3M TT-7000 Video Tape Recorder gives you:

- Autotrack following (ATF), with multipoint sampling, 1/4 reverse through 2X forward, plus preset slo-mo speeds and direction (optional).
- Video and sync confidence heads.
- Three channel audio confidence heads.
- Video sync channel.
- All DC motor and servo tape transport.
- Play start after scanner lock.
- Spot peels in any combination.
- 19" rack mountable with full dust cover.
- Front panel plug-in modules.
- Frame accurate insert and assemble editing.
- Dual tape timer with zero memory.
- Tape speed override on front panel.
- Stop tone and cue-up (0, 3, 5, 7 sec. preroll).
- Contact closure and TTL external interface.
- Variable speed forward/reverse shuttle.
- Still frame jog.
- Autochroma and color framing.
- Audio 3 record in play mode (built-in speaker).
- Instant stop action from play or slo-mo (with ATF option).
- Instant audio bias level adjust.
- Video level calibrate marker.
- Preset/Manual tracking select on front panel.
- Fixed precision rabbited drum tape guide.

- And low RF, high temperature and low voltage alarms.

Our Time Base Corrector comes complete with its own list of standard features:

- Sixteen line correction window.
- Ten bit quantizing.
- Four times subcarrier sampling.
- 65 dB signal-to-noise ratio.
- Velocity compensation.
- Digital one line drop out compensator.
- Compact size (8<sup>3</sup>/<sub>4</sub>" high by 17<sup>1</sup>/<sub>2</sub>" deep by 18<sup>1</sup>/<sub>2</sub>" wide).
- 45 pounds total weight.
- Portable cabinet or rack mountable.

- And front panel plug-in modules.

Add it all up, and you've got the most complete VTR/TBC package on the market. For a free demonstration, call (612) 733-7914 or write 3M Professional Audio/Video Equipment, Bldg. 223-5S, 3M Center, St. Paul, MN 55144. Get the picture.



**3M means business.  
And the time  
to act is now.**

3M hears you...

**3M**

---

Circle (128) on Reply Card

# #1 SELLER



## PCL-505/C and PCL-505A/C

Sound technology and time-proven performance have made the PCL-505/C Aural Studio-Transmitter Link the work horse of the Moseley STL line. The PCL-505/C has been the world's Number 1 selling composite aural STL since its introduction in late 1974. Taking the technology used in the PCL-505/C a step further, the PCL-505A/C was specifically designed for the dense metropolitan RF environments. Excellent adjacent-channel rejection is achieved in the PCL-505A/C, through the use of a Surface Acoustic Wave (SAW) first I.F. filter, in conjunction with a phase-linearized second I.F. filter.

The PCL-505/C and PCL-505A/C feature on-frequency RF amplifiers and micro-strip line techniques. Excellent frequency stability is achieved by referencing the low-noise, frequency-modulated oscillator output to a crystal-controlled reference oscillator. Composite stereo waveforms allow the stereo generator to be located in the studio, far from strong RF fields, and the wideband input carries both the stereo waveform plus two subcarriers as well.

Both versions are ruggedly constructed for continuous duty, with extensive multimetering and excellent serviceability. A built-in remote connector allows remote control, or optional automatic transfer panels for switching operation to standby units.



So, whether your STL requirement is for a ruggedized, economical work horse; or, if your market has grown to the point of crowded STL spectrum, Moseley's PCL-505 series of STL will accommodate your needs.

- TRUE COMPOSITE STEREO FM
- CARRIES STEREO WAVEFORM PLUS TWO SUBCARRIERS
- ON-FREQUENCY RF AMPLIFIER

- EXTENSIVE MULTIMETERING
- PCL-505A/C RECEIVER FOR HIGH DENSITY RF AREAS

For further information,  
please contact our Marketing Department

### MOSELEY ASSOCIATES, INC.

A Flow General Company . Santa Barbara Research Park

111 Castilian Drive . Goleta, California 93117  
(805) 968-9621 . Telex: 658-448 . Cable: MOSELEY

Circle (129) on Reply Card

## Exhibits roundup

Nytone (continued)

TSC-1: Flying spot scanner

TSC-2: Flying spot scanner

TSC-3: Flying spot scanner

New products

TSC-4: Flying spot scanner system  
(broadcast quality)

Circle (645) on Reply Card

Oak Communications

Booth 2206

Established products

Alpha: Addressable single-channel STV decoder

SIGMA: Addressable single- and multiple-channel STV decoder with audio encryption

ORION: Satellite security system

New products

ORION-I: Set-top satellite decoder

Circle (646) on Reply Card

see ad on page 183

O'Connor Engineering Labs

Booth 2001

Established products

C: Fluid camera head

30-B: Fluid camera head

50-D: Fluid camera head

100-C: Fluid camera head

150: Fluid camera head

102-B: O'Connor Hydro-Ped

Series: Wooden tripods and accessories

New products

Series: Metal tripods

Adjustable side-loading platform for model 50-D

Mechan-O-Ped (mechanical pedestal)

Adjustable spreaders for tripods

Adjustable spreaders with wheels for tripods

Circle (647) on Reply Card

see ad on page 273

Orban Associates

Booth 1812

Established products

8100A: Optimod-FM, audio processing/stereo generator system

9000A: Optimod-AM, audio processing system

111B: 2-channel reverb system for on-air sweetening

245E: Stereo synthesizer

418A: Stereo compressor/limiter

526A: Single channel de-esser for mic/production use

622A/B: Single/dual channel parametric EQs

672/674A: Single/dual channel quasi-parametric

New products

8180A: Optimod-TV, audio processor for TV

424A: Mono/2-channel gated compressor/limiter/de-esser

Circle (648) on Reply Card

see ads on pages 49, 51

ORROX Systems

See CMX/ORROX

Otari Corporation

Booth 1611

Established products

5050B: Compact professional recorder



**5050B-MKIII/8:** 1/2-inch 8-track production recorder  
**ARS-1000:** 1/2-track stereo PB machine  
**MTR-10:** 1/4-inch 1/2-track stereo or 1/2-inch 4-track production recorder  
**MTR-90:** 1-inch 8-track, 2-inch 16/24-track full function recorder  
**4050-C2:** Cassette-to-cassette duplicator

**New products**

**5050MKIII/2:** 1/4-inch 2-track  
**5050MKIII/4:** 1/2-inch 4-track  
**MTR-90-8:** 1-inch 8-track version of MTR-90  
**VL500/600:** Fully automated videocassette loaders  
**DP2700:** Automatic audiocassette winder/loader.

Circle (649) on Reply Card  
 see ad on page 126

**Pacific Recorders & Engineering  
 Booth 1608**

**Established products**

**BMX:** Audio control console  
**Tomcat:** Broadcast cartridge recorders/reproducers  
**SDA-8:** Distribution amplifier  
**SDA-20:** Distribution system  
**RS-16:** Routing switcher  
**Service:** Custom cabinetry

Circle (653) on Reply Card  
 see ad on page 191

**Panasonic Company  
 Professional Audio Div.  
 Booth 1621**

**Established products**

**8210:** Mixer  
**8816:** Mixer  
**8716:** Mixer  
**SL1015:** Turntable  
**SL1025:** Turntable

**New products**

**8112:** Mixer  
**8816-B:** Broadcast and production mixer  
**8112-B:** Broadcast and production mixer

Circle (654) on Reply Card  
 see ads on pages 76, 154

**Panasonic Company (Video)  
 Booth 3217**

**Established products**

**Series:** 1/2- and 3/4-inch videotape recorders/players and editing controllers

**Series:** B&W and color portable and studio TV cameras, video recording cameras

**Series:** B&W and color video monitors

**Series:** Video switching systems

**Series:** Wireless microphone systems

**New products**

See at booth

Circle (665) on Reply Card  
 see ad on pages 76, 154

**Parsons Mfg. Corporation  
 Booth 2023**

**Established products**

**R:** Cases with recessed wheels

**RW:** Cases with recessing handle and wheels

**V:** Valise style carry cases

**H:** Top handle carry cases

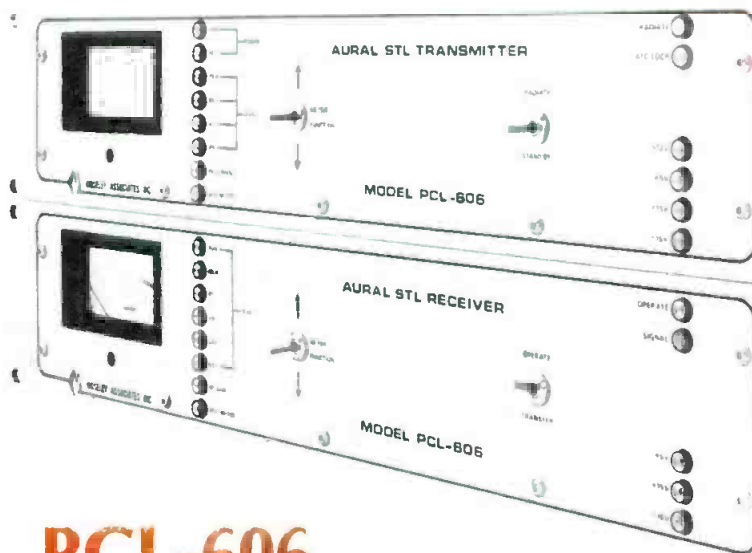
**L:** Two handle carry cases

**T:** Transit cases for shipping containers

**E:** Equipment enclosure cases

**New products**

# #1 PERFORMER



## PCL-606 and PCL-606/C

- ULTRA LOW NOISE AND DISTORTION
- EXCELLENT SELECTIVITY
- OUTSTANDING FREQUENCY STABILITY

Topping the Moseley line of aural studio-transmitter links, the PCL-606 and PCL-606/C are tailor-made for the broadcaster who demands the very finest in performance and engineering. Extremely congested, high-density RF environments are no problem for broadcasters using these all-new, state-of-the-art systems. Either the monaural (PCL-606) or stereo composite (PCL-606/C) provide today's broadcaster with the highest quality program interconnect available in an aural STL. Both are designed for maximum performance and reliability, with easy service features to minimize maintenance down time.

The dynamic range of both systems can be optimized as a function of

- SELECTABLE IF BANDWIDTH
- BUILT-IN DIAGNOSTIC METERING

signal strength, by a pin diode attenuator circuit in the receiver. Superior frequency stability is achieved in the PCL-606 and PCL-606/C Transmitters by locking phase and frequency to a synthesized AFC. Ultra-phase linear I.F. filters, and a broadband, extended digital demodulator provide surprisingly low noise and distortion, while the balance between distortion and selectivity can be tailored to user needs by adjusting I.F. bandwidth. A compensated, linear, baseband response maximizes both monaural and stereo transmission. Both the PCL-606 and PCL-606/C have switch-selectable signal metering functions to measure the incoming RF signal over its entire range. Internal system performance metering functions are built into both transmitter and receiver. All normal service adjustments are easily accessible through the top cover, and brass-enclosed module construction makes PC board servicing easier than ever. Should there be a failure or abnormality shutdown; the receiver is equipped to switch internally and automatically to a standby unit for continuous performance.

Continuing the legacy of the PCL-505, the PCL-606 and PCL-606/C are revolutionizing the state of the art in the aural STL marketplace.

For further information,  
 please contact our Marketing Department

**MOSELEY ASSOCIATES, INC.**  
 A Flow General Company • Santa Barbara Research Park  
 111 Castilian Drive • Goleta, California 93117  
 (805) 968-9621 • Telex: 658-448 • Cable: MOSELEY  
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# MAKE YOUR MOBILE 1 NUMBER ONE IN MOBILITY.



## HANNAY REELS GET YOU IN AND OUT FAST.

No other reel is "remotely" as efficient as a Hannay Reel. You can mix and match stock parts to custom-design the ideal reels to make your hook-up and pick-up of all sorts of cable a snap. And with a wide choice of rewind options and unlimited sizes, shapes and capacities to choose from, you just can't wind up with a better reel. So when an exclusive depends on getting in and out fast, you handle the news, we'll handle the cable!



Send Today  
For A Free Catalog.



### HANNAY REELS

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

Circle (131) on Reply Card

## Exhibits roundup

Parsons (continued)

See at booth

Circle (655) on Reply Card

Perrott Engineering Labs

Booth 2011

Established products

**Series:** Silver zinc ni-cad and lead acid battery packs for cameras and VTRs; portable power for lighting equipment and video analyzers

**Series:** Minichargers for silver zinc and ni-cad systems. Fast chargers for single or multiple ni-cad packs.

Circle (666) on Reply Card

see ads on pages 216, 293

Phelps Dodge Communications Company

Booth 3116

Established products

**Series:** FM antennas, coaxial transmission line and components, harmonic filters, directional couplers

Circle (656) on Reply Card

Philadelphia Resins Corporation

Booth 1715

Established products

**Phillystran HPTG:** Electrically transparent, maintenance free tower guys

Circle (657) on Reply Card

see ad on page 134

Philips Broadcast Group

(See also Central Dynamics Corporation)

Booth 3208

Established products

**LDK-25B:** Multi-conductor studio and field camera

**LDK-5B:** Triax-cable, studio and field camera

**LDK-14S:** EFP, studio, ENG portable camera

**LDM-3001:** Digital noise reducer UHF/VHF broadcast TV transmitter

New products

**LDK-6:** Automatic studio and field camera

**Van:** Mobile production 22-foot TV unit

**LDK-44:** Modular broadcast quality systems

Circle (658) on Reply Card

see ads on pages 43, 187

Philips Test & Measuring Instruments

Booth 3215

Established products

**PM3263X:** 100MHz oscilloscope with TV triggering

**PM3310:** 60MHz digital storage oscilloscope

**PM3215:** 50MHz dual trace oscilloscope

**PM3217:** 50MHz delayed sweep oscilloscope

**PM3543:** Logic scope

**PM5565:** Waveform monitor

**PM5567:** Vectorscope

**PM5539:** Color analyzer

**PM5533:** Color signal generator

**PM5560:** TV demodulator

**PM5570:** Video test signal generator

**PM5580:** IF modulator

**PM5581:** VHF converter

**PM5582:** UHF converter

**PM5583:** Converter base unit

Circle (659) on Reply Card

see ad on page 271

Phoebus Corporation, The

Booth 1713

Established products

**Ultra Arc Followspot:** Long throw

**Ultra Arc Followspot:** Short throw

Circle (660) on Reply Card

Portable Energy products

Booth unassigned at press time

Established products

**Series:** Sealed lead-acid batteries and chargers for video cameras, recorders and portable lights

New products

**30100:** 30V 10 AH battery packs for portable lights

Circle (661) on Reply Card

Porta-Pattern Telecommunications

Industries

Booth 1803

Established products

**001 series:** Video test charts and chart systems

**002 series:** Video test slides

**005 series:** Video test films

**008:** ENG 2-chart system

**006 series:** High resolution emulsions acrylic 8x10 test transparencies

**010-10:** Spherical transparency illuminator

**014 series:** EFP test chart systems

**019:** Porta-Flectors

New products

**001-44:** 11-step log gray scale chart

**005-12:** 16mm BBC #61P 10-foot color flesh tone reference film loop

**005-20:** 35mm B&W chess board aspect ratio transfer alignment film

Circle (662) on Reply Card

Power-Optics

Booth 3113

Established products

**System:** Remote camera control for broadcast TV, news studio legislature, courtrooms, conference facilities, racecourse, medical and other applications

**Series:** Instruments for color monitor set-up

**Series:** Motorized and servo-controlled heads for a wide range of antenna positioning requirements.

Circle (663) on Reply Card

see ad on page 86

Procart

Booth 1816

Established products

**Procart:** Audio cartridge with superior phase and phase flutter stability

Circle (664) on Reply Card

QEI Corporation

Booth 1919

Established products

**691:** FM monitor/test set

**675:** FM exciter

**675T150:** 150W FM amplifier (solid-state)

**675T300:** 300W FM amplifier (solid-state)

**675T500:** 500W FM amplifier (solid-state)

**772F:** Stereo generator

**811:** SCA generator

**7775:** FM automatic transmission system

New products



# Prodelin

THE SHOW BUSINESS DAILY

## FIVE METER ANTENNA A HIT

### Prodelin 5M Earth Station Antenna Sets New Standards

The smash hit of the new season isn't a stage musical, it's a new antenna by Prodelin—a star producer for more than 35 years.

Prodelin's new 5-meter antenna comes in several models offering a choice of feeds and polarizations—*high efficiency Cassegrain* with a diagonal horn and specially shaped subreflector in plane or dual polarized receive-only or transmit-receive configurations or *prime focus* with the LNA at the focal point in plane or dual polarized receive-only.

Some of the outstanding features are:

- Antenna can be easily erected without the use of cranes or special hoisting equipment.
- Segmented reflector significantly reduces size of shipping containers. Provides savings on handling and transportation costs.
- Segments have integral indexing tabs for positive self-alignment.
- Textured front surface diffuses sunlight and reduces solar heating at focal point.
- Individual reflector segments are interchangeable and field replaceable.

Prodelin's 5-meter antennas utilize a twelve-segment compression-molded fiberglass reflector. A patent has been applied for on this feature.

The parabolic reflector is easily assembled from twelve identical self-aligning segments. These segments are made from compression-molded fiberglass (FRP) material providing exceptionally high strength to weight ratio. For complete data and specifications, circle the number or contact Prodelin directly at P.O. Box 131, Hightstown, NJ (609) 448-2800.

made of fiberglass, which provides



FIVE METER ANTENNA SHOWN ON LOCATION WITH HIGH EFFICIENCY CASSEGRAIN FEED.

Circle (132) on Reply Card

eliminating the need for cranes, helicopters, or heavy hoisting gear.

recommendations contained in CCIR 465 and Report 391-1.

one inch damage to

## Exhibits roundup

### QEI (continued)

**FM1GAL:** All solid-state 1kW FM transmitter

Circle (669) on Reply Card  
see ad on page 194

### QSI Systems

**Booth 1502**

#### Established products

**TVL2400:** Off-air 24-hour audio-video logger

**VSID-81:** Video source identifier

**6x1:** Utility video distribution amplifier

**CB 7000:** Color bar identifier

**CB 7100:** Color bar identifier

**VALID:** Video identifier system

**600:** Video time date generator

**VFF6030:** Frame/field counter

**CB 7300:** 12Vdc/115Vac color bar identifier portable

**CB 7400:** 12Vdc/115Vac color bar identifier

#### New products

**CB 7005:** Color bar identifier

**CB 7105:** Color bar identifier

**CB 7405:** Color bar identifier

**TALLY-ID:** Routing switcher input identification

**NVS-8:** Numeric video slate

**DEM0400:** TV demodulator

**CLK 81:** Master clock system

**VT-7:** Video leader countdown generator  
Circle (670) on Reply Card

### Q-TV/Telesync

**Booth 3011**

#### Established products

**VPS-100:** VideoPrompTer System

**VPS-300:** VideoPrompTer System

#### New products

**MQ-1:** Mini Q Prompter for on-location event

Circle (671) on Reply Card

### Quad-Eight Electronics

**Booth 2705A**

#### Established products

**SYSTEM-5:** Digital reverb

#### New products

**248:** Broadcast/production console

**Ventura II:** New version of the Ventura short-frame console

Circle (672) on Reply Card

see ad on page 84

### Quantel

See MCI/Quantel

### RCA Commercial Communications Systems Div.

**Booth 3000**

#### Established products

**HCR-1:** Hawkeye recording camera system

**TK-47:** Automatic camera

**TK-47T:** Triax automatic camera

**TK-29:** Telecine system

**TR-800:** 1-inch helical VTRs with AE-800 editing system

**TTG:** TTG-series VHF TV transmitters

**TTU-55:** 55kW UHF TV transmitter  
TV antennas

**BTA-555:** 5kW solid-state AM radio transmitter

Circle (673) on Reply Card

see ads on pages 115, 121

### RCA/Solid-State Division/

**Electro-Optics & Devices**

**Booth 3001**

#### Established products

**Series:** Vistacons, Saticons, Vidicon Tubes for broadcast TV cameras.

**9011:** 30kW power tube for FM service

**8976:** 18.7kW power tube for VHF service

**9007:** 30kW power tube for VHF service

**Y1393:** 15-30kW cavity for FM service

Circle (674) on Reply Card

see ads on pages 115, 121

### R-Columbia Products Company

**Booth 2612**

#### Established products

**TR-50:** FM wireless intercom headphones

**T4/1C:** Self-powered intercom headphones

**52/TA:** Amplified camera operators headphone

#### New products

**T-50/2B:** Base station interface for TR50

FM wireless intercom headphones to existing "hard-wired" intercom systems

Circle (675) on Reply Card

### RF Technology

**Booth 2720**

#### Established products

**RF-201:** 1W, 2GHz transmitter-portable

**RF-200:** 2GHz portable receiver

**RF-203:** 2/10W 2GHz transmitter

## Howe 7000 Series Stereo Consoles . . . The \$10,000 console for only \$5300.



For further information contact:  
**Howe Audio Marketing**  
3085-A Bluff Street  
Boulder, CO 80301  
(800) 525-7520 or (303) 442-3231



**howe audio productions, inc.**

P.O. Box 383, Boulder, CO 80306

See you in NAB booth 2744

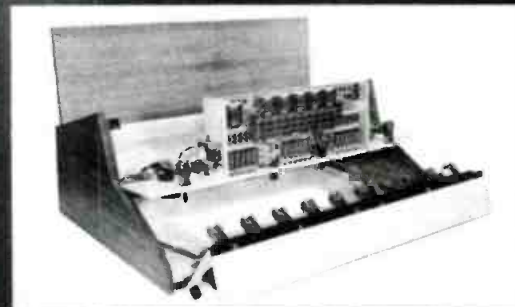
**"The most recent technology at an extremely affordable price!"**

Steven J. Pruett  
General Manager, WTCO  
Arlington Heights-Chicago

All our users recommend the cost-effective Howe line of broadcast equipment. The purchase price and low maintenance costs contribute to the valued position Howe Audio maintains in the industry.

With the advent of Opti-Cue™, Howe Audio now offers an all-inclusive three-year warranty.

Contact a Howe Audio products user today. Contact us for a complete users list.



Opti-Cue™ is a trademark of Howe Audio



**RF-212:** 12W 2GHz transmitter  
**RF-701:** 7GHz 1W portable transmitter  
**RF-700:** 7GHz receiver  
**RF-204C:** Central receiver-2GHz  
**RF-206:** Repeater-2GHz  
 New products \_\_\_\_\_  
**RF-212:** 12W 2GHz transmitter  
 Circle (676) on Reply Card

**RTS Systems**  
 Subsidiary of Compact Video  
**Booth 1604**  
 Established products \_\_\_\_\_  
 Conference line, multifunctional, 1-way  
 and point-to-point intercommunications  
 systems.  
 Circle (683) on Reply Card

**Radio Systems**  
**Booth 2920**  
 Established products \_\_\_\_\_  
**PA-1:** Stereo phono preamp  
**PW-100A:** Stereo power amp  
 New products \_\_\_\_\_  
**DA-8:** Audio distribution amplifier  
**DA-16:** Audio distribution amplifier  
**T-5:** Studio timer  
 Circle (677) on Reply Card

**Ramko Research**  
**Booth 1909**  
 Established products \_\_\_\_\_  
**DC3810S:** Stereo audio mixing console  
**ARA1612:** Audio router (electronic patch  
 panel)

**DA2080:** 20-in 80-out audio distribution  
 amp  
**LA5S/10M:** 5-channel stereo line amp  
**MA 20:** Stereo monitor amp  
**ESP38:** Stereo turntable preamp  
**DC5MS:** Stereo audio mixing console  
**SL 1200MKII:** Technics direct drive  
 turntable  
**MLA 2/E:** Mic/line amp  
 New products \_\_\_\_\_  
**PS 1:** Phasemaster stereo play cart  
 machine  
**RPS 1:** Phasemaster stereo rec/play  
 cart machine  
 Circle (678) on Reply Card  
 see ad on page 56

**Real World Technologies Group**  
**Booth 2621**  
 New products \_\_\_\_\_  
**VUer:** Audio bar graph level indicator  
 Circle (679) on Reply Card  
 see ad on page 98

**Recortec**  
**Booth 3137**  
 Established products \_\_\_\_\_  
**VTE-210:** Videotape evaluator  
**VTC-210:** Videotape conditioner  
**VTT-211:** Videotape timer  
**R-MOD:** Reel-servo modification  
 New products \_\_\_\_\_  
**VTE-110:** Desktop videotape evaluator  
 Circle (680) on Reply Card

**Research Technology International**  
**Booth 1903**

Established products \_\_\_\_\_  
**TV-120:** The total film care system  
**Data-Film:** Computerized timing/  
 reporting system  
**Cinescan:** High-speed 16mm film  
 viewer  
 New products \_\_\_\_\_  
 3/4-inch videocassette evaluator/cleaner  
 Circle (681) on Reply Card  
 see ad on page 290

**Rohde & Schwarz Sales Company**  
**Booth 3213**  
 Established products \_\_\_\_\_  
**Series:** Barco precision color monitors,  
 chroma decoders featuring complex  
 comb filter, precision demodulators,  
 video noise meters, noise generators,  
 signal generators, precision modulators  
 for test purposes  
 New products \_\_\_\_\_  
**Series:** Broadcast quality monitors; lower  
 priced monitor that still has all the  
 specs for broadcast quality master  
 control monitors  
 Optional crosshatch and white field built  
 in all monitors  
 American Standard phosphors now  
 available for Barco master control  
 monitor  
**EKFS/D:** TV demodulators  
**UPSF/2:** Microprocessor-based video  
 noise reducer  
 Circle (684) on Reply Card  
 see ads on pages 53, 211

**Ross Video**  
**Booth 2310**

## Nobody's perfect ... but we'll help you get close.

Phase errors in stereo cart machines, stereo  
 reel-to-reel machines, stereo-to-mono  
 dubs, and more can now be corrected inex-  
 pensively and effectively.

The revolutionary Howe Series 2000 Phase  
 Chaser™ is one neat little package that can  
 be placed in the audio chain in any of sev-  
 eral locations to correct phase error be-  
 tween left and right channels.

The Howe Series 2000 Phase Chaser™ is  
 not expensive, just essential.

Get your facility in phase  
 for as low as \$800.

Phase Chaser™ is a trademark  
 of Howe Audio

## Howe Series 2000 Phase Chaser™



OP2005



OP2020



OP2022



OP2023



SEE ME  
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 NAB BOOTH  
 2744

For further information contact:  
**Howe Audio Marketing**  
 3085-A Bluff Street  
 Boulder, CO 80301  
 (800) 525-7520 or (303) 442-3231



**howe audio productions, inc.**  
 P.O. Box 383, Boulder, CO 80306

Circle (133) on Reply Card





## Introducing the only $\frac{3}{4}$ " time code editing system that performs 20 automatic edits from multiple sources. The Panasonic 700 B-2 Series Time Code Editing System.

**700  
B-2  
SERIES**

Now Panasonic adds a new dimension to the speed and accuracy of time code editing with our new 700 B-2 Series Time Code Editing System. The AU-700 editing recorder, the AU-A70 programmable editing controller, and the AU-J10 multiple source adapter. Together they let you do what other time code editing systems don't: Perform up to 20 automatic, multiple-source insert and assembly edits. And the 700 B-2 Series is packed

with outstanding performance features.

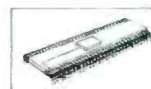
The precision of direct drive.



Check out the excellent stability and precision of the AU-700's direct-drive video head cylinder and capstan servo motor. The superb performance and durability of our crystal-oriented HPF™ heads. All combine to produce an outstanding picture with horizontal resolution of 260 lines color, 330 lines

monochrome and S/N ratio of 46 dB color, 50 dB monochrome. You'll also get an edit with less video noise because video head switching has been moved to the vertical interval so it never shows up in the picture. At the same time, we incorporated DUB IN and DUB OUT connectors with separate Y/C signals and a flying erase head. And to keep that good-looking picture looking good, all circuitry is mounted in a durable annealed aluminum die-cast chassis.

The speed of microprocessors.



Another touch of ingenuity is the AU-700's microprocessor controls. Designed to work perfectly with the AU-A70 editing controller, they give you the speed, accuracy and versatility of full-logic, mode-to-mode switching. The AU-700 will accept SMPTE time code on a separate track or on audio track one as well as standard CTL pulses. And its electronic

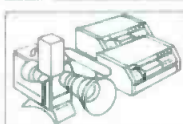




Shown from left AU-700 editing recorder, AU-A70 programmable editing controller.

digital tape counter displays LED readouts of CTL pulses in minutes and seconds—even in fast forward and rewind.

#### Multiple source versatility.



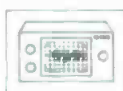
With our AU-A70 editing controller

not only can you generate and read time code pulses, microprocessors let it perform up to 20 time code edits automatically. Add an AU-J10 multiple source adapter and it will accept inputs

from two source decks and one live line plus perform A/B rolls. Microprocessors also let you automatically go to specific tape locations. You can also search both ways at speeds of 1/20X, 1/5X, 1X, 2X, 5X plus pause with picture. Other features include program check, program exchange, insert programming and overflow indication. For editing convenience, separate address time and lap time indicators are included. The AU-A70's error codes pinpoint any procedural

errors to avoid incorrectly programmed edits. The AU-A70 can also be used with any Panasonic solenoid-operated 3/4" and 1/2" VHS™ decks. For worldwide versatility, there is a built-in voltage selector that is compatible with 100V / 120V / 220V / 240V AC, at either 60 Hz or 50 Hz.

#### Total service capability.



When it comes to servicing and maintaining the 700 B-2 Series, Panasonic backs you with a full net-

work of B-2 dealers, equipped with total service capability. Each has the parts and technical expertise that professionals require. For further information, call your nearest Panasonic office: Northeast—(201) 348-7620 Southeast—(404) 923-9700 Midwest—(312) 364-7936 Southwest—(214) 258-6400 West Coast—(213) 655-1111 The new 700 B-2 Series Time Code Editing System. Only from Panasonic.

**Panasonic**  
VIDEO SYSTEMS DIVISION

Circle (134) on Reply Card

## Exhibits roundup

Ross (continued)

Established products \_\_\_\_\_

**Model 514, 508:** Video production switchers

New products \_\_\_\_\_

**SceneStore Memory System:** Will remember up to 200 separate setups or scenes of switcher crosspoint or keymode selections, which may be stored and recalled in order.

Circle (685) on Reply Card  
see ad on page 189

**Rupert Neve  
Booth 3118**

New products \_\_\_\_\_

**DSP Range:** Digital audio production console for television, film and music recording industry

**51 Series:** New design replacing existing production range of consoles

**53 Series:** Stereo broadcast production console

**81 Series:** Multi-track audio console range for sophisticated TV post-production and film use

Circle (819) on Reply Card  
see ad on page 10

**Russco Electronics Mfg.  
Booth 1806**

Established products \_\_\_\_\_

**Cue-Master:** 3-speed broadcast turntable

**Studio Pro:** Deluxe 2-speed broadcast turntable

**Mark V:** Electronic speed control—deluxe 2-speed turntable

**RTA-12:** Broadcast tone arm

**Phono-Mate series:** Phono preamps

**Fidelity-Pro Series:** Phono preamps

**505 series:** Audio consoles

**421:** Broadcast mini-mixer

**2418 and 4428:** Audio distribution amplifiers

New products \_\_\_\_\_

**T-411:** Dial up remote mixer

**T-112:** Telephone to line/equalizer-coupler

**MA-220:** Monitor amplifier

Circle (682) on Reply Card  
see ad on page 94

**SMPTE (Society of Motion Picture and Television Engineers)**

**Booth JJ**

Established products \_\_\_\_\_

**Series:** TV test pattern, audio and video test films and slides, technical literature, industrial standards for television and motion pictures

Circle (686) on Reply Card

**Sachtler**

**Booth 3330**

Established products \_\_\_\_\_

**Series:** Panorama fluid heads and tripods

New products \_\_\_\_\_

**Video 20:** Fluid head for ENG and EFP with associated tripod

**Video 25:** Fluid head for ENG and EFP with associated tripod

**Video 30:** Fluid head for EFP and small studio cameras

**Video 35:** Fluid head for studio and OB cameras

Circle (687) on Reply Card  
see ad on page 124

**Saki Magnetics**

**Booth 1722**

Established products \_\_\_\_\_

**Series:** Long-life ferrite tape heads for Ampex, MCI, Scully, Studer, Otari, TEAC.

New products \_\_\_\_\_

**Series:** High quality metal audio posts for 2-, 1- and ¾-inch VTRs.

Circle (688) on Reply Card

**Satellite Transmission Systems  
(a subsidiary of California Microwave)**

**Booth 2105**

New products \_\_\_\_\_

**DEQ700:** Delay equalizer

**Mod70:** Modulator

**Demod70:** Demodulator

**RL0100:** Restoral local oscillator

**UC14000:** Upconverter

**DC11000:** Downconverter

**UC6000:** Upconverter

**DC4000:** Downconverter

**FLX/MC** earth station monitor and control

**VP100T:** Video signal processor

**VP100R:** Video signal processor

Video compander

Circle (689) on Reply Card



## AUDI-CORD: A GOOD SOUND INVESTMENT!!

### "A" SERIES

An intermediate priced cartridge tape machine series with most of the quality and features found in units costing much more.

#### 3 TRANSPORT REPRODUCER:



#### TWO TRANSPORT RECORD-REPRODUCER



#### THREE SELECTABLE RECORDING MODES

##### — STANDARD DUAL REPLAY MODES:

- Dual Recordings
- Dubs — Copies
- Mixed Composites

AT AUDI-CORD WE DON'T TRY TO FOOL YOU ABOUT TAPE CARTRIDGE MACHINES. — WE KNOW THEIR APPLICATIONS AND THE LIMITATIONS. WE OFFER NO MIRACLE CURES — AND NO EXPENSIVE TO OWN COMPLEXITIES.

WE DO OFFER STURDY QUALITY, GOOD USEFUL FEATURES, FINE CUSTOMER SERVICE AND — TOP DOLLAR VALUE.

HERE ARE A FEW OF OUR MAJOR PRODUCT FEATURES:

- 28 Model variations
- Modular constructed for easy service.
- Interchangeable transports and other assemblies.
- 1 or 3 tone — mono or stereo.
- Replay reminder system.
- Full remote control — automation compatible.
- Meets the needs of the 1976 NAB standards.
- Latching connectors — slip/lift cover.

RACK CABINETS OPTIONAL FOR ALL MACHINES.  
See us at NAB, Booth 1510

Circle (135) on Reply Card

### Modu-Cart 100 Series

#### RECORD-REPRODUCER



#### REPRODUCER



AT AUDI-CORD  
VALUE IS NOT EXPENSIVE



**AUDI-CORD CORPORATION**

1845 W. Hovey Ave.,  
(309) 452-9461

Normal, Ill. 61761

GIVE US A CALL AND TALK CARTRIDGE NEEDS



**OUR  
PICTURE**

**VS.**

**THEIR  
PICTURE**

**LENCO'S  
NEW PCE-462  
COLOR ENCODER  
WILL SHOW  
YOU THE BEST  
RGB TO NTSC  
IN THE BUSINESS  
— FOR  
BROADCAST  
AND COLOR  
COMPUTER  
GRAPHICS.**



**LENCO**

Circle (136) on Reply Card

Now give yourself a clear advantage — with a picture that's clearly better. Not just visually, but cost-wise, too.

Lenco's new PCE-462 takes RGB sync, blanking, sub carrier and optional luminance and gives you NTSC out — with such high resolution superiority that we'll be glad to compare it against anybody else's.

Now you can upgrade picture quality at a fraction of the cost of other equipment. And enjoy enhanced results from compatible graphics computers with RGB out.

**Frequency response.** Compare this Lenco at  $\pm 0.3$  db to 6.5 MHz, to -3 db at 7.5 MHz. Truly outstanding performance.

**Enhancement.** Compare Lenco sharpness with signal boost of +8.3 db at 3.5 MHz.

**Non-composite RGB or composite green.** This Lenco video input processor accepts either without modification.

**Luminance channel input optional with plug-in circuit board.** Now you can up-date your older 4-tube cameras instantly. All the hardware is here — BNC coax connectors, internal wiring, etc. Just plug in for your clearest color ever.

**LENCO'S FREE OFFER**



It will improve your picture right now.

Write or call us today. We'll send you a spec sheet on the PCE-462 and give you a side-by-side comparison spec check with all other units now available: the answers you want — direct from our engineers.

Call 314-243-3147

☐ Have your sales representative call me.

☐ Send literature and comparison.

Name (please print) \_\_\_\_\_

Title \_\_\_\_\_

Firm or station \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

**Lenco, Inc.,** Electronics Division, 300 N. Maryland St., Jackson, MO 63755 (314) 243-3147

## Exhibits roundup

### Sennheiser Electronic Corporation Booth 2101

Established products \_\_\_\_\_

Series: Electret microphones, condenser microphones, professional microphones

New products \_\_\_\_\_

**MKE40:** Directional lavalier microphone  
**HD 40:** Ultralight weight monitor headphones

**HMD 410:** Lightweight electret headphone-microphone combination

Circle (690) on Reply Card

see ad on page 164

### Sescom

#### Booth 1700

Established products \_\_\_\_\_

**ENG-1 MKII:** 3-channel mixer

**MLD-1 MKII:** Mic-line driver

**SB-1 MKII:** Stereo balance box

**ADA-1 MKII:** Audio distribution amplifier

New products \_\_\_\_\_

**AVM-1:** Voltmeter

**AFM-1:** Audio frequency meter

**PAG-1:** Portable audio generator

**THD-1:** THD analyzer

Circle (691) on Reply Card

### Shintron Company

#### Booth 1603

Established products \_\_\_\_\_

**375:** Super switcher

**374:** Super 80 switcher

**372:** Special effects generator

**505:** Character generator

**641:** SMPTE time code generator

**644:** SMPTE time code reader

**350:** Encoded chroma-keyer

**316:** Audio distribution amplifier

**336:** Video distribution amplifier

New products \_\_\_\_\_

**515:** Character generator

**508:** Subtitled

Series: Modular distribution amplifiers

Circle (692) on Reply Card

### Shively Laboratories

#### Booth 1718

Established products \_\_\_\_\_

**6814:** Very high power circularly polarized FM antenna

**6810:** High power circularly polarized FM antennas

**6813:** Medium power circularly polarized FM antenna

**6811:** Low power circularly polarized FM antenna

**6812:** Educational power level circularly polarized FM antenna

**1203-28:** Coaxial patch panel

**1313-3F:** Unflanged and flanged coaxial transmission line

**2577:** Pressurization equipment

**5700:** RF reflectometer

New products \_\_\_\_\_

**6810D:** High power directional FM antenna

**6010PB:** FM panel antennas

model for antenna pattern optimization range

Circle (693) on Reply Card

see ad on page 274

### Shook Electronic Enterprises

#### Booth 2628

Established products \_\_\_\_\_

**14-C:** 22-foot mobile TV production system

Circle (694) on Reply Card

see ad on page 140

### Shure Brothers

#### Booth 3110

Established products \_\_\_\_\_

Series: Broadcast products, circuitry products and phono products.

New products \_\_\_\_\_

**M267:** Portable mic/line mixer

**M268:** Portable microphone mixer

**R104A:** Omnidirectional cartridge for Shure SM81 condenser microphone

Circle (710) on Reply Card

see ads on pages 39, 243

### Sigma Electronics

#### Booth 2614

Established products \_\_\_\_\_

**CSG-365A:** Color sync generator with color bars and crosshatch

**VPA-100:** Video processing amplifier

**Sys. 500:** Modular distribution equipment

Various: Stand-alone distribution equipment

New products \_\_\_\_\_

**BBG-144:** Phase adjustable blackburst distribution module

**BBG-550:** Phase adjustable blackburst module for system 500 frame

Circle (695) on Reply Card

### Singer Broadcast Products

#### Booth 3120

## Why Your Radio Station Should Own An Eventide H949 Harmonizer.<sup>®</sup>

### • IT'S A COMPLETE AUDIO TIME COMPRESSION SYSTEM AT A FRACTION OF THE PRICE

The \$3500\* H949 gives you the same audio time compression and expansion capabilities of competitive single-purpose units costing well over twice as much. You get the power to control time itself...with no editing, no program material deleted and no abnormal pitch effects.

### • IT'S A COMPLETE SPECIAL EFFECTS DEPARTMENT

The Eventide H949 Harmonizer\* special effects unit gives you an almost endless variety of effects. There's variable delay, echo and reverb. Feedback level and equalization controls let you "custom-tune" the audio. Pitch change capability can create new voices. Mix input with pitch-changed output for chorus and harmony effects. Want the distinctive sound of flanging? The H949 offers the best flanging ever. There's time reversal and repeat too. For even more versatility, many more effects can be created from combinations of the basic effects.

### WHAT CAN THIS MEAN FOR YOUR STATION?

### • IT CAN HELP YOU MAKE MORE MONEY

Go after those co-op dollars! The H949 can easily compress an existing national spot to accommodate a local retailer tag. Local advertisers who deliver their own ad copy will love what the H949 can do. Endless retakes to correct

the non-professional's timing errors are eliminated. Use pitch-change to make that local retailer sound more like an announcer (He'll love that!) Time compression with the H949 can bring order out of chaos when running back-to-back religious or political programs which are often mistimed. And, you'll find yourself doing more and better station-produced local spots—with those special audio effects that make for a more professional custom production. Your advertisers will notice and appreciate the difference.

### • IT CAN GIVE YOUR STATION A MORE DISTINCTIVE, TIGHTER SOUND

The H949 Harmonizer can really make a difference. Use its special effects capabilities to produce really distinctive promos, intros and custom jingles. For a brighter, fast-paced sound, some stations choose to speed up their music by a few percent, utilizing the Harmonizer to maintain normal pitch. Using pitch-change, you can even create new voices to populate your air.

**MOST EVENTIDE DEALERS HAVE EVALUATION UNITS AVAILABLE. CALL EVENTIDE TODAY FOR THE DEALER NEAREST YOU.**



**Eventide**  
the next step

265 West 54th Street  
New York, N.Y. 10019  
(212) 581-9290

\*List price in domestic U.S.

Circle (137) on Reply Card



Established products \_\_\_\_\_

**Series:** AM and FM transmitters  
**Circle (712) on Reply Card**  
see ad on page 8

**Sintronics**  
See Singer

**Skirpan Lighting Systems**  
Subsidiary of Compact Video  
**Booth 1604**

Established products \_\_\_\_\_  
Lighting control systems for broadcast studios  
**Circle (711) on Reply Card**

**Sono-Mag Corporation (SMC)**  
**Booth 3107**  
Established products \_\_\_\_\_  
**Series:** Broadcast automation systems and related equipment for radio  
**Circle (696) on Reply Card**

**Sony Broadcast Products Company**  
**Booth 3200**

Established products \_\_\_\_\_  
**BVH Series:** 1-inch format VTR  
**BVH-500:** Portable EFP unit  
**BVH-1180:** 3-hour mastering unit  
**BVP Series:** ENG/EFP cameras  
**BVP-330:** Diode-gun Plumbicon EFP color camera  
**BVP300A:** Midrange 3-tube EFP color camera  
**BVP-250:** ENG Saticon low cost color camera

**BVP110:** High quality HBST single 2/3-inch tube color camera for newsgathering

**BVE-800:** Low cost flexible time code editor for U-matic and 1-inch C-format VTRs

**Digital products:**

**BVX-30:** Video processor

**BVP-800:** Low cost TBC

**Series:** Broadcast monitors including BV-1900 studio monitor

New products \_\_\_\_\_

**Betacam Systems:** Full BVW1/BVW10 and accessories for VTR in camera combined 1-piece 1/2-inch tape recorder/camera unit

Updated BVE5000

Significant new advances in 1-inch C-format VTR and accessories.

Others to be announced

**Circle (713) on Reply Card**

see ads on pages 96, 136

**Soundcraft USA**

**Booth 2003**

Established products \_\_\_\_\_

**Series 1S:** Portable audio mixing console

**Series 800:** Post-production audio mixing console

Portable 1-inch 8-track audiotape recorder

New products \_\_\_\_\_

**Series 1600:** Post-production audio mixing console

**Circle (714) on Reply Card**

**Sound Genesis**

**Booth 2026**

Established products \_\_\_\_\_

**Series:** Equipment geared to audio production and reproduction.

New products \_\_\_\_\_

See at booth

**Circle (820) on Reply Card**

**Sound Technology**

**Booth 2636**

Established products \_\_\_\_\_

**1500A:** Tape recorder/audio test system

**1501A:** 2-channel balancing system

**TR-150:** Technical test record

**VP-150:** Video printer

**1710A:** Professional distortion analyzer

New products \_\_\_\_\_

**1501A:** 2-channel balancing system

**1500A/009:** Computer interface bus (GPIB) option for 1500A.

**TR 150:** Technical test record.

**Circle (697) on Reply Card**

see ad on page 165

**Spectra Computer Systems**

**Weathercaster**

**Booth 2415**

Established products \_\_\_\_\_

**CT-1000:** Color graphic-weather forecasting computer system

NTSC RS-170A gen-lock signal

**S-1010:** Digital fine art system

**Circle (698) on Reply Card**

see ad on page 40

**Sphere Electronics**

**Booth 2604**

Available products \_\_\_\_\_

**Series:** Audio mixing consoles

## Eventide's Timesqueeze Jr.™ T.V. Time Compression System— At Just \$5000, Isn't It Time Your Station Owned One?

### • EVENTIDE'S NEWEST VIDEO TIMESQUEEZE SYSTEM COSTS JUST \$5000\* COMPLETE

That's thousands less than any other T.V. time compression system. Eventide's Timesqueeze Jr.™ interfaces with virtually every variable-speed-capable VTR or film chain (and audio recorders too.) Compress or expand the running time of program material with no editing, no program material deleted and no abnormal pitch effects.

### • WE CUT THE PRICE BY SIMPLIFYING THE CONTROLS

We've kept operating controls to a minimum. Just set the desired percentage change on four thumb-wheel switches. The resulting time change can easily be calculated to the fraction of a second.

### • WE DIDN'T CUT BACK ON PERFORMANCE

Pitch normalization is the key to successful time compression. That's why the heart of every Eventide Timesqueeze System—regardless of price—is Eventide's fabulous H949 Harmonizer.\* Both Timesqueeze and Timesqueeze Jr. deliver the superior specs of the H949 Harmonizer—15kHz frequency response; 96dB dynamic range. You'll find your Eventide Timesqueeze System is an invaluable production tool. Endless retakes to correct timing errors are eliminated. Movies and syndicated programs can be time compressed without edits or cuts to accommodate fixed time slots and varying commercial loads. And Timesqueeze time compression gives your commercial productions extra punch. Spot retention studies prove it!



### • DOUBLE DUTY FOR GREATER VALUE

When not being used for time compression, Eventide Timesqueeze Systems can provide all the audio production effects that made the H949 Harmonizer an industry standard. There's pitch-change, chorus and harmony effects, variable delay, echo and reverb effects, flanging, time reversal, repeat and more.

### • EVENTIDE'S SUPER COMPUTERIZED TIMESQUEEZE

Now that you've read about the capabilities of our \$5000\* economy Timesqueeze Jr., just imagine what our top-of-the-line system can do. Incorporating a Hewlett Packard HP-85 (included in the \$7985\* price,) this system offers totally automated control of all calculations and operations. There's a C.R.T. readout to keep you fully informed as to tape machine status, running speed, pitch ratio and other operational data. It's so smart it can even print out how-to-use info and interconnect diagrams.

**SEE BOTH EVENTIDE TIMESQUEEZE SYSTEMS NOW. CALL EVENTIDE OR YOUR DEALER TO ARRANGE A DEMONSTRATION. VISIT US AT N.A.B. BOOTH 2934.**

**Eventide**  
the next step

265 West 54th Street  
New York, N.Y. 10019  
(212) 581-9290

\*List price in domestic U.S.

**Circle (138) on Reply Card**

## Exhibits roundup

Sphere (continued)

New products \_\_\_\_\_

**Series:** Digital attenuator and fader

**1604:** "Satellite" mixer (16-in/4-out)

**Circle (821) on Reply Card**

**Stainless**

**Booth 2418**

Established products \_\_\_\_\_

**Series:** Antenna support structures for the broadcast industries ranging from 20 to 200 feet.

**Circle (822) on Reply Card**

**see ad on page 208**

**Stanton Magnetics**

**Booth 3125**

Established products \_\_\_\_\_

**Series:** Magnetic cartridges, high performance professional series 980LZS, 981LZS, 980HZS and 981HZS, the model 310 preamplifier and a line of record care products

New products \_\_\_\_\_

**RC5 Plus:** The all-in-one record care cleaner

**Circle (699) on Reply Card**

**see ad on page 145**

**Stantron Division of Wyco**

**Metal Products**

**Booth 2420**

Established products \_\_\_\_\_

**Series:** Electronic modular cabinets, consoles, computer peripheral furniture, fan, blowers

New products \_\_\_\_\_

Cooling base for above

**Circle (700) on Reply Card**

**Star Case Mfg. Company**

**Booth unassigned at press time**

Established products \_\_\_\_\_

**ATA:** Flight cases for all broadcast equipment

**Transport:** Fiber cases lightweight with valence foam lines

**Mover:** Fiber cases lightweight telescoping lid with buckles and straps

**Circle (701) on Reply Card**

**Stephens Electronics**

**Booth 2511A**

Established products \_\_\_\_\_

**821B-104A-24P:** 24-track portable tape recorder/reproducer with QII Autolocator.

New products \_\_\_\_\_

**824-103-2:** 1/2-inch 2-track mastering analog recorder portable with Q II Autolocator.

**Circle (709) on Reply Card**

**Storeel Corporation**

**Booth 3205**

Established products \_\_\_\_\_

**Series:** Modular rapid transit storage systems for videotapes, cassettes and film.

**Series:** Cabinets, storage VTR and film, reel storage/retrieval systems, films and VTR. Set-up trucks, tape racks, cartridges.

**Series:** Room stretcher high density

storage for RCA and Ampex cassettes

**Circle (708) on Reply Card**

**see ad on page 221**

**Straight Wire Audio**

**Booth 1724**

Established products \_\_\_\_\_

**UA-2:** Universal audio amp card-mic-toline level with eight outputs

**PH-2:** Phono preamp with passing EQ and balanced input

**MTX:** L + R/L-R line amp for matrixed cart recording

**UPS 3:** Power supply board optimized for audio op-amp applications

**MF:** Mini file card cage—holds 3 SWA cards. All of the above are available as kits

New products \_\_\_\_\_

High com noise reduction system

**Circle (702) on Reply Card**

**Strand Century**

**Booth 3328**

Established products \_\_\_\_\_

Full line of studio and location lighting, dimming and control equipment including Strand Century/Ianaro HMI fresnels, lighting kits and pole-operated studio fixtures

**CD80:** Dimmer banks and portable packs

**Mantrix 4C:** Control console

New products \_\_\_\_\_

**CD80:** 6kW six pack for portable application or permanent installations  
**Strand Century/Ianaro** new 6kW 14-inch HMI fresnel

**Circle (823) on Reply Card**

**Studer Revox America**

**Booth 3123**

Established products \_\_\_\_\_

**B67 MKII:** Audio recorder

**A80 RC:** Mastering deck

**A80 VU:** Stereo and multi-track mastering recorders

**A800:** Microprocessor-controlled multi-track recorder

**169/369 Series:** Broadcast audio consoles

**900 Series:** Broadcast audio consoles

**TLS 2000:** SMPTE synchronizing and editing system

Telephone hybrid and interfacing systems

**PR99:** Compact broadcast recorder

**Revox B77:** Audio recorder, broadcast versions

**Revox B710:** Professional cassette deck

New products \_\_\_\_\_

**A810:** Microprocessor-controlled broadcast recorder (prototype)

**PR99:** Reproduce only version (prototype)

**Circle (703) on Reply Card**

**see ads on pages 123, 237**

**Swintek Enterprises**

**Booth 1702**

Established products \_\_\_\_\_

**MK 1L:** M500/SM58 hand-held transmitters

**MK 2L:** Lavalier reinforcement sound wireless microphone system

**MK 3:** Film/video wireless system

**MK 7:** UHF lavalier transmitters/receiver system

**MK:** EFP/ENG wireless system

**MK200:** Wireless headset with self-

contained power supply

**MK200/CPS:** Wireless headset for EFP/ENG applications

**MK200/RPL:** Rack-mount wireless intercom system

**MK9-2:** Diversity antenna systems VHF/UHF

New products \_\_\_\_\_

**200/PTT:** VHF/UHF push to talk wireless headset

**200/COM:** Hardware intercom to switch wireless headset interface

**Circle (704) on Reply Card**

**see ad on page 249**

**System Associates**

**Booth 2411**

Established products \_\_\_\_\_

**Service:** Brokers of used broadcast TV equipment

**Circle (705) on Reply Card**

**System Concepts Quanta Corp.**

**Booth 1705**

Established products \_\_\_\_\_

**Q-7A:** Quantafont teleproduction studio titler

**QST:** Quantafont automatic subtitling system

**Q-VII:** Quantafont teleproduction studio titler

**Q-6:** Quantafont teleproduction studio titler

**Q-6/A:** Quantafont teleproduction studio titler, monochrome

**Q-6/M:** Quantafont automated mass memory TV information display system/titler

**Q-V:** Quantafont low-cost monochrome teleproduction studio titler

**Q-3A:** Nightwatch automated sign-off to sign-on TV information display system

**QN:** Quantanews computer-assisted broadcast newsroom information handling system

New products \_\_\_\_\_

**Q-8:** Quantafont font loadable, high resolution teleproduction studio titler

**MG-100:** Microgen low-cost single- or dual-channel teleproduction studio titler

**Circle (706) on Reply Card**

**see ad on page 33**

**Systems Wireless Ltd.**

**Booth 3129**

Established products \_\_\_\_\_

**77D:** Dynex body-type transmitter

**81D:** Dynex hand-held transmitter

**63D:** Dynex diversity receiver

**58D:** Dynex single receiver

**66D:** Dynex portable receiver

**QT-1:** Pocket-size transmitter for cueing

**QR-1:** Pocket-size receiver for cueing

New products \_\_\_\_\_

**QX-1:** Wireless intercom base station for one channel

**QX-2:** Wireless intercom base station for up to six channels

**Circle (707) on Reply Card**

**TDK Electronics Corporation**

**Booth 2726**

Established products \_\_\_\_\_

**GX-LX Series:** 1/2-inch open-reel tape

New products \_\_\_\_\_

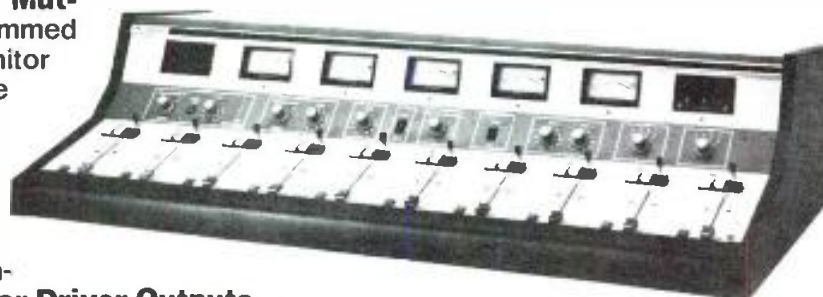
**PT-120 Series:** VHS videocassettes for all educational/industrial broadcast applications

**Circle (715) on Reply Card**



# Everything you want in an audio console:

**4 Models**—8 and 10 mixer dual stereo with rotary or linear faders • **Transformer Balanced Inputs and Outputs** • **3 Inputs Per Mixer**—internal pads allows mic/line selection on the same mixer • **Two 4-Input Auxiliary Input Selectors**—may be assigned to any mixer • **Pre-fader Pushbutton Cue**—in addition to normal CCW fader cue position • **LED Status Indicators**—color coded to aid in instant identification of function selectors • **Momentary or Continuous Remote Control Contacts**—internally selectable, also controls optional digital timer reset/start • **Full Metering Capability**—two meters standard, up to four meters and/or digital clocks and timers optionally available, all meters provided with LED peak indicators • **Gain Selectable Microphone Preamps**—provided with center tap access for phantom condenser microphone power, processor input/output port with buffer amplifier for outboard compressors, limiters, etc. • **Programmable Muting Logic**—internal pin-programmed matrix allows any selection of monitor and cue muting for the first five mixer positions • **Pushbutton Aural Phase Test** • **Announcer's Microphone Intercom-Air Selector** • **Full Dual Channel Operation**—independent program and audition assignment pushbuttons • **Five Monitor Driver Outputs**—four muted, one non-muted • **All Mixers Switch Selectable to Mono or Stereo** • **Ground-Plane Techniques Used Throughout for Increased RF Immunity** • **Selectable Internal or External Master Level Controls** • **Accessories and Options**—mono mixdown, high impedance (cassette) line input plug-ins, reference oscillator/line input plug-in, additional microphone input plug-ins, digital clock, digital timer, linear faders.



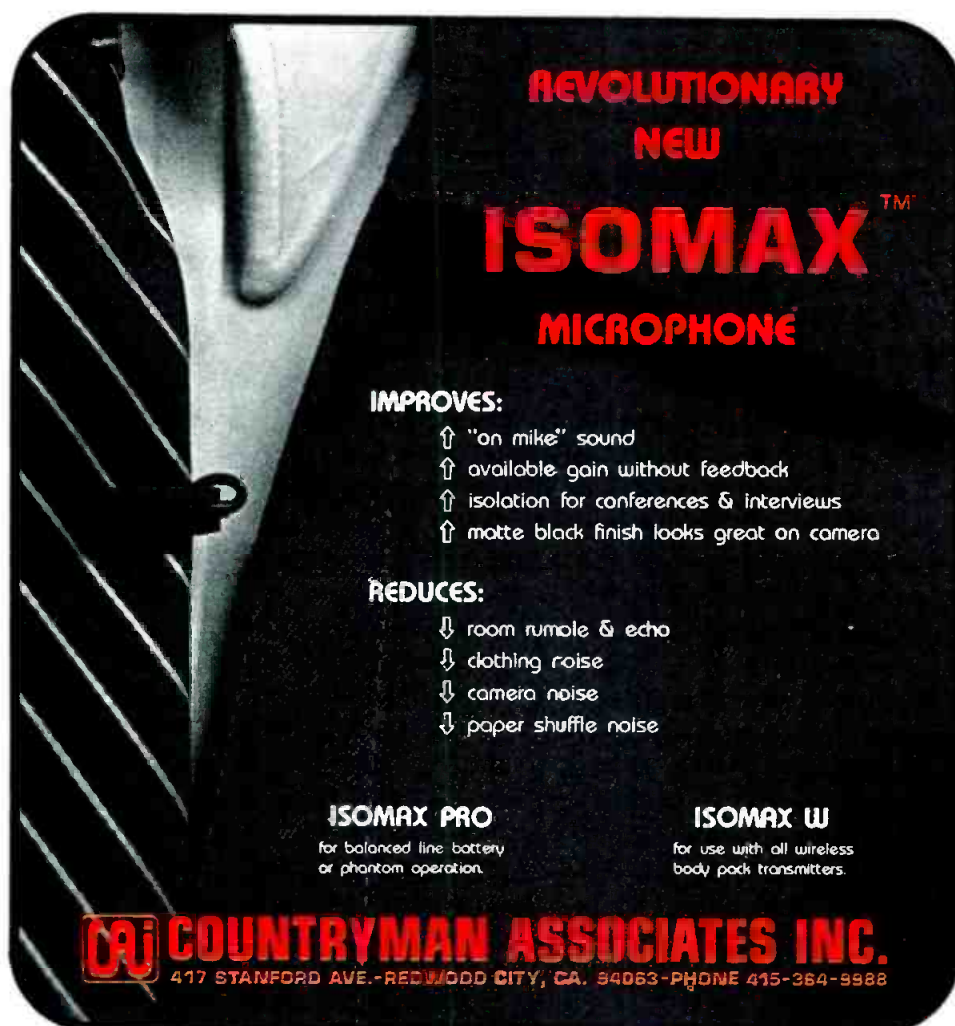
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Manufacturers and Distributors of Broadcast Equipment since 1960

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**REVOLUTIONARY  
NEW  
ISOMAX™  
MICROPHONE**

**IMPROVES:**

- ↑ "on mike" sound
- ↑ available gain without feedback
- ↑ isolation for conferences & interviews
- ↑ matte black finish looks great on camera

**REDUCES:**

- ↓ room rumble & echo
- ↓ clothing noise
- ↓ camera noise
- ↓ paper shuffle noise

**ISOMAX PRO**  
for balanced line, battery  
or phantom operation.

**ISOMAX W**  
for use with all wireless  
body pack transmitters.

**COUNTRYMAN ASSOCIATES INC.**  
417 STANFORD AVE.-REDWOOD CITY, CA. 94063-PHONE 415-364-9988

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**LITEPAK®**  
Dimming System

MADE IN CANADA BY  
**DILOR INDUSTRIES LTD.**  
BOX 2169 SQUAMISH, B.C. V0N 3G0  
(604) 892-9301 TELEX 04-53383

Manufacturers of the world's finest broadcast dimmer systems

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## Want MORE Information on Advertised Products?

Just refer to the Bingo #  
beneath each ad. Circle the  
appropriate number on the  
Reader Service Card in the  
back of this issue.

**Complete the remaining information and mail!**

## Exhibits roundup

**TEAC**  
(See Tascam)

**TFT**

**Booth 2838**

*Established products*

**7700:** Composite studio-to-transmitter  
link

**7900:** Microprocessor remote control

**7610/7830:** Digital remote control/digital  
on/off control and status monitoring

**7840:** Microcomputer-based data  
acquisition, limit alarm and logging  
system

**753/754:** AM modulation monitor/  
preselector with frequency readout

**763/764A:** FM modulation monitor/  
preselector with frequency readout

**701:** TV frequency and aural modulation  
monitor

**760:** Emergency broadcasting system

**8020:** E-alert radios

*New products*

**8100:** TSL transmitter to studio link

**7700:** STL studio transmitter link, new  
frequency bands

Circle (716) on Reply Card

**3M**

(See "Three" M)

**TASCAM Production Products Div.**  
**TEAC Corporation of America**  
**Booth 2734**

*Established products*

**35-2B:** ½-track recorder/reproducer  
for studio masterings

**44:** ¼-inch 4-track recorder  
reproducer for heavy-duty use

**80-8:** 8-track multichannel recorder/  
reproducer

**22-2:** ½-track recorder/reproducer

**MM20:** System 20 master mixing module

**MU20:** System 20 meter unit

**PE20:** System 20 parametric-type sweep  
equalizer module

**EX20:** System 20 expander module

**22-4:** 4-channel recorder/reproducer

*New products*

**M16:** 24-input, 16-track mixing console

**85-16B:** 16-track tape recorder/  
reproducer

**244:** 4-track mixer with built-in 4-track  
"Sync" Cassette Recorder/Portastudio

**M35:** 8-track mixer

**M30:** 8-track mixer

**32:** 2-track tape recorder

**34:** 4-track tape recorder

**38:** 8-track tape recorder

Circle (732) on Reply Card

see ad on page 61

**Tech Theatre**

**Booth canceled at press time**

*Established products*

Artificial snow

Makeup box

TV makeup

*New products*

Cobweb

Circle (717) on Reply Card



To the audio professional, when a compressor or limiter is needed to tame the potentially disastrous consequences of uncontrolled level or to create special effects, one name stands out as the best: UREI.

Studio Standards for more than a decade, the compressors and limiters from UREI have earned their way into thousands of recording, mastering, and broadcast installations around the world.

Because we built our reputation for unparalleled professional performance and quality with our compressors and limiters, we have continuously advanced their engineering and technology to offer more reliability, features and performance. When you need the fastest, quietest and most flexible gain control instruments available, you can be totally assured that these products will prove to you why they've earned the title — Studio Standard:

#### The Model LA-4

A single channel, half-rack unit with patented electro-optical attenuator. Featuring smooth, natural sounding RMS action, it offers selectable compression ratios, a large VU meter, adjustable output and threshold levels and stereo coupling.

#### The Model 1176LN

A peak limiter which features adjustable input and output levels; individual attack and release time controls; selectable compression ratios; switchable metering; and

stereo coupling. The 1176LN is the most widely used limiter in the world.

#### The Model 1178

A two channel version of the 1176LN in a compact (3-1/2") rack mounting design. Featuring perfect tracking in the selectable stereo mode, it additionally offers selectable VU or Peak reading meter ballistics.

From One Pro To Another — trust all your toughest signal processing needs to UREI.

# The UREI Compressor/Limiter



**UREI** From One Pro To Another

United Recording Electronics Industries  
60 San Fernando Road, Sun Valley, California 91352 (213) 767-1000 Telex: 65-1389 UREI SNVY  
Worldwide: Gotham Export Corporation, New York; Canada: E.S. Gould Marketing, Montreal

See your professional audio product dealer for full technical information



# YOU ONLY NEED ONE OF OURS.

No reliability problems from microphone or cable with the subminiature Sennheiser MKE-10 electret. Not only better-sounding, it's better looking—because you *don't* see it.

## SENNHEISER

ELECTRONIC CORPORATION  
10 West 37th Street, New York, NY 10018  
(212) 239-0190

Manufacturing Plant: Bissendorf/Hannover, West Germany  
© 1980, Sennheiser Electronic Corporation (N.Y.)

Circle (143) on Reply Card

## "The person you describe is the person we'll deliver"

It's not a slogan.

It's our track record.

We've successfully recruited for virtually every kind of executive post in broadcasting, cable television, and publishing. At every level.

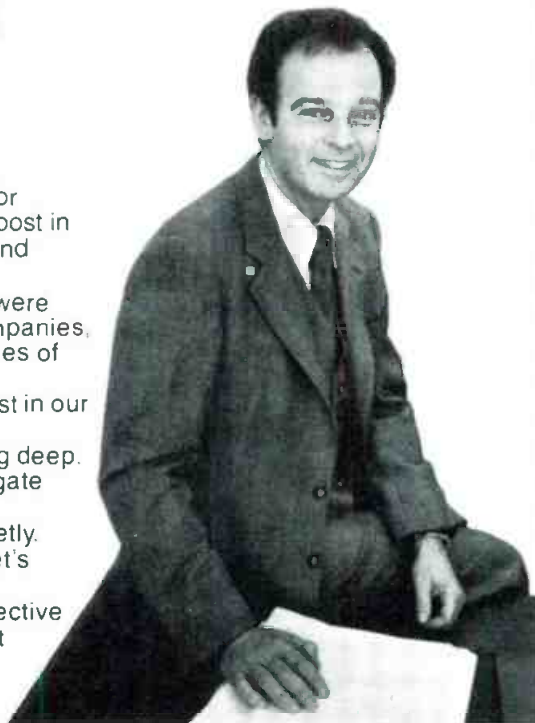
The executives we delivered were right for our clients, for their companies, and for the specific responsibilities of each position.

Our clients tell us we're the best in our field.

We know where to look. We dig deep. We sift meticulously. We investigate thoroughly.

And we do it all very, very quietly.

If you seek a key executive, let's discuss why our search and recruitment will be your most effective way to get the person who's right for you.



## Joe Sullivan & Associates, Inc.

Executive Search and Recruitment  
in Broadcasting, Cable Television, and Publishing

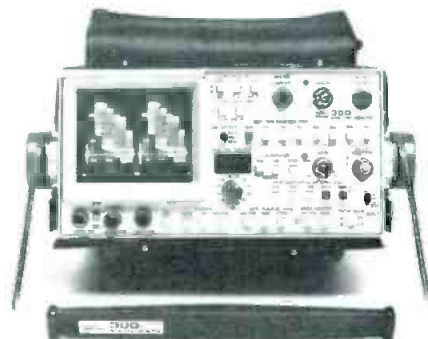
1270 Ave. of the Americas, New York, N.Y. 10020 (212) 765-3330

Circle (144) on Reply Card

## Exhibits roundup

**Tektronix  
Booth 3005**

Established products \_\_\_\_\_  
**690 SR:** 19-inch shadow mask color  
picture monitor



### Tektronix: A peek at new products

As this issue was being prepared, a group from Tektronix came to Kansas City to show us two new products you will be seeing for the first time at NAB-'82/Dallas.

The first was an option to the model 1980 ANSWER system (previously described by Les Dunn in the July 1981 issue of **BE**). This new Option 03 NTSC Transmitter Monitoring Software relieves users from routine measurement runs by providing continuous, automatic monitoring of user specified video signal characteristics; automatic alerts with print-out, telephone call, or alarm device whenever the monitored signal violates user-set limits; and automatic logging of specified measurement parameters at user specified times.

The second is the three-in-one portable 380 NTSC Test Monitor, which is claimed to be the only product of its kind in the world. It is manufactured in Japan by Sony/Tektronix Corporation, a joint venture company, and will now be marketed in the United States. TV facilities in all NTSC system countries will now be able to purchase the 380 from Tektronix. A PAL version of the product will be introduced later this year.

The 380 incorporates the functions of a waveform monitor, vectorscope and an oscilloscope, and it enables the user to examine the entire video signal. It is expected to be available eight to 12 weeks after its introduction at NAB-'82/Dallas.

For information on other Tektronix products at the convention, see the listings in the directory section of this issue.

continued after map on page 176



# GRAB ONTO THE BALANCED AND FLOATING 1710A.

## Accurate Distortion Measurements In A Strong RF Field?

At the studio, and especially at the transmitter, an engineer needs the flexibility and performance of the Sound Technology 1710A. It's the totally RFI immune distortion measurement system\* that's designed to give the broadcast engineer the accurate information he needs—without the headaches that go along with other test instruments that just plain fail, or worse yet, give erroneous data.

Because the 1710A has a bridging input and a transformerless balanced and floating output, you can throw anything into it and hang virtually anything on it. Single-ended or balanced lines—it doesn't matter. Ground either side of the output and the 1710A doesn't care. You now have the flexibility to perform rigid test checks without all the hassles.

The 1710A is several precision instruments in one. It combines a flexible, ultra-low distortion sine wave signal generator, a high resolution automatic measuring THD analyzer, an IMD analyzer and an accurate A.C. level meter in one instrument.

## The Capabilities And Spec's.

- Fully automatic nulling circuitry that measures distortion as low as 0.002%. In less than five seconds.
- A simultaneously tuned, balanced and floating oscillator that's capable of 10Hz to 110kHz. With three digit pushbutton frequency selection that's both repeatable and fast. And, adjustable from -90 to +26 dBm with three precision attenuators to 0.1 dB resolution.
- You can measure signal-to-noise ratios with a 100 dB dynamic range; sources from 30  $\mu$ V to 300V; power either in dBm or watts; push a button and reject hum and high frequency noise with built-in 18dB/octave

filters (30kHz, 80kHz and 400Hz).

Each Sound Technology precision test instrument is painstakingly manufactured and rigorously quality assured which results in the reliability that has made us a standard in audio instrumentation. And to prove this point further, we fully guarantee the 1710A for two full years. Parts and labor.

If you're spending too much time getting the facts and find yourself bobbing around in a sea of RFI problems, grab onto the balanced and floating Sound Technology 1710A.

It'll make your job and your station's performance a whole lot more secure. Contact us for full information and the name of your nearest factory representative.

\*10 V/m rejection

## SOUND TECHNOLOGY

1400 Dell Avenue, Campbell, CA 95008  
(408) 378-6540 Telex: 357445

Circle (145) on Reply Card



# Did you know that AFA is the nation's largest designer and builder of video systems?

VIDEOTAPE DUPLICATION CENTERS  
TELETRACK VIDEO SYSTEMS  
CABLE NETWORK PLAYBACK CENTERS  
OLYMPIC CROSS-COUNTRY  
SNOW CAT CAMERA SYSTEMS  
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RACE TRACK VIDEO PRESENTATION SYSTEMS  
MOBILE TV PRODUCTION UNITS  
STUDIO PRODUCTION FACILITIES  
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SATELLITE UP-LINK VIDEO SYSTEMS  
COMPUTER COLOR CORRECTION FACILITIES  
CMX POST PRODUCTION FACILITIES

## Now you know!



**BUILDING BETTER SYSTEMS BY DESIGN.**

AF ASSOCIATES, INC. 100 STONEHURST COURT, NORTHVALE, N.J. 07647 (201) 767-1000

Circle (146) on Reply Card





## Varian GEN II KPA. Pushing earth terminal technology through the 80's.

Designed specifically for today's modern world of earth terminal communications, the new Varian GEN II KPA simplifies complex communications problems with its advanced computer interface options. Easily adaptable, GEN II can be programmed to IEEE 488, RS-232 and RS-422 data busses.

**Smaller, more modern design.** Modular construction includes a proprietary,\* digitally-controlled, all solid-state, low noise regulated power supply.

Integrated in the RF section is a digitally-controlled PIN diode attenuator to provide precise setting of the RF output.

Controls/Monitors/Logic section circuits use C-MOS high

noise immunity digital techniques to energize, protect, control and monitor KPA performance. The modern front panel features all-LED indicators and digital meter displays.

### Enhanced Varian klystron for high efficiency.

GEN II utilizes the original, field-proven Varian VA-936 series klystron, with enhanced specification including 24-channels for top performance.

GEN II provides high efficiency with only 12 kVA for a full 3.35 kW tube, less than 1 kVA in standby and automatic 10% reduction of heater voltage for extended klystron life.

\*Patent applied

More information on the new GEN II KPA for the 80's is available from Varian Microwave Components and Subsystems Division. Or the nearest Electron Device Group sales office. Call or write today.

Electron Device Group  
Microwave Components and  
Subsystems Division  
3200 Patrick Henry Drive  
Santa Clara, California 95050  
Telephone: 408-496-6273



Circle (147) on Reply Card

## Exhibits roundup

### Tektronix

(continued from page 164)

**1900:** Digital test signal generator and VITS inserter  
**1980 ANSWER, Option 02:** Automatic video measurement set for PAL applications  
**7L14:** 10kHz to 1800MHz plug-in spectrum analyzer

### New products

**TM5000:** GPIB programmable test equipment  
**380:** Portable NTSC test monitor  
**496:** 1kHz to 1800 MHz portable spectrum analyzer  
**1980 ANSWER Option 03:** Automatic video measurement set  
**690SR:** Option 42, RGB multirate color monitor  
**2213/2215:** 60MHz dual trace oscilloscopes (2200 Series)  
**2335/36/37:** 100MHz dual trace oscilloscopes (2300 Series)  
**AA 501:** Distortion analyzer  
**SG 505:** Distortion analyzer, oscillator  
**Circle (718) on Reply Card**  
**see ads on pages 7, 19, 20**

### Tele-Cine

**Booth 3016**

### Established products

**Series:** Schneider lens systems for most ENG and automatic cameras  
**Series:** Adaptations for an assortment of cameras, auto diascopy-type lenses.

### New products

**Series:** 14X ENG lenses for 2/3- and 1/2-inch  
**Circle (733) on Reply Card**

### Telemet, Div. of Geotel

**Booth 3007**

### Established products

**Series:** Broadcast demodulators; fiber-optics systems; routing switchers; isolation amplifiers; thermal equalizers, sideband analyzers; spectrum/sideband analyzers; clamping amplifiers; repeaters; video cable terminals; test signal generators; modulators; chroma keyers; chroma keyer decoders; group delay measuring systems; RF test equipment; video and pulse distribution amplifiers; video DA; pulse DA

### New products

**Series:** Microprocessor sideband analyzer; routing switcher with computer-controlled option; RF synthesizer  
**Circle (734) on Reply Card**

### Telescript

**Booth 3015**

### Established products

**M/P 15:** 15-inch 1000-line resolution monitor/promoters  
**Transports:** Telecue with script feed assy—remote foot pedal control  
**Beam-splitters:** 30/70 coated both sides; multilayer low reflectance coating  
**Telepod:** Monitor/promoter and LensView Assy adjustable support assy  
**New products**

**M/P 17:** 17-inch 1000-line resolution monitor/promoters

**MPS-D:** Digital prompting system

**Universal:** Fluid heads

**Circle (719) on Reply Card**

### Telestrator

See Interand

### Television Engineering Corporation

**Booth 2114**

### New products

**TEC23B:** Remote unit self-contained and complete with cameras, video switcher, audio console and terminal equipment  
**Circle (720) on Reply Card**

### Television Equipment Associates

**Booth 3324**

### Established products

**Series:** Matthey video and pulse delays  
 Matthey video filters  
 BCA intercom and interphone systems  
 Elcon videotape cleaner/evaluators  
 IRT color monitor comparator  
 Link audio-video distribution amplifiers  
 Racal sportscaster headsets  
 Racal intercom carbon and dynamic headsets

### New products

**Model 254:** Elcon videotape cleaner/evaluator  
**Series:** Matthey video filters for A/D-D/A converters  
 Matthey video delays  
 Racal sportscaster and intercom headsets

## SAVE THE BUCKS!

**Follow the herd  
 into NAB Booth 1618  
 and check out our new  
 Broadcast Control Computer.**



H&F has done it again: developed the industry's most versatile control computer in a package that doesn't require big bucks. Our new PCC Broadcast Control is easily programmed to provide everything from simple FCC logging to full ATS, and for up to seven transmitter sites! Get all the details at the NAB show or contact us directly now.

# \$7495

## Hallikainen & Friends

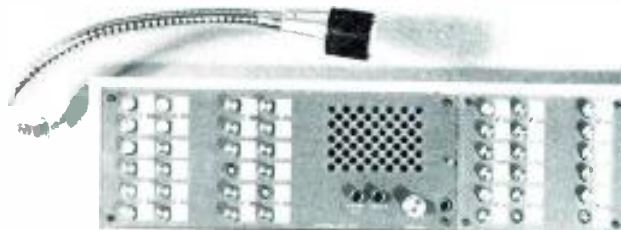
101 SUBURBAN ROAD SAN LUIS OBISPO  
 CALIFORNIA 93401 805/541-0200

**Circle (148) on Reply Card**

## EASILY EXPANDABLE

## INTERCOM SYSTEMS

**Proven Performer in The Top  
 TV Stations of the U.S.A.**



**• EASIER TO INSTALL • EASIER TO USE  
 • EASIER TO PAY FOR**

**FARRTRONICS MANUFACTURES QUALITY INTERCOM SYSTEMS, AUDIO PATCHFIELDS, DISTRIBUTION AMPLIFIERS AND AUDIO CONSOLES.**

**Ask for our customer list.**



**151 BENTLEY ST., UNIT 1, MARKHAM, ONTARIO, CANADA  
 L3R 3X9, (416) 495-6720**

**Write for our free folder of Product Data**

**Circle (149) on Reply Card**

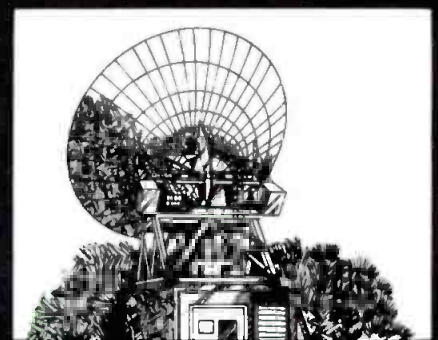
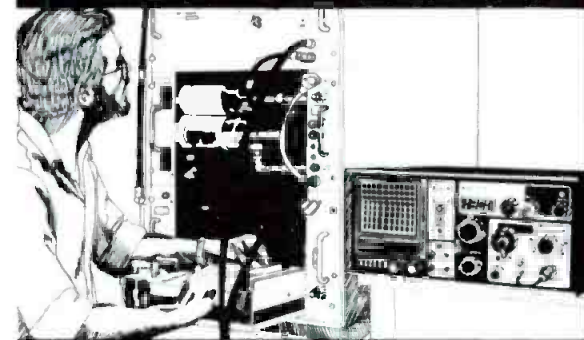


# NEW SPECTRUM ANALYZERS

**for monitoring,  
service and testing**  
**100 kHz to 2 GHz**

The Model 632B-1 compact Spectrum Analyzer provides excellent performance, high accuracy, ease of use and high reliability. It is well suited for modern communications

signal analysis, CATV, CB, wide range distortion and noise measurements, test equipment calibration, EMC tests, and other frequency domain applications up to 2.0 GHz.



Send for our new brochure.

polarad polarad **polarad** pc

Polarad Electronics, Inc. 5 Delaware Dr. Lake Success N.Y. 11042 Tel: 516-328-1100 TWX: 510-223-0414

Circle (150) on Reply Card

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

## Exhibits roundup

### TV Equipment (continued)

with headband and cushions  
Racal sportscaster headset  
Electret mic  
Link new universal pulse and video  
distribution amplifier  
**Circle (721) on Reply Card**  
see ad on page 59

### Television Products Company Booth 2315

Established products \_\_\_\_\_  
**P-25:** Pneumatic camera pedestal,  
medium-range studio-type  
New products \_\_\_\_\_  
**P-80:** Pneumatic camera pedestal, high  
performance studio-type  
**Circle (722) on Reply Card**

### Television Technology Corporation Booth 3117

Established products \_\_\_\_\_  
**XL-1000:** 1kW UHF transmitter/  
translator  
**UST-106A:** 100W UHF transmitter/  
translator  
**XL-20:** 20W UHF transmitter/translator  
**TVB-1:** 10W VHF translator  
**MA-TVF-10:** 10W VHF transmitter/  
translator  
**XL-10FM:** 10W FM transmitter/  
translator  
**XL-1FM:** 1W FM transmitter/translator  
New products \_\_\_\_\_  
**TL-1:** 1W UHF transmitter/translator

### XL-10FM-S: Satellite-fed FM translator Circle (723) on Reply Card

### Telex Communications Booth 3130

Established products \_\_\_\_\_  
**Series:** NAB cartridge recorder/  
reproducers  
**Series:** Reel-to-reel recorders/  
reproducers  
**Series:** Audiocom intercom system  
**Series:** Turner professional microphones  
**Series:** Reel-to-reel loggers  
**Series:** Headphones and headsets  
**Series:** Professional wireless microphones  
**Circle (724) on Reply Card**  
see ad on pages 4, 241

### Tennaplex Systems Ltd. Booth 2111

Established products \_\_\_\_\_  
**Series:** Kathrein broadband TV and FM  
panel antennas  
**Series:** Spinner precision coaxial  
hardware  
**Elcom network analyzer**  
**Series:** TV and FM multichannel  
combiner systems  
**Circle (725) on Reply Card**

### Tentel Corporation Booth 1605

Established products \_\_\_\_\_  
**Series:** Tape tension gauges, U-matic  
spindle height gauges.

### Series: Spindle height gauges for VHS and BETA format recorders (video) Circle (735) on Reply Card

### Theatre Service & Supply Corporation Booth 1900

Established products \_\_\_\_\_  
**Series:** Studio cyclorama curtains and  
tracks  
**Series:** Studio and portable lighting  
equipment  
**Circle (726) on Reply Card**

### Thermodyne International Ltd. Booth 2407

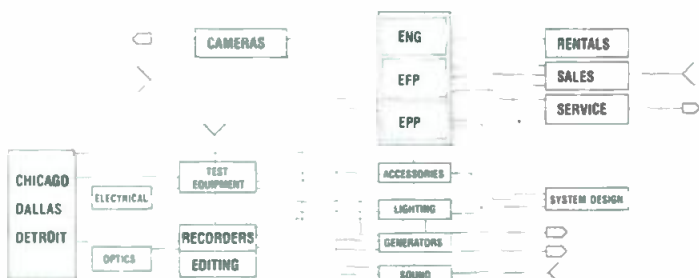
Established products \_\_\_\_\_  
**Shok-Stop:** Shipping cases  
**Rack-Pack:** Operating and shipping cases  
**Circle (727) on Reply Card**  
see ad on page 119

### Thomson-CSF Broadcast Booth 3201

Established products \_\_\_\_\_  
**4101:** FM volumax automatic peak  
controller  
**4300:** AM volumax automatic peak  
controller  
**440A:** Audimax automatic level controller  
**4500:** Dynamic presence equalizer  
**1602:** Dual distribution amplifier  
Color corrector  
**8010:** Image enhancer  
**7011:** Chroma keyer  
**9100:** Digital video processor  
**9150:** Signal max (one word)

## VICTOR DUNCAN VIDEO

**Designed to meet your  
equipment needs**



At Victor Duncan Video our facilities and business systems have been designed to meet your needs. Developed through more than twenty years of professional production experience, our Rental departments offer the very latest video equipment. And not just cameras and recorders, but the myriad of support and accessories needed to keep your production on schedule. Our rental technicians have extensive field experience, not just "shelf" experience, and can help provide recommendations and alternatives for your equipment needs.

Our knowledgeable sales staff can provide product demonstration and comparison of the most current production equipment available. In cooperation with the video engineering department, our sales consultants can also provide complete system design and installation services as required for your specific needs.



VICTOR DUNCAN, INC.

Victor Duncan Video maintains the finest service in all three office locations. Simple tweaking and minor service functions can be rapidly performed saving you from costly downtime. Our routine, scheduled maintenance on all your equipment can prevent location breakdowns and keep your equipment in top shape for each production.

With three fully staffed offices in Chicago, Dallas and Detroit, you'll find Victor Duncan Video your most convenient source for production equipment in the midwest and southwest.

For all your equipment needs, plug the Victor Duncan system into yours. It's designed to be a perfect fit, everytime.

#### Rentals, Sales and Service

CHICAGO  
651 N. LaSalle, Chicago, IL 60610 (312) 943-7300  
DALLAS  
2659 Fondren, Dallas, TX 75206 (214) 389-1165  
DETROIT  
32380 Howard, Madison Hgts., MI 48071 (313) 569-1900

Circle (151) on Reply Card

**CIRCULAR  
WAVEGUIDE  
HIGHEST  
EFFICIENCY  
TRANSMISSION  
LINE  
AVAILABLE  
save up to  
50kW RF Power**

**MICRO  
COMMUNICATIONS  
INC.**

**BOOTH 3312**

Circle (152) on Reply Card



# We wrote the book on Time Code.



**Time Code Pioneers.** Before we wrote The Time Code Book, we helped establish SMPTE Time Code standards and engineered the first SMPTE Time Code Generators and Readers. The first to make SMPTE Code really work, our leadership has been recognized and awarded.

**Innovation, A Way Of Life.** Now, we've introduced the first microprocessor-based equipment enabling you to utilize Vertical Interval Time Code (VITC). Because it's one thing to earn a reputation, it's another to maintain it.

And again, we're contributing to a standard. Further participation with SMPTE helped establish a proposed recommended practice for VITC, and our equipment is designed to make the most of its capabilities. With VITC every field/frame is identified and the code is in the video picture, permitting you to read the code in still frame while freeing the audio track normally used for time code.

**At Technology's Leading Edge.** Like all EECO Video Products, our VITC Generators and

## And now it's yours free.

Readers are innovated for performance, providing quality, reliability and precision at competitive prices. And our Readers allow you to extract VITC at wind speeds.

### 15 Years Of Industry Involvement.

Supported and serviced by our factory, EECO Video Products are distributed worldwide by Ampex Corporation and in the Southwest by Hoffman Video Systems.

### Ask For Our Free Time Code Booklet.

For the whole time code picture—Serial and VITC—ask for The Time Code Book, from the people who wrote the book. Write or call, EECO Incorporated, 1601 East Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659 Phone: 714/835-6000.

**EECO**  
Incorporated

See us at NAB  
booth #1819  
Circle (153) on Reply Card

## Exhibits roundup

### Thomson-CSF (continued)

Vidiplex system  
 Array of Microcam cameras  
**TTV1525:** Color studio cameras  
 Vidifont Graphics V  
**ITV 2705:** Slide scanner  
 Assortment of LGT transmitter and translators  
**Vidifont IVA:** Character generator  
 New products \_\_\_\_\_  
**Series:** Vidimax

**Circle (736) on Reply Card**  
 see ad on page 245

### Thomson-CSF Electron Tube Div. Booth 1609

Established products \_\_\_\_\_  
**TH 328:** 100W common amplification UHF power tetrode  
**TH 393:** 2.2kW common amplification UHF power tetrode  
**TH 361:** 5kW common amplification VHF power tetrode  
**TH 298:** 1kW common amplification VHF power tetrode  
 New products \_\_\_\_\_  
**TH 347:** 1kW UHF power tetrode  
**TH-18363:** 1kW UHF cavity  
**TH-382:** 5kW common amplification UHF power tetrode  
**TH-582:** 10kW common amplification UHF power tetrode  
**TH-3591B:** 600W TWT KU band satellite ground station

### Watch for the unexpected at NAB-'82

Each year at this convention, unexpected events occur that set new records of achievement in instrumentation and in convention attractions. Two years ago, the magic act at the Thomson-CSF booth drew the crowds. Last year, the VRC (video recording camera or recorder-in-camera combination) and the Ampex new products made big hits in new equipment.

Also, last year at the Bird and McMartin booths there was a cooperative effort that set new records at the convention. Operating into an 80kW dummy load loaned by Bird, the McMartin transmitter operated at new power levels for such a demonstration. The tests were planned for 10-minute operations each hour, but actual tests ran longer. There were rumored efforts behind the scenes to shut down these demonstrations; if so, they were unsuccessful. It is our understanding that this demonstration was impressive enough to sell the transmitter on the floor and that it was shipped to a South American customer from the convention.

There is no way to tell what will stand out at NAB-'82/Dallas. But, keep watching for the unexpected.

**TH-3640:** 3kW TWT C-band satellite ground station  
**TH-2416:** 3KW C-band klystron satellite ground station  
**THX-1130:** CCD for miniature TV cameras

**Circle (728) on Reply Card**  
 see ad on page 245

### 3M Professional Audio/Video Equipment Booth 3006

Established products \_\_\_\_\_  
**40X, 20X series:** Routing switching equipment  
**6500:** Machine control system  
**D-8800:** Graphics system with camera compose operation  
 New products \_\_\_\_\_  
**TT-8000:** 1-inch VTR with improved editing and operating features  
**NTC-10B:** Time base corrector heterodyne operation

**Circle (729) on Reply Card**  
 see ads on pages, 12, 14, 16, 18, 29, 92, 129, 130, 146

### Torpey Controls

#### Booth unassigned at press time

Established products \_\_\_\_\_  
**CLK-5:** Intelligent master clock  
**CLK-6:** Digital slave clock  
**TMP-1:** Digital thermometer  
**CFD-1:** Digital temperature readout  
**VCLK-8:** Video clock  
**VTMP-8:** Video temperature display  
**MCS-1:** Remote control system, encoded  
**TO-9:** Video message generator  
 New products \_\_\_\_\_  
**PC-12:** Analog impulse clock  
**STW-1:** Central master digital stopwatch/countdown  
**STR-1:** Stopwatch/countdown readout assemblies

**Circle (730) on Reply Card**

### Toshiba

#### Booth 2106

Established products \_\_\_\_\_  
**PK 39:** EFP camera  
**PK 60:** ENG camera  
**PK 40:** Automatic studio camera

**Circle (737) on Reply Card**

### Townsend Associates

#### Booth 3311

Established products \_\_\_\_\_  
**Phaestar:** 100W low-power UHF transmitter-antenna system.  
 Plug-in vacuum contactor for klystron beam voltage power supplies.  
**TMP-3-10:** All solid-state mod anode pulser for UHF klystron transmitters.  
 New products \_\_\_\_\_  
**TA-10NTH:** 10kW high-band UHF transmitter  
**PE-250:** Perveac klystron beam voltage control system

**Circle (731) on Reply Card**  
 see ad on page 236

### Trompeter Electronics

#### Booth 3310

Established products \_\_\_\_\_  
**Series:** Patching and patching accessories, coax, twinax and triax BNC-type connectors

**Circle (738) on Reply Card**

### Tweed Audio (USA) Booth 2303A

### Established products \_\_\_\_\_

**Service:** Specialize in custom-designed systems for radio and TV broadcasting studios  
**Circle (732) on Reply Card**

### UMC Electronics

#### Booth 1814

Established products \_\_\_\_\_  
**100/200:** Broadcast cartridge machines  
**300:** Multideck cartridge machines  
**System 8:** Automatic recording system  
**Playmate:** Automatic retrieval system  
**Beau Pro:** Stereo consoles  
 Automatic splice finder  
 New products \_\_\_\_\_  
**(047):** Special effects cartridge machines for animation

**Circle (760) on Reply Card**

### UNR-Rohn, Division of UNR

#### Booth 3138

Established products \_\_\_\_\_  
**Series:** Broadcast and communications towers and accessories  
**Circle (741) on Reply Card**

### UREI

#### United Recording Electronics Inc. Booth 2530

Established products \_\_\_\_\_  
**Mod 1:** Modular audio console  
**BL-40:** AM signal processor  
**533:** Octave-band graphic equalizer  
**535:** Dual octave-band graphic equalizer  
**1176LN:** Peak limiter  
**1178:** Dual-channel peak limiter  
**LA4:** RMS compressor  
**Series 200:** Audio analysis system  
**811A:** Time-align monitor loudspeakers  
 New products \_\_\_\_\_  
**6150:** 80W/channel audio power amp  
**6250:** 150W/channel audio power amplifier  
**6300:** 225W/channel audio power amplifier  
**6500:** 275W/channel audio power amplifier

**Circle (761) on Reply Card**  
 see ad on page 163

### US JVC

See JVC

### US Tape & Label Corporation

#### Booth 1506

Established products \_\_\_\_\_  
**Series:** Bumper strips and window labels for the broadcasting industry  
**Circle (762) on Reply Card**

### Uni-Set Corporation

#### Booth 2503

Established products \_\_\_\_\_  
 Modular studio staging system  
 Rear screen/chroma-key module  
 Graphic design cart  
 New products \_\_\_\_\_  
 Riser blocks/tops/ramps  
**Circle (742) on Reply Card**

### United Media

#### Booth 2504

Established products \_\_\_\_\_  
 Fully expanded Commander II Editing System and other stand-alone products.



The new advanced-design MQ-Series mixers.

# RIGHT ON THE MONEY.

Introducing the MQ-Series. A new line of highly affordable mixers that refuse to compromise with audio performance. Or with your needs.

You get the tonal flexibility of a 4-band EQ on each channel and the added flexibility of per-channel echo and foldback

sends. Plus a pair of master-program 9-band graphic equalizers. And direct interface flexibility with per-channel dual input switching.

There's also the dependability and service convenience of a modular layout with each channel's components mounted on a separate internal printed

circuit board. The MQ-Series. Right on the money, right down the line.

Visit your Yamaha dealer or write us for more information. Yamaha, Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarb., Ont. M1S 3R1.

Combo Products

THE WAY IT WILL BE.

 **YAMAHA**

Circle (154) on Reply Card

## Exhibits roundup

### United Media (continued)

#### New products

"The Translator" and "The Director" systems, audio-for-video synchronizing equipment, allowing real time dialog replacement.

Audio router/dissolver (8 inputs)

Basic Expandable Commander II system

Circle (763) on Reply Card

see ad on page 141

### United Research Electronics Inc.

See UREI

### Unitel

Booth unassigned at press time

#### Established products

Textel "V": Videotext picture editing unit with instant Antiope graphics.

Circle (740) on Reply Card

### United Research Laboratories Corporation

Booth 3128

#### Established products

"S": Auto-tec reel-to-reel recorders

C5: Solid-state conversion amplifiers for tube amps

ML-6: 100068M pinch rollers for tape recorder and cart machines, replacement parts for most professional tape recorders

#### New products

Auto-sense, patented motion sensitive

for machines not having this feature

Circle (743) on Reply Card

### Ursa Major

Booth 1913

#### Established products

SST-282: Space station -digital reverberation and special effects system

8X32: Digital reverberator

#### New products

8X32: Digital reverberator remote unit

Circle (744) on Reply Card

### Utah Scientific

Booth 2602

#### Established products

AVS-1: Switching system and various party line control panels. Numerous alphanumeric display devices and control panels will also be demonstrated.

#### New products

PLMC-1: Machine control system

Circle (764) on Reply Card

see ad on page 117

### Utility Tower Company

Booth 3105

#### Established products

Actual tower sections, lighting equipment, galvanized hardware

Circle (745) on Reply Card

### Valentino Music Library, The

Booth 1716

#### Established products

### Production music library

Original music production and scoring

Sound effects library service

VideoStockshot library service

Cassette duplication service

Circle (746) on Reply Card

### Varian Associates/Eimac Div.

Booth 3119

#### Established products

8990: Tetrode

8989: Tetrode

8974: Tetrode

3CX10,000U7: Triode

CV2250: VHF TV cavity

CV2240: VHF TV cavity

4CX3500A: Tetrode

CV2225: FM cavity

#### New products

4CW300,000G: 300kW graphite grid tetrode

4CW100,000G: 100kW graphite grid tetrode

4CX40,000G: 40kW graphite grid tetrode

CV-2230: 50kW FM transmitting cavity

Y-730: 100W UHF TV triode

Y-831: 200W UHF TV triode

Circle (747) on Reply Card

see ads on pages 17, 175

### Varian Associates/Microwave Components Subsystems Div.

Booth 3119

#### Established products

6965A2: 1kW C-band medium-power amplifiers

#### New products

**CONGRATULATIONS!!!**

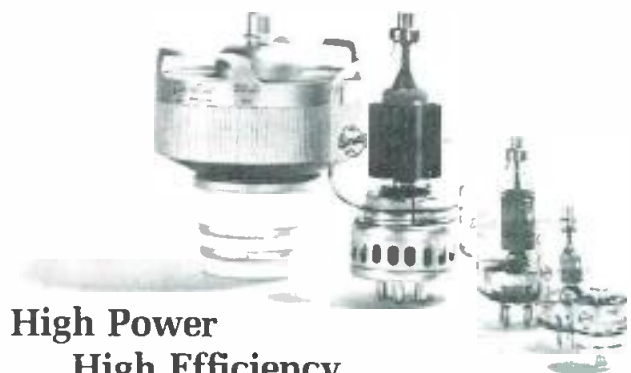
**WE CONGRATULATE THE  
NATION'S BROADCASTERS  
ON THEIR CONTRIBUTIONS AND  
ACCOMPLISHMENTS TOWARD MAKING...**

**THE 1980's  
"A DECADE  
OF  
DEREGULATION!"**

**PLEASE VISIT BOOTH NO. 1808  
(Lower Level) AT THE SHOW IN DALLAS.**

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2424 SOUTH 2570 WEST • 801 972 5900  
SALT LAKE CITY, UTAH 84119

**ECD meets your broadcast  
tube replacement needs with  
Eimac, the finest tube in the world.**



**High Power  
High Efficiency  
High Reliability**

Planar triodes to forced air-cooled pentodes — Eimac features high quality and rigid inspection, providing low failure rate and low cost per tube operating hour.

For further information, please contact the tube replacement experts at



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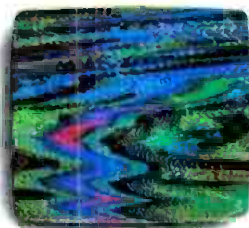
Circle (155) on Reply Card



# HOW TO BEAT THE RISING COST OF PIRACY WITH OAK'S ORION™ ADDRESSABLE SATELLITE SECURITY SYSTEM

Oak's ORION was introduced in late 1979 as the world's first commercially available satellite encryption system. Since then, ORION has been used in applications ranging from teleconferencing and pay-per-view events to network program distribution.

Signals transmitted by ORION are encoded to ensure that only authorized viewers are able to receive an intelligible signal. But while ordinary encoding protects signals from reception by terminals *outside* the network, it does not by itself provide for selective distribution *within* the network. ORION uses a combination of addressability and program level tiering to accomplish this objective.



*Unauthorized viewers receive no audio and see only a jumble of broken color bands.*



*Only authorized viewers equipped with an ORION decoder can recover the original television signal.*

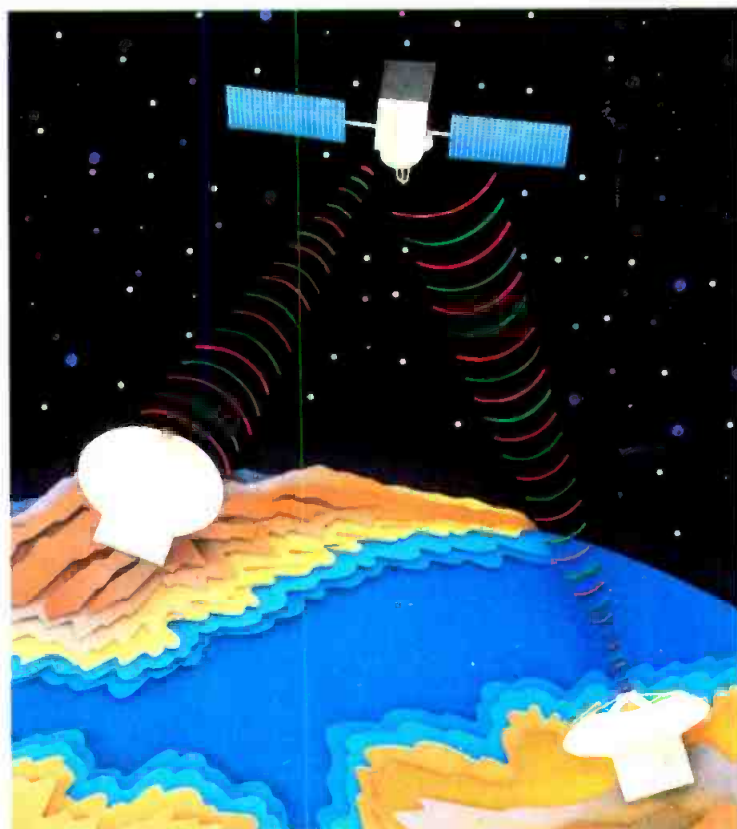
Selective program distribution means that the program supplier has complete computer control of decoder authorization levels at all times. Fully proven computer software minimizes operator input requirements, and a business computer interface is also available.

Individual decoders can be turned on and off immediately in accordance with program changes and subscriber status. Each decoder may be authorized to receive any or all of 49 different program tiers.

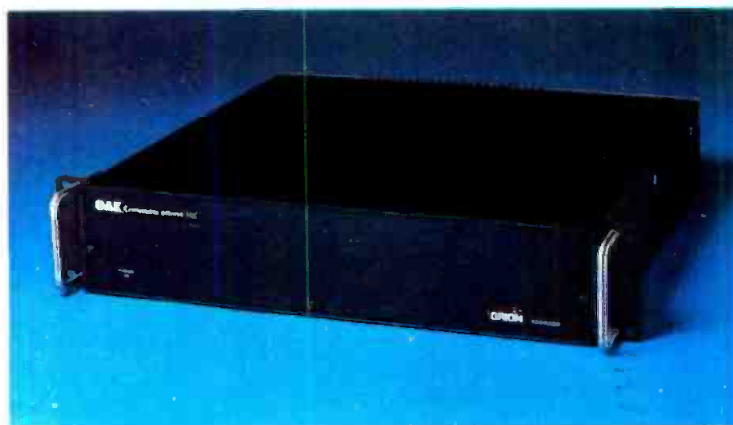
In entertainment program distribution, program level tiers might correspond to regional news, movies, sports or any other desired category of programming. Pay-per-view events in particular may offer significant opportunities, not only in increased direct revenues, but also in competing for subscribers.

In teleconferencing applications, designated decoder groups can be authorized to receive different levels of private information, in effect creating networks within a network. Program levels might correspond to several divisions within a company, or even to different companies. As a result, network operating costs could be reduced significantly.

ORION's flexible program tiering concept has evolved from many years of addressable technology experience at Oak—the world leader in CATV and STV signal encryption. For a detailed technical description, call or write:



*Who on earth is listening in? With Oak's ORION Satellite Security System, it's up to you.*



The ORION Satellite Security System consists of a pre-encoder, post-encoder and one or more decoders. Each unit occupies two mounting spaces in a standard 19-inch rack. The extremely rugged construction of the ORION components is designed to ensure maximum reliability, particularly in applications where equipment is subjected to rough handling encountered in shipment. ORION versions are currently available to meet NTSC as well as CCIR video standards.

**OAK**  
Satellite  
Corporation | Satellite  
Systems  
Division

16935 West Bernardo Drive, Rancho Bernardo, California 92127 • 714-485-9880

Circle (157) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)

## Exhibits roundup

### Varian (continued)

**2700G:** 1.5 to 3.35kW generation II high-power klystron amplifier  
**6995A2:** 500W power combined Ku-band medium-power TWT amplifier  
**Circle (748) on Reply Card**  
 see ads on pages 17, 175

### Varian Associates

**Palo Alto Microwave Tube Div.**  
**Booth 3119**

#### Established products

**VA-936:** Medium-power klystron used in C-band satellite uplink application  
**VA-890H:** Cut-away of a UHF-TV klystron showing the electron gun, cavities and collector assemblies

**VKU-7791M:** Ku-band high-power satellite ground station klystron

#### New products

**4KM150LAH:** High efficiency external cavity UHF-TV klystron  
**A-1200:** High efficiency aural coupler  
**VCP-7858:** High efficiency visual coupler  
**Circle (765) on Reply Card**  
 see ad on pages 17, 175

### Video Associates Labs

**Booth 1917**

#### Established products

**VB-1:** Microkeyer device to be used with a microprocessor

#### New products

**VB-3:** Microkeyer device to be used with a microprocessor  
**Circle (758) on Reply Card**

### Video Data Systems

**Booth 2502**

#### Established products

**VITL:** Vertical Interval Transmission Link.

**TPT-2500:** Titler for production and broadcast use.

**MCG-2500:** Character generator for stand-alone message display.

#### New products

To be announced.

**Circle (749) on Reply Card**  
 see ad on page 44

### Videomagnetics

**Booth 2320**

#### Established products

**Service:** Refurbishing for quad video heads for Ampex and RCA video recorders and conversion of lowband RCA heads to highband configuration

#### New products

See at booth

**Circle (759) on Reply Card**

### Videomedia

**Booth 2300**

#### Established products

**Z6000:** Editor series  
**VMC100:** Sequencer system

#### New products

**KR6000:** Character generator

**Circle (750) on Reply Card**

see ad on page 275

### Videotek

**Booth 2208**

#### Established products

**VM-26P:** 26-inch professional color monitor

**VM-17PR:** 17-inch rack-mount monitor

**Studio 12:** 12-inch split screen color monitor

**VM-8PRD:** Dual 8-inch rack-mount monitor

**RM-8A:** Portable ac/dc ENG, EFP

**RM-5A:** Monitors

**APM-2R:** Dual-channel audio-program monitor

#### New products

**TSM-5A:** Video waveform monitor

**VSM-5A:** Video vectorscope with internal graticule NTSC/PAL

**APM-8R:** Audio-program monitor with eight inputs

**Studio-12PAL:** Color monitor in PAL standard

**VM-8PRD PAL:** Dual 8-inch PAL monitor

**VM-8PT:** Portable ac/dc PAL monitor

**Circle (751) on Reply Card**

### Vital Industries

**Booth 3018**

#### Established products

**VIX-114-4A with PSAS-2:** Production switcher with triple reentry; PSAS-2 adds microprocessor-based automation which can control more than 1000 events per discette.

**VIX-115-4B:** On-air switching system, includes stereo audio master control switcher

#### New products

**SqueezeZoom Rev. 4:** Video manipulation unit will introduce new video effects, such as mosaic, posterization, star trail

# Weather and News without the **BLUES**



**No blue tint or edging—all hair detail intact!\***

These same results are possible in **your** newscasts and other live broadcast situations. Operating on a new principle, detail from the foreground camera comes through perfectly in the composite—including each strand of hair, smoke, liquid, shadows, transparent objects—the works! No blue tint, blue edging or edge crawl—no “cut-out” look; no soft edges on hard objects—no hard edges on soft objects.

**NEWSMATTE** needs no encoder and is simple to operate with its one knob control. It will integrate into your switcher or can stand alone. **NEWSMATTE** marks a breakthrough for live broadcast just as the Emmy award winning **ULTIMATTE-4** was a breakthrough for commercials and TV production. Call or write **now** for more information or a demonstration.

## See **ULTIMATTE'S NEWSMATTE!**

**ULTIMATTE CORPORATION** 18607 Topham St., Reseda, California 91335 USA • (213) 345-5525

\*Actual photo from BARCO CTVM MONITOR

**Circle (158) on Reply Card**

**See us at booth 2738 at NAB**



# Great announcer mics should be heard and not seen.

You won't see the MCE 5, but you will hear the rich full frequency sound that tells you it's a Beyer. Now the top quality and reliability for which Beyer is famous has been packaged into the world's smallest broadcast microphone – the MCE 5 – the announcer's mic.

The MCE 5 is an omni-directional electret condenser microphone with 20Hz-20kHz  $\pm$  3dB frequency response, 62dB signal-to-noise ratio and a maximum rated SPL at 1kHz of

116dB. Its matte black finish will not reflect light, so it goes unnoticed on camera. And Beyer's unique floating element eliminates pick-up of clothes rustle and body movement. Wind and air noises are reduced by up to 20dB. with the (removable) windscreen. You get only the announcer's voice.

Unlike conventional mini mics that are subject to breakdown from temperature and humidity, the MCE 5 is specially designed to withstand the elements.

The Beyer MCE 5 is available in a variety of configurations and connectors including: balanced, unbalanced, XLR, 1/4-inch and open end; as well as phantom and self-powered with its own battery.

You may not find the Beyer MCE 5 on our announcer, but you'll find it at your local Beyer dealer, today.

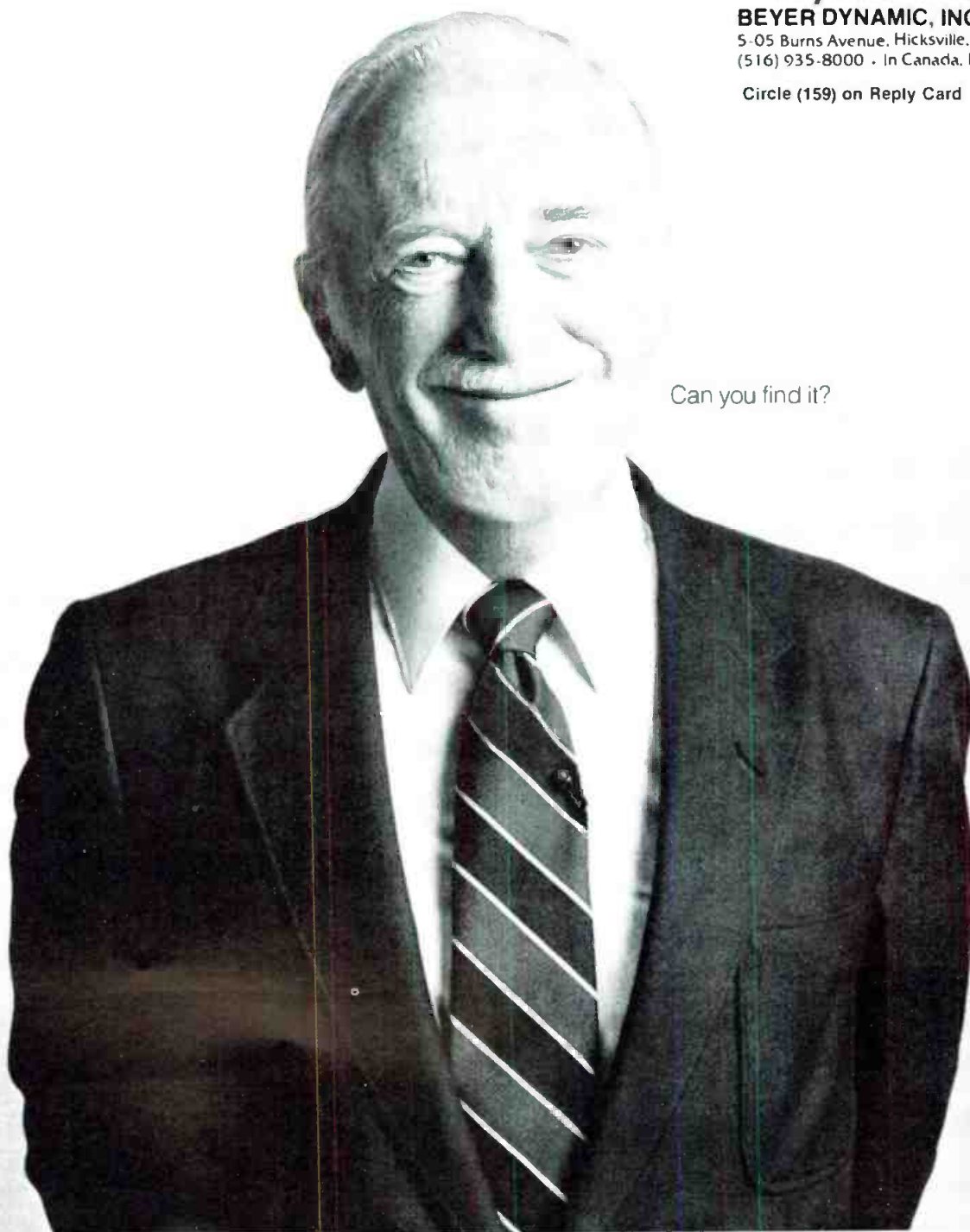


**Beyer**   
**Dynamic**

**BEYER DYNAMIC, INC.**

5-05 Burns Avenue, Hicksville, NY 11801  
(516) 935-8000 • In Canada, H. Roy Gray, Ltd.

Circle (159) on Reply Card



Can you find it?

## Exhibits roundup

**Vital** (continued)  
and others

**Saturn:** Completely microprocessor-based production switcher; four complete mix effects systems

**SAM:** Station automation manager, automates different pieces of equipment in a station

**250 P/N PAL/NTSC:** Video production switcher; totally self-contained

Circle (766) on Reply Card  
see ad on page 227

**Vlahos-Gottschalk Research (VGR) Corporation**  
Booth 2738

Established products \_\_\_\_\_

**Ultimatte-4:** Video matting device

New products \_\_\_\_\_

**Ultimatte-NP:** Simplified version of Ultimatte-4 for live newscasts or interviews and post-production

Circle (752) on Reply Card  
see ad on page 184

**Walter Brewer**  
See Brewer

**Ward-Beck Systems Ltd.**  
Booth 3301

Established products \_\_\_\_\_

**T1202:** Transportable audio console

**M1204B:** Production audio console

**M2484B:** Broadcast/multi-track audio console

**L2042:** TV audio console

**R1200:** Radio audio console

**R2000:** Radio audio console

New products \_\_\_\_\_

**MicroCOM:** Microprocessor-controlled communications systems

Circle (753) on Reply Card  
see ad on 8C

**Wilkinson Electronics/Television Technology**  
Booth 3117

Established products \_\_\_\_\_

**Wilkinson:** AM-2500W transmitter

**Wilkinson:** FM-2500W transmitter

**Wilkinson:** AM-250W transmitter

**Wilkinson:** FM-30,000W transmitter

**S1A-2:** Line surge protectors

Silicon rectifiers

**FME-10:** Solid-state FM exciter

New products \_\_\_\_\_

**Series:** 1000W UHF/VHF transmitters

1W UHF/VHF translators

Circle (754) on Reply Card

**Winsted Corporation**  
Booth 1703

Established products \_\_\_\_\_

**Series:** Editing consoles for ¾-inch and 1-inch tape formats

Videotape and film storage systems

Videotape and film trucks

Equipment racks

Dubbing racks and post-production consoles

New products \_\_\_\_\_

**Series:** Modular console systems

for ¾-inch format

**Series:** Low profile consoles

**A-B Roll:** Consoles

**Super-Pak:** ¾-inch tape storage systems

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see ads on pages 18, 186

**Wold Communications**  
Booth 2729

Established products \_\_\_\_\_

**Service:** Point-to-point and point-to-multi-point TV and radio program transmission and network interconnection via the Wold Satellite Network

**Service:** Transportable earth station

**Service:** Fixed satellite transmission and reception in New York, Los Angeles and Washington, DC

**Series:** Transportable microwave services throughout the United States

**Series:** More than 40,000 hours of satellite transponder capacity annually on the RCA Satcom, Western Union Westar and AT&T Comstar systems.

**Series:** 7-meter TV receive-only earth stations designed specifically for the Wold Satellite Network.

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**Frank Woolley & Company**  
Booth 2930

Established products \_\_\_\_\_

**Motionmaster:** Video animation stand

Polarized animation

New products \_\_\_\_\_

**Motionmaster:** Colortint sheets

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MODULAR  
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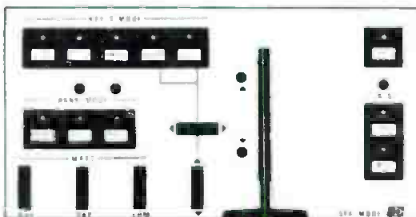
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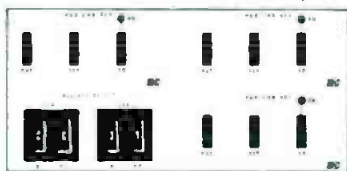




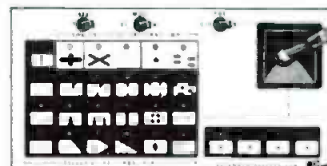
Title Key



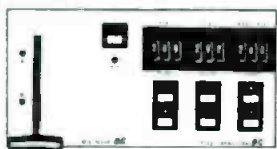
SFX Amplifier



Chroma Keyers...RGB and Encoded



Extended Effects Generator

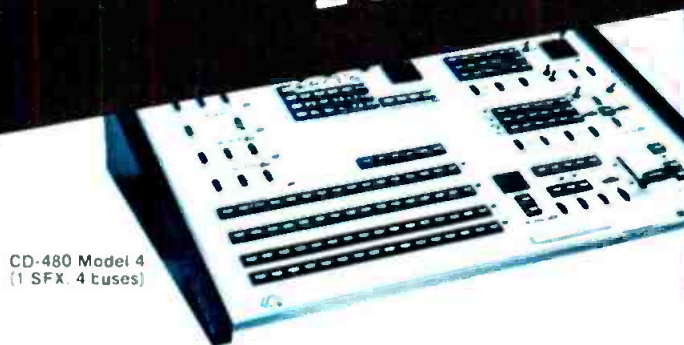


Master Mix & Auto Transitions

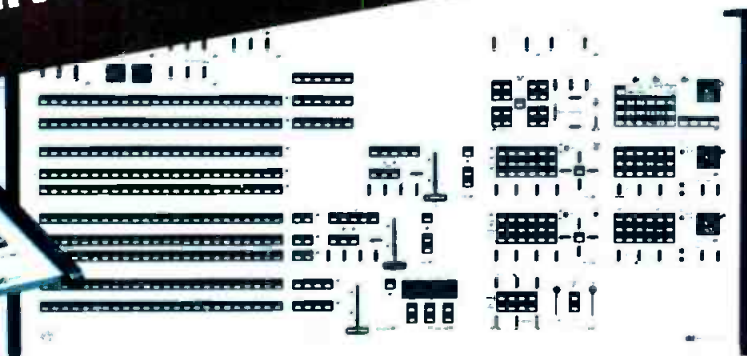


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2 stages...2 live presentations.



CD-480 Model 4  
(1 SFX, 4 buses)



CD-480 Model 10 (2 SFX, 10 buses)

## CD-480...the most powerful and modular production switcher available today.

The 480's proven superior performance, reliability and flexibility has evolved from these powerful video production modules.

That's why you can customize a 480 to your specific production requirements...within your budget. And because of the 480's modular design we can deliver the largest model within 90-120 days.

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The 480 family includes switchers with 4 buses to 10 buses...even a model you can upgrade from 1 SFX and 5 buses to a Model 8 or 9 with 2 SFX Amplifiers and 8 or 9 buses. And the 480 continues to evolve which means you can always add the latest 480 production accessories.

That's why over 300 users call the 480 the most powerful and flexible new generation switcher available today.

Start designing your new CD-480 now so you can have the competitive advantage. Call or write for literature or our complete CD-480 Design Kit.

Central Dynamics Corporation, 900 Corporate Drive, Mahwah, NJ 07430. 201-529-1550.  
Central Dynamics Ltd. Montreal. 514-697-0810.



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# NAB LATE EXHIBITOR ROUNDUP

**AVL Digital Ltd.**  
**Booth 3106**

*Established products* \_\_\_\_\_  
**VDA-41:** Video distribution amplifier  
**VDA-42:** Video distribution amplifier  
**VCA-2:** Video clamping amplifier  
**VLG-10:** Video leader generator  
**VAC-41:** Video activated control  
**VAC-42:** Video activated control  
**VAS-10:** 10x1 audio-follow-video switcher  
**ADA-41:** Audio distribution amplifier  
**AVS-100:** Video switcher  
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**Advanced Designs Corporation**  
**Booth 1620B**  
**Circle (830) on Reply Card**

**Agfa-Gevaert**  
**Booth 1920**  
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**Peter Albrecht Corporation**  
**Booth 2319**  
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**Allied Tower Company**  
**Booth 3141**  
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**Amco Engineering**  
**Booth 3126**  
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**American Telephone & Telegraph**  
**Booth 1504**  
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**Amtel Systems**  
**Booth 2927**  
**Circle (836) on Reply Card**

**Arben Design**  
**Booth 2112A**  
**Circle (838) on Reply Card**

**Arvin/Diamond**  
**Booth 2901**  
*Established products* \_\_\_\_\_  
**System:** Satellite weather displaying  
 system; capable of displaying 1400  
 weather pictures per month  
**Circle (839) on Reply Card**

**Associated Press, The**  
**Booth 3204**  
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**Auburn Instruments**  
**Booth 2311**  
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*see ad on page 106*

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# Simply Sophisticated ... and then some



## ROSS 500 SERIES Multi Level Effects Switchers ... are

### Sophisticated

- ☐ Each Multi Level Effects (MLE) amplifier processes 2 background and 2 key signals.
- ☐ Optional rotary, spin and matrix wipes with soft edges and borders.
- ☐ Interfaces available for a wide variety of videotape editors and digital effects systems.
- ☐ Analog key border generator — a new optional feature that provides superb quality title keys.
- ☐ Encoded Chroma Key and individual RGB Chroma Keyers with key-follow switching for up to 8 cameras available.

- ☐ Models: 1 or 2 MLE Amplifiers, 12 to 24 inputs ... many options ... NTSC, PAL & PAL-M.

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- ☐ Clean logical panel layout designed for the operator. Exclusive transition Preview System ... complicated program transitions can be previewed while the MLE amplifier is on the air.
- ☐ Quad split does not tie up a primary bus.

### ... introducing the **NEW** Ross Scene Store

- ☐ The **Scene Store** memory system combines ease of operation and the facility to remember up to 200 scenes plus 10 sequences of 32 scenes each ... sure to improve accuracy and reduce switcher operator error during fast moving programs. The **Scene Store** can be added to any series 500 or 514 Ross switcher and is priced to appeal to even the most budget conscious station.

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Ross Video Limited  
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613 652 4889 Telex 05-811579

U.S.A.  
Ross Video Inc.  
P.O. Box 6700  
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13669

... AT NAB BOOTH 2310



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## Late exhibitors

### Audio Technica

Booth 2923

Established products \_\_\_\_\_

Pro Series: Microphones

Series: Microphone cables, connectors, lengths and colors

ATC820: 8-channel stereo console

ATC1220: 12-channel stereo console

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### Audio Development

Booth 2002

Circle (843) on Reply Card

### Auditronics

Booth 3124

Circle (844) on Reply Card

see ad on page 104

### 2B Systems Corporation

Booth 2739

Circle (845) on Reply Card

### BIW Systems

Boston Insulated Wire

Booth 3017

Circle (846) on Reply Card

### William Bal Corporation

Booth 2200

Circle (847) on Reply Card

### Basys

Booth 2940

Circle (848) on Reply Card

### Belar Electronics Labs Corporation

Booth 2715

Established products \_\_\_\_\_

Series: AM modulation and frequency monitors

Series: FM modulation and FM stereo monitors

Series: TV modulation and frequency monitors

Series: FM and TV SCA monitors

Series: AM, FM, TV RF amplifiers

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see ad on page 265

### Bell Helicopters

Booth 2400

Circle (837) on Reply Card

### Best Audio

Booth 2707

Circle (850) on Reply Card

### British Videotext and Teletext

Booth 2526

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### Broadcast Music Inc. (BMI)

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### Bryston Vermont Ltd.

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### Centro Corporation

Booth 2204

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### John Chiles

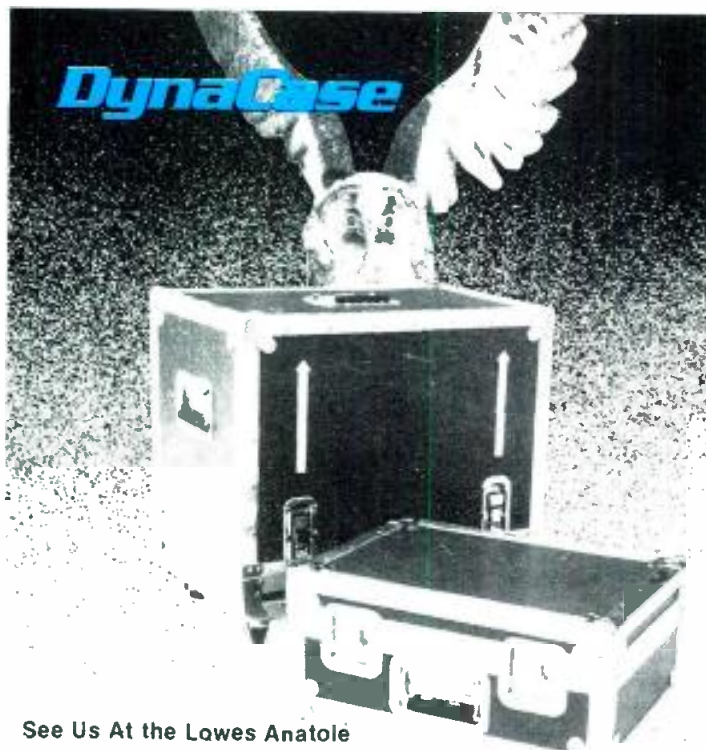
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### Compucon

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## Late exhibitors

### Computer Graphics Lab

Booth 2933

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### Computer Video Systems

Booth 2305

Circle (862) on Reply Card

see ad on page 46

### Comtech Data Corporation

Booth 1503B

Circle (863) on Reply Card

see ad on page 70

### Continental Recordings

Booth 2800A

Circle (864) on Reply Card

### Corporate Communications Consultants Booth 2413

Established products \_\_\_\_\_

**SYSTEM 60XL:** Computerized color correction; film-to-tape transfer

New products \_\_\_\_\_

**SYSTEM 60B:** Computerized color correction system for the Bosch FDL-60A2

**SYSTEM L-100:** Computerized color correction for positive and negative film

**SYSTEM 30:** Computerized color correction; scene-by-scene especially designed for the Sony BVX-30

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### Crown International

Booth 1921

Circle (866) on Reply Card

### D-B Electronics

Booth 2024

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### Peter Dahl Company

Booth 2101A

Circle (868) on Reply Card

see ad on page 196

### Bill Daniels Company

Booth 2813

Circle (869) on Reply Card

### Datum

Booth 2409

Circle (870) on Reply Card

### DeWolfe Music Library

Booth 2610

Circle (871) on Reply Card

### Deltamod Corporation

Booth 2906

Circle (890) on Reply Card

### Dictaphone Corporation

Booth 2020

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see ad on page 69

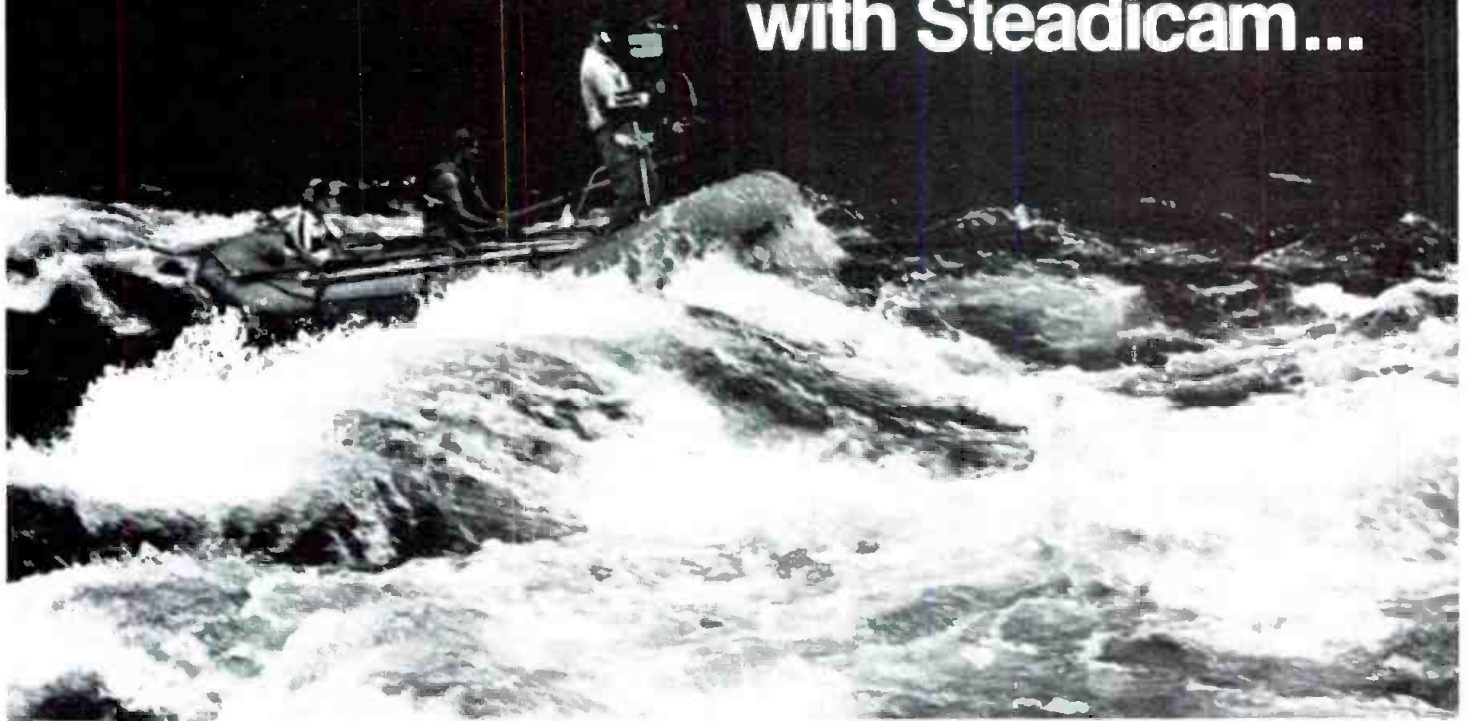
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# Shooting the rapids EFP-style with Steadicam...



Planning ahead with Steadicam, Cinema Products' Oscar-winning video/film camera stabilizing system, pays off in spades. Economically as well as artistically. A good example of such planning is a new sports series for cable TV, "*Outside The Arena*," produced by Westwood Communications, Inc. (Eugene, Oregon).

The premise for the series is to take well-known sports figures out of their commonly-known element, and to feature them as they are engaged in various interesting activities. The pilot program involved videotaping a famous pro football player kyaking down the McKenzie River in Oregon.

To get the best footage from the camera raft (equipped with a Hitachi SK-91 camera and an HR-100 1-inch portable recorder), Steadicam was mounted on a specially built pole which was welded onto the framework of the raft.

"Even though the raft was forever being tossed every which way but the right direction, Steadicam came through with flying colors," says Steadicam operator Stephen W. Allen of Allen Production Services, Ltd. (Portland, Oregon). "In situations where I had to pay more attention to the water in front of the raft than to the monitor, Steadicam practically kept in frame by itself."

"Steadicam was an integral part of the planning for the production of this segment," says producer Bruce O'Neil.

"Future segments will no doubt place even greater demands on the Steadicam, due to the many and varied locations we plan to use for this series."

The results of the two-day Steadicam shoot on the McKenzie River were spectacular. Says director J. Clayton Lawson: "Steadicam enabled us to capture some of the most exciting moments ever shot on a white water river."

Steadicam, of course, is not restricted to "shooting rapids." On the contrary. It is a most versatile production tool which can be used effectively—even in "normal" shooting circumstances—in a thousand and one dramatic ways.



Steadicam operator Stephen Allen shooting with video camera and Steadicam on the McKenzie River in Oregon.

For further information, please contact:

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\* FCC Type Approval No. 3-244

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

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### Late exhibitors

**Digital Communications Corporation**  
Booth 2200A

Circle (873) on Reply Card

**Victor Duncan**  
Booth 2404

Circle (874) on Reply Card  
see ad on page 178

**Dynacom International**  
Booth 2424

Circle (875) on Reply Card  
see ad on page 72

**Dynamic Technology Ltd.**  
Booth 2912

Circle (876) on Reply Card

**E-N-G Corporation**  
Booth 1501

Circle (877) on Reply Card

**Electro & Optical Systems Ltd.**  
Booth 2104

Circle (878) on Reply Card  
see ad on page 60

**Emcor Products**  
Booth 1901

Circle (879) on Reply Card

**Enstrom Helicopter Corporation, The**  
Booth 2406

Circle (905) on Reply Card

**Enterprise Electronics Corporation**  
Booth 1822

Circle (880) on Reply Card

**Finntek Ltd.**  
Booth 1717

Circle (881) on Reply Card

**Firstcom Broadcast Services**  
Booth 2414

Circle (882) on Reply Card

**Flash Technology**  
Booth 1708

Circle (883) on Reply Card

**Fostex**  
Booth 1911

Established products \_\_\_\_\_  
A8: Recorder/reproducer, 8-track, 1/4-inch  
250: Multi-tracker, 4-track cassette deck  
with built-in mixer  
3080: Reverb unit  
Small monitors with 10W amp built-in  
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**GE/Canada**  
See Larcan Communications Equipment

**Gagnon LaForest**  
Booth 2800

Circle (885) on Reply Card

**General Electric**  
Booth 2500

Circle (886) on Reply Card  
see ad on page 289

**Generic Computers**  
Booth 2317

Circle (887) on Reply Card

**Gerstenslager Company, The**  
Booth 2630

Circle (888) on Reply Card  
see ad on page 78

**Golden Image Network**  
Booth 1800A

Circle (889) on Reply Card

**Grove Video Corporation**  
Booth 2701

Circle (891) on Reply Card

**Grumman Aerospace Corporation**  
Booth 2641

Circle (907) on Reply Card

**Hardigg Industries**  
Booth 1705

Circle (918) on Reply Card

**Harrison Systems**  
Booth 1910

Established products \_\_\_\_\_  
ALIVE: Series of live-performance  
consoles  
MR-2: Music recording console  
MR-3: Music recording console  
PP-1: Film-sound post-production console  
DS-1: Videographics display system  
Auto-graph: Graphic equalizer system  
864 Auto-Set: Automatic system  
New products \_\_\_\_\_  
TV-3: Video-Sound (broadcast) console  
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**Inflight Services**  
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**Integrated Sound Systems**  
Booth 2924

Circle (893) on Reply Card

**Interactive Systems**  
Booth 1602A

Circle (939) on Reply Card  
see ad on page 118

**Jam Creative Productions**  
Booth 1728

Circle (894) on Reply Card

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## Late exhibitors

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### Kavouras

Booth 1622

Circle (898) on Reply Card

### Klark-Teknik Electronics

Booth 1818

Circle (899) on Reply Card

### Larcan Communication Equipment

Booth 2736

New products

TTC30000f/1: 30kW TV low channel transmitter

FMT25F: 25kW FM transmitter

Circle (455) on Reply Card

see ad on page 213

### Libra Programming

Booth 2631

Circle (900) on Reply Card

### Live Sound

Booth 1726

Circle (901) on Reply Card

### Logica Ltd.

Booth 1502C

New products

Flair Graphics System: Microprocessor-driven method for "painting" TV pictures

Circle (902) on Reply Card

### Magnasync/Moviola Corporation

Booth 2108

Circle (903) on Reply Card

### Magnavox Electronics Consumer Company

Booth 3145A

Circle (940) on Reply Card

### Management, The

Booth 1809

Circle (904) on Reply Card

### Mead Data Central

Booth 2801

Circle (906) on Reply Card

### Media Computer

Booth 2938

Circle (907) on Reply Card

### Minolta Corporation

Booth 2315

Circle (952) on Reply Card

### Mole Richardson

Booth 3203

Circle (908) on Reply Card

### Motorola C & E

Booth 1508

Circle (909) on Reply Card

### Multi-Track Magnetics

Booth 2922

Circle (910) on Reply Card

### Music Directors Programming Service, The

Booth 1503D

Circle (911) on Reply Card

### Musicworks

Booth 1914

Circle (912) on Reply Card

### NTI America

Booth 1815

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### N Z Video Systems

Booth 2919

Circle (966) on Reply Card

### Nautel Maine

Booth 2902

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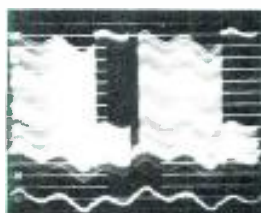
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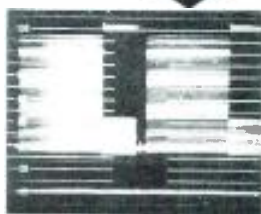
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GATES FM-1B	.....\$450
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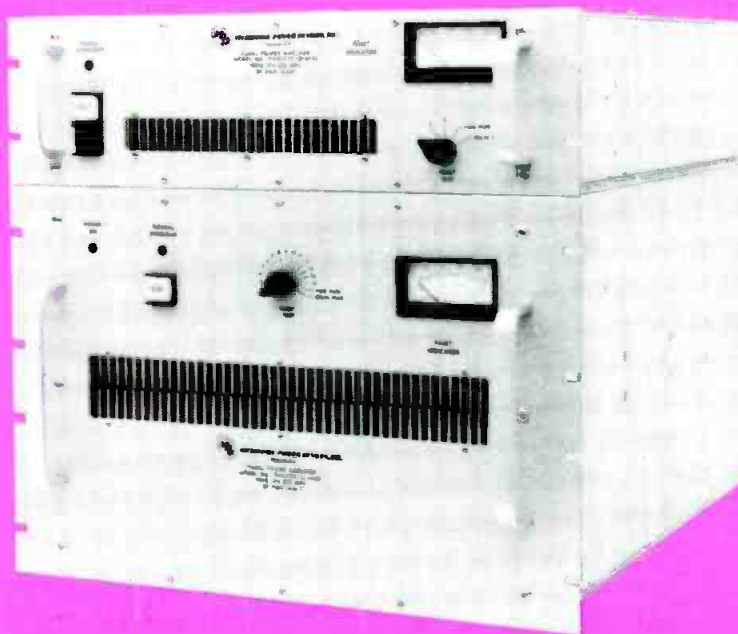
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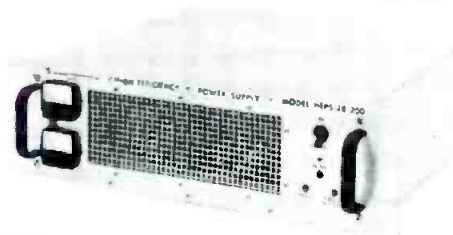
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# Audio switching systems:

## Past, present and future

By Mike Palmer, Arrakis Systems, Fort Collins, CO

The switching and routing of audio signals has been a technical problem since Alexander Graham Bell spoke the first sentence over the telephone on March 10, 1876. In fact, the greatest difficulty the telephone system faced was audio switching. The modern telephone system that connects more than 40 million homes in the United States is a monument to the genius and ingenuity of the early pioneers.

The development of audio switching from the knife switch to the modern electronic routing switcher has been spearheaded by the telephone industry. The 1870s and 1880s saw the use of the first crude rotary and toggle switches. The first simple patching system was used in Richmond, VA, in 1882. By 1901, the

modern ¼-inch 3-wire telephone jack and patch panel, which is still in widespread use, was fully evolved. The telephone lever key switch was first used in 1888 and developed by 1912 into what we would recognize today. That switch is still commonly used for switching on audio consoles.

The relay was invented by Morse for the telegraph in the early 1830s. It began as a part that weighed three to five pounds, and evolved into our modern telephone relay by 1910. The relay, the patch panel and the lever key switch were the guts of early telephone switching systems. In the 1920s, a standard 10,000-line telephone switching office used more than 50,000 mechanical relays.

Early radio developed at this stage. The first station, KDKA of Pittsburgh,

began broadcasting in late 1920. As in telephony, these broadcasters were confined to the mechanical relay, patch panel and mechanical switches for audio switching. Ironically, the majority of stations to this day rely on these same tools.

The modern age of electronics began in the early 1950s with the introduction of the transistor. The world of electronics owes a debt to Bell Telephone for the development of the transistor and the revolution it brought to our field.

Bell Telephone introduced the industry's first electronic switcher in the late '60s. Called the ESS 1, which stands for Number One Electronic Switching System, it is computerized and capable of switching 100,000 lines peak. The primary switching element

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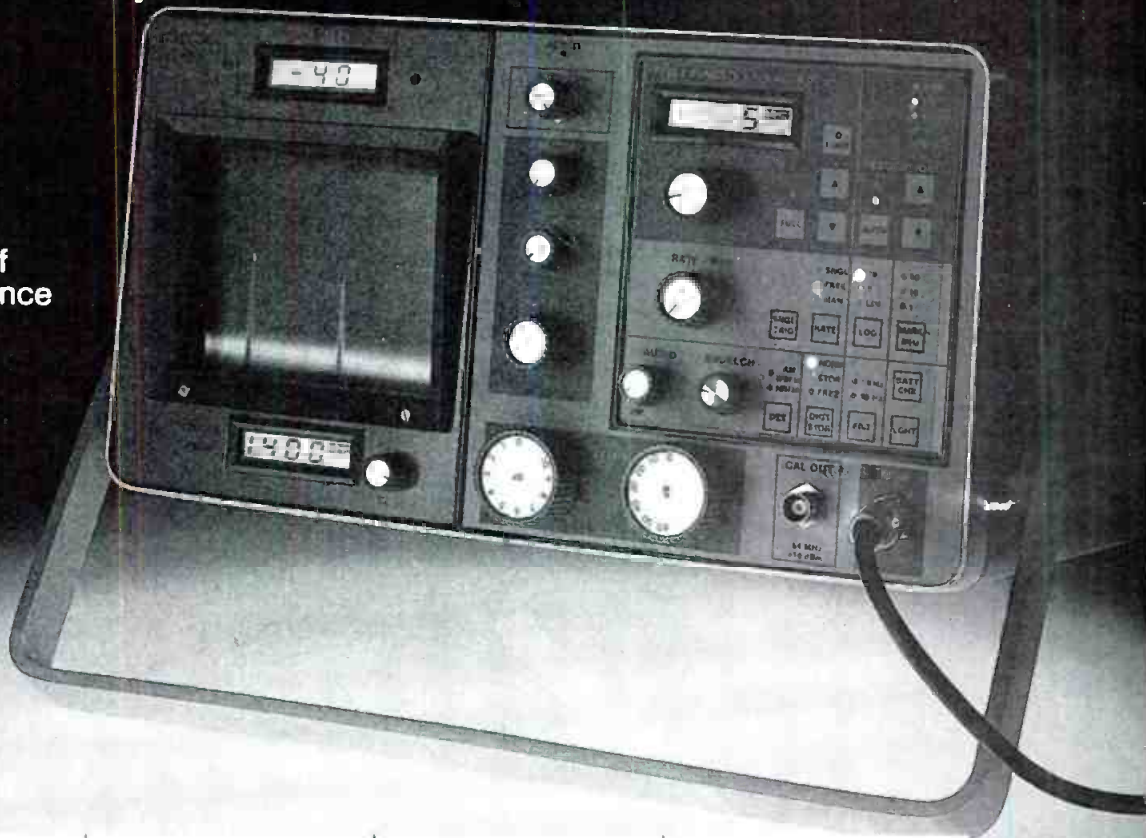
The AL-57 is the only microprocessor controlled portable spectrum analyzer in its price range.

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**True:**

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Specification		HP 8558B/182T*	Tektronix 496*
Price	\$7,500.00	\$10,915.00	\$22,950.00
Frequency Range	1-1600 MHz	0.1-1500 MHz	.01-1800 MHz
Dispersion	20 KHz-1000 MHz	50 KHz-1000 MHz	.5 KHz-1000 MHz
Frequency Accuracy	$\pm .005\%^{**}$	20% of Dispersion $\pm 5$ MHz	20% of Dispersion $\pm 5$ MHz
Amplitude Dynamic Range	70 dB	70 dB	80 dB
Average Noise Level	-117 dBm (10 KHz resolution)	-107 dBm (10 KHz resolution)	-105 dBm (10 KHz resolution)
Accuracy (worst case total)	$\pm 3.5$ dB	$\pm 3.5$ dB	$\pm 3.5$ dB
Resolution (minimum)	.3 KHz	1 KHz	.03 KHz
Short Term Stability	.2 KHz (phaselocked)	1 KHz	.01 KHz (phaselocked)
Noise Sidebands	-60 dB 10 KHz away	-65 dB 50 KHz away	-75 dB 300 KHz away (10 KHz res.)
Operating Power	115/230V AC, 12V DC	115/230V AC	115V AC
Size In <sup>3</sup>	1367	2059	Not specified
Weight Lbs	40	40	Not specified
Internal Battery	Standard	Not offered	Not offered
External 12V DC oper	Standard	Not offered	Not offered
Phaselock	Standard	Not offered	Standard
Audio	Standard	Not offered	Not offered
Frequency Markers	Standard	Not offered	Not offered
Digital Storage	Optional	Optional	Standard
Preset Frequency Bands	Standard	Not offered	Not offered
Two Log Ranges	Standard	Standard	Standard
Rugged Carrying Case w/Front Panel Cover	Standard	Optional	Standard
Camera Mount	Standard	Standard	Standard
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\*Information obtained from manufacturer's published specifications.

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## Audio switching

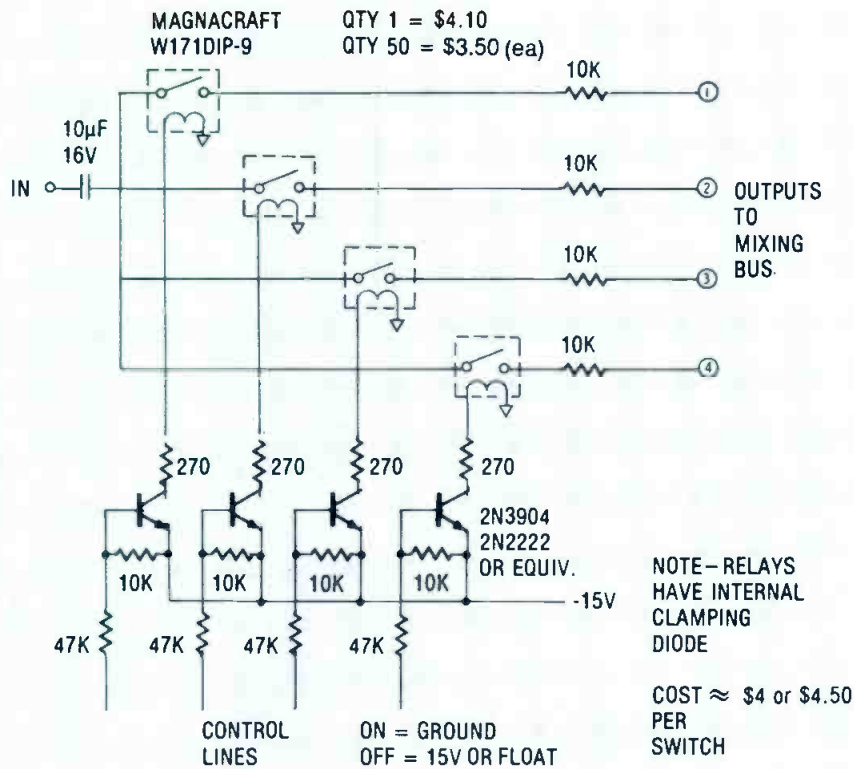


Figure 1. Reed relay switch building block.

is the reed relay. The IBM 2750, introduced in the same period for voice and data switching, used thyristors for its switching elements.

True solid-state audio routing switchers came on the scene for the radio and TV market at this time. Prices, however, were and are very high, which prevented their use by most of the radio market.

In order to survey present market trends and to elicit comments, Arrakis Systems polled 1500 Midwestern radio stations through its normal brochure mailings. The response was almost unanimous. More than 95% of the stations polled use patch panels for patching around defective components and elementary switching. Nearly 20% of the stations use some form of custom switcher based on relays or mechanical switches for routing net lines, interstudio and transmitter lines. All those polled saw the need for a reliable, easy to operate, inexpensive audio routing switcher. Complaints were that rotary and push-button switches were unreliable and that electronic switchers were much too expensive.

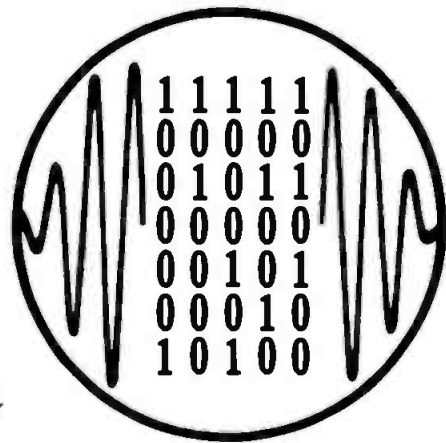
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## Audio switching

**Table I.**

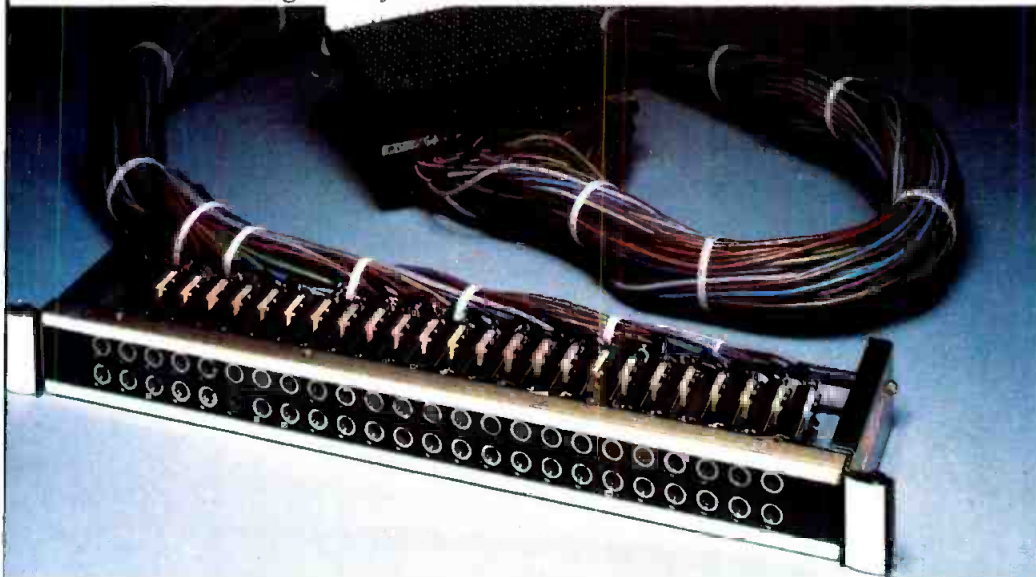
This list of manufacturers represents those companies listed in the 1980 Buyers' Guide issues of **Broadcast Engineering** and **Broadcast Communications** as supplying audio routing switchers and with sales offices in the United States.

Company	Inputs	Outputs	THD %	Noise	Crosstalk	Level	Price
Grass Valley Group 13024 Bitney Springs Grass Valley, CA 95945 (916) 273-8421	32	16	0.25%	S/N-75 Below 8dBm	-80dB @ 15kHz	24dBm	\$15,100
Dynair Electronics 5275 Market St. San Diego, CA 92114 (714) 263-7711	10	10	0.25% @ + 8dBm	-75dB	-80dB @ 20kHz	24dBm	\$3225
Tri Tee Systems 1324 Motor Parkway Hauppauge, NY 11785 (516) 234-6090							Price on Request
Industrial Sciences 3521 SW 42nd Ave. Gainesville, FL 32602 (800) 874-7590			0.25% @ 0dBm	-68dB below 0dBm	-65dB	+ 18dBm	\$40/ Cross point
Pacific Recorders & Engineering 11100 Roselle St. San Diego, CA 92121 (714) 453-3255	16 20	Expand- able	0.2% @ 28dBm	-83dB below 8dBm		28dBm	Price on Request
Utah Scientific 2276 S. 2700 W. Salt Lake City, UT 84119 (801) 973-6840	20 20 50 20	10 20 10 105	1% @ 24dBm	-80dBm	75dB @ 20kHz	24dBm	Price on Request
HEDCO P.O. Box 1985 Grass Valley, CA 95945 (916) 273-9524	8 8	8 mono 8 stereo	0.1%	-96dB	-70dB @ 20kHz	27dBm	\$3900 \$5900
Ramko Research 11355 Folsom Blvd. Rancho Cordova, CA 95670	16 8	12 12 stereo	0.3% @ 21dBm	75dB below 8dBm	60dB @ 20kHz	21dBm	\$3100 \$3100
America Data 401 Wynn Drive Huntsville, AL 35805 (205) 837-5180							Info on Request
Datatek 1166 W. Chestnut St. Union, NJ 07083 (201) 964-3656	25 50	20 25	0.1% @ 30dBm	105dB below 30dBm	-85dB @ 20kHz	30dBm	\$15,000 \$27,000
DiTech 311 Wyanauch Ave. North Babylon, NY 11704 (516) 643-4040	20 12 40	stereo 15 12 15	0.5% @ 8dBm	-80dB	-65dB @ 16kHz	18dBm	\$12,000 \$ 9000 \$20,000
3M 223-5E, 3M Center St. Paul, MN 55111 (612) 736-1032							Info on Request



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**Standard Longframe Jackfield**—One of our most popular jackfields shown here with jacks mounted in a 1 3/4" panel. This unit shows normals, tip, ring and sleeve wired out to a terminal block. We also offer 240 other low-cost configurations.

**ADC Pro-Patch Video Jackfield** is the newest offering in our broadcast jackfield line. Shown here in rear view, this unit features self-normalling loops that are internal to the jackfield. Loops are color phase compensated for cross-patching. No phase shift occurs between self normal and patch cord.

**ADC Pro-Patch Audio Jackfield** is another new member of the family. This configuration incorporates pin and socket termination that allows instant making or breaking of normals, and eliminates soldering at the patch bay, thus reducing installation labor costs.

For more information about ADC Custom Jackfields call our toll-free hotline today. 1-800-328-6188. In Minnesota, call (612) 835-6800.



ADC Pro-Patch Video Jackfields



ADC Pro-Patch Audio Jackfields



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## Audio switching

It is easy to understand the widespread use of patch panels and rotary switches when you contrast the \$200 price of a 24-by-24 stereo patch panel or \$150 price of an 8-by-8 stereo switcher using rotary switches with the \$3000 plus price for an 8-by-12 stereo audio electronic routing switcher.

The 1980s and 1990s, however, are going to see staggering technological and procedural changes. Satellite downlinks will particularly effect the

radio market. Microwave links from satellites are capable of bringing hundreds of high fidelity simultaneous audio channels to any radio station. With satellite links costing less than \$20,000 installed, unprecedented flexibility in programming is possible at a realistic price.

The question is now raised of what we can do with even 10 simultaneous audio channels. Patching is possible and is certainly the cheapest way. Unfortunately, programming will be 24

hours a day and a patch panel, rotary or push-button switcher cannot be automated or set with a timer. The audio routing switcher will undoubtedly prove useful in these applications.

The National Public Radio Satellite Net is a perfect example of the situation that most stations will face eventually. The satellite can potentially microwave down simultaneous channels. Any one can be mono or any two can be combined to form stereo. Not all of this programming can go straight on the air. Most are recorded for future airing. Two local stations exemplify the wide range of possible approaches. KSMU, Springfield, MO, used toggle switches to pair demods and the patch panel for switching. KSOZ, Branson, MO, has combined a Ramko routing switcher with a Chronotimer and the station's own controller to perform the same function. It costs KSMU less than \$100 and KSOZ almost \$6000.

A list of companies that produce audio routing switchers, plus specifications and prices, appears in Table I. The switchers start out at approximately 8-in by 12-out stereo, costing approximately \$3000. This is the Ramko Research switcher, which stands out as the least expensive. It achieves this by a design aimed directly at the radio market. The majority of available switchers are designed for audio follow video for television. For many of these, audio only is available separately. The average price for these switchers is \$40 per crosspoint. That comes to the \$7000 and \$8000 range for 8-in by 12-out stereo. Devices used to form the crosspoint vary from unit to unit, and so do the basic specifications of distortion, noise and bleed-through. Most of these switchers are modular and may be combined in series and parallel to form larger stereo switchers.

Audio routing switchers are made up of simple building blocks. Generally, there is a differential input buffer amp. This input is sent to a switch card with a 1-by-10, 1-by-20, or larger solid-state switch matrix. The switch card plugs into a motherboard with the output bus. The output bus connects to the active balanced outputs.

The switch matrix is almost universally controlled with a BCD digital control bus. Control of the routing switcher can then be as simple as a thumbwheel switch or as flexible as a microprocessor.

Although audio routing switchers are useful now and have become attractive for use with satellite links, their prices are still far from attrac-



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## Audio switching

tive. To form an idea of future price trends, I spoke to several engineers and marketing managers at a number of manufacturers. The opinion was unanimous. Although prices have decreased about 30% in the last five years, everyone expects prices to begin heading up rather than down. Certainly there is no expectation of any of today's technologies producing a radical price decrease.

All of the basic switching technologies have been around for 10 years or more and are well-established. The forces that produce price decreases in established technologies are increasing volumes or denser integration in ICs. The telephone industry uses tremendous numbers of reed relays, which is the main reason for their comparatively low price. The CD 4016 and CD 4051 are examples of what we face with IC technology. The CD 4016 is a quad-bilateral CMOS switch that has been on the market and well-established since the early '70s. Price per switch is 16½ cents. The CD 4051 is a CMOS single-pole 8-throw switch with BCD decoding that has been on the marketplace nearly as long, and is 13½ cents per switch. Further integration along the lines of the CD 4051 is possible. A 40-pin chip with one input switched to 32 outputs by five binary control lines could be built. It would combine the circuitry of four CD 4051 ICs on the same chip. Because of chip

size, this is about the limit of integration and would require large volumes to bring the price much below the \$4.50 price of four CD 4051 ICs on the market today.

In light of the present high prices and the unique switching requirements of each individual station, it is likely that we will see a lot of custom switchers in the next years.

Current audio switching is based upon a number of solid-state and mechanical devices. These include in approximate order of increasing cost:

- CMOS ICs;
- junction FETs;
- thyristors;
- LDRs (photoresistors);
- reed relays;
- telephone type mechanical relays; and
- mechanical switches (rotary, push and toggle).

Current designs in routing switchers revolve basically around CMOS ICs, JFETs, LDRs and reed relays. Each of these devices has its own special strengths and weaknesses. A set of schematics with performance data and pricing is presented for each of the four basic switches throughout this article. These schematics are designed to facilitate cookbook design of custom switchers.

The important parameters of these four devices are cost, size, performance and reliability. Performance is

broken down into distortion, noise, level, power, bleedthrough and switching transients.

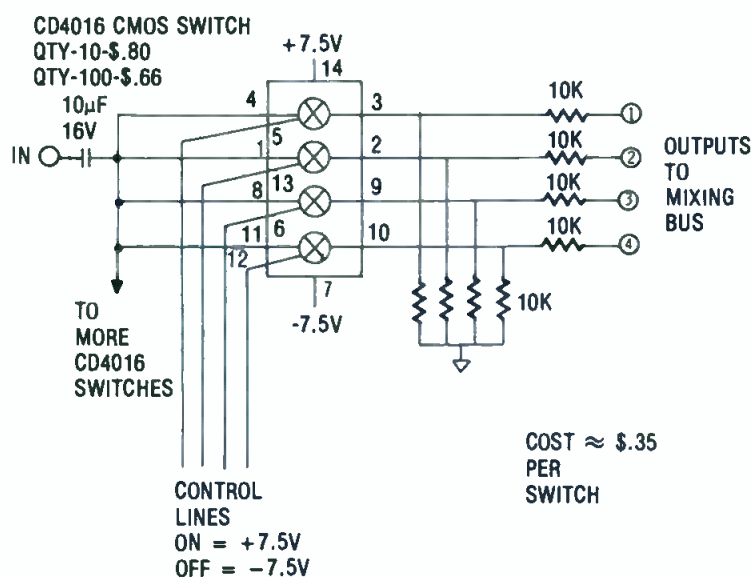
The CD 4016 is the least expensive of all audio switchers at 66 cents per hundred. It has four CMOS switches with input, output and control accessible at the pins. Each switch costs 16 cents. This compares favorably with the reed relay at about \$4 for a SPST switch. The CD 4016 is the building block of Ramko audio routing switchers and is one of the major reasons for the switchers' competitive prices. The chip comes in a 14-pin DIP package and has excellent reliability. Buffering the inputs and outputs of the switches is highly recommended to eliminate static discharge problems and improve switch performance.

Performance of the CMOS switch can be adequate if the input and output circuits are designed to limit signal level to the switch. Distortion is a function of signal level, supply voltage and control voltage. With a 15V supply, a 10,000  $\Omega$  load, and a 5V peak-to-peak input signal, distortion is 0.2%. As the signal increases further, distortion increases rapidly. To handle levels as high as 18dBm, an attenuator must be placed before the switch and then again be placed after it. Signal-to-noise suffers slightly, but this is a worthwhile tradeoff. The Ramko switcher uses this technique to reduce distortion. Lab tests show it to have less than 0.1% distortion at 8dBm output with a signal-to-noise of 75dB.

Unfortunately, there are switching transients because the CMOS switches are in integrated circuit form. The CD 4016 uses two complementary CMOS transistors to form the basic switch. One gate is directly accessible but the other is buffered by a CMOS inverter. It is therefore impossible to control the rise time of the control signal to the switch. A switching transient of as much as 0.4V is coupled through the gate to source capacitance. With a discrete device, an RC time constant can limit the rise time of the control signal and reduce the transient to inaudibility.

Bleedthrough (crosstalk) is 75dB at 1kHz and -60dB at 20kHz. Overall, the performance of the CD 4016 is moderately good. It is inexpensive and reliable. The only drawback is the switching transient, which in many applications is not a problem.

**Junction Field Effect Transistors (JFETs)** are often confused with CMOS FETs. However, they are actually bipolar transistors that use the depletion layer of a reverse-biased PN



**Figure 2. CMOS IC switch module.**



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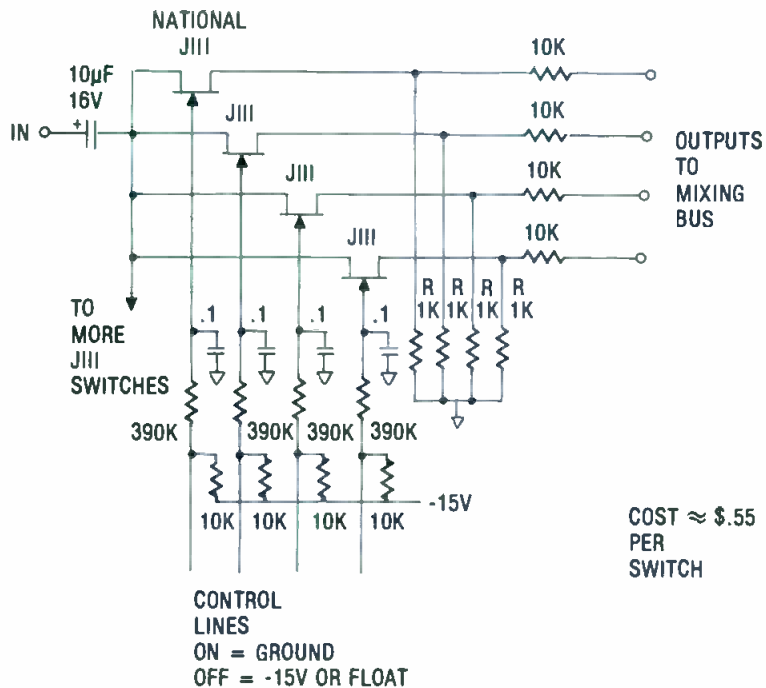
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## Audio switching



junction to modulate the resistance of a narrow channel. They are not subject to static discharge problems any more than any other bipolar transistor is. They are low-noise, easy to use, and relatively inexpensive. National's J111, a JFET that I have had a great deal of experience with, costs about 30 cents per hundred. The JFET is the basic building block of many routing switchers.

The JFET as a switch is similar in certain respects to the CMOS switch. A gate voltage turns it on or off. Distortion increases as signal level approaches the cutoff voltage. Transients are coupled through the gate to source capacitance. The level of the transient depends on the rise time of the gate control voltage and can be reduced to inaudibility with a 1- to 10-second rise time. The J111 costs almost twice the amount per switch as the CD 4016. It is equally reliable. Four J111s will fit in the same space as a 14-pin DIP. The CD 4016 uses two CMOS devices in a complementary parallel arrangement to overcome inherent deficiencies, but the JFET can be used to stand alone.

JFETs may be used in two basic ways for audio switching. They may

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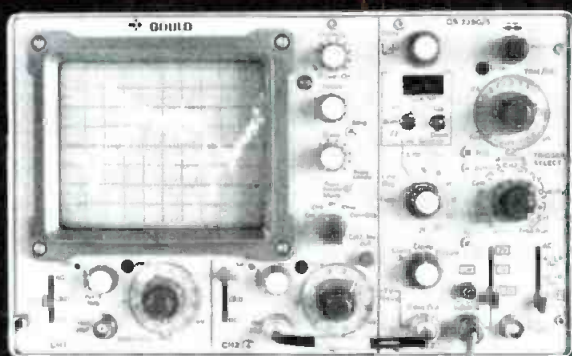
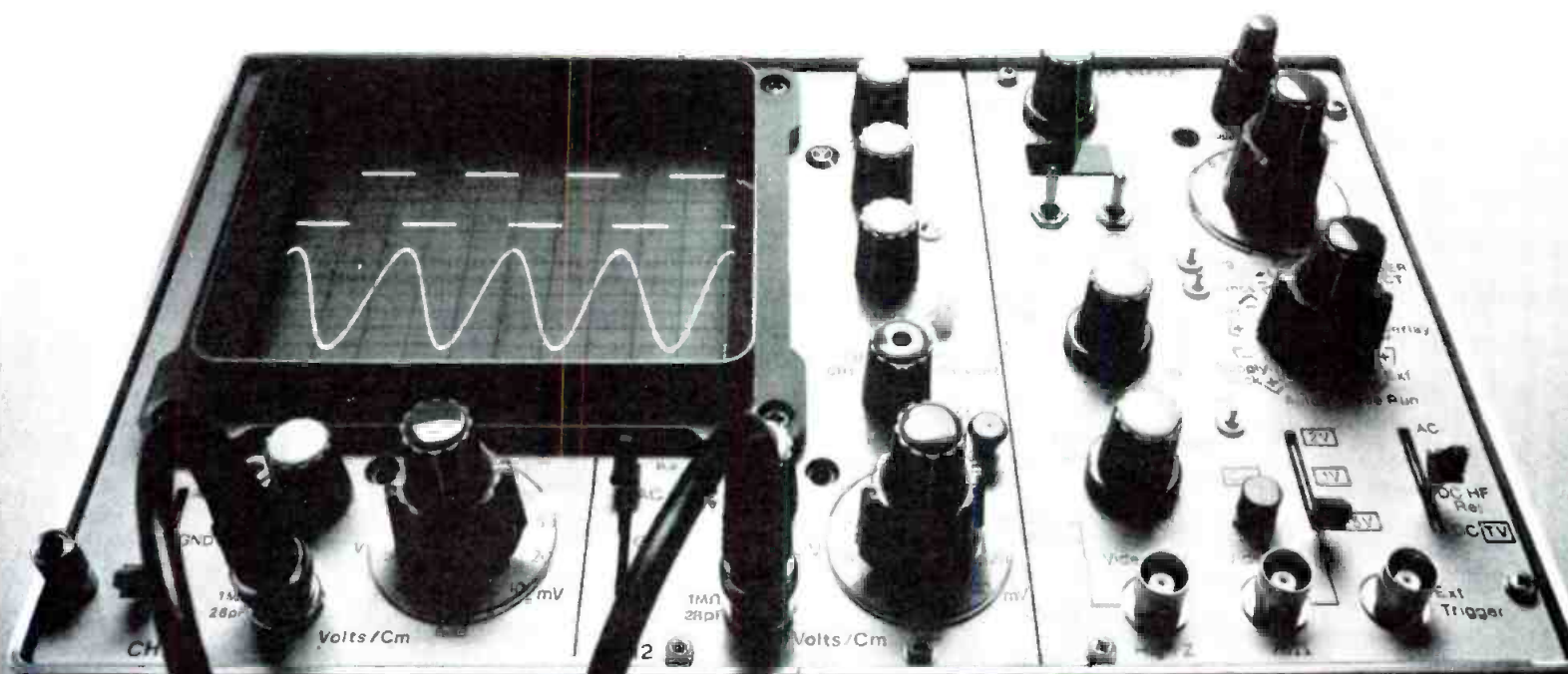
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## Audio switching

be used in series or in a series-shunt arrangement. The series switch is self-explanatory. The series shunt switch uses a series JFET and then a JFET to ground. The first JFET is on while the second is off and vice versa. The primary purpose of this arrangement is to reduce bleedthrough through the switch when it is off. Contrary to popular belief, the simple series JFET is capable of better than 75dB of attenuation at 16,000Hz, as demonstrated by the circuit (Figure 3). The trick is proper choice of device, circuit impedances, gate drive and proper PC board layout. As with the CMOS CD 4016, the JFET will normally be operated in a buffered arrangement with an op amp input and op amp output.

In summary, the JFET is much like the MOSFET. It is slightly more expensive, but has slightly higher performance and is immune to static discharge. JFET switch ICs such as National's LF 11508 are also available.

Photoresistors have sometimes been used for audio switching. They basically represent a light source that is coupled to a photoresistor material. These devices received a bad name from the early photomodules that used incandescent light sources. These early photomodules had poor reliability and tended to shift resistance with age. Modern photomodules, typified by Clairex CLM 6500, use LED light sources and have excellent reliability and stability.

The Clairex CLM 6500 comes in a small package about the size of an 8-pin miniDIP. Their price, \$2.40 per hundred, is roughly 10 times that of a CMOS or JFET switch.

The photomodule must be buffered by an op amp to match impedances. The photomodule is not level sensitive. The CLM 6500 varies from 300Ω to about 10MΩ depending on LED current. It is, however, completely resistive and therefore has no distortion. It also has no turn on transient because it uses light to turn on and not a voltage that can couple through internal capacitance. These features make this device desirable as an audio switch.

Unfortunately, the off resistance is not sufficiently high to give reasonable attenuation of more than 60dB at 16kHz. This doubles the cost of a photomodule switch to nearly \$5. The series shunt arrangement also requires two drivers. The LED must be driven by about 20mA to be fully on. This is in contrast to the CMOS and JFET switches that require drive current in the microamps.

In summary, the photomodule has

some good and some bad qualities that make it useful for certain applications in which absence of distortion and switching noise are more important than cost.

Reed relays are the ultimate mechanical switch in many ways. They are small and may be purchased packaged in DIP form. Many are designed to be switched by IC compatible currents as low as 10mA. They feature high reliability. Life can exceed 100 million operations. The reed relay introduces no noise, has no distortion, accepts 24dBm signal levels, has low bleedthrough at audio frequencies, and does not have a switching transient if placed in the circuit properly. All this comes at a price of about \$3.50 for an SPST switch. Quantity has very little effect on price. A DPST switch costs almost exactly twice the price of a SPST switch.

To summarize, the reed relay costs more than 20 times the cost of a CMOS switch and 10 times the cost of a JFET switch. It is used in several of our current audio routing switchers. The only advantage of the CMOS and JFET switches is in switching power. A SPDT reed relay draws about 150mW in contrast to the FET switches that can draw microwatts. Other than this one point, the reed relay is a nearly perfect audio switching device. There is no signal degradation at all.

It must be pointed out that the CMOS and JFET switches do not act alone. They both require the use of input and output op amps for buffers. These buffers enable the switches to mix channels and create multiple feeds. However, if strictly crosspoint switching is required, these op amps with associated circuitry can make the price of a small crosspoint routing switcher using CMOS or JFET devices comparable to the price of one using reed relays. For larger switchers, the number of crosspoints per input buffer would increase to make the reed relay switcher again much more expensive.

Routing switchers, whether custom or off-the-shelf, are going to be expensive. We have also seen that they will likely remain expensive for some time to come. Fortunately, there are some emerging technologies that should begin to effect the field in the late 1980s.

Current audio routing switchers use what is called space division switching. This means that there is a bus line assigned to each output, which means that a 50-by-50 switcher must have 50 bus lines. Each input must then have 50 switches to be able to switch to any





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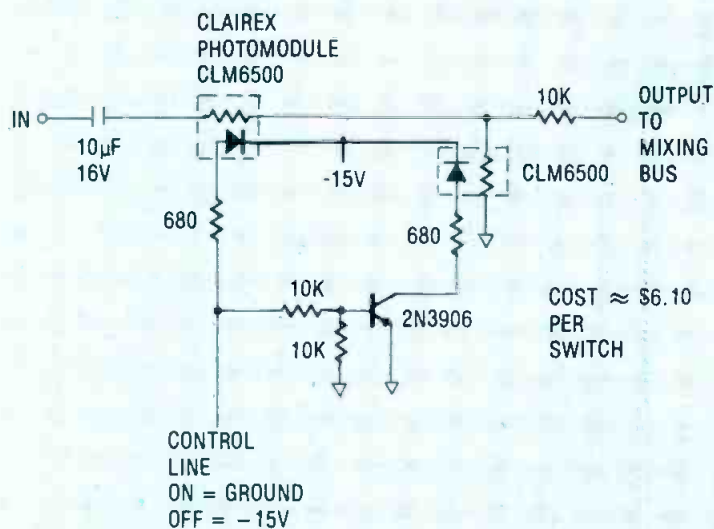


Figure 4. Photomodule SPST switch building block.

## Audio switching

output. This is 2500 total switches.

There is one other basic type of switching available today: time division switching. Time division switching has been used by the telephone company for more than 10 years in the ESS 101. This system converts the audio to an 8-bit digital code that is sampled at 8000 c/s. This means that each channel has 64,000 bits per second. The bits from each channel are then sped up and fed to a single bus line in sequence. In other words, channel one sends eight bits, then channel two sends eight bits, and then channel three and so on until it is time for number one again. Each output channel then needs only be assigned a time slot in the data stream. The input channel need only change time slots to change outputs.

The telephone company has been doing this for many years to save on wires. Of course, the telephone company does not have to reproduce high fidelity sound. Although each input does not require a switch for each output, each input does require an A/D converter. An A/D converter that will reproduce high fidelity sound is very expensive. However, the cheap A/D converter is the central part of the

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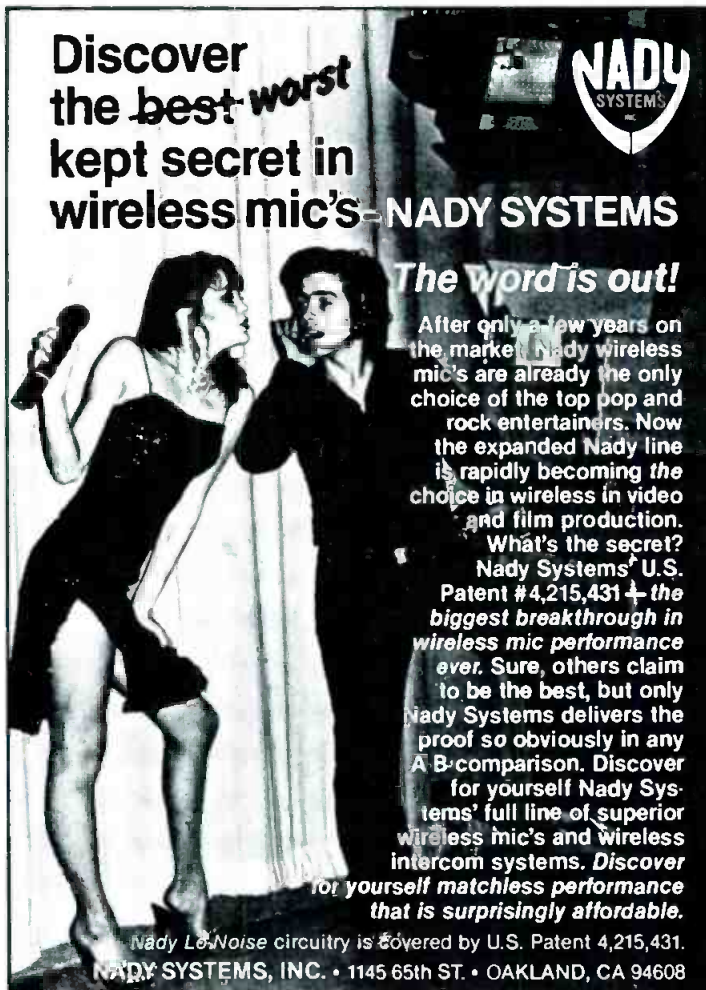
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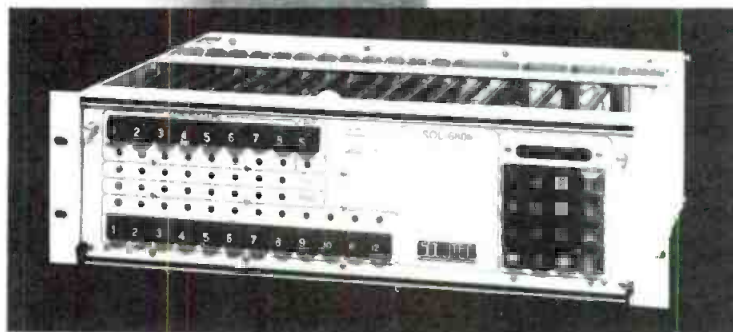
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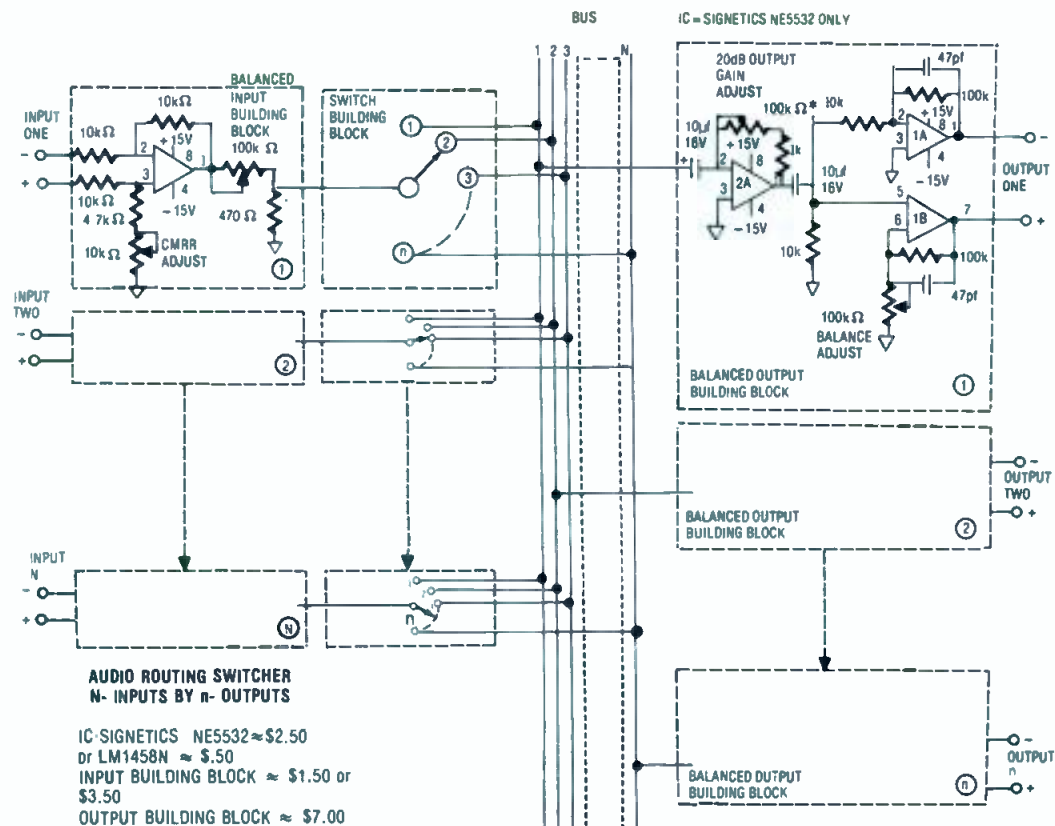
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## Custom designing studio routing switchers

four switches and will be determined greatly by PC board or wiring layout. Switch inputs should be routed as far away as possible from outputs.

the switcher is capable of 22dBm input and output.

## Audio switching

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Real time subtitles for the Royal Wedding were inserted by the BBC to help the hearing impaired. This was the second time in history for such captioning, the first being for President Reagan's Inaugural Address.



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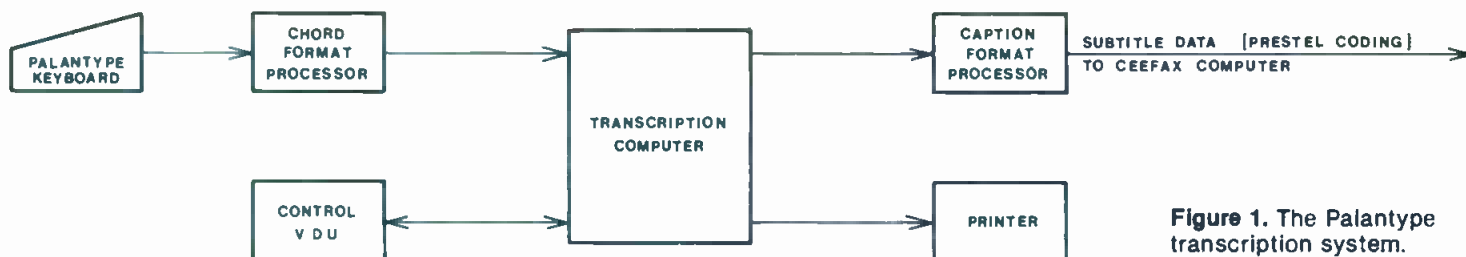


Figure 1. The Palantype transcription system.

# Real time subtitles for TV

By Bill Hawkins, head, Recording Section, Designs Department, BBC, London

The wedding of his Royal Highness Charles Philip Arthur George, Prince of Wales, and Lady Diana Spencer on July 29, 1981, provided a unique opportunity for a nationwide broadcast for the benefit of the entire hearing impaired community in the United Kingdom. As part of the celebration, arrangements had been made for the marriage ceremony in St. Paul's Cathedral to be broadcast on BBC1 together with the procession before and after the service. It was also decided to broadcast the same 3-hour program on BBC2 with open captions.

Although it was fairly straightforward to prepare subtitles containing information on known situations, the live commentaries presented a serious problem that had to be solved.

Fortunately a technique is being developed in the BBC's Engineering Designs Department that promises real time, verbatim transcription of

speech using Palantype machine shorthand. When completed, it should prove to be a useful tool in subtitling live and recorded programs as part of the Ceefax services for the hearing impaired. Subtitled programs are usually broadcast on the nationwide teletext service of Ceefax and Oracle in the United Kingdom. (There are 300,000 teletext sets in use.) The BBC's Ceefax pages 170 and 270 regularly provide such programs.

In all, four caption generators were used on the wedding day. Two were operated in a conventional manner using material prepared on floppy disc before the broadcast, and two others were used for the verbatim transcription. The palantypist keyed the speech phonetically into a special keyboard syllable by syllable. Its output was fed to a transcription system that matched the syllables to the contents of a dictionary held in store on a 10Mbyte Winchester hard disc. As each completed word was found, it was passed to a small output formatting microcomputer that assembled the words into a single line of text and then to an Aston II character generator. The system was completely duplicated and included changeover arrangements should any part fail. But, during the wedding those reserve arrangements were not required.

The three palantypists used for the work had spent some time before the

broadcast practicing on their normal mechanical keyboards with audiotapes of the same commentator's work on previous state occasions. With just two days to go, the installation was completed and it was only then that they could try out their keystrokes using the computer system in its final form. They rehearsed their changeovers about every 10 minutes.

However, during the wedding, the rate of speech was much faster than the audiotapes had suggested, and this, coupled with the atmosphere of a special occasion, caused the error rate to be higher than expected. Under more relaxed conditions, the error rate is lower, and the palantypists can easily correct their work during the subsequent typing of the shorthand records.

Real time, verbatim transcription offers no such second chance: the subtitles have to go out as they are. Nevertheless, the gracious response from many hearing impaired people was encouraging and, at times, moving—even though the operation took place during a development program.

## Extended usage

There are, of course, two possible uses for a machine shorthand system in this context: subtitling unscripted, actuality broadcast; and subtitling recorded programs more efficiently than at present. The BBC Palantype

### Editor's note:

As with its teletext developments, the British broadcasters and industries have taken an active interest in creating meaningful captions for television to aid the hearing impaired. Just three weeks before the Royal Wedding, I toured England and discovered that the BBC was developing a new system to implement captioning in real time to report this popular event...a system new in scope and dimension even though portions of the system had been used once before.

When I was in England, the BBC staff was not sure that the updated captioning system would be ready for the Royal Wedding coverage. But it was, even though development work on the system continues. Because of its pioneering nature, we asked the BBC to report here on the success of this effort.



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## Subtitles

transcription system is a result of a collaboration between the BBC Engineering Designs Departments and Leicester Polytechnic where various transcription programs were written. The work at Leicester Polytechnic continued work begun in the mid-'60s by Dr. Wyn Price at the National Physical Laboratory. However, the latest computer programs, originally developed on mainframe computers, are now running on a Cromemco Z-2H microcomputer using 192kbytes of random access memory and a 10Mbyte Winchester disc system.

Before this broadcast, the transcription dictionary held in the machine contained a significant number of errors because of changes in operating techniques since it was first compiled. As a result, the commitment to subtitle the Royal Wedding meant that it had to be updated with 20,000 new entries. These entries were merged with the old, and a new dictionary tree was reconstructed by Lyndon Thomas at Leicester Polytechnic on the large computer. The results were then downloaded onto the hard disc of the microcomputer. Unfortunately, the scale of the update was such that it became available only a few days

before the broadcast. The producer of the subtitled program had researched the subject thoroughly and provided the Palantype team with a number of specialized words that were fed into the transcription computer. Also, he prepared the floppy discs for the conventional system, capable of naming the occupants of carriages and notable personalities, and displaying all the words of the wedding service in the Cathedral.

These captions were composed using black-edged, yellow letters to differentiate them from the black-edged, white letters of the verbatim subtitles. There was a high degree of redundancy in the commentary when one viewed the picture and linked it with the prepared factual subtitles from floppy disc, but the words of the commentator gave an air of spontaneity to the broadcast so that the hearing impaired audience felt involved. It is possible that any attempt at concise summary under these circumstances might lead to a series of bald statements which, although being accurate, would not convey the atmosphere of the occasion.

### Problems remaining

There are still a number of problems to be minimized: the delay of approximately five seconds before the tran-

scribed subtitle appears; the difficulty of handling a large number of proper names that may be unfamiliar to the palantypist; and the improvements that should be made to make the captions more acceptable to the audience. As much as possible should be done to improve the accuracy of the transcription. Even though the dictionary was updated to ensure that its contents conformed to modern operating practice, some characteristic errors remain and must be investigated. The operators will need sufficient practice to become accustomed to the live broadcast environment.

The automatic compilation of 2- and 3-line captions should be provided to enable easier reading and understanding of the material; in displaying complete packets of meaning on the screen the viewer will become more relaxed. It may be that a special commentator speaking somewhat slower than normal speech will significantly reduce the number of transcription errors, allow the audience time to perceive the subtitles, and give the operator experience in this new broadcasting field. If the technique is to become widespread, a comprehensive training scheme for more operators will be essential and, perhaps using a larger transcription computer, error correcting techniques

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may be incorporated.

Clearly, those viewers who saw the broadcast as an example of the automatic generation of accurate captions were disappointed at the results. They are accustomed to programs that they can understand with the help of the picture and sound channels. They look upon the printed word more often as supplemental, which is not the case with the hearing impaired. The positive response indicated that the hearing impaired audience enjoyed the broadcast because they understood what was going on. They also saw it as a promise for the future, even though it took place during a development program and was only the second of its kind; the first being the live verbatim transcription of President Reagan's Inaugural Address in January 1981 on the BBC1 Ceefax service.

Perhaps it is appropriate to quote from two of the letters received as a result of the broadcast. For example, "On behalf of those 50 or more deaf people from the Borough of Bromley who were gathered around four large televisions to watch the coverage of the Royal Wedding, I would like to thank you and your team for such splendid subtitling cover of the day's main event. Prior to BBC2's plans, it had been our intention to interpret into sign language the whole of the procession and service. What a marathon it would have been for us to interpret the procession and service into sign language! We are pleased to say you made us almost redundant. The more elderly in our gathering had more problems in understanding some of the Palantype, and some words produced amusement. However, for me it was good to see an actual translation of the commentary. Please pass on our thanks, particularly to the palantypists who made the day complete for thousands of deaf people."

Or again, "Please accept my sincerest thanks for subtitling the Royal Wedding from start to finish. As a person to whom a hearing aid is of no use for the spoken word, I was glued to the screen all the time. It was really wonderful to feel that we (the deaf) could enjoy the proceedings with so much knowledge of what was happening."

The equipment is still in the development and experimental stage and has made two live broadcasts because of the special opportunities and broad interest presented by those occasions. But at least one consideration is clear: The needs of the hearing impaired audience are special and must not be judged by everyday TV audience criteria. □

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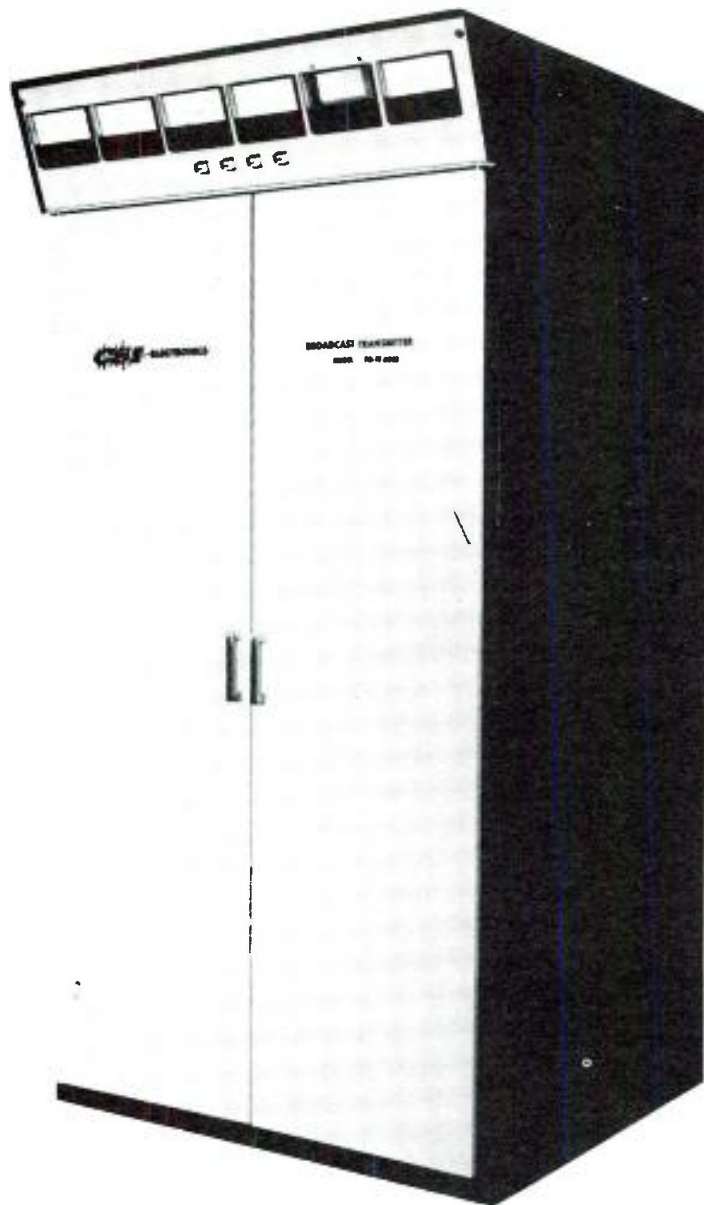


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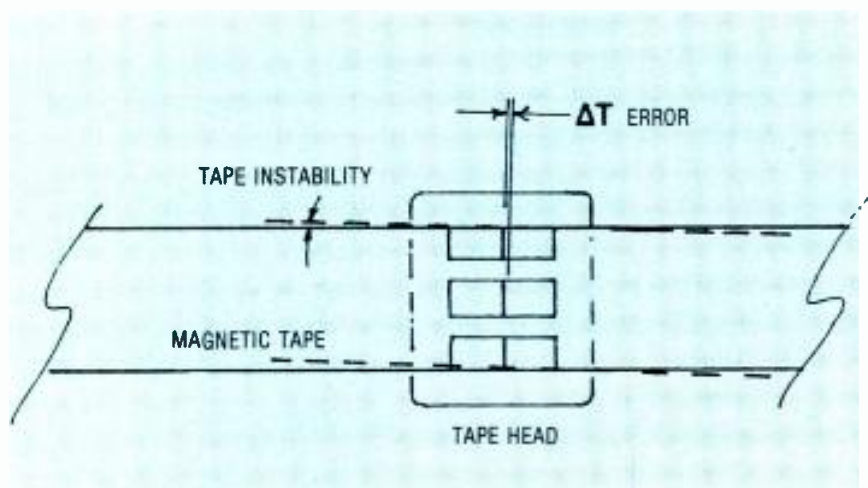
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# Problem solving: Stereo tape cartridge phasing

By Dave Howe, president, Howe Audio Productions Inc., Boulder, CO



**Figure 1.** Instability in the motion of the tape past a tape head causes a subsequent time (hence, phase) error between audio tracks.

The convenience and improving quality of tape, tape cartridge, and cassette formats have led to their increased use in broadcasting. Although many advancements have been made in tape drive technology, the problem of aligning and stabilizing the audio phase relationship between two playback channels of a stereo tape format still exists. The effect of bad cart phasing appears most obvious when taped stereo channels combine in the playback process. Audio information originally in phase in both channels is played back more or less in phase along with relative phase fluctuations caused by instabilities of the tape moving past the heads (both in recording and playback stages). Figure 1 shows a track-to-track time error caused by this instability.

For a listener, the channels most often combine in the space in front of a pair of loudspeakers. Of course, direct combining occurs when the playback is rendered in monaural. In FM stereo, some receivers introduce a direct combining of signals at high frequencies (*hi-blend*), trading separation for lower noise. Increased noise is considered more objectionable than loss of high frequency stereo separation.

Channel-to-channel phase instability appears in the combining process as an easily distinguishable loss or change in the high frequencies, a "whirling" effect, or even a hollowness in the medium frequencies. A time-delay error between channels causes high frequency audio signals to be combined out of phase. The frequency at which out-of-phase cancellation occurs becomes lower and more noticeable as the time-delay error increases.

## Matrixing

The problem of phasing has become so severe in tape cartridge formats that some manufacturers of cartridge machines are advocating matrix recording and playback. This process records  $L + R$  in one track and  $L - R$  in the other. There are possible problems with this approach.

First, matrixed 2-channel cartridge recording does not solve the fundamental problem. It simply reintroduces it in another form. If there is phase instability, there will be instability in the matrix decoder, hence a poor stereo image for the listener.

Second, signal-to-noise is considerably degraded. Most stereo material has more  $L + R$  than  $L - R$

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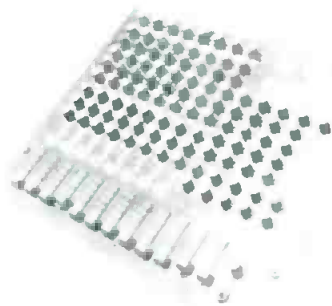


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## Stereo

audio. A voice announcement driving both left and right equally in-phase has no L-R audio. The L + R track must be recorded 6dB lower in this case vs. the conventional L and R 2-track method (because L + R equals twice L or R). Furthermore, additive noise from the L-R track is directly mixed into the output. Being random, its contribution is a 3dB increase in noise. The net effect is a 9dB degradation in signal-to-noise for a common cartridge presentation.

Dynamic noise reduction has also been recommended to solve the noise problem of matrixed 2-channel formats. This suggestion leads to questions. Which noise-reduction technique should be used? What about the highly discussed issue of the audio effect and quality of all approaches? How much will this cost? Is it compatible with non-noise-reduced playback systems? Matrixing may have reached a point of diminishing returns.

### Active phase correction

Over the years, tape cartridge and tape machine manufacturers have made strides in stabilizing head assemblies, the tape path and tape-to-head uniformity and stability. These are goals worth pursuing, but problems still exist. As the industry strives to make improvements to the hardware, another solution for tape instability would be the introduction of electronic compensation to the audio.

Two stumbling blocks have plagued designers of such devices in the past. The first is the question of building a circuit (voltage-controlled time delay with adequate linearity, range and stability) to correctly compensate for all the possible tape variations routinely encountered. The second stumbling block is phase sensing. Conventional phase-detection techniques fail mainly because almost all music material contains intentional, random phase variations. However, it is known that human ears can separately perceive a phase problem, so it is reasonable to assume an electronic circuit can do the same.

Such a circuit has been developed. This electronic solution to the phase problem between channels of a stereo audio signal provides stable, time-aligned output signals for optimum combining either spatially by stereo loudspeakers or for monaural compatibility. No other audio parameter is affected.

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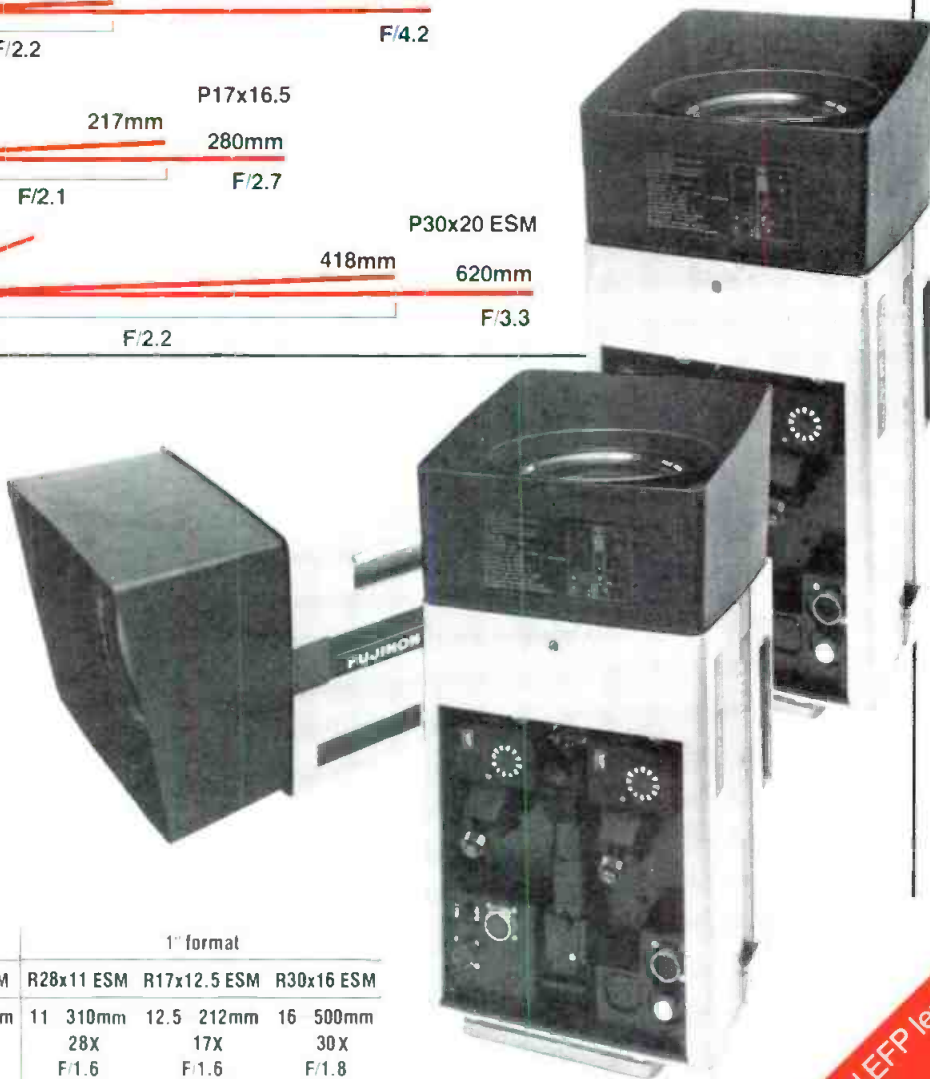
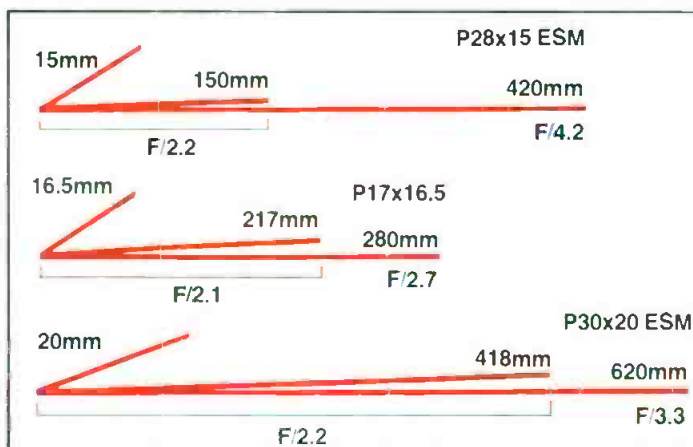
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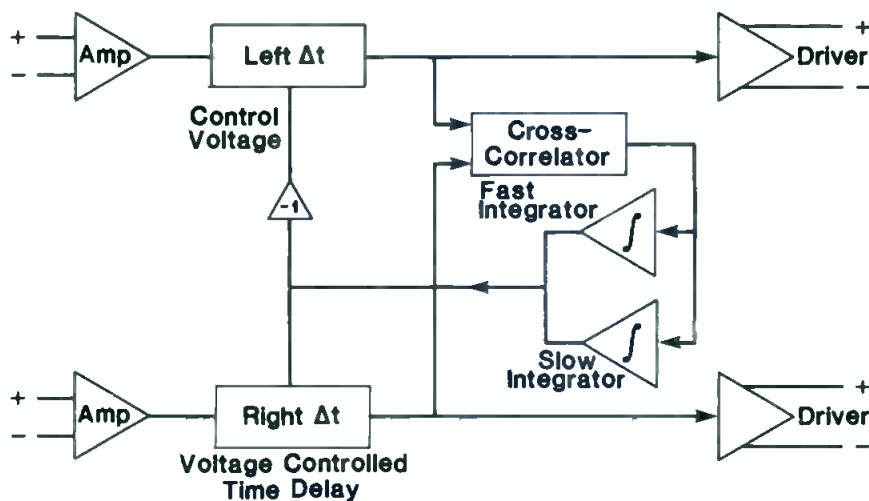
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## Stereo



**Figure 2.** Block diagram of the active phase corrector. Output signals are time-aligned, thus eliminating a stereo phase error. A detector performs a time-phase analysis on regular program material to sense a phase error. Feedback loops to analog display lines correct the error.

the demand on each delay and thus improves performance. A wide variety of digital and analog delay techniques exist. The digital approaches are useful where long delays are needed, but for short delays of less than 1ms, as encountered in tape phasing errors, the analog approach has the advantage of simplicity.

The device uses only program material to determine the existence of a phase or, more accurately, a time error. No reference tones, encoding or special track formats are needed. The device uses time and phase analysis of program material in order to apply a correction.

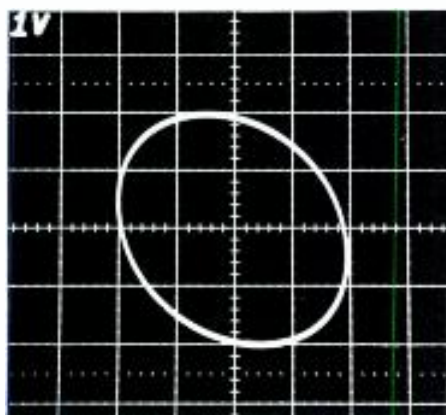
This new circuit can be accurately described as an *active phase corrector*. The active phase corrector discussed here is aptly referred to as a *phase-chaser*. For comparison, a passive phase corrector describes a fixed delay network used to compensate for a fixed error such as in the matching of stereo telephone line remotes.

### Phase-chasers

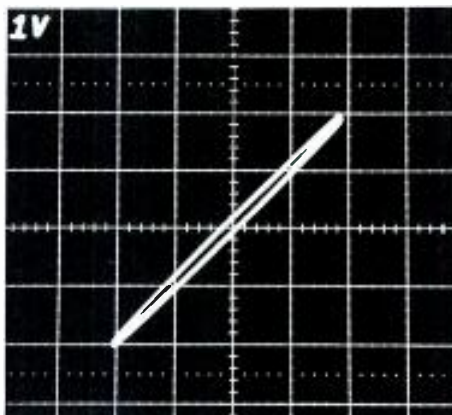
The phase-chaser automatically aligns the time relationship of two audio signals. It uses the audio program material to sense a uniform time difference between the signals, then applies a correction time delay (via feedback loops) to one signal to compensate for a system-related time lag.

Figure 2 shows a block diagram of the phase-chaser. The audio terminations are active balanced. The left and right audio paths are separate. Both left and right channels have analog time-delay devices whose delay times are voltage-controlled.

A relative phase difference at the outputs of the left and right analog delays is analyzed by a phase-sensitive detector. If a phase error exists, a dc signal is applied to two integrators, which add up the errors as they are sensed. The outputs of the integrators are summed, forming a correction or "steering" voltage to the time delays. The delays are controlled in opposing directions so that relative time be-

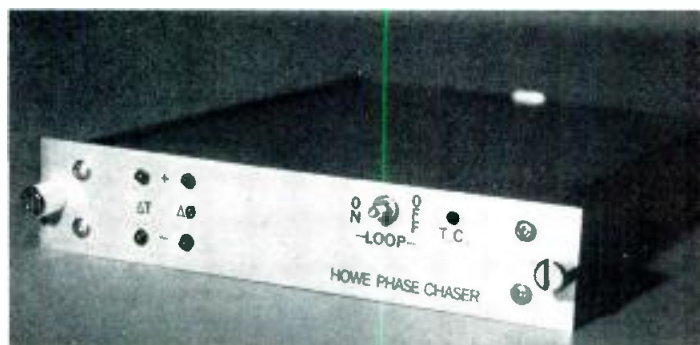


**Figure 3a.**

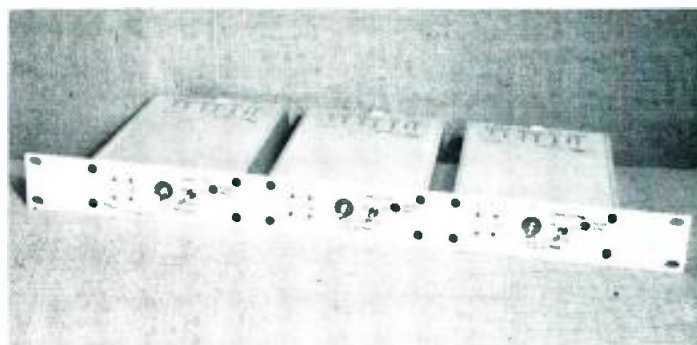


**Figure 3b.**

**Figures 3a and 3b.** Active phase correction of a single tone at 5kHz. 3a shows input phase relationship. 3b shows output phase after active phase corrector. Left channel is vertical axis. Right channel is horizontal axis.



**Active phase corrector module.**



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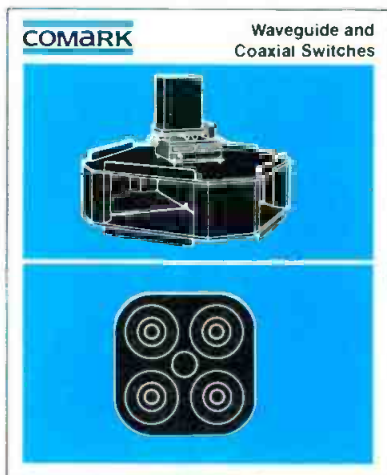
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## Stereo

tween the channels will advance or retard. Feedback loops then drive the time difference to zero equilibrium. Fast and slow feedback loops are incorporated, because the instabilities are best characterized by a fixed relative delay along with fast time fluctuations in limited range.

For the fixed (or offset) time delay, the slower correction loop establishes a nominally zero phase difference. The time constant for this zero point reference platform is user adjustable from 0.5 to 10 seconds. The faster loop responds within a millisecond to quickly varying phase fluctuations around the zero point. It has a limited range of  $\pm 20^\circ$  measured at 5kHz.

Figure 3 shows X-Y oscilloscope displays of the input and output of the phase-chaser for a tone at 5kHz. Left channel is the vertical axis; right channel is the horizontal axis. Figure 3a shows the input phase relationship to have an error greater than  $90^\circ$ . After correction, left and right outputs show a minimal error (Figure 3b).

Figure 4 shows input and output

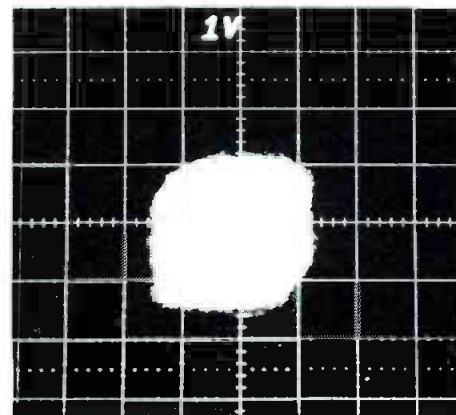


Figure 4a.

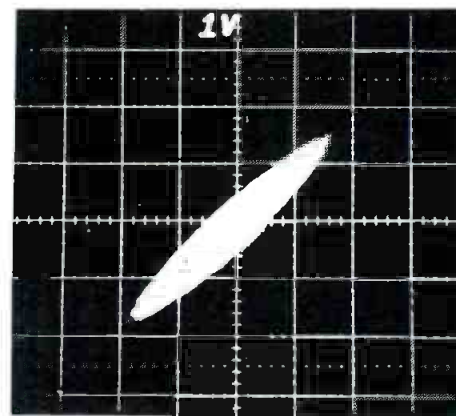


Figure 4b.

Figures 4a and 4b. Active phase correction of wideband noise. 4a shows input (from stereo cart machine). 4b shows output after active phase correction. Left channel is vertical axis. Right channel is horizontal axis.



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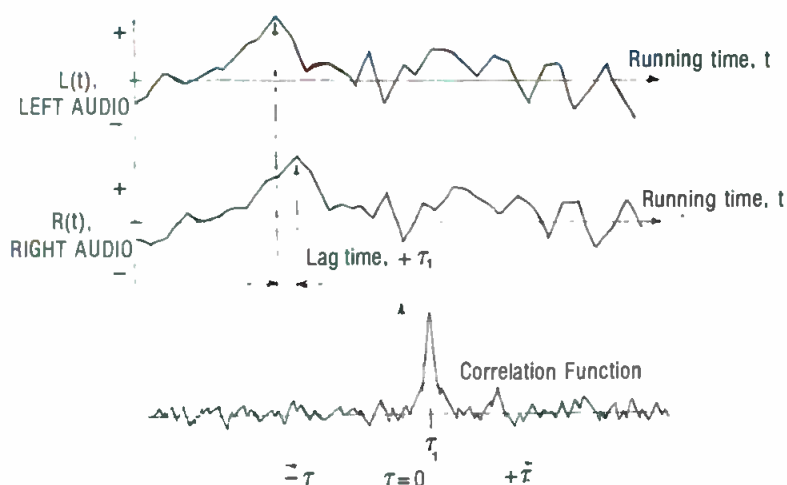
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**Figure 5.** The detection of time and phase errors using the cross-correlation method.

A cross-correlator is a device whose output is a function of relative time difference (lag time). The output represents the degree of coherence (or signal similarity, both real and imaginary components) between two signals. Given signals  $L(t)$  and  $R(t)$ , the correlation at a given lag time  $\tau$  is described by:

$$\text{Corr}(\tau) = L(t) \cdot R(t + \tau)$$

and the correlation function (C.F.) is the integration over all possible  $\tau$  values.

$$\text{C.F.} = \int_{-\infty}^{\infty} L(t) \cdot R(t + \tau) d\tau$$

For two random signals,  $L(t)$  and  $R(t)$ , having some coherent (in-phase) components, the correlation function might look like that shown above.

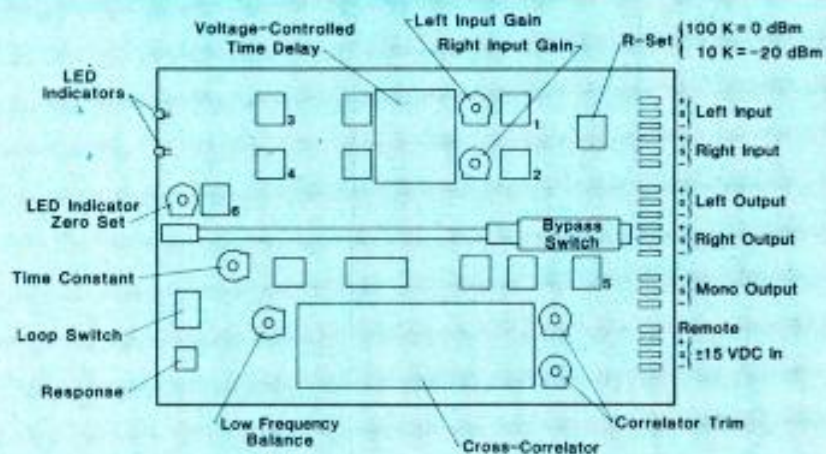
Circuitry has been developed that will quickly find  $\tau_1$ , the maximum value of C.F. for  $L(t)$  and  $R(t)$  signals. The method involves finding the maximum value of C.F. by computing its first derivative.

All maxima and minima for C.F. exist at values of  $\tau$  where

$$\frac{d(\text{C.F.})}{d\tau} = 0$$

To find the dominant maxima, one of the signals, either  $L(t)$  or  $R(t)$ , is continuously sampled in time through a 1ms interval. A peak detection circuit then tags the value for  $\tau$  by sensing two parameters. First, the largest maximum is separated out, and second, the point at which the first derivative goes to zero is established.

This value ( $\tau_1$ ) is converted to a voltage and subsequently used to servo  $\tau_1$  to zero. This represents an in-phase condition for  $L(t)$  and  $R(t)$ .



**Figure 6.** Phase chaser electronic layout.

## Stereo

displays with a 20Hz to 20kHz white noise source. The noise was recorded on a cartridge with both channels in phase at equal levels. The output of the tape cart is shown in Figure 4a. Figure 4b shows the same signals after phase-correction.

### Circuitry

Three notable circuit advances led to the creation of the phase-chaser:

- a dual response error correction feedback loop having a long-term correction of  $\pm 360^\circ$  and instantaneous correction to  $\pm 20^\circ$  (typical of stereo tape cartridge playback conditions). Measurements at 5kHz.
- a voltage-controlled time-delay network modeled to real world time delay errors encountered in stereo tape formats.
- a wideband time error detector accurate to within 0.5% at all frequencies from 20Hz to 20kHz.

A unique feature of the circuitry is its ability to discriminate between a systematic time delay (such as cart tape misalignment) and normal phase fluctuations in music material. Consider what happens if a music selection has a string section (violins) with reverberation along with another instrument, for example, a trumpet solo, (in phase, both channels driven) with very little reverberation. An extended single note played by the strings with reverb may cause the left and right relative phase to randomly move. If this moving random phase of the strings is aligned, phase errors will be introduced in the solo.

The phase-chaser virtually eliminates this effect in two ways. First, the user sets his own error-correction averaging time to as long or short as his program material will allow. He reduces the sensitivity to program-related phasing effects. Second, the phase detector used is not just a zero-crossing sensor coupled to a synchronous detection scheme. Rather, it is also a circuit that senses phase error as a function of frequency. The phase-chaser looks for errors that model as a time delay in one channel vs. the other. Correction is applied only if a phase error exhibits a specific known phase-to-frequency relation over the audio spectrum. The detection technique uses a cross-correlator. (See Figure 5.)

### Other uses

Along with correcting stereo tape phase errors, the phase-chaser may be used to correct for fixed systematic time differences, such as in stereo telephone line remotes. To achieve



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## Stereo

greater correction, more than one phase-chaser may be wired in cascade.

LED indicators on the phase-chaser may serve to monitor stereo tape head alignment and tape stability in both production and playback studios. The indicators show the degree of error and its activity. This allows a check on playback system quality while it is in operation.

The system may also apply while recording or airing live stereo stage performances. If spatially separated microphones are not optimally positioned equidistant from a source, a time delay will exist in one channel. One phase-chaser will correct for a microphone lead-to-lag range of six feet.

It is noteworthy to point out that the phase-chaser performs a relative time correction for any 2-channel source. Thus, it is compatible with proposed phase error correction schemes using reference or subcarrier tones. One technique being tested at WSM, Nashville, TN, involves mixing with tape audio a 19kHz tone at -25dB with 297Hz square-wave amplitude modulation. The modulated tone is sensed by a 19kHz detector. The 297Hz components in each channel are driven to an in-phase condition using voltage-controlled delay lines.

Likewise, the phase-chaser will read tones and/or subcarriers contained in the audio channels and will use this information (along with program material) to apply a time correction. The only requirement is that the tones and subcarriers be recorded in phase, a generally true initial condition.

The WSM system aligns the 297Hz components. The phase-chaser will also time-align the 19kHz tone used as a subcarrier. Along with program material, this amount of information given to the phase-chaser is probably overkill, but it is useful nonetheless.

In practice, we know that tape alignment and stability problems exist. Good mechanical designs and good products are often at the mercy of heavy-handed operators in 24-hour per day facilities. Alignments will drift, parts will wear out, things will age and change.

It could easily be argued that a stereo phasing problem will always exist to a greater or lesser extent, now and in the future. For the stereo phasing problem, the phase-chaser is a solution that seems to avoid drawbacks of other concepts. ☐

Complete phase-chaser specifications can be obtained from the author at: Howe Audio Productions, P.O. Box 383, Boulder, CO 80306.



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# Field report: Spectra Sonics bandpass filter and oscillator

By Brad Dick, director of engineering, KANU, Lawrence, KS



510 bandpass filter and 802 signal generator

## Editor's Note:

The field report is an exclusive BE feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

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

In essence, these field reports are prepared by the industry and for the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of Broadcast Engineering to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by Broadcast Engineering for or against a product.

Spectra Sonics recently introduced two pieces of test equipment that should be of interest to broadcast and audio engineers. The equipment includes a low distortion, selectable frequency, variable output oscillator and a 20Hz to 20kHz bandpass filter.

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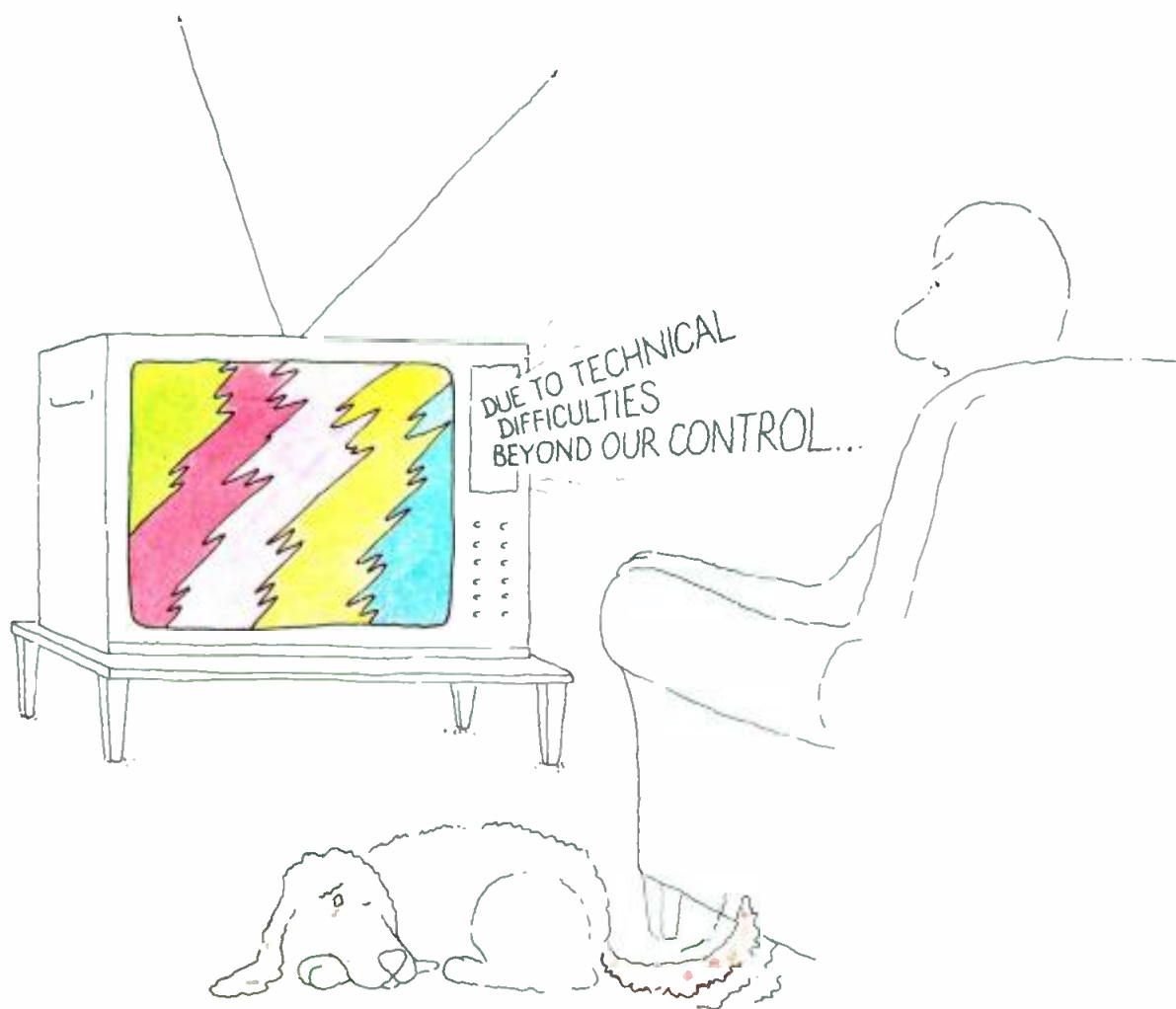
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## Field report

These two devices form a useful test set.

The model 802 Oscillator has only three controls: frequency select, output control and a power switch. The output is available on the rear panel in the form of an XLR connector. The oscillator has five selectable output frequencies: 50, 100Hz and 1, 10 and 15kHz. The output level is adjustable from off to +4dBm, with the approximate output levels marked on the front panel. The remaining control is simply a toggle switch for power with the accompanying LED indicator.

The oscillator was tested in several ways, and a summary of the tests is shown in Table I. The output frequencies were first measured for accuracy as shown in the first column. Each of the selected frequencies was sufficiently accurate for broadcast and audio work. If tighter accuracy is desired, each frequency can be independently adjusted by an internal trim pot.

Next, the output response was checked against the 1kHz reference. The second column shows that all outputs were within 0.3dB of the reference. With this consistency, the oscillator could be used to quickly spot check the frequency response of any piece of audio equipment in seconds.

The distortion was measured at +4dBm across 600Ω. In all cases the distortion was well within broadcast and audio tolerances. At 1kHz, the distortion was only 0.086%. Figure 1 shows the spectral output of the oscillator at 1kHz at +4dBm. (10dB, 1kHz/division). This amount of distortion is insignificant for most broadcast applications.

The output level indications on the front panel were not as accurate as might be expected at 600Ω, but were well within acceptable tolerances. Table II shows the measured output from the rear panel with the output

### Manufacturer's specifications 802 Signal Generator

Output level . . . . .	Continuously variable from infinity (−74dBm) to +4dBm (+11dBV, unterminated)
Output calibration . . . . .	Panel calibrated, infinity, −10dBm, −2dBm, −0dBm, +2dBm and +4dBm
Frequency selection . . . . .	50Hz, 100Hz, 1kHz, 10kHz and 15kHz
Frequency tolerance . . . . .	Within ±10% of frequency selected
Total harmonic distortion and noise (+4dBm) . . . . .	Less than .025% 100Hz to 15kHz Less than .04% at 50Hz
Stabilization time . . . . .	Not more than 3 seconds at 50Hz, less than 3 seconds at all other frequencies
Power requirements . . . . .	Three 9-volt batteries (NEDA #1604)
Physical dimensions . . . . .	3¾" wide, 5" overall depth, approximately 1½" high.
Weight . . . . .	2½ pound

Table I.  
Oscillator test results

Selected Frequency	Actual Frequency	Response Error	Distortion
50Hz	49.6Hz	−0.2dB	0.11%
100Hz	10.52Hz	−0.3dB	0.10%
1kHz	1.003kHz	Ref.	0.09%
10kHz	10.242kHz	−0.0dB	0.09%
15kHz	15.545kHz	−0.1dB	0.09%



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### Flexible Broadcast Use

The MC-II is so flexible it virtually defies obsolescence. You can choose mono or stereo models, play only, or with record capability. Best of all, play models are field-convertible to record/play. The record electronics come in a separate housing for convenient, space-saving installations.

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As with all Magnecords, the MC-II is designed to work long and reliably. For example, the woven polyester drive belt and polyurethane pressure roller are virtually indestructible. The regulated dc

power supply has universal line capability (100-140V, 200-280V, 45-65Hz), consumes nominal power and is brown-out proof. Computer grade push buttons are rated at 10 million operations. A single piece chassis and machined base plate assure positive alignment of all tape transport parts. Hard core, long life heads are mounted on unique, glass-filled Lexan® head brackets with precision, phase-locked tape guides. Carefully designed circuit boards and a Mu-metal shield make the MC-II immune to RFI, even when operated directly under a transmitting tower.

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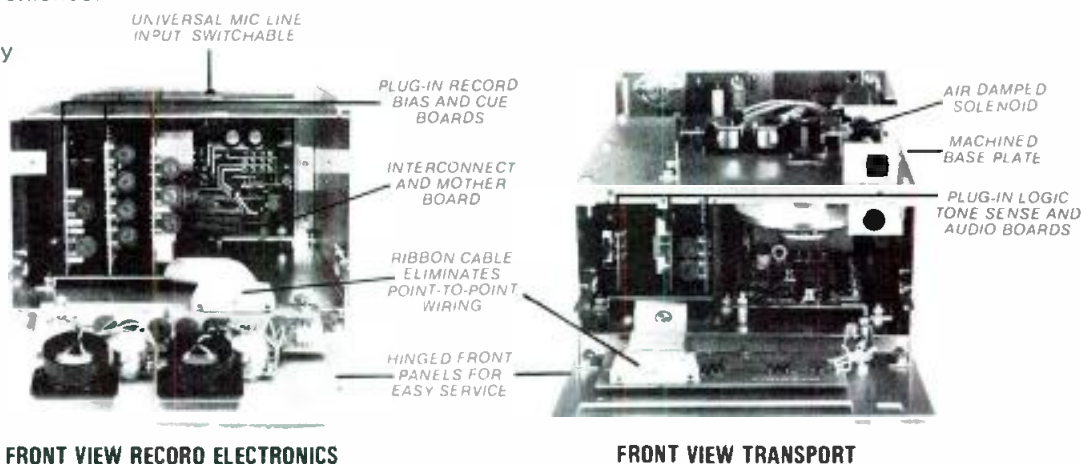
When a Magnecord MC-II needs service, downtime is minimized. The covers and front panels are hinged for convenient access. All solid state circuitry is on plug-in

epoxy boards. Plug-in ribbon cables eliminate point-to-point wiring. And, of course, the Magnecord MC-II is made in the U.S.A. so parts are readily available.



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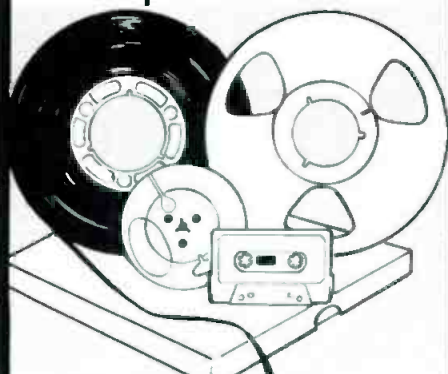
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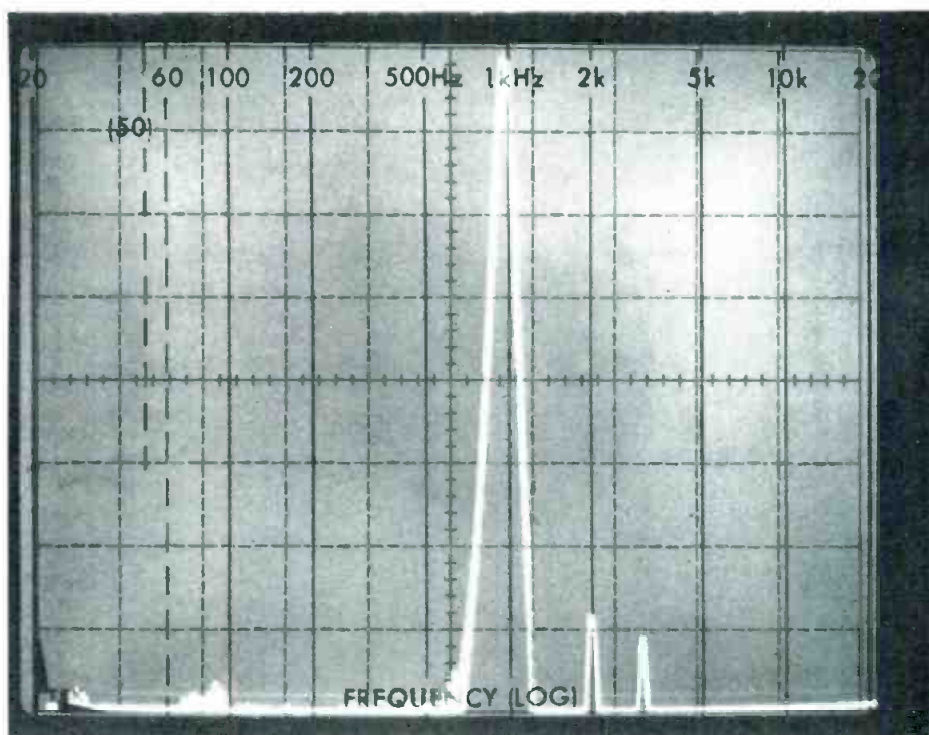
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Figure 1. Spectral output at 1kHz at +4dBm.

## Field report

control set at the corresponding indication.

The model 510 Bandpass Filter is unique in the area of broadcast work. The device is a 20Hz-20kHz filter with 60dB of gain to make possible low level noise measurements without the accompanying problem of extraneous noise. The filter simply plugs into the measuring meter and becomes a selectable amplifier/filter or straight wire input. By turning off the filter, the input is directly connected to the measuring device so the input signal is unaffected. Turning on the switch provides 60dB of gain and inserts the bandpass filter.

The audio passband is shown in Figure 2. The 3dB points were

**Table II.**  
**Front panel calibration**

Front Panel Setting	Actual Output Level
-10dBm	-11.1dBm
-5dBm	-6.8dBm
0dBm	-1.9dBm
+2dBm	+0.5dBm
+4dBm	+3.8dBm

## Manufacturer's specifications 510 Bandpass Filter

Gain . . . . . 60dB  $\pm$  0.5dB

Input impedance . . . 10k  $\Omega$  (resistive)

Output impedance . . . . . Less than 100  $\Omega$

Output level (maximum) . . . . . +10dBm

Output loading . . . . . 600  $\Omega$  to infinity

Frequency response . . . . . 20Hz (-3dB) at 18dB/octave, 20kHz (-3dB) at 18dB/octave, passband flat to  $\pm$  0.2dB

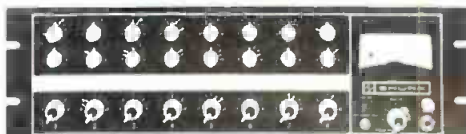
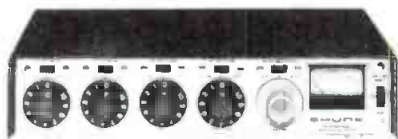
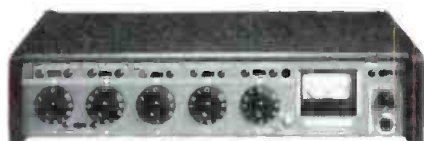
Connections . . . . . Male banana for output. Binding post for input

Physical dimensions . . . . . approximately 2 1/4" wide, overall depth 4 1/8", case approximately 2 1/4" in depth, approximately 2" high

Weight . . . . . 1/2 pound



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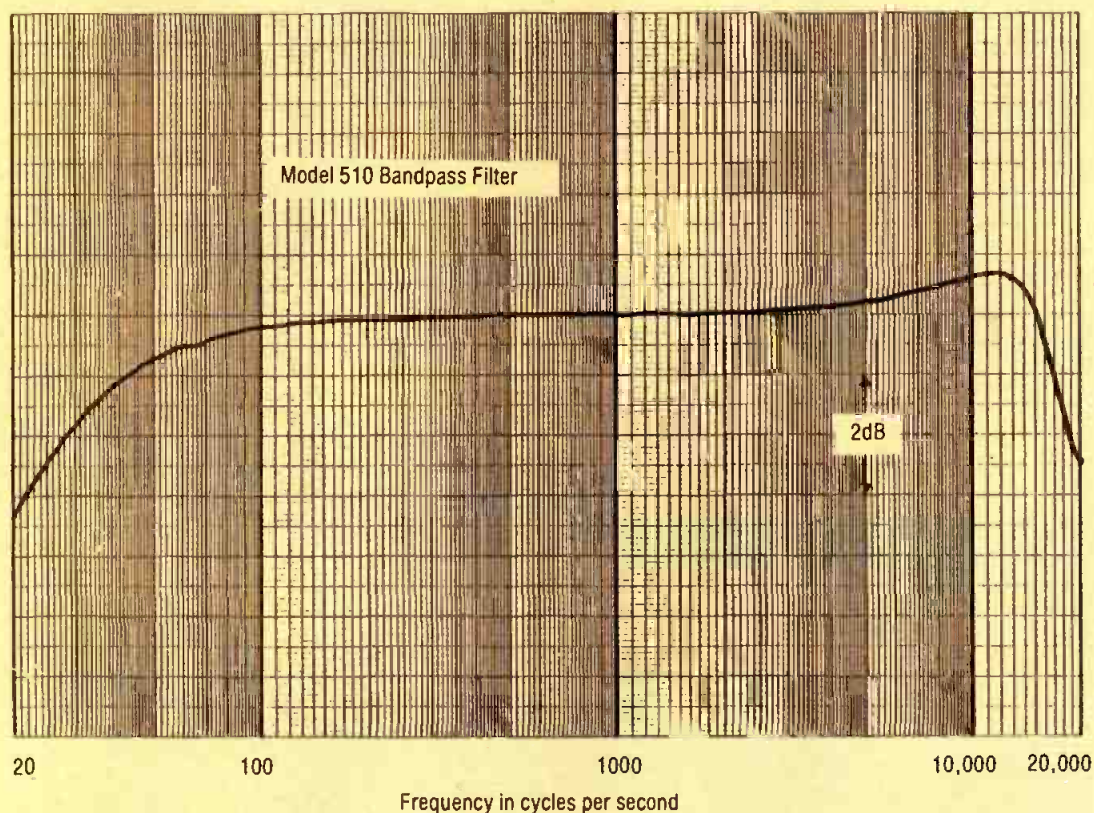


Figure 2. Audio passband of 510 Filter.

## Field report

measured to be 21Hz and 20.5kHz with skirts falling close to the 18dB/octave specification.

The usefulness of the filter comes from its capability of discriminating between signals within the audio pass-band and those outside of it. In regular maintenance, the standard procedure for measuring the signal-to-noise ratio is to apply a steady state tone to the input of the device and adjust to a reference output. The tone is then removed, and the remaining noise is measured. The difference between the two levels is then considered to be the signal-to-noise ratio. One of the possible problems with this procedure is the capability of extraneous noise to cause inaccurate readings.

For example, most noise meters (distortion analyzers) contain only a low pass filter, usually with a cut-off of about 100kHz. This means that fre-

quencies such as tape recorder bias can cause audio noise readings to appear higher than they really are. With the Spectra Sonics filter in place, those high frequencies will not fool the engineer. Naturally, some consideration must be made when the filter is used for the conditions present in the test. It is, however, better to know about the audio signal-to-noise ratio than not to know because of the lack of a filter. In high noise environments, it is possible to miss significant noise problems in audio equipment without an audio filter.

Table III shows some typical readings obtained by using the 510 in everyday measurements. The first column shows the reading obtained on a Fluke model 8050A DVM without the filter. The second column shows the same DUT (Device Under Test) signal-to-noise ratio with the Spectra Sonics filter in place. The third column

shows the difference in measurements. Notice that, in one case, the measurements were made in a high RF environment. The extraneous noise caused the noise meter to be fooled by the RF signals. However, the filter eliminated the interference and provided more informative readings.

According to Spectra Sonics, the main reason for the development of the oscillator and filter was to prevent the common problem of ground loops from developing in test measurement. Typically, the oscillator will be somewhat removed from the DUT and the accompanying ground loop that can develop can be difficult to eliminate, especially at 3 a.m. By using a battery-powered oscillator, ground loops are not a problem, and the battery-powered filter provides the same feature. For those engineers who do any amount of audio testing, this battery feature alone will far outweigh the cost of the devices.

The 802 Oscillator retails for about \$150 and the 510 Filter retails for about \$130. Any engineer needing easy to use, accurate, battery-powered test equipment should consider these additions. □

Table III.  
Typical readings  
obtained with 510 Filter

Signal-to-Noise without Filter	Signal-to-Noise with Filter	Improvement
42dB	46dB	4dB
41dB	48dB	7dB
56dB	60dB	4dB
46dB	74dB	32dB
50dB	62dB	12dB

The equipment covered in this field report is manufactured by Spectra Sonics, 3750 Airport Road, Ogden, UT 84403. Comprehensive product data may be obtained directly from this company. Equipment tested in this report was shipped to BE and loaned to the author for his studies.



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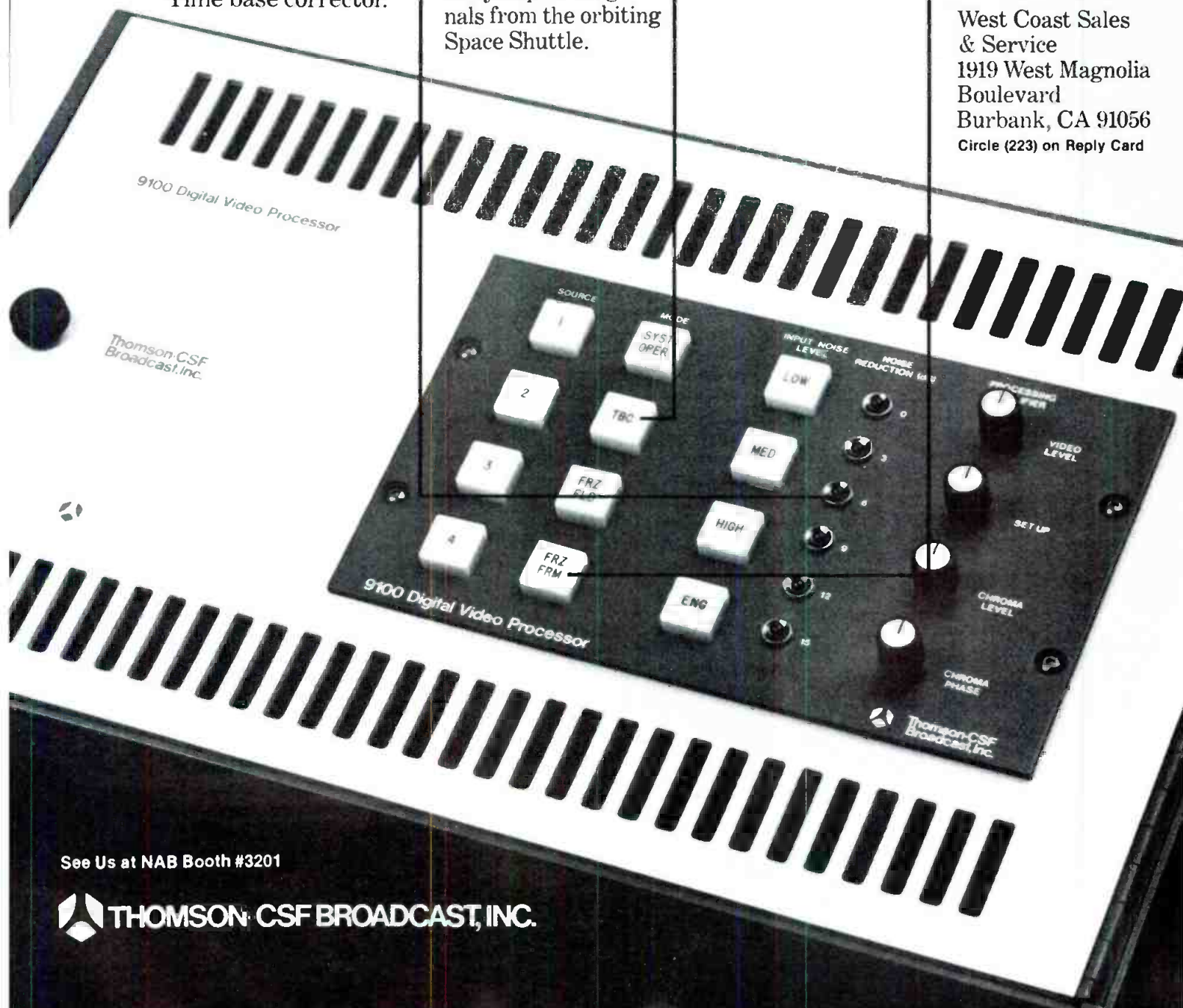
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# TV studio lighting systems

By Robert J. Nissen, vice president, Hubert Wilke Inc., New York, NY

Nissen has a 38-year background in the communications industry. For 25 years, he was associated with radio and TV broadcast stations in various engineering and management capacities. For the past 13 years he has been engaged in consulting and design activities in the TV field and has designed more than 200 studio facilities during that time.

Hubert Wilke Inc. is an international communications consulting firm with offices in New York, Los Angeles and London.

Few elements of TV production have as direct an impact on the quality of the final picture as does lighting. With effective lighting control, meaning and mood can be established, attention can be directed, and size and shape can be identified or altered. And, despite the inherent 2-dimensional reality of the TV image, a

3-dimensional illusion can be created in the viewer's mind.

The designer of a TV studio lighting system must be concerned with both the technical and the artistic objectives of a lighting system. The technical objective requires control of light intensities and scene contrast ratios. The artistic objective requires a system that permits a broad range of lighting techniques to be used to achieve a variety of visual impacts.

This article is not about lighting techniques or the selection of particular luminaires to achieve an effect. Rather, its purpose is to provide guidelines for the design of studio lighting systems that will permit the

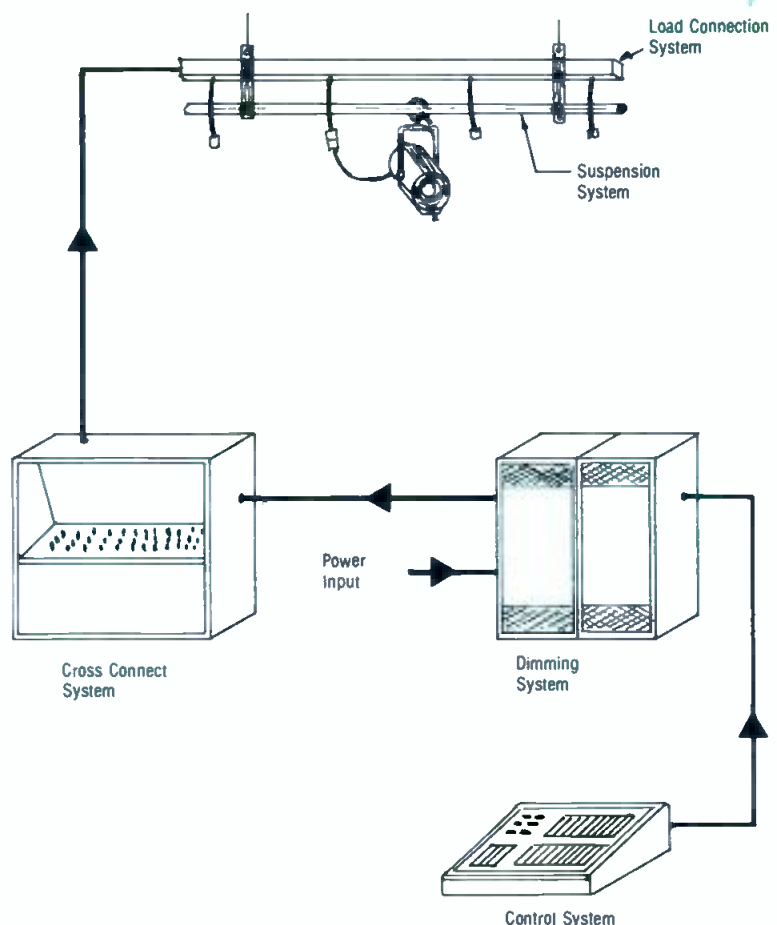


Figure 1. Lighting system components.





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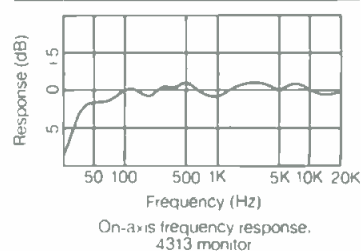
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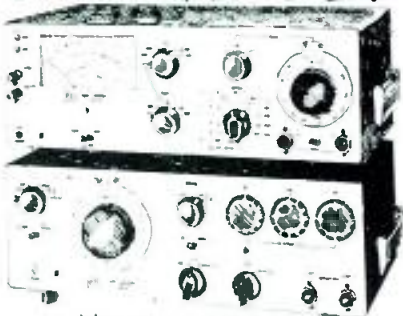
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## TV lighting

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### Lighting systems components

A typical TV studio lighting system consists of five major components:

- the suspension system, which provides the means to mount the lighting fixtures;
- the load connection system, which provides connection receptacles for the fixtures;
- the cross connect system, which interconnects the power from the dimmers to the receptacles;
- the dimming system, which varies the power to the receptacles; and
- the control system, which controls the power of each dimmer.

Figure 1 illustrates these five systems. In a dimmer-per-circuit system, the cross connect system is eliminated.

### The suspension system

The nature of multiple-camera TV production dictates that the lighting fixtures be suspended overhead to permit freedom of camera movement on an unobstructed floor space. This is in contrast to motion picture production techniques, where a single camera shoots only short segments of film that are later edited together. Accordingly, for such film production, lighting instruments can be mounted on floor stands because the movement of the camera is carefully limited for a particular segment. A similar technique can, of course, be used with a

single TV camera and post-production editing, but this is seldom done in a studio environment.

This difference in production technique accounts for the absence from most film studios of an overhead suspension system for light fixtures, and the universal use of such systems in TV studios. Because of this difference, film production can effectively take place in a TV studio, but TV production is greatly restricted in a film studio not equipped with an overhead lighting suspension system.

The lighting suspension system can also support the power connector strips for the fixtures, the cyclorama track system, and can serve as a framework from which to hang set and scenery elements.

There are two basic types of overhead suspension systems: grids and battens.

### Grid systems

The majority of TV studios use a fixed-height grid suspension system for the lighting fixtures, consisting of a cross matrix of pipes that are hung from the ceiling structure by means of steel rods, chain or cable, as shown in Figure 2. The rows and columns of the grid pipes are placed at right angles to each other and cover the entire production area of the studio. The lighting fixtures are typically mounted to the grid pipes by means of "C" clamps that are secured to the pipe by tightening a single screw.



Figure 2. Grid suspension system.

Courtesy of Strand Century Inc.



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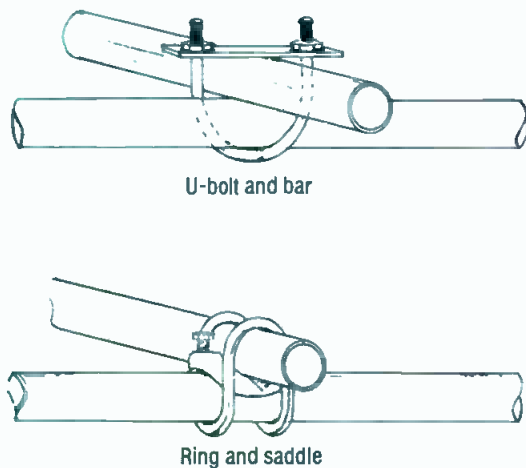
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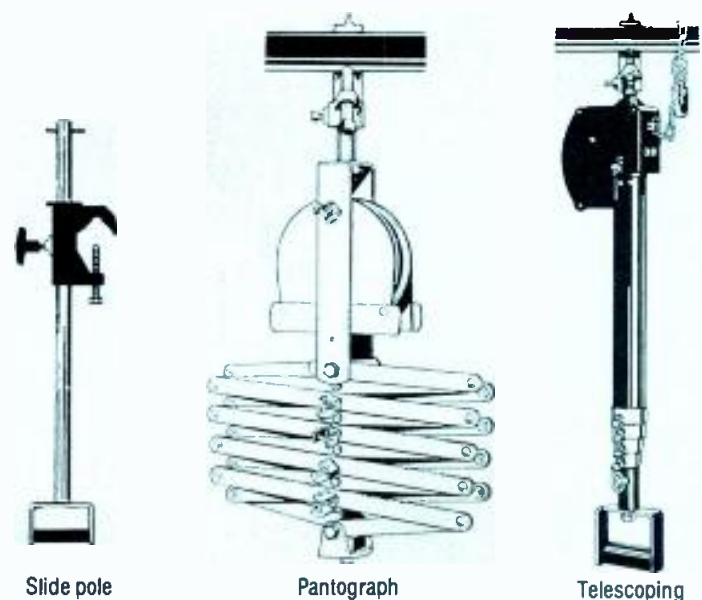
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**Figure 3.** Grid crosspoint joints.



**Figure 4.** Vertically adjustable fixture hangers.

## TV lighting

The spacing of the grid members depends on the height of the grid above the floor (the higher the grid, the wider the spacing can be) and the production requirements of the studio (the more complex and sophisticated the lighting, the closer the spacing). Typical studios will have a 4- or 5-foot spacing between grid members.

The pipe recommended for grid structures is 1½-inch "schedule 40" black iron pipe. If properly suspended, 1½-inch pipe has the strength and rigidity to support virtually any density of lighting fixtures. Maximum load figures per lineal foot may be calculated by assuming side-by-side lighting fixtures, the weight of the grid pipe, the weight of cyclorama tracks and drapes (if suspended from the grid), and a weight allocation for scenery elements that may be hung from the grid. In addition, a factor should be added for a suddenly applied downward thrust to represent the weight of a person hanging a lighting fixture who finds it necessary, in an emergency, to grab the grid for support. Given these load requirements, a qualified structural engineer can specify the type and spacing of the suspension rods, chain or cable.

There are a number of methods of anchoring the crosspoints of the grid members, two of which are shown in Figure 3. The classical method is the U-bolt and bar, which applies compression at only a single point between the two pipes. A preferred device is the "ring and saddle" joint, which is specifically designed for joining pipes. It is structurally more sound than the U-bolt and bar and

eliminates the problem of protruding bolts.

Because a fixed grid system cannot be adjusted vertically for height, other means must be used to adjust the height of the lighting fixtures. Three types of vertically adjustable hangers are available, as shown in Figure 4. The first is a simple slide pole that clamps to the grid. A sufficient amount of space must be available above the grid to allow for upward protrusion of the pole. The second device is the pantograph "scissors" type hanger. The pantograph can have considerable vertical range, but for large fixtures it is bulky and difficult to maneuver. The third device, which is generally preferred, consists of a series of telescoping concentric tubes with an internal counterbalance system. This telescoping device usually has less vertical range than the pantograph.

The height of the fixed grid above the studio floor is determined by a number of factors. If the grid is too low, lighting fixtures cannot properly illuminate the set and talent with the optimum 30° to 45° lighting down angle. A low grid also restricts the height of set background elements. If the grid is too high, hanging and adjustment of the fixtures can be difficult if not dangerous. In addition, if the grid is too high, most of the fixtures will have to be mounted on vertically adjustable hangers to achieve the desired lighting angles.

Practical experience with hundreds of studios indicates that the size of the studio virtually dictates the optimum height of the lighting grid. Table I gives the recommended grid heights

for several representatively sized studios, assuming that there are no unusual production requirements.

### Batten systems

A batten suspension system is similar to the grid system except that there are no cross member elements. The system consists of a series of parallel pipe battens running in one direction only, as shown in Figure 5. The main advantage of a batten system is that it allows each of the pipes to be independently adjusted in height and permits them to be lowered to the studio floor for mounting the fixtures. Although many studios have been built with fixed-height battens, they offer no operational advantage over the fixed grid system and have less mounting space for the fixtures.

Three methods are available for raising and lowering the adjustable battens: counterweights, hand winches and motorized winches. The counterweight and hand-winch systems require a considerable amount of studio floor space, which may reduce the usable production area. Motorized winches are normally installed near the studio ceiling and require no floor space.

Batten systems are especially appropriate in large studios that must accommodate a wide variety of production requirements that entail frequent movement of fixtures. It is claimed that mounting the fixture to a pipe batten at the floor level, rather than from a ladder, increases the speed of lighting setups. However, the saving in setup time may not be as great as anticipated because the fixtures will always require final adjust-

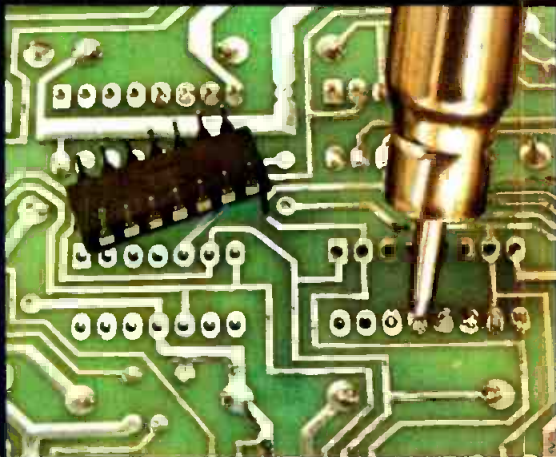


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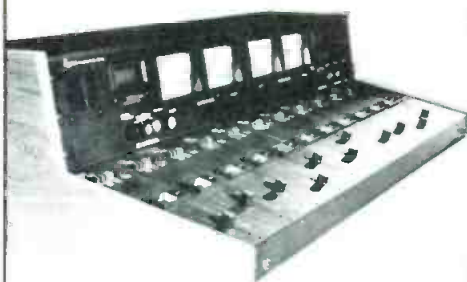
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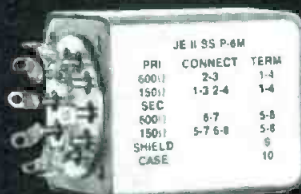
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## TV lighting

ment after the pipe batten is raised to its proper operating position.

The choice between a fixed-height grid system and an adjustable height batten system depends on a careful analysis of production requirements and cost. Adjustable batten systems are invariably more expensive than fixed grids. Experience shows that a fixed-height grid system is entirely adequate to meet the production needs of a typical broadcast or corporate studio. On the other hand, an adjustable batten system can provide considerable advantages in a large studio that must be capable of the ultimate in production flexibility.

### The load connection system

The usual method of providing power to fixtures mounted on the grid or batten pipes is by means of a connector strip consisting of a metal wireway with pigtail connectors, as shown in Figure 6. The connector strip is mounted above or alongside the pipe elements. The use of pigtails on the connector strip—rather than flush-mounted receptacles—permits flexibility in the location of the fixtures without requiring the fixtures themselves to have inordinately long connecting cables.

Each connector and its associated wiring should have a 20A rating to permit the connection of 2kW light fixtures. In large studios with high grids, 5kW light fixtures may be required, necessitating 50A connectors and circuits. In most studios of less

than 2500 square feet, 50A outlets are no longer required because of the increased sensitivity of modern cameras and the higher efficiency of modern lighting fixtures.

The total number of outlet drops depends on the nature of the studio production. The density of outlets is determined by the space concentration of lighting fixtures and is unrelated to the total amount of power being provided for lighting. This density can range from one outlet for every 10 square feet of net production area to one outlet for every 20 square

TABLE I. Recommended lighting grid heights.

Studio Size (feet)	Grid Height (feet)
20 x 30	13
30 x 40	15
40 x 60	16 to 18
60 x 80	18 to 20

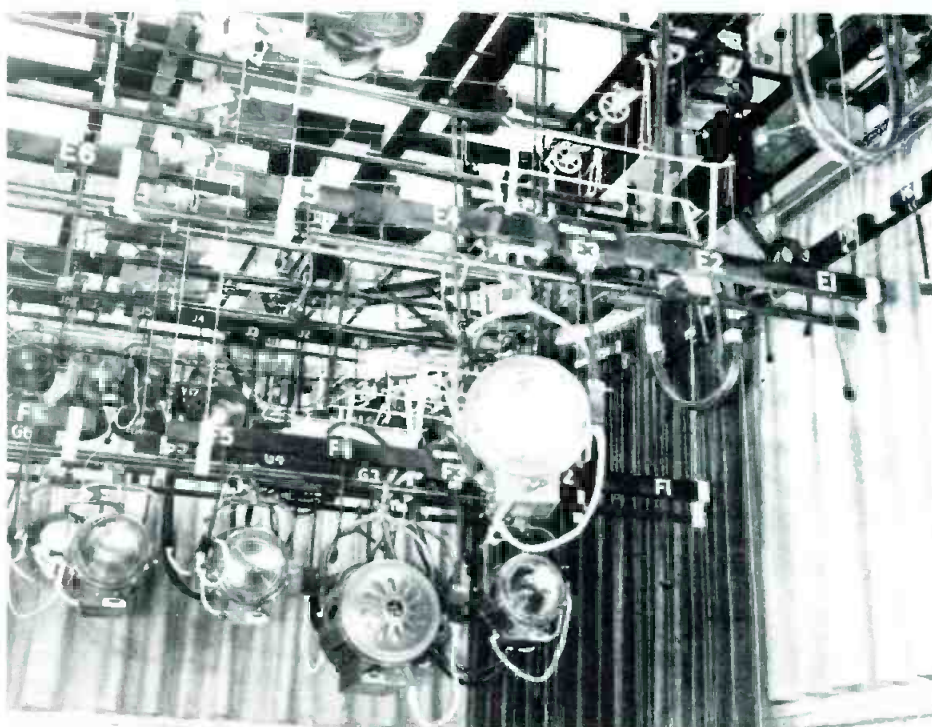


Figure 5. Adjustable batten suspension system.

Courtesy of Peter Albrecht Corporation.



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## TV lighting

feet. The higher density is desirable for a production studio that requires maximum lighting flexibility and scene lighting changes. The lower density is ample for a minimum studio with little need for other than basic fixed lighting.

Assuming a typical studio, with connector strips having outlets every four feet and with connector strips spaced four feet apart, the outlet density would be one outlet per 16 square feet. As a rule of thumb, the number of outlets provided for a typical grid system should equal the number of grid cross points.

There should be a heavier concentration of outlets around the periphery of the studio, along the cyclorama track system, to provide power for both cyclorama light fixtures and talent backlights.

In addition to the outlets provided for overhead suspended light fixtures, receptacles can be installed on studio walls at the floor level to accommodate floor-mounted fixtures, ground row lighting, and other special effects lighting. Many studios dispense completely with these wall receptacles and obtain power for floor-mounted fixtures from lighting

grid connectors via dropped extension cables.

For safety (and code) reasons, it is essential to use grounded 3-conductor connectors. At one time, the round pin, in-line rectangular connector (developed for theatrical stage lighting) was almost universally used. In recent years the 3-conductor "twistlock" type connector has become preferred because it provides a more secure connection and requires less maintenance than the round pin connector. Both types of connectors are shown in Figure 7.

### The cross connect system

As can be seen from the foregoing, studio lighting systems require a large number of connection outlets. A typical 30' x 40' studio may require from 75 to 100 outlets with only a portion of them being used for a particular scene.

Ideally, the power for each of these receptacles would be provided by its own separate dimmer. This approach is called a dimmer-per-circuit system and will be discussed later. Where a dimmer-per-circuit system is not feasible, some means must be provided to feed power to only those outlets being

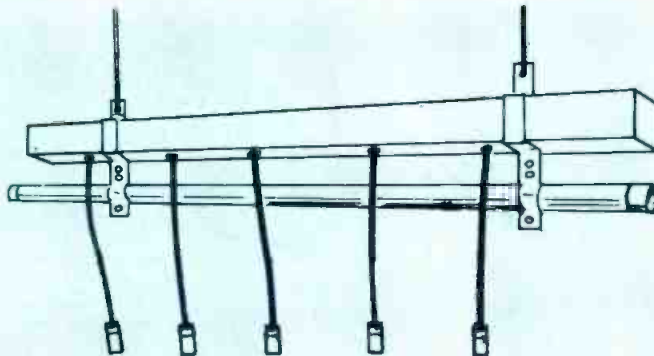
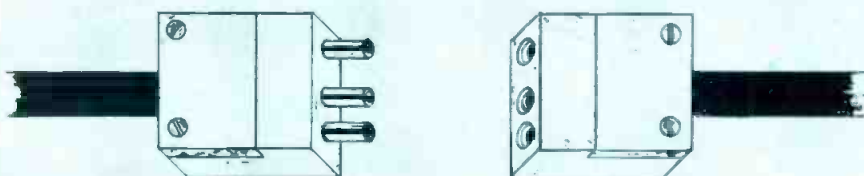
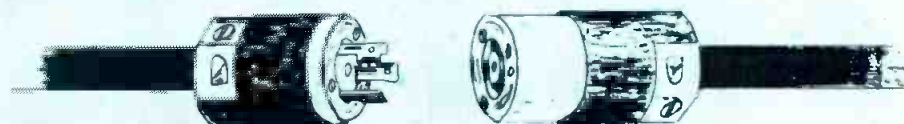


Figure 6. Load connector strip.



Round pin



Twistlock

Figure 7. Load connectors.



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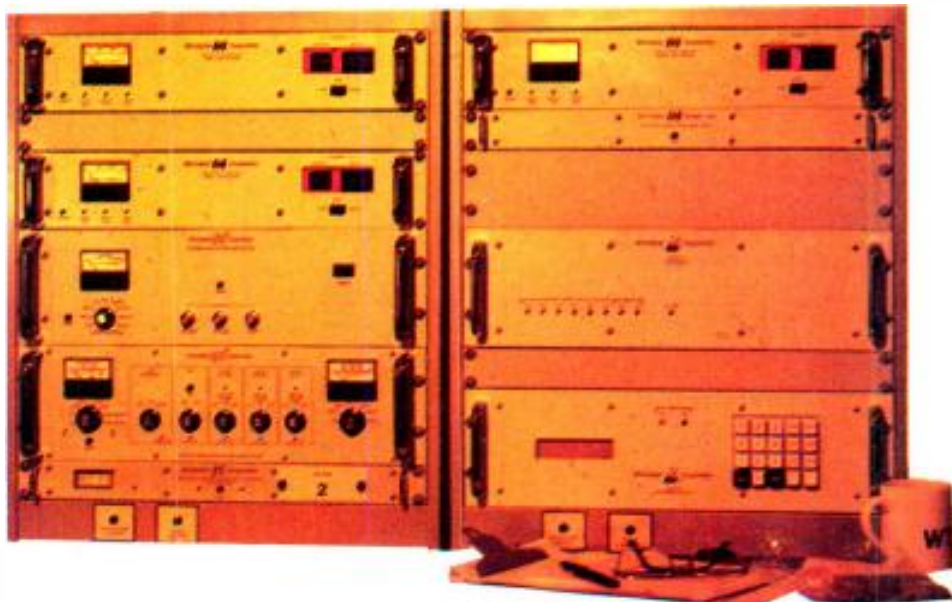
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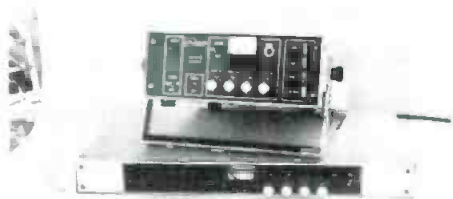
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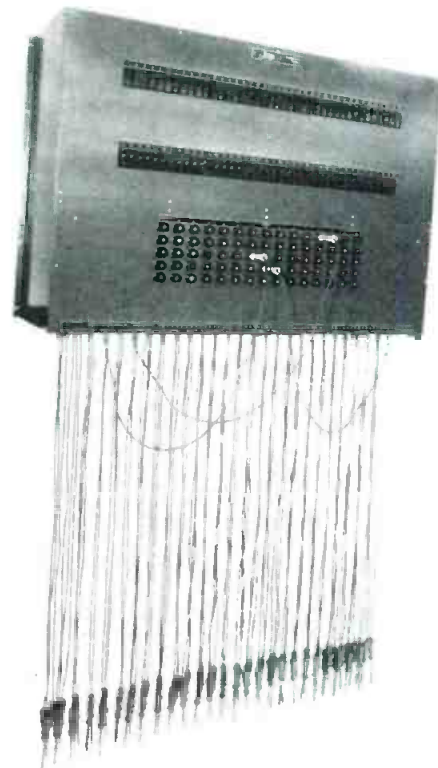
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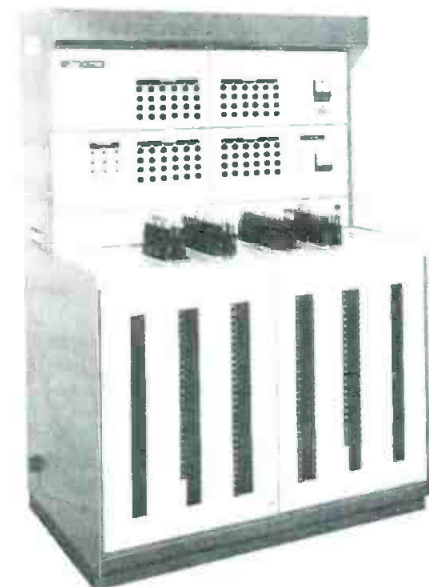
used at a particular time. A cross connect system allows any outlet in the studio to be connected to any dimmer and also permits several outlets to be grouped to a single dimmer.

Many forms of cross connect systems have been developed, but the industry has virtually standardized on the cord and plug patch panel, shown in Figure 8a and 8b. Patch panels for large systems normally have retrac-



*Courtesy of Berkey Colortran.*

Figure 8a. Hanging cord patch panel.

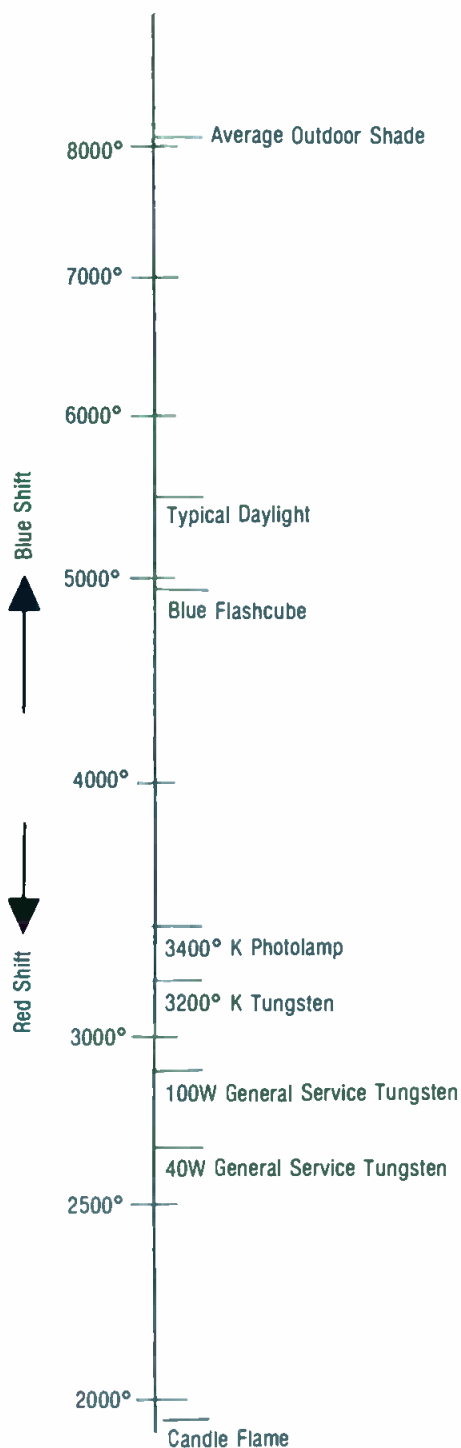


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Figure 8b. Retractable cord patch panel.

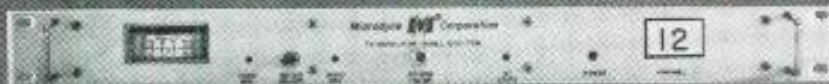


Kelvin  
Temperature



**Figure 9.** Kelvin temperature of typical light sources.

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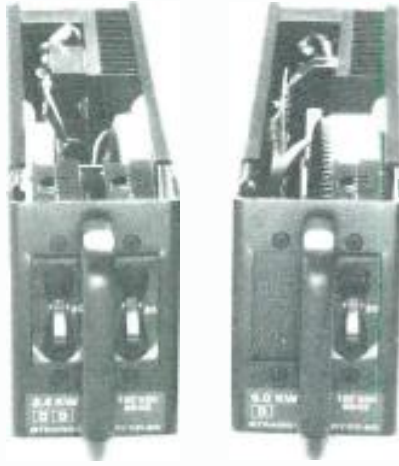
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## TV lighting



Courtesy of Strand Century Inc.

Figure 10. SCR dimmer modules.

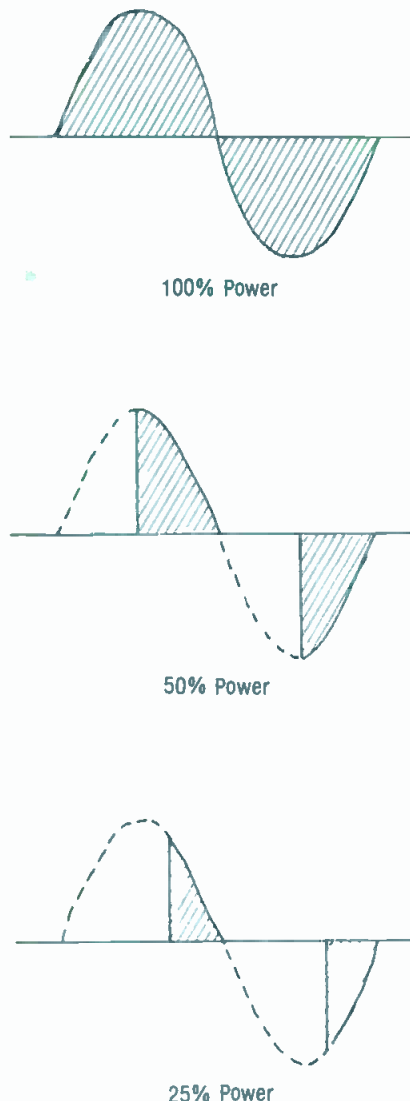


Figure 11. SCR dimmer output waveforms.

table weighted cords, while those for smaller systems have hanging cords.

Each outlet is connected via wireway or conduit to one patch cord on the patch panel. Accordingly, there are as many patch cords as there are outlets in the studio. To connect an outlet, the patch cord plug is inserted into a source receptacle on the panel. These source receptacles provide controlled power from either dimmers or non-dim sources. Each dimmer or non-dim source usually has three to six patch receptacles to allow several load circuits to be grouped together.

Individual circuit breakers must be provided for each of the load circuits. This is required for protection of the load circuit, because it may be rated at a lower current than the source to which it is patched. Thus, for example, a 20A load circuit may be patched into a dimmer that is capable of providing 50A.

The patch panel should be located in the studio because constant access to it is required by lighting personnel during the lighting of the set. The panel should be placed against a studio wall that will not be covered by scenery or cyclorama drapes. It should also not impede personnel traffic or production activities. In other words, its location should satisfy the sometimes contradictory requirement of being out of the way but easily accessible.

### The dimming system

The ability to control light intensity is essential for even the simplest TV production. The intensity of illumination falling on a scene can be varied by five methods: lamp wattage, flood/spot control of the fixture, fixture-to-subject distance, diffusing material placed in front of the fixture, and dimmers. If used alone, the first four methods have limitations in terms of degree of control and the time required to effect an intensity change. The fifth method, the dimmer, permits immediate and remote control of light intensity. It is only in small studios (with relatively fixed lighting plans for repetitive programming of a simple nature) that dimmers are not essential for adequate TV production.

### Effect of dimming on color television

When the power to an incandescent lamp is decreased, the filament temperature lowers and the spectral distribution of the emitted light shifts to the red end of the spectrum. Conversely, as the power is increased, the filament temperature increases and

the spectral distribution shifts to the blue end.

The spectral distribution of an incandescent light source can be related to Kelvin temperature, which is the actual temperature of the filament on the absolute Kelvin scale. The higher the Kelvin temperature, the bluer the light. The lower the Kelvin temperature, the redder the light, as shown in Figure 9. It is an interesting psychological anomaly that what we normally think of as a cool blue light is actually caused by a hotter filament, and what we normally associate with heat—that is, “red”—is caused by a cooler filament.

During the early years of color television, there was great concern over this color shift because the apparent colors of objects being illuminated change toward the red when lights are dimmed. The TV industry has found that the original concern regarding dimmers and color television was greatly overstated. As a matter of practice, lamp dimming is now considered not only acceptable for color TV production, but necessary for proper aesthetic control of production values.

Unlike motion picture film—which has a fixed emulsion color characteristic—TV cameras can be easily adjusted to accept a wide range of Kelvin temperatures. 3200° Kelvin lamps have become a *de facto* standard in TV studios not because of their particular color temperature, but mainly because they provide a good compromise between high light output and long lamp life.

The limits imposed on the amount that a light can be dimmed for color television are determined by the ability of the TV viewer to detect a color shift. It has been found that the average viewer will be unaware of a color shift that does not exceed a Kelvin temperature change of about 200°. In terms of light intensity, a lamp may be dimmed almost 40% before the 200° Kelvin shift occurs. This amount of acceptable dimming allows the lighting director a considerable leeway for intensity control.

Moreover, this amount of color shift is really noticed only on human skin tones, for it is only skin tones that are recognized by the viewer as “right” or “wrong”. Other elements in the scene—sets, backgrounds, furniture, etc.—can be almost whatever color appears on the TV monitor. The viewer, not knowing the actual color of these elements, is not disturbed by a color shift in these non-human portions of the picture. Accordingly, light striking these elements can go far beyond the



200° limit indicated above. As a practical matter, only the light striking faces (or products that must be displayed in true color) need be held within the 200° Kelvin limit.

#### Types of dimmers

Many devices have been used to control the amount of power applied to a lamp, and hence, to change the intensity of the light. One of the earliest devices was the salt water dimmer, which consisted of two rods immersed in a crock of salt water. By mechanically changing the depth of the rods in the salt water, the resistance was changed and the current to the lamp was varied. A rather messy way of dimming lights!

For many years, large wire-wound variable resistance dimmers were the standard. As power control technology advanced, there followed a number of dimming devices including autotransformers, saturable reactors, thyatrons, and magnetic amplifiers. With the advent of a transistor-type device called the silicon controlled rectifier (SCR), shown in Figure 10, all the preceding dimming methods became ineffectual competitors.

The SCR has the ability to control large amounts of power, with a high degree of efficiency, by the application of a small electrical control signal to the gate of the SCR. This efficiency arises from the fact that the SCR acts as a fast electronic switch that turns the power on and off at selected times during each cycle of the alternating current.

Accordingly, virtually no power is absorbed by the SCR, in a manner similar to the way a light switch absorbs no power. The amount of power delivered to the lamp will depend on the length of the "on" time as compared with the "off" time, as shown in Figure 11. Because the switching rate is 120 times a second (for 60Hz power), there is no flicker from the light source.

#### Dimmer-per-circuit systems

Lighting systems that use one dimmer per outlet circuit (and thus eliminate the patch panel) are not new. Hundreds of studio and theatrical facilities have used this technique. Dimmer-per-circuit systems, however, have not gained widespread use up to this time because of four factors: higher equipment cost, unwieldy control systems, reluctance to provide equipment (dimmers) that may seldom be used, and inaccurate estimates of the total installed system cost.

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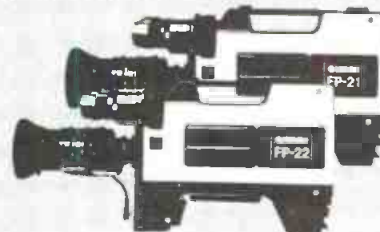


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## TV lighting

Two important changes have occurred in recent years that require a lighting system designer to seriously consider the advantages and cost-effectiveness of a dimmer-per-circuit system as compared to the conventional patch panel/dimmer system.

The first of these changes is the reduced cost of dimmer modules and dimmer racks as a result of standardization and improved manufacturing methods. Second, the use of inexpensive microprocessors now enables the sophisticated control that is essential to the flexible operation of a dimmer-per-circuit system.

In comparing the cost of dimmer-per-circuit systems vs. patch panel/dimmer systems, the following factors must be considered.

- The cost of the dimming equipment will be greater because of the increased number of dimmers required.

- The cost of the patch panel and its installation will be eliminated.
- The number of wires (and possibly the size of the conduit) to the lighting outlets will be reduced. It is possible to reduce the number of wires because in a conventional patch panel/dimmer system, separate neutral wires are required for each load circuit, whereas for a dimmer-per-circuit system, 3-phase, 4-wire runs can be made to groups of three outlets.
- A dimmer-per-circuit system may require a larger main service feed because the potential connected load is greater than for a patch panel/dimmer system. This larger service feed is an electrical code requirement and does not relate to actual power that will be used.

A proper cost analysis of the total lighting system—including installation—may indicate that a dimmer-per-circuit system is not significantly more expensive (and in some cases, costs less) than a patch panel/dimmer system. To determine the real cost differences, it is recommended that the lighting system designer obtain proposals from lighting equipment manufacturers for total installed system costs for both a patch panel/dimmer system and a dimmer-per-circuit system.

What are the operational advantages of a dimmer-per-circuit system? First, a dimmer-per-circuit system reduces setup time by eliminating patch panel operation. Second, it permits a rapid means of assigning—at the control console—any outlet to any controller. Third, it allows any number of dimmers to be controlled by one controller. Finally, and most important, it permits storage in memory of a great variety of lighting scenes with random control delegation of any outlet.

### Size and number of dimmers

Dimmer manufacturers provide a variety of sizes of SCR dimmers, typically ranging from 2.4 to 12kW. The number of dimmers and the power capability of each depends on the size and function of the studio, the power of the largest light fixture to be used, the degree of production sophistication required, and the lighting system budget.

With a dimmer-per-circuit system, the number of dimmers required is normally equal to the number of outlet receptacles in the studio. Although it is possible to permanently wire more than one outlet to a dimmer, this approach, if carried to an extreme, defeats the operational advantages of

a dimmer-per-circuit system. If the studio does not require larger fixtures than 2kW, all the dimmers should be rated at 2.4kW (20A). If the studio is of a size that will require 5kW fixtures, a worst-case estimate should be made for the number of 6kW (50A) dimmers required for those fixtures, with the remaining outlets to be powered by 2.4kW dimmers.

With a patch panel/dimmer system, calculating the number of dimmers and their power ratings is a bit more complicated. The problem is mainly one of determining how many fixtures can be appropriately grouped together for simultaneous control. A logical starting point is to draw up light plots of the maximum size productions that might be encountered, and to assign all the required lighting fixtures to dimmer groups. This obviously should be done by a person with considerable lighting experience. The advantage of using high capacity dimmers (for example, 6 or 12kW units) is that only one control is necessary to dim several light fixtures. The advantage of using low capacity dimmers (for example, 2.4kW units) is that there will be a greater degree of individual fixture control. For the majority of TV studios, the best compromise is often a combination of 2.4kW and 6kW dimmers.

It is important to keep in mind that the maximum power capability of the total dimmer system should be approximately the same amount of power as calculated in the original design of the studio. (For the calculation of this total power load refer to the article "Power and Cooling Loads for TV Studios and Control Rooms," in the November 1981 issue of **Broadcast Engineering**, pp. 48-56.

### Suppression of interference

SCR dimmers operate on the principle of rapidly turning the power on and off 120 times a second (for a 60Hz system). The turn-on time for a typical SCR is only a few microseconds. The resulting extremely fast current rise time will cause lamp filaments to vibrate and acoustically "sing," and will also generate radio frequency radiation that will interfere with the audio and video systems in the studio. This interference is readily detected by listening to an AM radio in the same room in which an inexpensive consumer-type room light dimmer has been installed.

This radio frequency interference can be effectively eliminated by using a large inductive filter in the output of the dimmer. These filters will increase the current rise time from a few



Courtesy of Kriegl.

Figure 12. Dimmer rack.



microseconds to several hundred microseconds. A typical specification for a high-quality filtered SCR dimmer unit will require that the current rise time of the dimmer shall not be less than 500 $\mu$ s as measured at the 90° conductive angle from 10% of rise to 90% of rise when the dimmer is operating at full rated load. Units meeting these specifications will seldom produce lamp filament sing or radio frequency disturbances.

Some engineers in the industry believe that this traditional rise time method of specifying a dimmer is inadequate. They point out that the generation of radio frequency interference is proportional to the rate of current rise. Accordingly, two dimmers of different current capacities can have the same current rise time but a different rate of rise, and hence generate different amounts of interference. Furthermore, they point out, radio frequency interference can be generated when the SCR first turns on; and because the traditional method of specifying rise time does not take into account what occurs during the first 10% of the rise curve, a rise time specification does not necessarily guarantee an interference-free system.

The author strongly recommends that lighting specifications contain the performance requirement that the system shall produce no objectionable interference under any normal operating conditions.

Many other dimmer characteristics in addition to radio frequency generation must be considered. Among these are load and line regulation, fully magnetic circuit breakers, plug-in modules, capability to withstand hot-patching of cold loads, ease of servicing, and mechanical construction. The major reputable lighting equipment manufacturers provide roughly equivalent equipment with respect to these requirements. As with most technical equipment you get what you pay for, and the buyer should be wary of inexpensive equipment from manufacturers with marginal track records.

#### Location of dimmer racks

The dimmer equipment racks, shown in Figure 12, containing the SCR modules, should never be located in the studio proper. There are three reasons for this. First, dimmers radiate a magnetic field that can interfere with cameras and microphones, either directly or through their associated cables. Second, although modern SCR dimmers are relatively quiet, they do generate



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## TV lighting

some acoustical noise that may be objectionable in the studio. Third, dimmer racks can occupy a significant amount of floor space, which is usually at a premium in a studio.

The most logical location for the

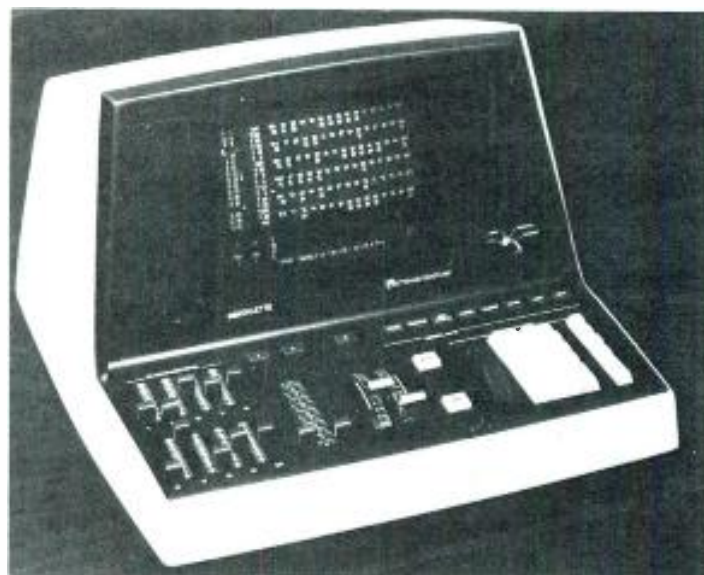
dimmer racks is in an area adjacent to the studio where the magnetic radiation and acoustical noise are not objectionable. Such areas as the prop storage room, mechanical rooms, and large electrical closets are often ideal.

In selecting such an area, keep in mind that normal wall construction does not impede magnetic fields. Accordingly, the dimmer racks should not be located on the opposite side of a studio wall or control room wall



*Courtesy of Berkey Colortran.*

**Figure 13.** Manual control console.



*Courtesy of Strand Century.*

**Figure 14.** Microprocessor-based control console.

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where the magnetic field penetration could interfere with equipment in the studio or control room.

#### The control system

The lighting control system is the final remaining element to be considered in the total studio lighting facility. Its purpose is to provide low-voltage control signals to the dimmers to regulate the amount of power they provide to the fixtures. A control system typically consists of a remote control console with faders and switches and, in more sophisticated systems, CRT displays and magnetic disc memories. See Figures 13 and 14.

An almost infinite variety of control configurations are offered by lighting equipment manufacturers. It is beyond the scope of this article to attempt a comparative analysis of available control systems. What is important to grasp are the fundamentals of control systems so that particular units can be properly evaluated.

Those who do not have an on-going working relationship with lighting control systems may be confused by the proliferation of terms that are not familiar to those outside the lighting field, such as scenes, presets, masters, sub-masters, grand masters, independent, pile-on, bypass, X & Y, and A & B faders, etc. The recent introduction of microprocessor-based control systems with memory can compound the confusion.

#### Manual control systems

It is essential to keep in mind that, regardless of the sophistication or complexity of the control console, the function of a control system is to provide each dimmer with an adjustable voltage (usually from zero to about 10V) to control the amount of power that the dimmer is delivering to its load.

In the simplest form of control system, each dimmer has one controller (also called a fader). The overall control voltage for all the dimmers is varied by a master controller (see Figure 15). This system is seldom used in studio facilities because of its minimal control flexibility.

The next higher level of control flexibility provides basic 2-scene preset control, as shown in Figure 16. Each dimmer has two controllers—one for Scene A and one for Scene B. The control voltage provided to all Scene A controllers and all Scene B controllers is adjusted by the respective scene masters. A preset system enables the lighting operator to establish the intensity of any or all dimmers in the system in advance of the next lighting

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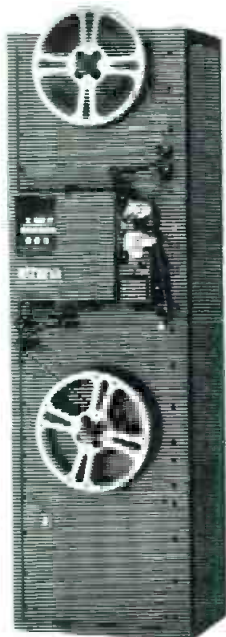
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## TV lighting

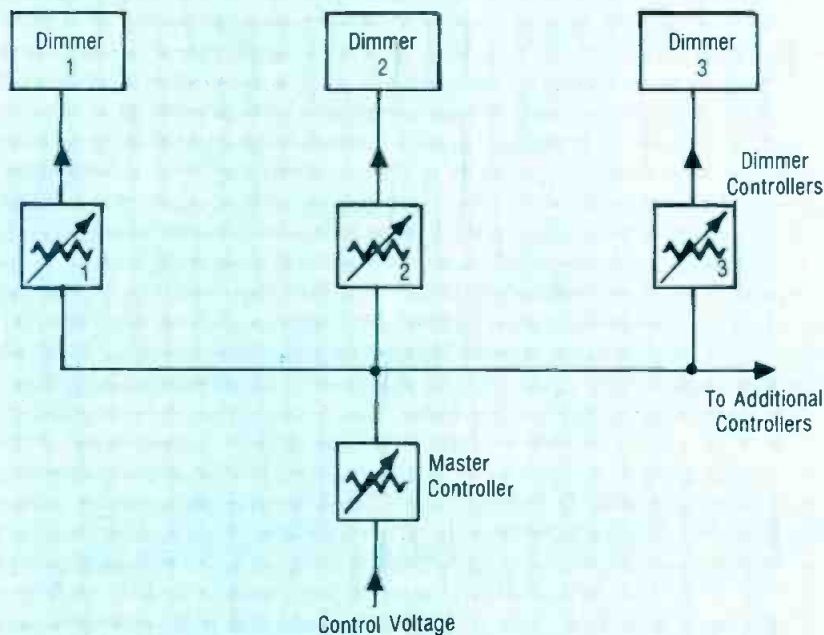


Figure 15. 1-scene control system.

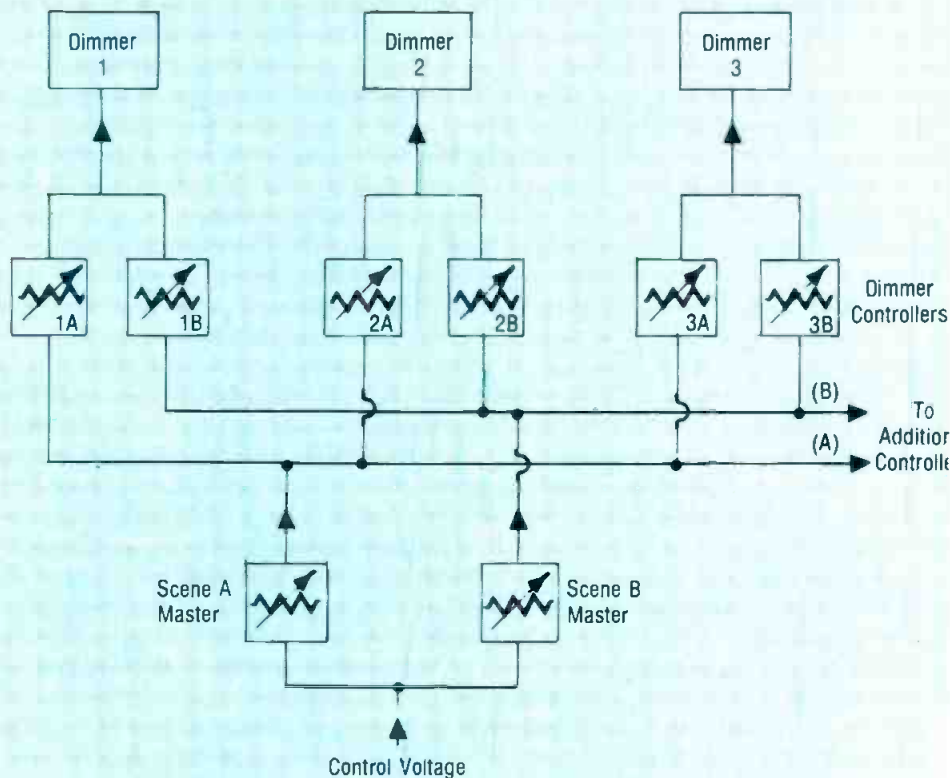


Figure 16. Basic 2-scene preset control system.



change. The transfer to the following light scene is accomplished by lowering one scene master while raising the other scene master.

Building on this basic scene preset concept, Figure 17 illustrates the addition of a grand master, an independent master, and delegation switches for the controllers. The functions of the various controls can be understood by tracing the control voltage paths on the diagram. This type of control system (or a variation of it) has been installed in the majority of TV studios constructed in the last 20 years.

The particular design shown in Figure 17 is not necessarily universal because different manufacturers circuit the control functions in different ways and provide other features not illustrated. Different terms may also be used. For example, the "scene master" may be called a "preset master" or a "sub-master." However, regardless of the complexity of various design approaches, it should be remembered that a dimmer control system will provide a control voltage to each of the dimmers that is varied by a chain of one or more controllers.

Large studio facilities that must accommodate highly sophisticated productions with numerous lighting changes will require additional control flexibility. For example, additional scene presets, beyond the two shown in Figure 17, will normally be required. However, because each dimmer must have an additional controller for each scene, there is a point of diminishing returns in adding manually controlled scene presets. The control console simply becomes too large and uncontrollable. This fact alone has been the major impetus for the introduction of microprocessor-based lighting control systems.

#### Microprocessor-based control systems

Lighting control for sophisticated systems consists of making a great number of rather simple decisions. This type of control requirement is ideally suited to the abilities of a computer that can remember thousands of commands, call them up as required, and perform actions with extreme speed. The recent availability of powerful microprocessors at a reasonable price has made a microprocessor-based lighting control system imperative for systems beyond a certain size and sophistication. Microprocessor-based control systems reduce the size of the lighting control console to a small unit with only a few (if any) manual type controllers. Some systems can control

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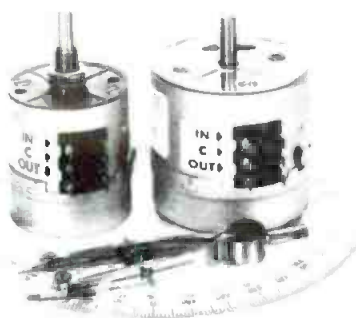
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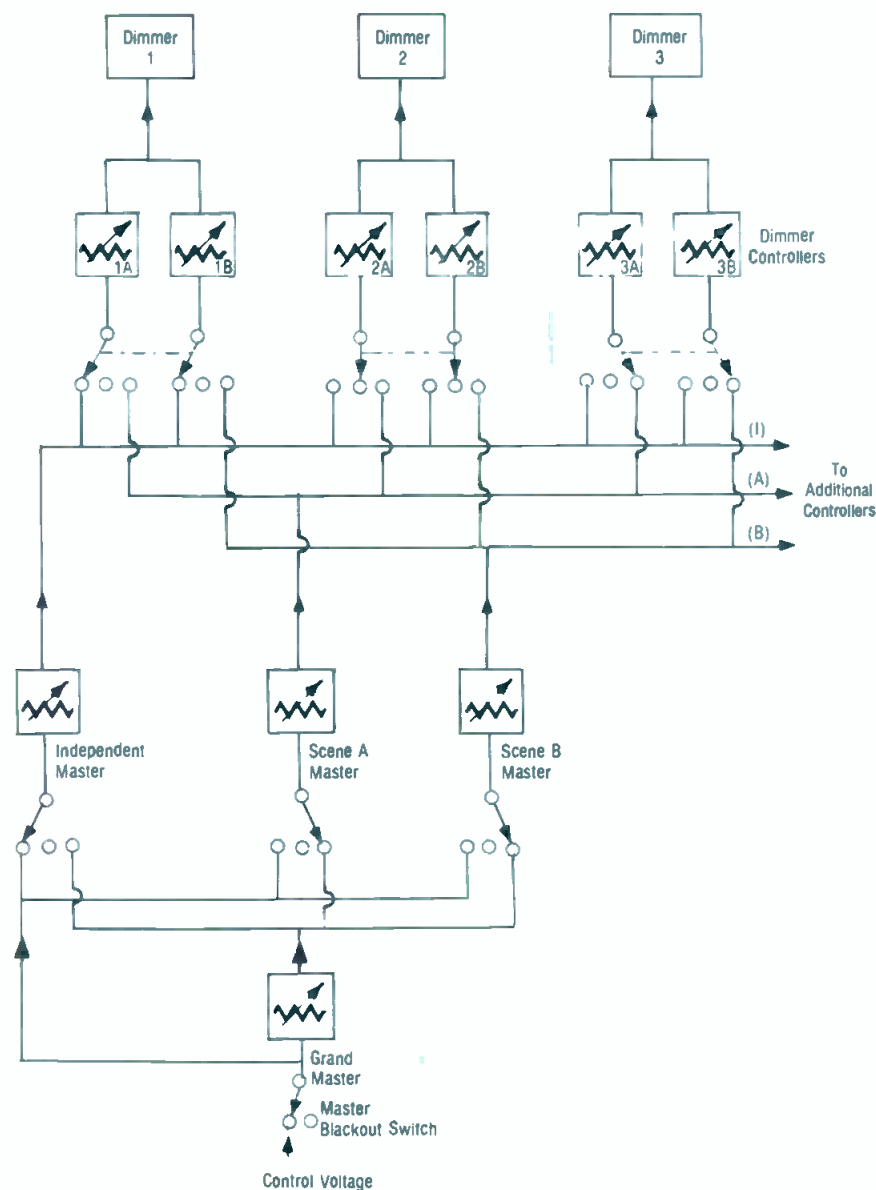


Figure 17. 2-scene preset control with independent master and grand master.

## TV lighting

more than 500 dimmers and can store information (internally or on magnetic disc) for thousands of scene changes. Once programmed during rehearsal time, any of the preset scenes may be called up by simply pressing one or more buttons.

Although small or medium size TV studios may not require all the control power available from a microprocessor-based system, such systems should be investigated because of their greatly decreased cost in the last few years. □



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The Agile 24M is a 24-channel, stand-alone master receiver with sufficient gain to drive as many Agile 24S

slave receivers as required to satisfy any satellite communications system. The unique Agile 24S slave receivers offer all the operating features of the Agile 24M with the exception of the first block down converter. The active amplifier loop-through design of the Agile 24S is cost-effective, eliminating need for redundant passive power dividers.

Nearly all critical adjustments and test functions can be accomplished by accessing the front or rear panel of Agile 24/S receivers. The multi-function front panel meter permits zero tuning as well as carrier-to-noise metering, eliminating the need for special test equipment. Channel indicators display both transponder number and frequency in MHz.

The Agile 24 receiver system carries Standard's full technical support. System installation and alignment is facilitated by enlarged schematic diagrams and an illustrated technical manual. Standard's field engineers offer operator training as well as on-site repairs. Where factory service may be required, 48-hour turn-

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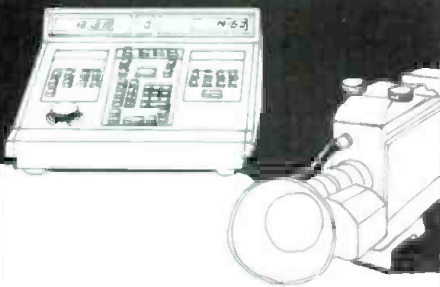
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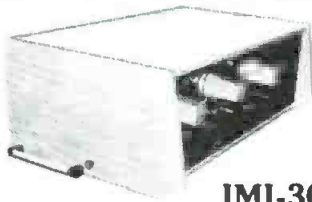
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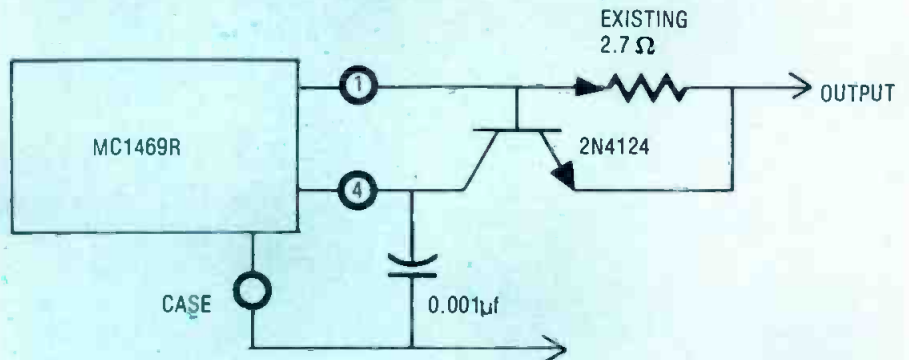


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## station- to-station



## Central Dynamics VA 2035 Video DA

By Edgar Lee Howard  
Supervisor  
Special Projects  
WOSU-TV, Columbus, OH

The Motorola IC power regulator MC1460R, used, among other places, in early versions of the CD video DA is no longer available. A newer device, the Motorola MC1469R is a pin-for-pin equivalent to the older device, with one exception. The new device requires one outboard silicon NPN

transistor and one 0.001µf capacitor to properly implement the regulator's current-limiting capability.

When installing the new regulator, pin 4 is isolated from existing foil traces and is connected to the new transistor as indicated in the drawing. Should there be no interest in preserving the current-limiting capability of the regulator, pin 4 may be left floating.

The new regulator, while having a slightly lower maximum device dissipation, has a higher applied voltage rating, which may reduce the occasional failure of these devices after power surges. □

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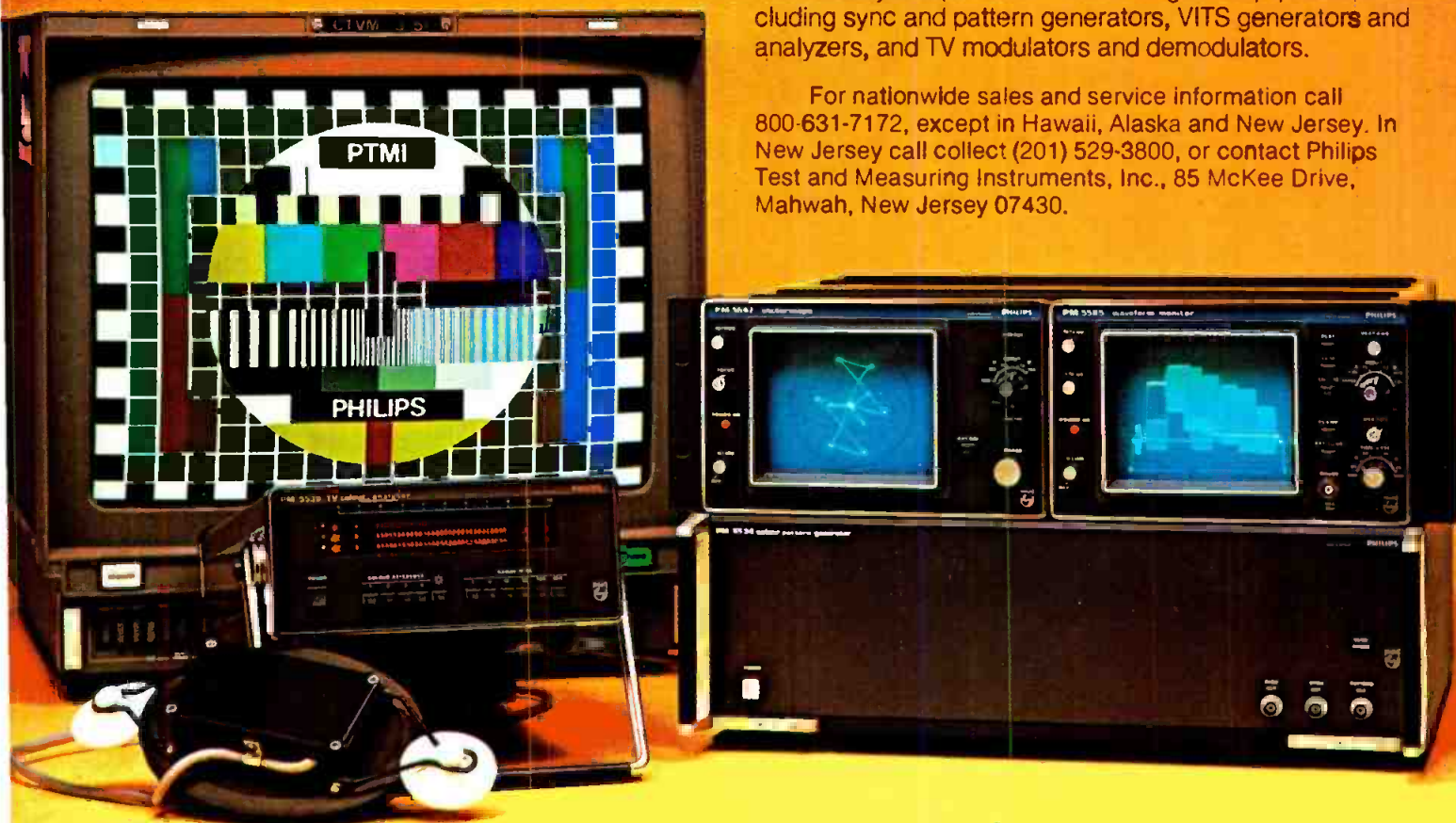
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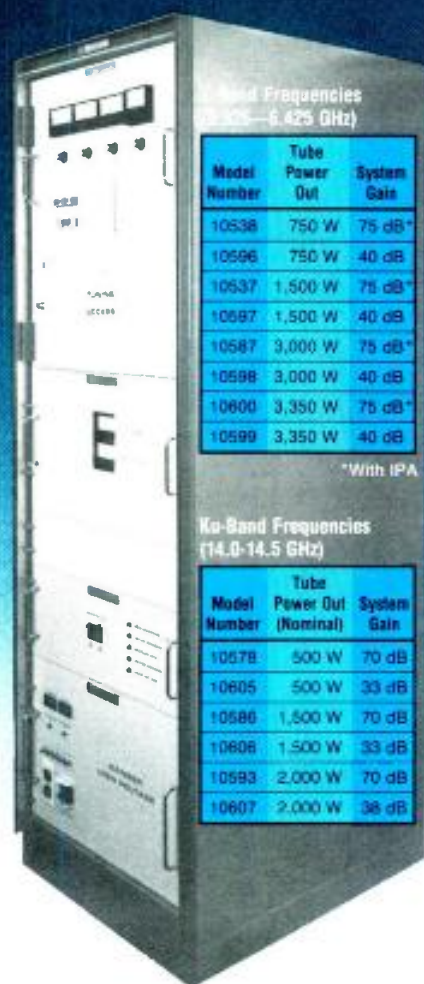
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## new products

### 3V chip

dbx Inc. has announced the development of a new integrated circuit (IC) for dbx noise reduction that operates from 3V nominal power. The dbx NRX Chip is viewed by the company as a major factor in narrowing the gap between the performance of analog and digital signal processing techniques for audio and recording industry applications.

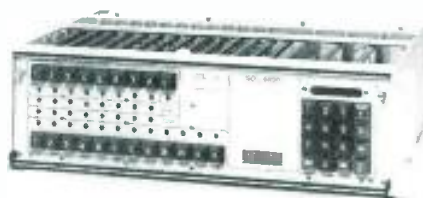
The chip will operate from a 3V nominal supply with good performance down to battery end-life of 1.8V. Each chip contains the active components for stereo dbx noise reduction packaged in a 20-pin miniature flat pack. It is now being prepared for production by a major Japanese IC manufacturer.

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### Automated broadcasting system

The SOL-6800, introduced by Solutec Ltd., controls up to eight VTR machines using standard remote connectors. Its audio-video switcher configuration can be varied to meet customer requirements.

Designed for automatic use, the unit constantly detects the video signal and if needed, will switch automatically to emergency or fill-in inputs until the following event in the sequence is



reached.

The keyboard allows the operator to program sequential real time or asynchronous events and to monitor them on the alphanumeric display. The SOL-6800's communication link allows the unit to be integrated into a master computer control system.

Carefully planned software facilitates operation and provides fast operator training. The unit also features manual override.

Circle (985) on Reply Card

### Audio-video multicables

Wireworks Corporation has introduced a new series of audio-video multicables, the HVT series, which incorporates audio and video cables in one outer jacket, simplifying installa-

tion. The HVT series multicables are hardwired multicables (single unit systems) that incorporate one or two video lines in the same cable with one, three or five audio pairs: HVT2, one audio/one video; HVT4, three audio/one video, both Siamese cable construction; and HVT7, five audio/two video, conventional round cable.



HVT series multicables are suited for broadcast, ENG, EFP and CCTV applications, transmitting sound and picture for monochrome and color TV cameras, as well as for remote control, and monitor/cue line systems.

HVT cables are configured with BNC-type connectors on all audio pairs. Audio channels consist of standard twisted pairs to reduce crosstalk and a 100% foil shield that guards against EMI and RF interference. Video channels are made of flexible RG59/U-type cable.

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### AM transmitters

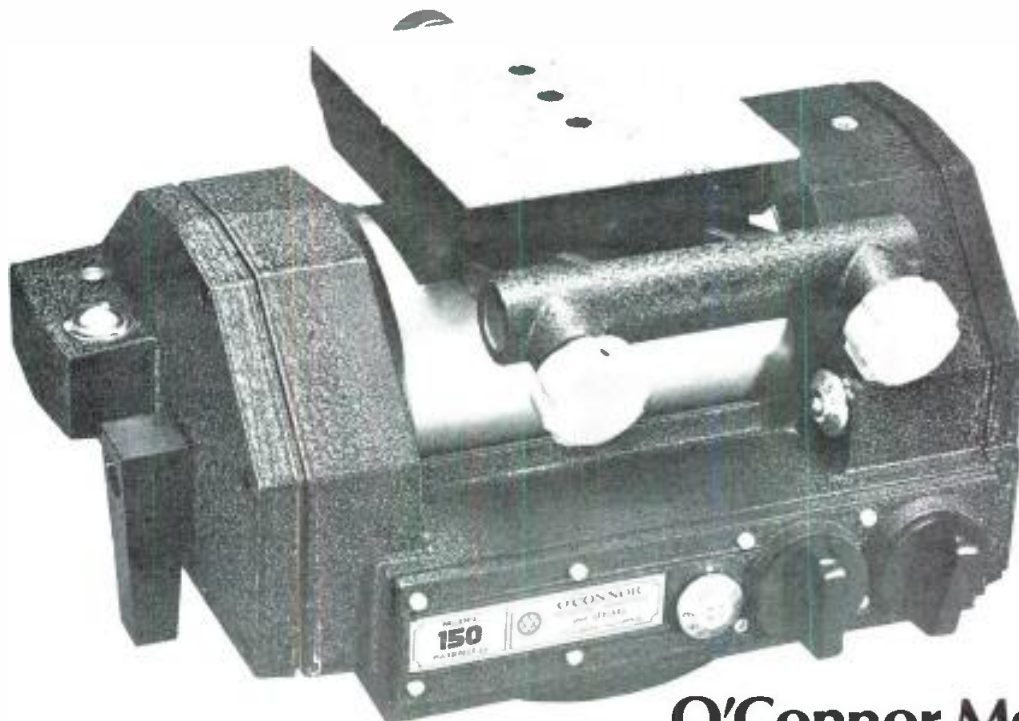
The Broadcast Division of Harris Corporation will introduce four major new products, including a new line of solid-state AM transmitters, at the upcoming NAB Convention.

Harris will introduce a new line of solid-state AM transmitters, offering broadcasters up to a 36% savings on annual power bills. Named the SX Series, the new line includes the SX-1 (1000W), the SX-2.5 (2500W), and the SX-5 (5000W). All deliver increased long-term stability and reduced maintenance requirements.

Each model offers built-in diagnostics and pre-programmed microprocessor control and status monitoring. All of the SX transmitters employ a unique convective cooling system that protects components from dirt build-up. The SX Series transmitters are designed for AM stereo and easily interface with most remote control and facility control products. They



# EXCEPTIONAL.



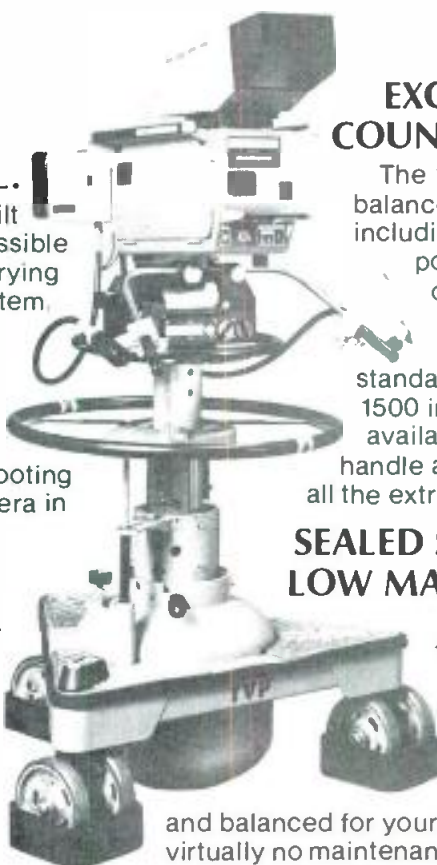
## O'Connor Model 150. Exceptional fluid control for heavy television cameras.

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### EXCEPTIONAL COUNTERBALANCE.

The 150 is counterbalanced at all times, including extreme tilt positions, making operation much easier. A 1000 in-lb spring comes standard with an optional 1500 in-lb spring also available so the 150 can handle any TV camera with all the extras up to 150 lbs.

### SEALED SYSTEM FOR LOW MAINTENANCE.

Like all O'Connor fluid heads, the Model 150 is fully sealed off from all contaminants. Once the head is properly adjusted and balanced for your camera, it requires virtually no maintenance whatsoever.

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The 150 is built of lightweight aluminum and magnesium castings, weighing only 25 lbs.

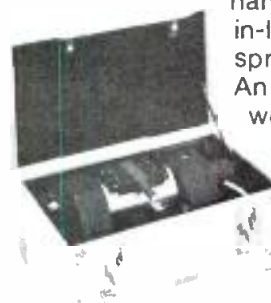
The pan and tilt locks are fully independent of the pan and tilt drag adjustments.

The tilt range is  $\pm 45^\circ$ .

### THE EXTRAS COME STANDARD.

The Model 150 comes equipped with an O'Connor adjustable and removable platform with double

handles. The 1500 in-lb counterbalance spring is optional. An exceptionally well-constructed carrying case is probably the only accessory your Model 150 will need.



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## New products

also employ extremely efficient MOSFETS (Metal Oxide Semiconductor Field Effective Transistors) and Polyphase PDM (Pulse Duration Modulation), a 4-phase sampling system in which the audio input of the transmitters is sampled four times during each PDM cycle for exceptional audio performance.

Also introduced will be a new Harris earth station controller system called the Harris 9165. Up to 24 pre-programmed antenna positions and earth station configurations are available. The advanced unit allows on-site and remote access to the antennas, receivers and uplink electronics.

A third new product is a tabletop-sized computer for script preparation, news room use and word processing. The desktop computer, the Infowriter, greatly increases the word processing capabilities of the Harris Autotron Star business automation system. Offered in three models, the basic Infowriter consists of a single CRT workstation with detachable keyboard, dual 650k bytes of memory, and one synchronous line for general communications purposes.

A new line of UHF TV transmitters will be introduced that includes 30kW, 55kW, 110kW and 220kW models. Notable features include a new exciter and greatly improved efficiency. Harris will display the 55kW model at NAB.

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### Lavalier microphone

The Isomax Pro introduced by Countryman Associates is a new directional lavalier microphone offering up to 20dB better rejection of feedback and unwanted sound when compared



to other lavaliers. It operates with equal ease on phantom power or internal batteries and has a balanced output with standard XLR-3 type connector

Standard features include switch selectable low frequency rolloff and presence peaking making it equally at home in voice or music applications. Its ability to handle 150dB sound levels without distortion allows it to be used on horns or amplified instruments without possibility of overload. An optional tie clip that holds two microphones is available.

Circle (988) on Reply Card

### Video squelch

Video Aids of Colorado has introduced the VAC Video Squelch, which provides a new dimension of convenience to operators of video distribution systems. Basically an electronic video switch, the instrument constantly monitors the main video source line to determine whether video is indeed present, and whether the signal-to-noise ratio exceeds a preset level. If both of these conditions are met, the device passes the main video on to the output. If either condition is not met, the alternate source of video is connected to the output.



Other features include an ac relay, with normally open (or normally closed) contacts, which can be activated when the main video source is operational. The unit also provides a visual and aural warning to the operator when it senses a fault on the main video.

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### Audio distribution system



Bonneville Productions has introduced the model PC-1 audio distribution system, which offers state-of-the-art electronic design featuring the 990 op amp and Jensen transformers. This combination provides for exacting performance specifications with the flexibility of transformer isolation. Each of the 16 outputs are selectable to line or microphone level. The PC-1 is suited for use in mobile recording on location, interfacing large audio systems at conventions and media-covered events, and isolating feeds in applications where ac ground



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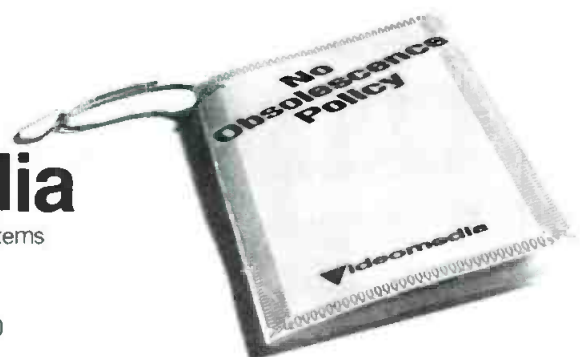
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## New products

currents might present problems.

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### Transmitter update package

Marcom has announced the introduction of its Synergistic FM transmitter update package. The system is intended to yield new performance from older FM transmitters at significantly lower costs than new transmitter purchases.

System components include the following:

- the new programmable audio processor, with five remotely selectable processing regimes;
- the Rood/Marcom stereo generator that produces approximately 70dB stereo separation; and
- the new HPA-4635 FM exciter with ultra-linear modulator.

Circle (991) on Reply Card

### SCA generator

Broadcast Electronics has introduced the model FC-30 SCA Generator, which ensures high-performance and reliability in audio and data subchannel multiplex transmission.

Although specifically designed as a companion unit for the BE FX-30 Synthesized FM Exciter, the FC-30 is compatible with other FM exciters and is recommended as an effective means of upgrading existing SCA operations.

Audio frequency response is  $\pm 0.5$ dB, 10 to 10,000Hz, exclusive of the audio lowpass filter. Data information low-frequency response extends to dc. Total harmonic distortion is less than 0.5% within the audio passband, with 0.5% or less intermodulation distortion, 60Hz/7kHz; 4:1 ratio (audio lowpass filter bypassed). FM noise is 67dB or greater below  $\pm 6$ kHz deviation at 400Hz.



All adjustments are made by recessed, front panel controls. Continuous signal level monitoring is afforded by front panel LED modulation indicators. The FC-30 is capable of full remote control operation, using unique optically isolated interface for either positive or negative polarity control logic.

Memory logic ensures operating mode status for primary power interruption up to one hour, with automatic restart upon restoration of power.

The FC-30 subcarrier operating frequency is 67kHz. Other frequencies in the 39 to 95kHz range can be supplied. Fully shielded, with extensive RFI filtering, the FC-30 occupies 1.75 inches of standard EIA 19-inch rack space.

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### DTMF receiver

Teltone has introduced the M-927, a DTMF receiver that accepts all 16 digits of the Dual Tone Multi-Frequency (DTMF or Touch-Tone) standard. It provides a complete Central Office grade DTMF and rotary dial receiver in a reliable low cost part. The digital output of the M-927 can be used directly with CMOS and with simple transistor drivers.

Digit information interpreted by the M-927 is presented at the output pins along with a strobe and can be user formatted as binary, 2 of 8, or 1 of 12. Other features include three handy clock outputs, enable and clear pins.

Packaged as a 40-pin DIP hybrid, the sophisticated signal processing power of the M-927 is in the proprietary LSI devices used. The unit requires no more than an inexpensive TV color burst crystal (3.579MHz) and a single 12V power supply to operate.

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### Rolling color changer

ColorMax, a computerized rolling color changer that enables the lighting designer to use a band of 12 separate colors, is now available from The Great American Market.



ColorMax is a self-contained unit that slides into the gel frame holder of the lighting fixture. It plugs into a 120Vac non-dim circuit for motor and fan power. The control signal is programmed from an external controller, and up to 100 units may be slaved to a single control channel. Maximum color change time is 2.5 seconds, using all 12 color squares.

The ColorMax controller can address any channel individually, or all channels together with a single, preset signal. It is available in 4- and 15-channel models. Custom consoles of up to 100 channels can be built.

ColorMax is offered in two configurations: 8x10 for fixtures with 8-inch lenses, and 6x7½ for fixtures with 6-inch lenses. Weight of the unit is 10 pounds.

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### Routing switcher

HEDCO will introduce a small, 100-input, 100-output routing system, the TransPath I, at NAB-82. The switcher is based on a 3-stage, non-blocking system that radically reduces the number of crosspoints. A standard 100x100 routing switcher now requires 10,000 crosspoints; TransPath I uses only 5700, increasing the MTBF of the overall switcher. Because of the reduced number of crosspoints, the matrix has been packaged in 22 rack units. A complete audio or video 100x100 switcher can be assembled with its power supply and control computer in 29RU of a standard 19-inch rack.

TransPath I can be configured as video, audio, AFV, or AFV with breakaway. Up to three levels of audio or time code can be used with a video system for stereo AFV operation. A central terminal provides bus control or diagnostic information in parallel with individual remote panels.

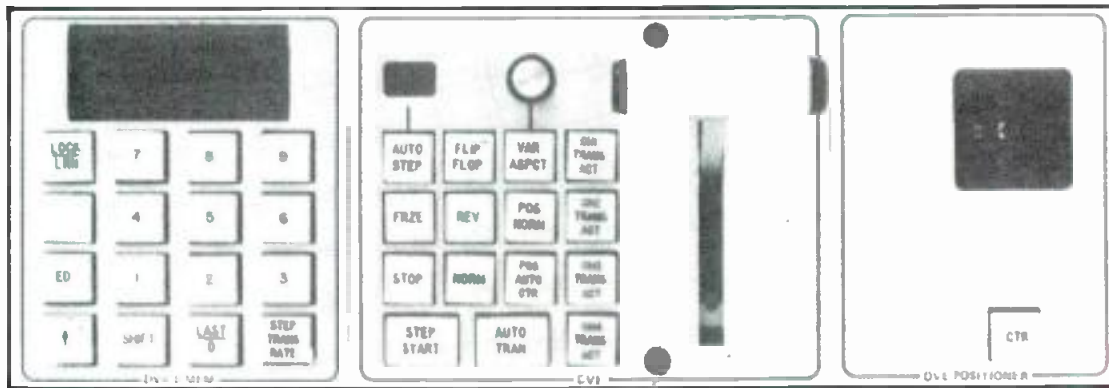
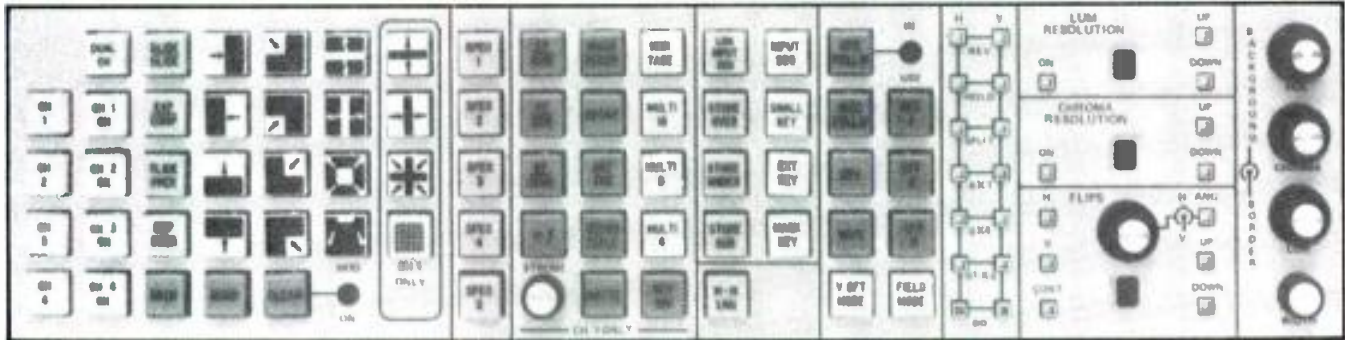
The physical construction of the matrix uses mother-board construction and ZIF connectors to minimize crosstalk and wiring variables. Only three basic types of PC boards are used in the main switcher. The basic 100x100 configuration can be reduced in size by removing boards in modular increments and later field expanded by station personnel.

A central MC68000 microprocessor handles the internal switching and interface to the switcher. Operational paths are stored by a unique use of EEROM to ensure absolute system recovery following station power outage. To provide additional reliability, TransPath I is equipped for redundant path computes and redundant power supplies. Communication between remote panels and the central processor is via coax cable. A serial bi-directional bit stream transfers all requests for input switching. Various types of control panels using the MC68701 microprocessor are available as standard items: an X-Y system, individual keypads with numeric or alphanumeric designations, and a CRT display of paths and system control.

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equipment house offering the DVE for rent. Now you can take the dynamic system that's revolutionizing Digital Video Effects on the road with you. What's more, you're renting from ALL MOBILE, so you're getting our operator too!

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## April 2-3

The *International Association of Satellite Users (IASU) Second Annual SATCOM Conference* will be held at the Hyatt Regency Hotel at Reunion in Dallas, TX. This conference, which precedes the National Association of Broadcasters Conference that opens April 4, will feature programs by experts and opinion leaders that will interest satellite users.

SATCOM '82 will bring the realities of new satellite application advances to the forefront. Topics include direct broadcast satellites, interconnection of satellites and interactive cable systems, assessments of teleconferencing, enhanced broadcast station services, training and educational applications to military, business and medicine.

## April 4-7

Dallas will be the site of the *60th Annual National Association of Broadcasters Convention*. The convention will feature radio seminars, discussions of TV trends, demonstrations of innovations in television, exhibits, and a spouse program. Glen Campbell will perform on Sunday, April 4 and Jonathan Winters will appear on Wednesday, April 7. For more information, contact NAB, Convention Information, 1771 N St. NW, Washington, DC 20036.

## April 20-23

The Institution of Electronic and Radio Engineers will hold its *Fourth International Conference on Video and Data Recording* at the University of Southampton, Southampton, England. Aimed at engineers and physicists in manufacturing and user industries and universities, 45 papers will be presented in four days by authors from France, Germany, Italy, Japan, The Netherlands, United Kingdom and the United States.

A feature of the conference will be a forum on digital standards. Seven manufacturers and broadcasters from Europe, the United States and Japan will put forward their own positions. The speakers and audience will then take part in an open debate. A trade exhibition will be held in conjunction with the conference. Co-sponsors of the conference are the AES, IEE, IEEE, IoP, RTS and SMPTE. More details and registration forms are available from the Conference Registrar, IERE, 99 Gower St., London WC1E 6AZ.

## April 29-May 1

The *1982 Electronic Distribution Show and Conference* will be held in the New Orleans Hilton Hotel in New Orleans, LA. The conference will encompass the Electronic Distribution Show trade exhibits, the *EDS '82 Industrial Distribution Conference*, and the *Third Annual National Sound and Electronic Systems Conference (NDESC)*. The NDESC encompasses the EDS exhibits as well as marketing and technical sessions for contractors sponsored by the National Sound and Communications Association in conjunction with the Show Corporation.

The National Electronic Distributors Association will conduct industry seminars in conjunction with EDS. NEDA's activities will begin with an "Outlook" program on the future of industrial distribution during the afternoon of Wednesday, April 28, the day before the show opens. Concurrent programs for distribution management will be conducted each show morning from 8:30 to 9:45 a.m. In addition, NEDA will conduct a separate

educational program for distributor middle management personnel (sales and purchasing) from 12:45 to 2 p.m. Friday.

For more information, contact David L. Fisher, executive vice president, Electronic Industry Show Corporation, 222 S. Riverside Plaza, Suite 1606, Chicago, IL 60606; (312) 648-1140.

## May 3-5

"Cable Delivers!" will be the theme at the *National Cable Television Association 31st Annual Convention and Exposition* in Las Vegas, NV. Exhibit hours at the convention will be increased 24% from last year. In addition to hundreds of exhibits planned for the convention at the Las Vegas Convention Center, there will be dozens of panels featuring technical, management and programming discussions. Daily luncheons will include guest speakers on topics vital to the cable industry.

Exhibits featuring cable programming and hardware will open with a special ceremony at 11 a.m. on May 3 and close at 6 p.m. that day. They will be open from 8 a.m. to 6 p.m. May 4 and 5. A reception and sneak preview of exhibits is set for Sunday evening, May 2.

A dinner dance and national awards presentation will conclude the convention on May 5. Early registration will begin on May 1. Reservation forms are available from Trade Associates Inc., 4701 Willard Ave., Suite 105, Chevy Chase, MD 20815-4697. Space reservations cannot be made by telephone.

## May 3-6

*Video '82, Program International* will be held in Berlin in the form of a congress with an exhibition and music market. It will deal with questions and problems concerning video software and is intended particularly for the specialist trade. The *International Music Market Seminar Berlin 1981*, which took place in September 1981, will be continued within the framework of this event.

## May 8

The Chicago section of SMPTE will hold its *Seventh Annual All Day Meeting* at the Ramada O'Hare Inn in Chicago. This meeting will feature presentations on film and related technologies. Last year's program contained presentations on new film stocks, power sources for location lighting, super-16mm production, color dye stability and the interface of film and video.

Planning for the program is in progress. Those interested in submitting papers for consideration should contact: Program Chairman, Kenneth R. Knaus, Eastman Kodak Company, 1901 W. 22nd St., Oak Brook, IL 60521; or Publicity Chairman, Edward Blasko at the same address.

## June 4-6

The forthcoming premier AES conference, titled "The New World of Digital Audio," will be held at the Rye Town Hilton, Rye, NY. The areas to be included as follows: an overview on the present state-of-the-art; the digital disc; high density magnetic recording; high density optical recording; digital data protection; digital data preservation; error correction; encoding and transcoding; and digital music. Also, planned participation by experts in the field of the digital disc from Europe



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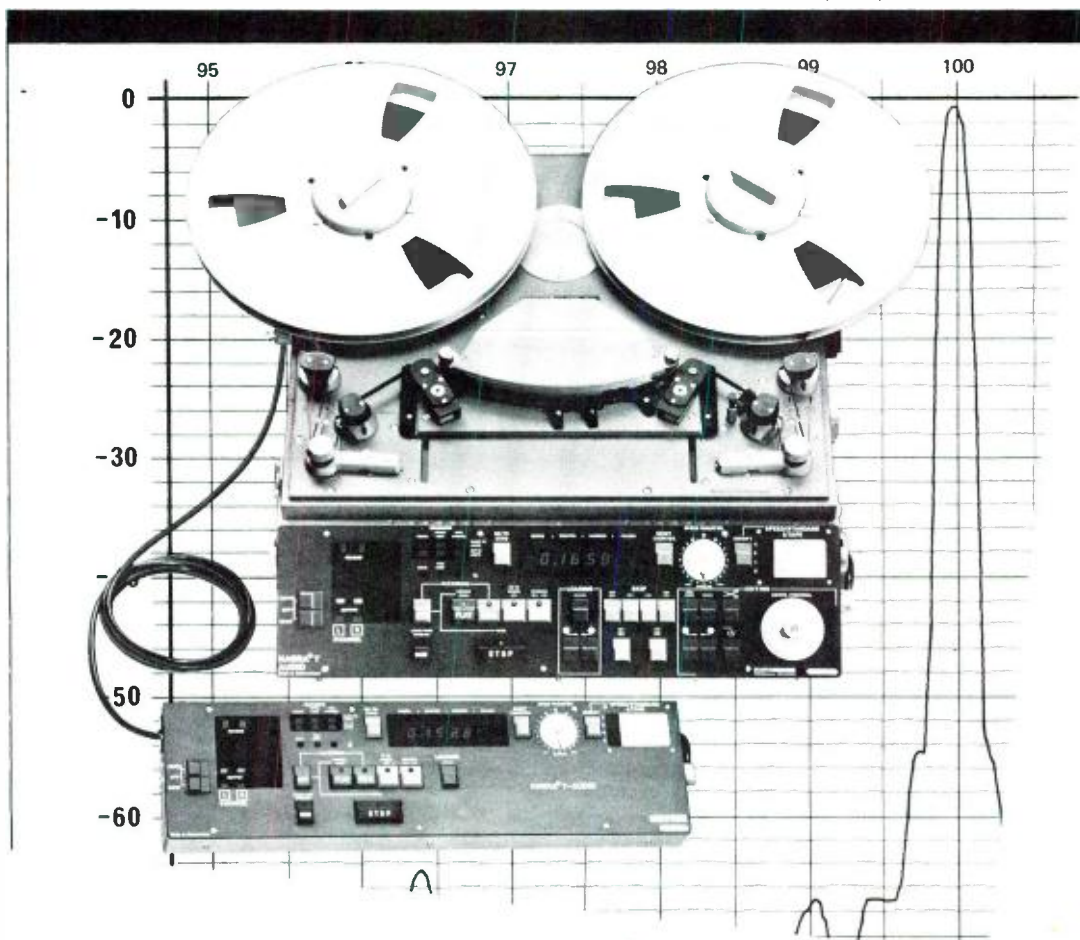
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and Japan is scheduled.

In addition to the scientific papers presentation, there will be a limited exhibition of digital technical products that are associated with the field of digital audio. This will allow the attendees to see today's digital products, to evaluate such products and to enable them to better plan a future equipment strategy. For registration information, contact the Audio Engineering Society, 60 E. 42nd St., New York, NY 10165; (212) 661-2355 or (262) 661-8528.

## June 10-13, 24-27

The 1982 National Video Festival will take place in both Washington, DC and Los Angeles. Scheduled for June 10-13 at the Kennedy Center in Washington, DC and June 24-27 at the AFI campus in Hollywood, the 1982 National Video Festival will include premiere screenings with large screen video exhibition, seminars on current video issues, and a national student competition in videotape production.

The 1981 National Video Festival, held at the Kennedy Center on June 3-7, drew more than 550 independent, commercial and industrial producers, as well as artists, educators, funders and students. The five days of screenings (185 tapes) and presentations (eight panel discussions plus keynoter Erik Barnouw) drew extensive na-

tional press coverage, broadcast and print.

## July 18-22

Communications and the Future, the Fourth General Assembly of the World Future Society, will be held at the Sheraton Washington Hotel in Washington, DC.

The assembly will cover the spectrum of the communications field, including the future of telecommunications, computers, broadcasting, films, newspapers, libraries, magazines, advertising, and interpersonal communication and new research into the process of human communication. It will explore how the revolution in communications will affect a wide variety of other areas such as business, government, human values, economics, family life, education and environmental issues.

For more information, write 1982 Assembly Committee, World Future Society, 4916 St. Elmo Ave., Bethesda, MD 20814.

## July 21-23

The Second Annual WOSU Broadcast Engineering Conference will be held at the Fawcett Center for Tomorrow, Ohio State University, Columbus, OH. Papers are invited and full details can be obtained from John H. Battison, director of engineering, WOSU AM/FM/TV, 2400 Olentangy River Road, Columbus, OH 43210. ☐

## Mark your calendar

The following is a brief show listing for 1982. Make your plans now.

March 2-5	Audio Engineering Society (AES), Congress Center, Montreux, Switzerland	Sept. 18-21	IBC International Broadcasting Convention, Brighton, UK
March 12-17	National Association of Television Program Executives, (NATPE), 18th Annual Conference, Las Vegas Hilton	Sept. 30-Oct. 2	Radio Television News Directors Association International Conference, Caesars Palace, Las Vegas, NV
April 4-7	National Association of Broadcasters (NAB), 60th Annual Conference, Dallas	Oct.-Nov.	AES, Los Angeles
April 17-22	National Public Radio (NPR), Marriott Hotel, Washington, DC	Nov. 2-4	Scientific Atlanta Earth Station Seminar, Atlanta
May 2-5	National Cable TV Association, Las Vegas, NV	Nov. 7-12	SMPTE 129th Annual Conference & Exposition, Hilton, New York <input type="checkbox"/>
May 4-8	American Women in Radio and TV, San Francisco		
June 6-10	(1) Broadcasters Promotion Association; (2) Broadcast Designers Association Third Annual Seminar, St. Francis Hotel, San Francisco		
Aug. 29-Sept. 1	NAB Annual Radio Programming Conference, Hyatt, New Orleans		
Sept. 12-15	National Radio Broadcasters Association (NRBA), Reno, NV		
Sept. 12-15	BFMA Conference, Las Vegas, NV		
Sept. 15-17	IEEE 32nd Annual Broadcast Symposium, Hotel Washington, Washington, DC		

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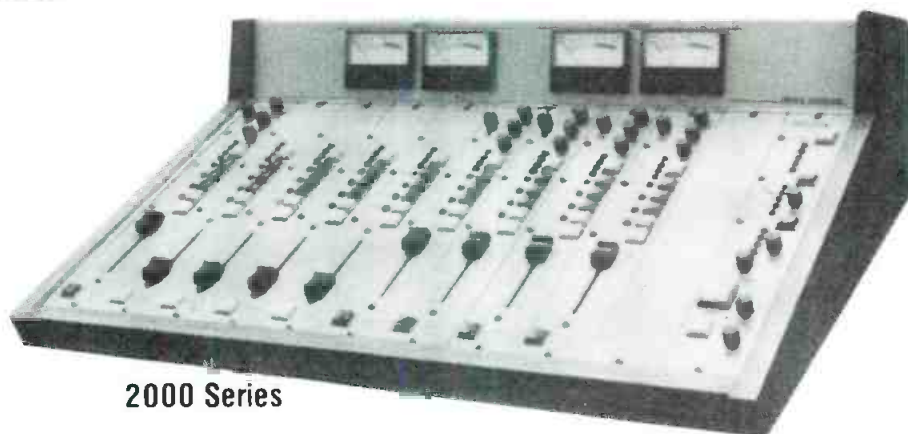
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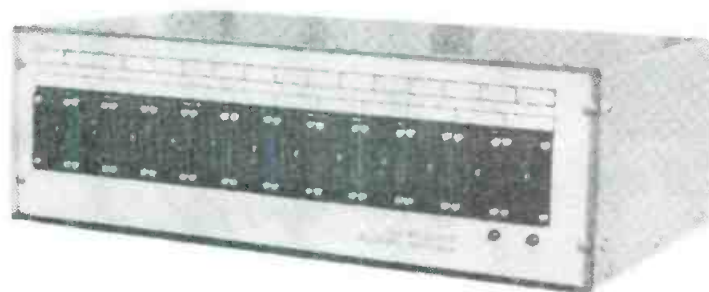
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## **Shook distributes mobile production system**

Shook Electronics, now incorporated as Shook Electronic Enterprises Inc., recently distributed its third mobile TV production system to Mexico. This unit is similar in design to the one that has been shown in the Philips Booth at the NAB Convention for the last two years. It is designed on a 22-foot Chevrolet chassis with a 14-foot production area, able to house up to four cameras plus a full complement of audio and video equipment.

The company custom designs mobile TV production systems that are manufactured, racked and cabled, ready for customer equipment or built with a full array of equipment. The units range in size from ENG film-style vans to large trailers equipped for broadcast production.

In addition to manufacturing vehicles, the company designs studio layouts, offers equipment installation and is available for consultation.

## **Ikegami names Cinema Products distributor**

Cinema Products Corporation has been appointed Western states distributor for Ikegami's new EC-35 video camera for electronic cinematography.

Designed and engineered by Ikegami to handle and perform like a professional portable 35mm motion picture camera, the EC-35 uses  $\frac{3}{4}$ -inch low capacitance diode-gun Plumbicon tubes and a unique optical system designed to deliver outstanding picture quality.

The EC-35 was designed for using film production and lighting techniques when shooting video. The optical system accepts a variety of prime and zoom lenses designed by Canon and Fujinon for the EC-35, with viewing angles similar to those of professional cine lenses. The EC-35 primes are interchangeable without affecting registration and color balance.

Of special interest to cinematographers is the fact that the EC-35 optical system permits full use of the T1-5 capability of the Canon set of five high speed prime lenses. This capability, together with its signal-to-noise ratio of 57dB minimum, makes the EC-35 ideal for shooting in low light situations.

## **Taft Broadcasting adopts British standard teletext**

Taft Broadcasting Company has become the second major US broadcaster to adopt British standard teletext. Taft will use the Context system, supplied in the United States by Logica Inc.

Teletext uses spare capacity present in every TV signal to deliver an auxiliary text-and-graphics magazine to TV sets. Viewers are able to select from an index what information is displayed.

The Federal Communications Commission recently notified broadcasters that it expects to adopt an open-market approach to teletext technical standards, rather than adopting a specific standard. Such an approach will substitute manufacturer, broadcaster and viewer decisions—the marketplace—for traditional government regulation.

## **Victor Duncan consolidates offices**

Victor Duncan Inc., a film and video production equipment company, has announced the completion of a corporate 5-year plan of locating departmental directors in one administrative office.

The executive team includes Lee A. Duncan, president; Victor Duncan, vice president of Technical Planning and

Development; Frank Marasco, vice president of Branch Operations and director of Rentals; Jack Zavitz, corporate secretary and treasurer and director of Finance; Bob Burrell, director of Engineering; Norm Bleicher, director of Marketing; and Alan Sheffield, director of Video.

The company will continue to base its administrative office in Dallas with branch operations in Chicago and Detroit.

## **Ramko announces financing program**

Ramko Research has announced a 10% interest financing program. Called the "Bottomline Plan," it features up to two years' financing for any Ramko or Technics professional series product with a 20% down-payment. The program is being announced in the broadcast trades with a large direct mail effort and through Ramko's sales representatives.

## **RKO buys Modulation Associates terminals**

Modulation Associates Inc. recently received an initial order from RKO Radio Network for 25 Stereo SAT Demodulator Terminals. The terminals will permit the RKO affiliates and perspective affiliates who have their own satellite earth stations to receive RKO radio network programming in stereo.

The units are fully compatible with the UPI satellite earth stations and with the newly introduced Modulation Associates Economy Small Aperture Terminals (E-SAT).

## **SMN purchases Express Limiters**

Audio & Design Recording Inc. has announced the sale of a large, undisclosed quantity of its Express Limiters to the Satellite Music Network. The limiters will be used on the various uplinks to provide high fidelity processing and overall protection of equipment. The Express Limiter is a versatile compact multiratio compressor/limiter/expander. A soft clipper can be switched in following the limiter for absolute peak control.

## **Matthews receives achievement award**

The American Society of Lighting Directors recently presented Matthews Studio Equipment Inc. with a plaque for outstanding achievement in engineering development. The company was chosen for its accomplishments in the design and manufacture of lighting control and production support equipment and its close work with other manufacturers, equipment designers, lighting directors, individuals, rental houses, and major motion picture and TV studios.

Edward Phillips, president of Matthews, was honored with the Board of Directors Award for Individual Achievement, recognizing his efforts to establish industry-wide standards that would create compatibility between different brands of lighting and support equipment; his responsiveness in solving specialized problems on lighting projects; and his donations of services on behalf of charitable activities.

## **New audio consoles unveiled**

Neve has recently unveiled\* several new ranges of audio consoles, including an all-digital console. The com-



pany has accomplished two main objectives with this launch:

- First, its three new analog consoles for the radio, TV, music recording and film industry represent a continuing commitment to the analog console market, which the company believes will predominate in the majority of studio applications for a long time to come.
- Second, the new, all-digital DSP (Digital Signal Processing) console gives the industry a look at the possibilities, probably restricted initially to the larger studios or broadcast organizations, for a totally digital approach to sound mixing and dubbing.

Speaking at the introduction of the new products, Dr. M. H. Jones, group technical director at Neve, stressed the importance of the latest type of integrated circuit—the ubiquitous silicon chip—to the design and reliability of analog and digital circuitry, which allowed the building of sophisticated consoles at a lower cost in comparison to the older discrete transistor models. This has allowed the company to hold down the price of the new systems which, in a time of economic recession, is of great importance.

Versatility is the keynote of the new 51 series of analog console systems, the result of application of appropriate op amp chips combined with the latest ribbon interconnectors to provide what the company believes to be the ultimate in flexibility. This flexibility exceeds that

achieved with older generations of discrete component assemblies, and allows standard production modules to be used as the basis of customizing. Designed as radio or TV production consoles, this series has three standard models, but also has the flexibility of being easily adapted to a customer's specifications. The 5104 is a 4-mixing bus, 2-output mixer, offering from 12 to 48 inputs, with provision for simple or comprehensive facilities.

Intermediate in size, the 5106 is an 8-bus, 4-output mixer with standard consoles available providing 24, 36 or 48 input channels. Up to eight of the channels may be used as fully equipped and equalized groups, yet when one of these channels is selected to function as a group it is still available as an input, but with reduced facilities.

The third model in the series is the 5116, which has the same basic format of the 5106 model, but has the added benefit of 24-track monitoring and metering, with comprehensive over-dub facilities. This model has been designed for use by the growing number of radio and TV production studios requiring sophisticated multi-track mixing, but where a conventional multi-track recording console is inappropriate because of lack of facilities or layout design for this type of work.

All 51 series models are available with VCA faders, or with full NECAM 1 or NECAM 2 automation systems. (NECAM 2 is Neve's automation system designed for television and film post-production mixing.)

Particularly suited to the requirements of radio stations, the second new series of mixing consoles an-

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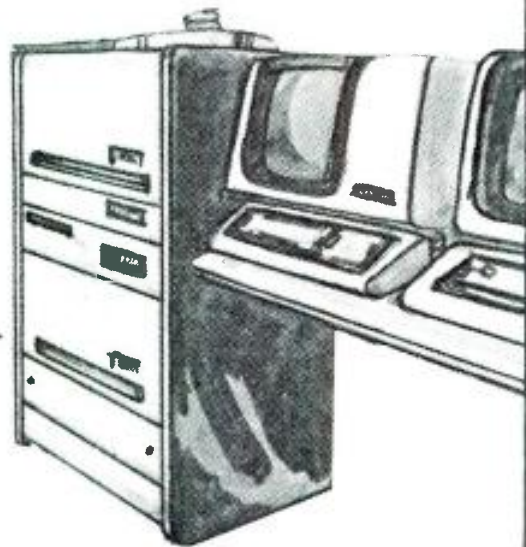
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## Business

nounced by the company is the 5322 on-air console. The 5322 caters to a wide diversity of operational requirements with the minimum of top panel controls. This is achieved by using a flexible design with the provision of preset links and switches, enabling the configuration to be matched to the requirements of the user.

The third of the new analog consoles announced is the 8128, a range produced for the professional multi-track recording industry. Designed as a follow-on from the 8108 range, the 8128 features formant spectrum equalization, which the company claims is the key to providing the distinctly musical sound of its consoles.

Maximum serviceability and reliability is claimed for the 8128, with all electronics accessible on plug-in cards employing back-plane type circuitry, and solid-state switching under microprocessor control. Available in 32-channel, 24-track; 48-channel, 32-track; or 56-channel, 48-track configurations, each with reverberation modules, the 8128 has provision for including VCA systems or NECAM 1 or NECAM 2 automation.



51 series broadcast console

The most technically advanced console introduced is the DSP (Digital Signal Processing) console designed for applications in which the user requires the ultimate in modern control systems. Totally remote from the signal processing equipment, the control console offers CCR (Complete Control Reset), full control assignability and memory of all control functions.

Neve included in its announcement the news that the British Broadcasting Corporation had declared its intention to purchase a 48-channel DSP console, for use in a fully digital remote truck containing two ¼-inch fixed head digital tape machines with provision for a digital multi-track machine.

DSP consoles carry out signal processing digitally, and can receive and output analog signals without the studio being aware that the processing is carried out in the digital-domain (in the same way that many analog studios today use digital delay lines, echo devices, etc.). DSP mixers will also operate analog in and digital out, to feed multi-track machines like the future Studer, Sony, 3M or Mitsubishi models. They can also operate digital-to-digital for mix-down between digital multi-track and digital master tape recorders.

Neve is listing with digital tape recorder manufacturers about interfaces. As an example, Neve and Studer International have announced that signal interfaces between the DSP system and future Studer digital tape machines will be guaranteed. The preferred sampling rates for

Neve's DSP consoles are 44.1 and 48kHz, although versions can be built for other standards.

Versions of the DSP mixer are also available for disc mastering applications, using digital delay to achieve the advance signal required for analog cutting lathes. With the three new analog consoles, and its digital desk, the company claims to have a console to meet almost any requirement in the broadcast industry, both now and in the future.

\*BE was invited to attend Neve's press conference in England, but prior commitments made our attendance impossible. Instead, we invited Neve to set forth the scope of its announcement here.

### California Microwave receives COMSAT contracts

California Microwave Inc. has announced receipt of \$3.9 million in contracts from Communications Satellite Corporation (COMSAT) for satellite earth station upgrades to be provided by the company's subsidiary, Satellite Transmission Systems Inc. (STS).

STS will expand the capacity of the COMSAT earth stations located in Brewster, WA, and in Andover, ME, and will prepare the stations for operation with new international satellites. These earth stations are the US international gateways to the Atlantic and Pacific for telephone, TV and data traffic via satellite.

### KVUE-TV uses helicopter in ENG coverage

Station KVUE-TV, the Austin, TX, ABC affiliate, is the first in the area to add a helicopter to its electronic news gathering (ENG) operation for local and network broadcasts.

The Bell Jet Ranger III, leased from Omniflight Helicopters of Janesville, WI, provides KVUE with a quick response facility to transport cameramen and reporters anywhere within a 100-mile radius to cover fire, floods and other news events.

The chopper has been used in covering such stories as the devastating floods that recently swept through Texas. Although its primary function is ENG coverage, the helicopter frequently is loaned out to local law enforcement officials. It is also used for emergency evacuations of injured persons.

### Telex buys antenna rotor business

Telex Communications Inc. has acquired the antenna rotor business of Cornell-Dubilier Electric Corporation in North Carolina. Financial terms of the acquisition were not disclosed.

The antenna rotor production will be continued with a minimum of disruption as manufacturing is transferred to the company's Hy-Gain division antenna plant in Lincoln, NE. Telex acquired the assets of Hy-Gain Electronics, a producer of communications antennas, in April 1978.

No significant changes are foreseen for the rotor products. They will be sold under the Telex/Hy-Gain label and marketed through the Telex Amateur Radio Products Group based at the company's head office in Minneapolis.

### Compact Video, Fernseh enter licensing agreement

Compact Video Inc. has entered into a licensing agreement with Fernseh Inc. The agreement makes Fernseh the first broadcast equipment manufacturer to incorporate Image Vision technology, a new patented process relating to high definition television, developed and owned by Compact Video Inc.

Compact Video plans to license the encoder and decoder system to other major manufacturers of cameras,



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## Business

videotape recorders and professional broadcast equipment. The system can also be used to shoot movies electronically and transfer them to film with quality similar to 35mm. The system was first demonstrated fully on Oct. 28, 1981, at the new \$20 million Compact Video Entertainment Center in Burbank, CA.

### KSTS-TV installs Cetec CP antenna

KSTS-TV of San Jose, CA, has recently installed the highest power circular polarized transmitting facility in the world. Located at the 2550 foot level of Monument Peak, eight miles North of San Jose, the station transmits with 4.6 megawatts ERP CP (4.6 megawatts each H & V) to provide reception to the San Francisco Bay area and Silicon Valley.

The antenna is a Cetec Ring Panel consisting of two arrays of four panels mounted on a triangular tower section to produce a bent peanut pattern. This pattern was selected to provide best use of the 110kW transmitter power while meeting the FCC requirements for signal strength over San Jose and restricting radiation in undesired areas.

The antenna was supplied with a waveguide input to match the transmitter output although standard transmission line feed is also available. The installation uses both electrical and mechanical beam tilt to provide optimum coverage. A 1° mechanical beam tilt combines with a 0.3° electrical tilt to cover San Jose from the antenna site. The mechanical tilt lessens in other directions, aiming the antenna beam at the population centers further away.

### Sony restructures US operations

"Sony's presence in the United States has expanded rapidly during the past several years. We have been actively building our business in many areas, adding top caliber executives to manage our various operations. We will now structure our US company into five operating groups, each with a great deal of autonomy," Akio Morita, chairman and co-founder of Sony Corporation said recently, announcing Sony Corporation of America's reorganization, which includes the addition of a new company.

The new company, the Sony Broadcast Products Company, will be headed by Neil Vander Dussen, president and chief executive officer. The company was formed to better serve the expanded market in the United States. Vander Dussen comes to Sony after a 25-year career with RCA Corporation, where he had been executive vice president of RCA's diversified businesses since 1979. The company will be headquartered in New York City, while the engineering, training and warehouse will remain in San Jose, CA.

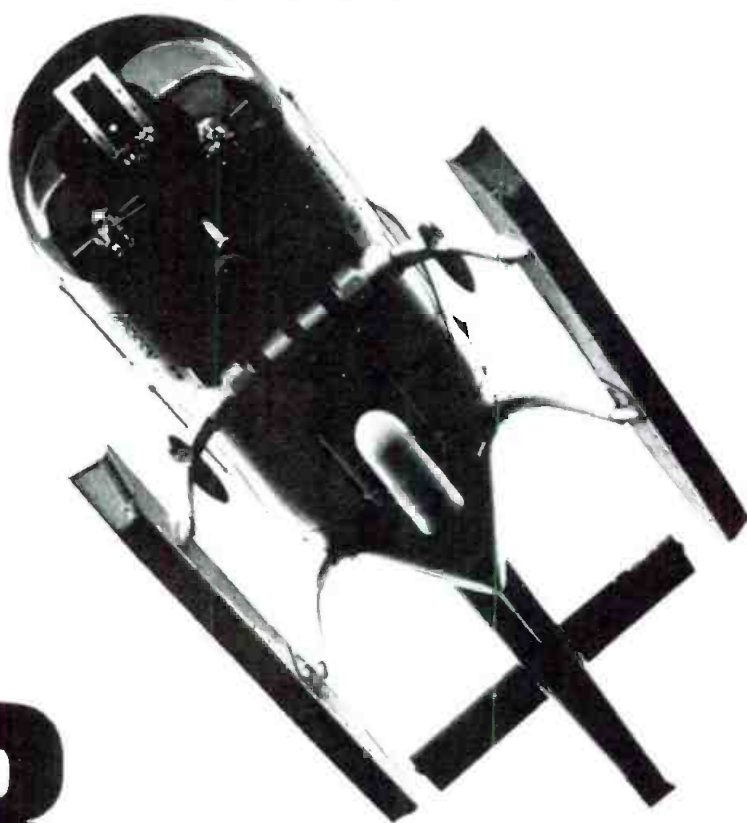
The Broadcast Products Company will be included in the marketing and sales group, one of the five in the reorganized structure. The other four are the manufacturing, service, engineering laboratories, and diversified operation groups.

The marketing and sales group includes the following companies: Sony Consumer Products Company, Joseph A. Lagore, president and chief executive officer; Sony Communications Products Company, Koichi Tsunoda, president and chief executive officer; Sony Tape Sales Company, Eiji Tanaka, vice president and general manager; and the Sony Broadcast Products Company.

The following companies are included in the manufacturing group: Sony Manufacturing Company of America, Shiro Yamada, president; and Sony Magnetic Products



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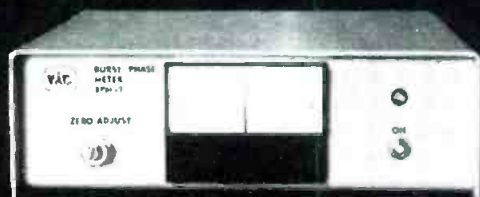
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## Business

Inc. of America, Clinton Michaelis, president.

Service operations are handled by the Sony Consumer Service Company, Tsukasa Kimura, president.

The engineering laboratories group includes the Sony Technology Center Inc., Grant Smith, executive vice president; and the Sony Consumer Electronics Laboratories.

The diversified operations group covers the Sony Aviation Inc. organization, which leases aircraft in the United States and coordinates the sale of Falcon Jet aircraft, through Sony's parent company, in the Japanese market. Other functions under diversified operations include a liaison office for Sony Trading Company that exports a wide variety of American-made products for sale in Japan and other businesses still in the developmental stage.

Executive promotions include the appointment of Kenji Tamiya as president and chief operating officer for Sony Corporation of America, filling the office made vacant in 1978 at the death of Ray Steiner. Tamiya, as executive vice president, has guided the company's growth from 1977 annual sales of \$500 million to nearly \$1.3 billion during the fiscal year ending in 1981. Also promoted was Robert E. Dillon, Jr., to executive vice president for Sony Corporation of America. Dillon has been with Sony since 1973 and has been senior vice president, finance and administration.

### ADM Technology relocates

Groundbreaking ceremonies were held in September for a modern building in Troy, MI, which will be the new home of ADM Technology Inc. The company, a manufacturer of audio consoles and components, expects to move from its present facility in Roseville, MI, to the new building this January. The new building will provide more than twice the space the company now occupies.

### Teleprompter van begins production

Teleprompter of Grosse Pointe Woods, MI, recently received its new M1-101 2-camera production van. The ¾-ton GMC Truck was custom built by the Mobile Unit Group of Midwest Corporation.

The Teleprompter unit is equipped with two Hitachi FP40S Color Cameras with studio viewfinder and rear conversion kits for the lenses. Support equipment includes generator, full video monitoring and an audio package.

The production van is currently used for shooting local programming and civic projects. Future plans call for using the M1-101 in commercial production.

### Modulation Associates receives Mutual order

Modulation Associates Inc. of Mountain View, CA, will produce audio distribution amplifiers for Mutual Broadcasting System Inc.'s nationwide satellite network. The AD01 amplifiers plug into the existing Mutual satellite earth terminals and will be used to distribute multiple audio program channels from the terminals at the Mutual affiliates to other nearby stations who use the company's services.

### Toshiba America relocates offices

Toshiba America Inc. has announced the reorganization and relocation of its divisional headquarters to Tustin, CA. The reorganization, which was effective in July, was the result of the company's growth and diversification.

Under the new alignment, Toshiba America Inc. contains two independently operating business groups. The



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**Entertainment:** Theatre television, closed-circuit TV events, overflow crowds, special effects.

**Television Production:** Backgrounds for news programs, special effects, data display, program previewing.

Call or write: General Electric Company, Video Display Equipment Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152.



**NEWS BACKGROUND** at WTMJ-TV, Milwaukee, is displayed rear screen by General Electric projector.



**SELL-OUT CROWDS** at Fiske Planetarium, Boulder, watched live NASA transmission presented by General Electric projector.

## GE Professional Large Screen Television Projector Specifications

### COLOR PROJECTORS

Model	Light Output in Lumens			Resolution* in TV Lines per Picture Height		Input Power Req.		Scan Standards***	Video Input**
	Open Gate, Min.	Modulated TV, Min.	Modulated TV, Typ.	Min. Horiz.	Min. Vert.	Watts	Volt-Amps.		
PJ 5000	550	220	280	750	300	1200	1600	525 li./60 fps; 625 li./50 fps	(1)
PJ 5050	1250	500	650	750	300	1600	2150	525 li./60 fps; 625 li./50 fps	(1)
PJ 5800	550	200	280	750	600	1200	1600	875 lines, 60 fps	(2)
PJ 5850	1250	500	650	750	600	1600	2150	875 lines, 60 fps	(2)
PJ 5100	550	200	280	750	650	1200	1600	1023 lines, 60 fps	(2)
PJ 5150	1250	500	650	750	650	1600	2150	1023 lines, 60 fps	(2)

### MONOCHROME PROJECTORS

PJ 7000	1000	600	750	800	400	1000	1350	525 li./60 fps; 625 li./50 fps	(3)
PJ 7050	1700	1000	1250	800	400	1000	1350	525 li./60 fps; 625 li./50 fps	(3)
PJ 7055	3300	2000	2400	800	400	1500	2000	525 li./60 fps; 625 li./50 fps	(3)
PJ 7800	1000	600	750	800	650	1000	1350	875 lines, 60 fps	(3)
PJ 7850	1700	1000	1250	800	650	1000	1350	875 lines, 60 fps	(3)
PJ 7855	3300	2000	2400	800	650	1500	2000	875 lines, 60 fps	(3)
PJ 7100	1000	600	750	800	750	1000	1350	1023 lines, 60 fps	(3)
PJ 7150	1700	1000	1250	800	750	1000	1350	1023 lines, 60 fps	(3)
PJ 7155	3300	2000	2400	800	750	1500	2000	1023 lines, 60 fps	(3)

Line Power. All Projectors: 117 or 240 v. ± 10%, 50/60 Hz

\*Resolution measurements made with wide-band video input

\*\*Video Input Key (1) NTSC or RGB (2) RGB. (3) Wide-Band

\*\*\*For use at other scanning rates, contact General Electric (VDEO) for special application/model information

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**NAB Booth 1903**

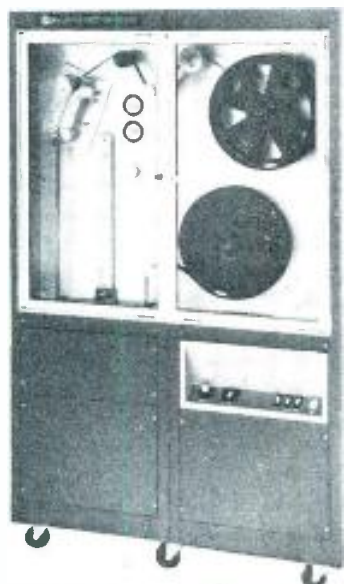
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## Business

Consumer Products Business sector has maintained its headquarters offices in Wayne, NJ.

The Industrial Electronic Business sector is headquartered in a new facility in Tustin, CA. Its operating divisions include:

- the Broadcast Electronic Systems Division—presently located in Sunnyvale, CA;
- the Business Equipment Division, presently located in Wayne, NJ;
- the Electronic Components Division, presently located in Irvine, CA, and Northbrook, IL;
- the Industrial Electronics OEM Division, presently located in Northbrook, IL;
- the Information Processing Systems Division, presently located in Tustin, CA;
- the Medical Systems Division, presently located in Carson, CA; and
- the Telecommunications Systems Division, presently located in Armonk, NY.

All of these Toshiba America divisions are being relocated and headquartered at the new Tustin office, 2441 Michelle Drive, Tustin, CA 92680; (714) 730-5000.

For more information, contact John Lesser & Associates, 420 Lexington Ave., New York, NY 10170; (212) 986-6660.

### Dynatech, Utah Scientific merge

Utah Scientific recently became a subsidiary of Dynatech Corporation. The transaction was implemented as a merger, with Utah Scientific shareholders receiving Dynatech shares in exchange for their Utah Scientific shares.

The merger satisfied both the long-range objectives of Dynatech in acquiring a leading company in the growing telecommunications field, and of the Utah Scientific shareholders because they could capitalize on the substantial growth in their Utah Scientific equity, receiving publicly traded shares in a tax-free exchange.

J.P. Barger, Dynatech president, said the company views the merger as a logical extension of its involvement in the communications industry and as a forerunner to a broader involvement by Dynatech in broadcast communications. Utah Scientific will continue under its present management with its operations continuing essentially unchanged in Salt Lake City, UT. No changes are planned in the company's products or markets served.

### Winegard expands product line

The Winegard Company has recently announced Winegard's expanded line of earth station products.

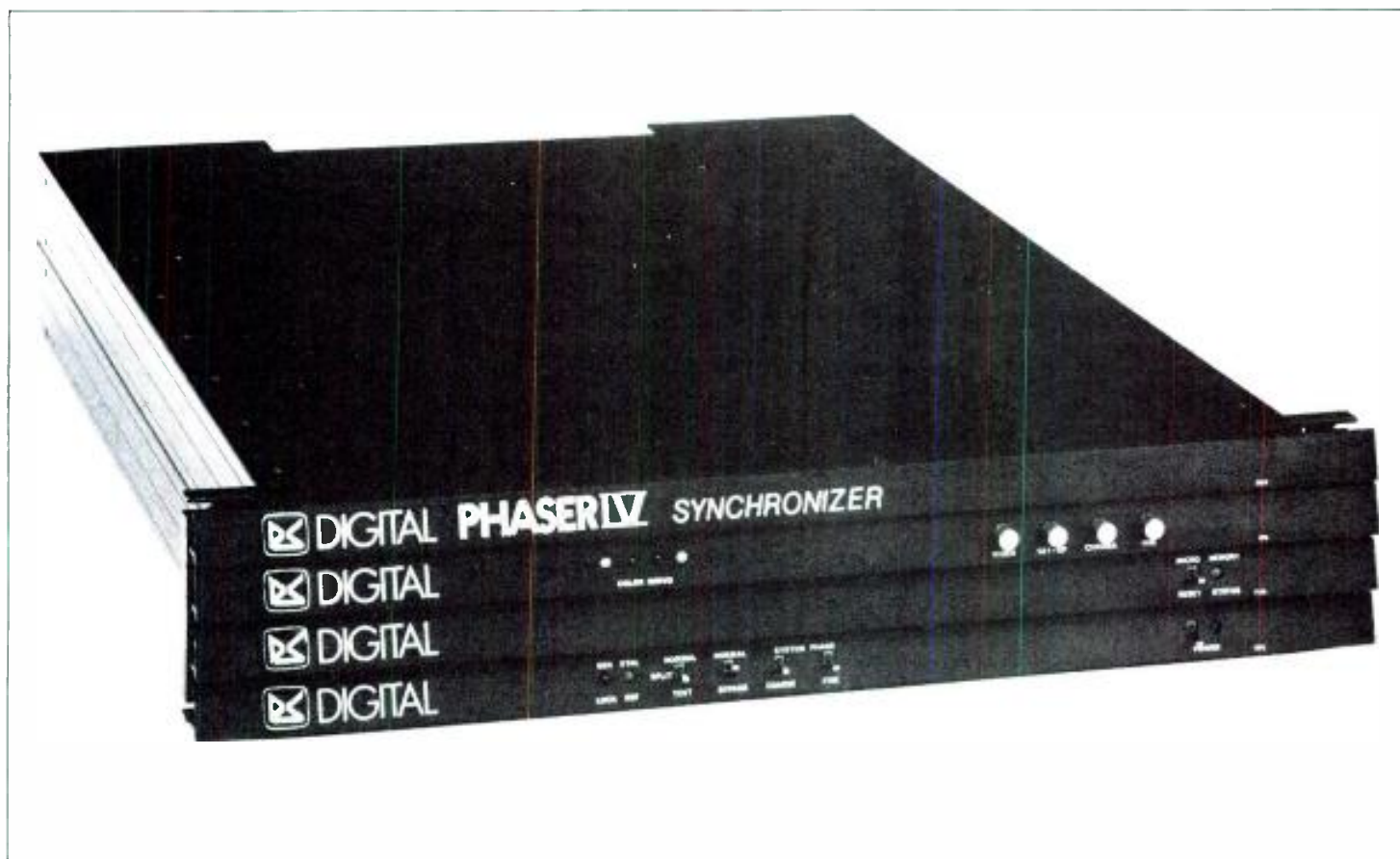
Winegard is offering four complete, commercial grade quality earth station packages ranging in list price from \$7995 to \$10,600. Each package includes two LNAs, 24-channel tunable receiver, polar mount, dual-polarized feed and segmented fiberglass antenna. Combination packages of 10-foot and 12-foot antennas and 120° and 100° LNAs are available. Customers can also buy components separately.

Winegard also has demonstrator units available for site surveys, which are complete earth station packages including trailers.

### Hitachi Denshi announces reorganization

Hitachi Denshi America Ltd. recently announced its reorganization. The new structure will include a Broadcast and Professional Division, Test and Measurement Division and Visual Products Division.





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of system throughput against a precision digital test signal output every 16 lines. System performance can be evaluated instantly and, if necessary, analog alignment adjusted easily without external test signals.

The Phaser IV also has 5 TV line hysteresis. Motion discontinuities due to frame deletion or insertion are virtually invisible.

And, of course, VTRS, closed caption subtitling, and teletext are passed without degradation. And, because the Phaser IV is modular, maintenance is simple. All Digital Video Systems' dealers selling this product carry service kits of replacement boards.

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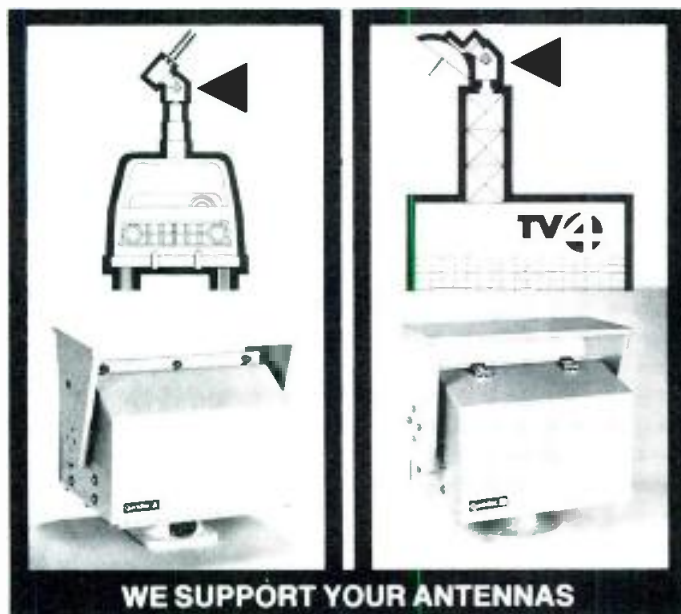
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## Business

Bernard Munzelle, national sales manager, has been promoted to vice president of Hitachi Denshi America Ltd., as well as national sales manager of the Broadcast and type "C" VTRs and FP cameras.

Alex Orloff, sales manager of the Test and Measurement Department has become national sales manager of the Test and Measurement Division, handling oscilloscopes, waveform monitors and new products to extend the current product line.

The Visual Products Division, which includes GP cameras, the new 1/2-inch VHS portable recorder and tuner timer, monitors and black and white CCTV cameras, will be under Fred Posner, in the new position of national sales manager for Visual Products. Richard Alexander has been appointed product/marketing services manager for the FP and GP cameras and 1/2-inch VHS.

The purpose of the reorganization is to provide a strong base for future growth while strengthening dealer/sales support. The new structuring will allow for better servicing of dealers and end user needs.

### Vital announces SqueeZoom sales

Vital Industries has announced sales of SqueeZoom systems now totaling 150 multichannel units worldwide. "Many areas of the world have virtually no specialty post-production houses and have to rely on their own facilities to turn out a reliable sophisticated product," said Christopher Donoyan, Vital's president. Worldwide sales efforts since 1980 have placed systems in 24 countries including Africa, Asia, Europe and South America. These sales reflect system use in all three major color standards: SECAM, PAL and NTSC.

### Sony acquires MCI

Sony Corporation of America has recently acquired MCI of Fort Lauderdale, FL, a manufacturer and seller of professional recording equipment.

The privately owned Florida company, founded in 1955, is the largest manufacturer of multi-track recorders and studio mixing consoles in the United States. Its facilities include a main manufacturing plant and a precision service plant in the Fort Lauderdale area with 440 employees.

MCI will be an independent division within Sony Corporation of America. Daily operations of MCI will continue unchanged. MCI's founder, G.C. (Jeep) Harned will remain as president and chief executive officer of the MCI Division, and Michael Schulhof, a director of Sony Corporation of America, has been appointed chairman.

MCI announced last spring that it would adopt the common format for multichannel stationary-head digital audio recording system announced in 1980 by Sony Corporation and Willi Studer of Switzerland.

Officials of both companies noted that MCI is well-positioned to develop the major new market in professional audio equipment that will open with the introduction of stereophonic AM and TV broadcasting and the anticipated expanding consumer market for component television.

The new operation will join an existing broadcast video technology from Sony. The Sony Technology Center in Palo Alto, CA, is a manufacturer of broadcast VTR controls and a major research and development operation in the broadcasting field.

The MCI facility becomes Sony Corporation of America's fourth major manufacturing operation in the



United States. A color TV plant, established in 1972 in San Diego, CA, was the first such facility started here by a Japanese company. In 1977, Sony opened a magnetic tape plant in Dothan, AL, and the company announced plans last year to build a second color TV plant in Columbia, SC, which will become operational later this year.

### Harris Farinon changes name

Farinon Video, an operation of the Broadcast Products Division of Harris Corporation, recently announced that the operation's name has been changed from Farinon Video to Harris Corporation, Broadcast Microwave.

James B. Murray, vice president and general manager of the company, said, "When the company was founded nine years ago, the name 'Farinon Video' was chosen to display our association with Farinon Electric, as well as with the TV industry. Many changes have occurred in the history of the company; in particular, the recent joining of our operation with the Broadcast Products Division and the formation of the Farinon Division. The name Broadcast Microwave is more descriptive of the kind of systems we market to the broadcast industry. We believe our customers will better identify our place in the business."

### 3M acquires ITC

International Tapetronics Corporation (ITC) of Bloomington, IL, and 3M recently announced an agreement for the purchase of ITC by 3M for undisclosed cash terms. The agreement calls for operation of ITC as a subsidiary of 3M's Magnetic Audio/Video Products Division.

ITC produces tape cartridge equipment for the radio/TV industry. 3M, since pioneering the introduction of magnetic tape in the United States in 1947, has become a worldwide producer of audio- and videotapes as well as audio- and videocassettes under its Scotch brand trademark. 3M company-wide sales of all products totaled \$6 billion in 1980.

ITC has operated as a privately held company since its founding in 1969. Principals in the sale to 3M are N. Elmo Franklin, board chairman; John P. "Jack" Jenkins, president; Andrew M. Rector, executive vice president; and W. Merle Wilson, a retired employee, and their families.

Franklin plans to pursue other business interests; Jenkins, Rector and other key ITC management personnel will continue to function in their present positions. Jenkins will assume overall management responsibility for the new 3M subsidiary, reporting to John E. Povolny, division vice president, Magnetic Audio/Video Products/3M.

Povolny's division is a part of 3M's Electronic and Information Technologies Sector, one of the firm's four major operating business units. Povolny said the ITC acquisition will provide 3M with a strong systems manufacturing and marketing capability for new cartridge technology, which has been under development in 3M's St. Paul laboratories for several years. He expects the combined ITC-3M expertise to result in an expanding line of products for the broadcasting industry, with some of these new products to be introduced in 1982. Systems manufacturing would continue to be centered in the Bloomington facility.

In addition to tape cartridge equipment, ITC also manufactures a line of reel-to-reel audiotape recorders and accessories for broadcasting and sound studio applications.

Assets of two ITC subsidiaries—ITC Communications of Arizona, which owns Radio Stations KJJJ-AM/FM. Phoenix, AZ; and Field Electronics, which is involved in electronic agricultural products—are not involved in the 3M acquisition. □

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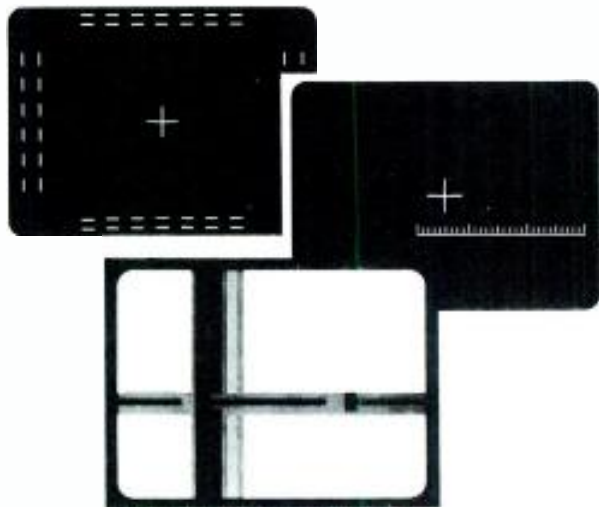
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## people



Anita K. Gold has been named eastern marketing manager for Intertec Publishing Corporation's Electronics Group of publications, including *Video Systems*, *Broadcast Engineering* and *Radio y Televisión*. The announcement was made by Cameron Bishop, group publisher. Gold joins the company with a strong background in sales and marketing. She is former president and general manager of AKG Consulting in New York City, and was advertising manager for *Art News* and *Portfolio* magazines. Before that she lived and studied Japanese art and archeology in Tokyo. Gold has held several faculty and lectureship positions at numerous colleges and universities. She received an MA from the University of Michigan and holds a PhD in Art History/Middle East Studies from New York University.

**Terry A. Murphy** has been named manager of marketing training for General Dynamics Communications Company (GDCC). Murphy is responsible for product and sales education functions.

**Janet L. Fowler** was recently appointed vice president and corporate controller of Central Dynamics Corporation and its American Data Division. Her responsibilities will include all accounting and financial operations at both American Data and the corporate offices of Central Dynamics. Fowler has been the chief financial officer and controller for American Data for the past eight years.

System Concepts Inc. has announced the appointment of **Joseph W. Hering**, Western regional sales manager; **Ronald Ward**, manager, Product Design Engineering; and **David Quebbeman**, technical writer.

**Donald H. Haight** has been appointed general manager of the Audio Products Group of the Ampex Audio-Video Systems Division. Haight will be responsible for the development, manufacturing and marketing of all Ampex audio products. He succeeds **Charles Coover** who has been named manager of product management for the Video Recorder Group in the Ampex Audio-Video Systems Division.

**William H. Borman** has been named vice president, marketing and sales for the ADDA Corporation. Borman was formerly director of marketing and has been with the company since 1980.

California Microwave Inc. (CMIC-OTC) recently announced three corporate and two divisional promotions.



Gilbert F. Johnson, executive vice president, has been designated chief operating officer of the company. **Howard Oringer**, president of the Telecommunications Division, was appointed a corporate executive vice president. **Joseph Russell** was appointed president of the Government Electronics Division and a vice president of the company. **Russell Hardy** was promoted to division vice president/defense equipment. Hardy is responsible for the engineering and manufacturing activities of the Government Electronics Division. **Herbert P. Radding** was promoted to director/operations for satellite communications.

Moseley Associates Inc. has announced the appointment of **Bill Ticen** as international sales manager. Ticen, formerly a sales engineer in the marketing department, will be responsible for the sales of all Moseley-manufactured products through a distributor network of 44 representatives and distributors in more than 80 countries worldwide.

**Howard G. McClure** has been appointed vice president of marketing, Townsend Associates Inc.. McClure will assume the responsibilities for domestic and international sales and product management. McClure comes to Townsend Associates from Fernseh Inc., where he was director of product management and applications engineering.

**Richard Stevens** has been named Southeastern regional sales representative for Sony's Professional Digital Audio Division. Stevens brings to his new position several years of experience as a recording engineer in addition to an extensive background in studio design and computerized acoustic research and analysis.

The appointment of **Donald E. Quinn** as vice president, Alascom Services and New Business Development for RCA American Communications Inc., has been recently announced. In his new position, Quinn will continue to serve as RCA Americom's liaison with Alascom, but will also be responsible for studying new business opportunities involving domestic satellite communications. Initial emphasis will be on the market potential for direct broadcast satellites.

MCI/Quantel has announced several promotions and new appointments. **Donald Prather** has been promoted from national sales manager to sales vice president, a new position. **Paul Kendrick**, formerly director of engineering, has been promoted to the new position of director of research and development. **George Hamilton**, formerly technical services manager of the company's Eastern region, has been promoted to director of engineering and technical services. **Judy Thoene**, formerly manager of marketing administration, has been promoted to director of administrative services, a new position that includes corporate as well as marketing responsibilities. **Joseph Hanf**, previously Eastern regional service manager for Consolidated Video Systems, has been named to the new position of Northwest district sales manager. **Laurence Biehl**, previously production/operation manager for ABC-TV's Detroit station, has been named to the new position of North Central district sales manager. **Gary Young**, previously sales vice president of Dallas Records, has been named to the new position of South Central district sales manager. □

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**INSTANT CASH FOR BROADCAST Equipment:** Urgently need Transmitters, AM-FM-TV; Microwave; Towers; WX Radar; Color Studio Equipment. Ray LaRue or Bill Kitchen, Quality Media Corp., 800-241-7878. In GA 404-324-1271. 3-82-11

**\$500 REWARD FOR UHF TRANSMITTERS:** For information which leads to our purchase of any UHF TV Transmitter. Call Ray LaRue or Bill Kitchen 800-241-7878. In GA, 404-324-1271. 3-82-11

**INTERIOR MODULES FOR OLD COLLINS 212-F-1** console including power supply; Volumax 400 peak controller; old Magnecord tape decks; RCA 44 ribbon mike; RCA ribbon mike desk stand; old roundback carts, KVXL, Box 4, Bisbee, Arizona 85603. 3-82-11

**AM AND FM TRANSMITTERS** to 5kW wanted. Any condition considered. 805/646-2358. 832 County Dr., Ojai, CA 93023. 3-83-2t

**WANTED:** Pre-1928 radio equipment and tapes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, CA 92054, (714) 722-6162. 3-76-tf

**HIGHEST PRICES PAID** for 112 Phase Monitors and for clean, 12 year old or less, 1 KW and 10 KW AM Transmitters. All duty and transportation paid. Surplus Equipment Sales, 2 Thorncliffe Park Dr., Unit 28, Toronto, Canada M4H 1H2, 416-421-5631. 2-79-tfn

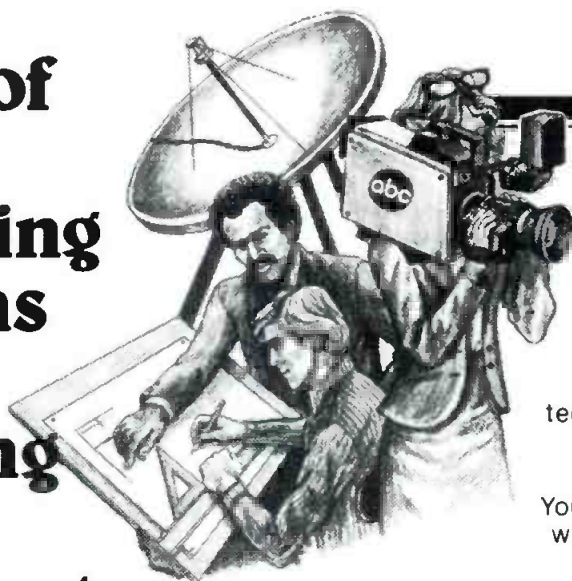
**INSTANT CASH FOR TV EQUIPMENT:** Urgently need transmitters, antennas, towers, cameras, vtrs, color studio equipment. Call toll free 800-241-7878. Bill Kitchen, Quality Media Corporation (in Georgia call 404-324-1271). 6-79-tfn

**WANTED:** Radio Transcriptions 16" E.T.'s any Eddy Arnold or other Country 15" or 12" Transcriptions. Will consider others. Interested in Radio Station Libraries to purchase, all speeds of records. Boyd Robeson, 2425 W. Maple, Wichita, Kansas 67213, (316) 942-3673, 722-7765 Ev. 9-80-tfn

**WANTED: USED RECORDING EQUIPMENT** of all ages and varieties. Mics, outboard, etc. Dan Alexander, (415) 441-8936. 1-82-6t

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Engineering

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## HELP WANTED (CONT.)

**ENGINEERS, TV Systems Engineers, Electronic Technicians, Technical Supervisors, Maintenance.** Immediate openings. Experienced. Full time. Full benefits, plus Pension. Excellent salary plus commissions. Send resume to Technical Operations, Inc., P.O. Box 840, New Hyde Park, N.Y. 11040, or call Personnel Mgr. (516) 352-2238. 9-80-tfn

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## HELP WANTED (CONT.)

**ENGINEERING SUPERVISOR—WFUM-TV HAS** an opening on its technical staff. Duties include supervising a small group of technicians; maintaining TV equipment; and training others in good engineering practices. Competitive salary, excellent benefits. The University of Michigan is a non-discriminatory/affirmative action employer. Send resume to: WFUM-TV, The University of Michigan-Filmt, Flint, Michigan 48503, Attn: Guy Beverlin, Chief Engineer. 2-82-21

**AUDIO ENGINEER—The School of Music, University of Michigan,** offers an immediate opening for an audio electronics and recording engineer, skilled in the design, construction and maintenance of professional recording systems and analog-digital music synthesis facilities with comparable abilities as a recording specialist. Professional experience required. B.S. in Electrical Engineering or in a related technical field preferred. Familiarity with computer hardware and program implementation desirable. Reasonable background in a broad range of musical literature with an ability to communicate effectively with a diverse group of student, faculty and non-university clientele essential. Salary dependent on qualifications and experience. Address letter of application and resume to: Prof. George Balch Wilson, School of Music, The University of Michigan, Ann Arbor, MI 48109. Application deadline: April 30. An affirmative action, non-discriminatory employer. 3-82-11

**SOFTWARE/HARDWARE ENGINEER:** A position is available for an individual with a strong hardware and software background in 8080/386 and similar instrument systems. This position requires 2 or more years experience with assembly language software development and a B.S.E.E. or equivalent degree. **PROJECT ENGINEER:** This position requires an individual who is able to assume overall responsibility for development of digital audio products from specification through introduction to production. Applicants should be familiar with both digital and analog processing systems and have had prior experience in designing products for the professional audio or broadcast market. Interested applicants are invited to submit their resumes (specifying position of interest) to: LEXICON, INC., 60 Turner St., Waltham, MA 02154, (617) 891-6790. Lexicon is an Equal Opportunity Employer. 3-82-11

## HELP WANTED (CONT.)

**CHRISTIAN TELEVISION:** Rapidly expanding noncommercial broadcast/cable network requires experienced maintenance engineers for its station in southern California, Oklahoma City, and Cincinnati areas. Send resume and salary history to Ben Miller, Director of Engineering, Trinity Broadcasting Network, P.O. Box "A", Santa Ana, California 92711. EOE. 3-82-11

**KRGV-TV IN THE LOWER RIO GRANDE VALLEY** of Texas, has an opening for an Asst. Chief Engineer/Studio Maintenance Operator. For more info call Bill Yordy, Director of Engineering, c/o WBRZ-TV, 504-387-2222. 3-82-11

**WANTED, VIDEO TECHNICIAN,** maintenance experience required. ENG experience preferred. Great opportunity for Operations Engineer, doing some maintenance to move into a maintenance oriented position. Live and work in a warm resort community. Contact: John Ross, Chief Engineer, KIII-TV, Corpus Christi, TX, (512) 854-4733. 3-82-21

**MAINTENANCE ENGINEER FOR AM AND TV station** wanted. FCC license and two years maintenance experience required. Salary: \$20,000 to \$24,000 D.O.E. Contact: Chief Engineer, Bethel Broadcasting, Inc., P.O. Box 468, Bethel, Alaska 99559. Bethel Broadcasting, Inc. is an Equal Opportunity Employer. 3-82-21

**VIDEO ENGINEER—IMMEDIATE OPENING:** Award winning Boston production house has an immediate opening for a top-notch video engineer. Heavy emphasis on commercial production. Maintenance and management experience a desired plus. Excellent salary and benefits package. Call (617) 329-4080 or write to: President, Videocom, Inc., 502 Sprague Street, Dedham, MA 02026. 3-82-11

**TV/RADIO MAINTENANCE ENGINEER.** State-of-the-art television production facility and FM radio station. First Phone, min. 3 yrs. current broadcast maintenance experience. Salary—low to mid 20's. Excellent benefits. Contact: Personnel Services, SAN DIEGO COMMUNITY COLLEGE DISTRICT, (714) 230-2110. EO/AA Employer. 3-82-11

**ASSISTANT CHIEF ENGINEER—We** are looking for an individual with 3-5 years studio/transmitter maintenance experience with a desire to move up to a management level position. We are a growing independent UHF in a major eastern market, group owned, offering a competitive starting salary and benefits package. E.O.E. M/F. Please forward resume and salary history to Dept. 558, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 3-82-11

## Television Studio Engineer/Technician

Experienced Television Engineer/Technician needed for our audio and video production center expansion. Your responsibilities will include production coordination as well as set-up, operation and maintenance of production equipment.

We require a minimum of three years experience in a video production facility. An electrical engineering degree is preferred. However, a technician with a strong technical background will be considered.

Our company, a Fortune 500 manufacturer of electrical equipment, is a leader in its field. We offer an excellent salary/benefit package. Please send your confidential resume or letter, including salary history, to Cynthia Duwel, Square D Company, 1415 S. Roselle Road, Palatine, IL 60067.

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- Design of high performance digital image processing equipment. Development of TV video frame synchronizers or time base correctors for video tape recorders. Ability to engineer and control synchronization and timing between subsystems; electro-mechanical, electronic memory and analog video processing.
- Circuit and system design of TV systems (NTSC, PAL, SECAM). Analysis of feedback systems and design of high-speed digital processors including A/D-D/A conversion. Knowledge of color t.v. systems, broadcast VTR/TBC, filters, signal processing and frequency/phase time relationships.
- Development and refinement of communication systems; linear systems and frequency/phase modulation principles. Knowledge of TV encoding systems, NTSC and PAL standard systems. Ability to use television techniques to improve system performance and develop system tolerance.

RCA offers an excellent compensation and benefit package along with substantial relocation assistance. Please send your resume to:

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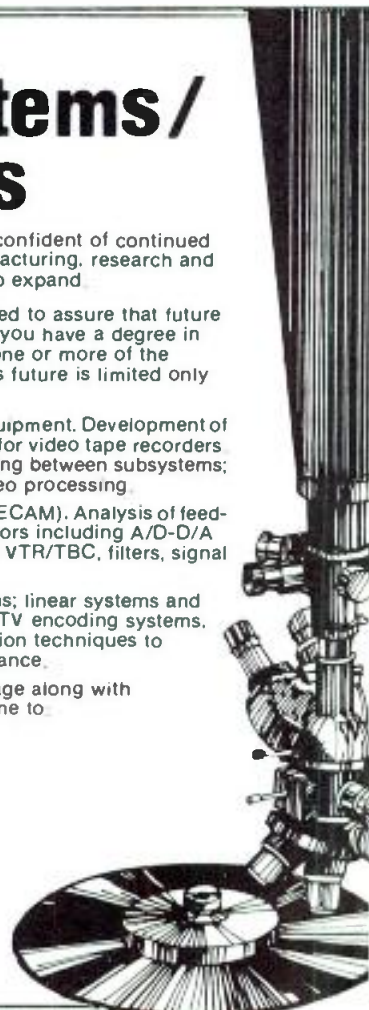
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## HELP WANTED (CONT.)

### ENGINEERING AND TECHNICAL SALES POSITIONS

We specialize in the placement of **Technical Engineers with Television Stations, Cable TV, Satellite Programmers & Networks, Pay TV, Manufacturers, Industrial TV, CCTV, Production Houses & Dealers. Also, technical sales with Manufacturers & Dealers. All levels, positions & locations nationwide. Employers pay all fees - confidential, professional. Over \$3,000,000.00 in Salaried Positions Placed. Employee & Employer inquiries invited.**

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**TV MAINTENANCE TECH. ENGINEER:** Experience with IVC 9000's, Ampex Quads, CMX Systems. Analog electronic animation equipment valuable. Career opportunity for someone with broad experience in maintenance planning and supervision. Salary commensurate with experience. Write in confidence to Dolphin Productions, Inc., 140 East 80 Street, New York, N.Y. 10021. 2-82-31

## HELP WANTED (CONT.)

**MAJOR PRODUCTION FACILITY IN FLORIDA**, is offering top salaries to experienced Maintenance Engineers. Work in a modern new facility with state-of-the-art equipment. Contact: Robert Hemsley, Chief Engineer, (1-305-920-0800), 2040 Sherman Street, Hollywood, Florida 33020. 2-82-31

**MAINTENANCE ENGINEER FOR GROWING** post-production facility. Experienced only; familiar with 1", 2" and 3/4" videotape recorders. CMX editing and switchers helpful. Send resume to Greg Reis, Edit/Chicago Video, 160 E. Grand Ave., Chicago, IL 60611. (312) 280-2200. 2-82-21

**ASSISTANT CHIEF ENGINEER:** Responsibilities include operation/training of the Maintenance Department, overseas equipment installation and repair. The qualified applicant should possess general class radio/telephone license. Prior transmitter and studio maintenance experience is preferred. We are a group-owned network affiliated VHF station. Send resume and salary requirements to: Personnel, KLTU-TV, P.O. Box 957, Tyler, Texas 75710. Equal Opportunity Employer. 2-82-21

**SYSTEM DESIGN ENGINEER - CCTV.** Must be able to specify, design, supervise installation and de-bug top quality industrial CCTV systems. Experience required. **SYSTEM ENGINEER - AUDIO VISUAL and PROFESSIONAL AUDIO.** Hands on experience with audio/visual equipment a must. Digital knowledge helpful but not required. Responsibilities include complete job oversee and client interface. Both positions provide paid health, life insurance, vacation, etc. Please call collect 201-288-6130, Stylist Systems, Teterboro, N.J. 9-81-11n

## POSITION WANTED

**POSITION WANTED:** I have a B.S. Degree in Broadcast Engineering with 2 years experience in operation and maintenance in TV. Will relocate. Seeking for a job. Write Dept. 559, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 4-82-11

### International Opportunity Audio Visual

The King Faisal Specialist Hospital and Research Centre has current openings in its Audiovisual Department for a Chief TV Engineer and a Producer/Director. The AV Department is responsible for the educational and television needs of the Hospital's employees and their dependents. The Hospital, a 250 bed acute care referral facility, is located in Riyadh, Saudi Arabia.

#### Requirements:

**Chief TV Engineer:** BSEE, 8 years related experience (2 as supervisor) in the design and maintenance of CCTV systems and other AV equipment.

**Producer/Director:** BA in communications, radio - TV, Journalism or related field and 3 years "hands-on" production experience directing production crews.

Benefit package includes attractive salary, 30 day annual leave, furnished housing, bonus leave and bonus pay.

For further information and/or to apply, please send resume to: Kathleen Langan, Personnel Consultant, Hospital Corporation of America, International Division, P.O. Box 550, Nashville, TN 37202.

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**Se Necesita Director Técnico:** La revista RADIO Y TELEVISION necesita un Director Técnico que tenga la habilidad de escribir y leer fluentemente el inglés y español para traducir terminología técnica. También debe tener amplios conocimientos sobre equipo de radiodifusión y teledifusión. Enviar las solicitudes conjuntamente con antecedentes profesionales y requisitos de salario a: Publisher, Radio y Televisión, P.O. Box 12901, Overland Park, Kansas 66212.



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