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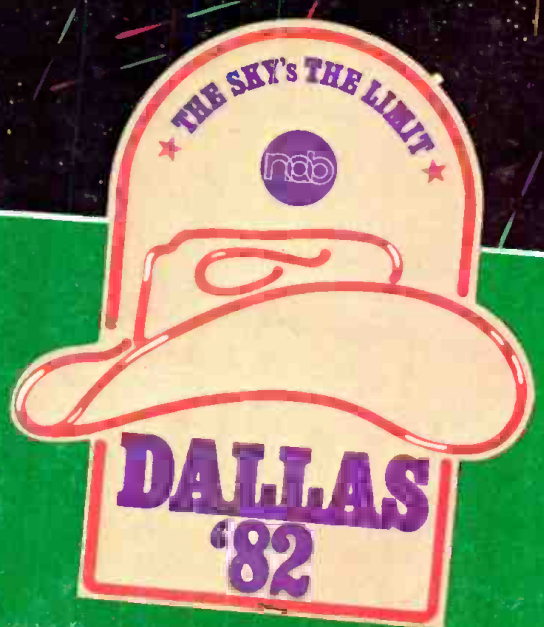

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BROADCAST engineering

The journal of broadcast technology

March 1982 • Volume 24 • No. 3

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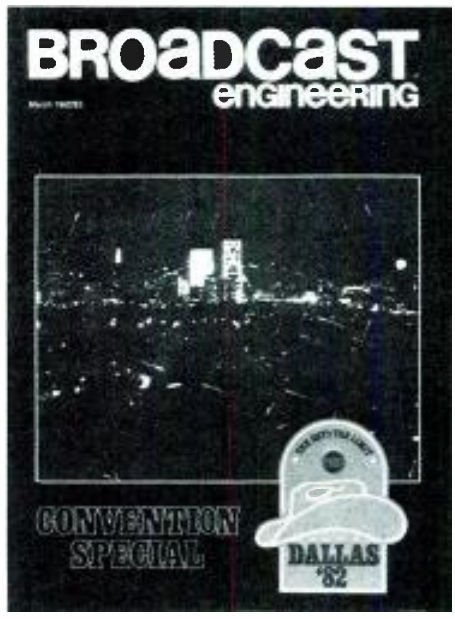

THE COVER this month is adapted from NAB brochures promoting the organization's 60th annual convention and international exposition. The convention's theme is "The Sky's the Limit"...in radio...in television...in engineering...in new technologies...and in government regulations. NAB-'82 will help broadcasters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

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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
- SMPTE Winter Conference highlights
- INTV Conference highlights
- Special cable engineering demographics

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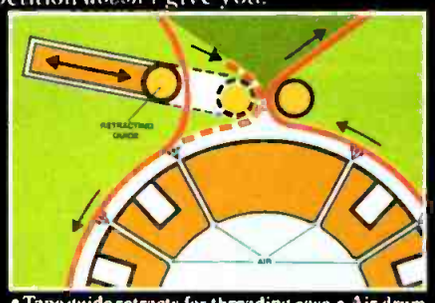

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4. Audio and Video Confidence

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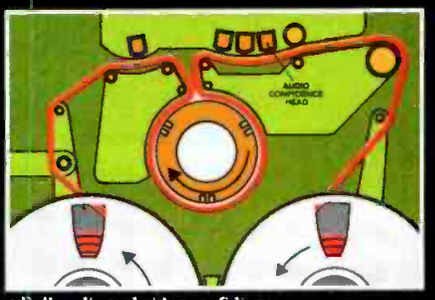
5. Non-contact Tape Shuttle System

In shuttle and standby modes, tape rides on a cushion of air. Increases head and tape life immeasurably. Cuts frictional 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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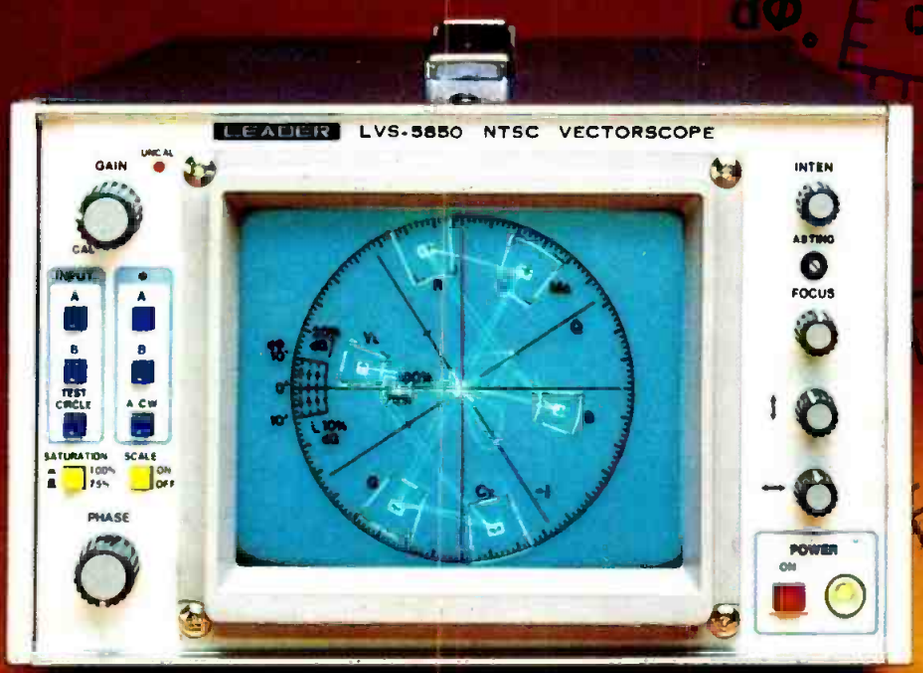

The Leader Vectorscope is unique.

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, 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.

LCG-400 Sync/Test Generator.

A network-proven 50 MHz oscilloscope.

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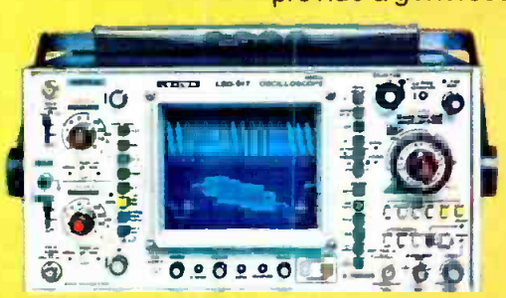

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FCC update

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 commisison 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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Design for the 2213 ($1100) and dual time base 2215 (just $1400) includes some 65% fewer mechanical parts. Fewer circuit boards. Fewer electrical connectors and cabling. Result: a lower purchase price for you plus far greater reliability.

Performance is pure Tektronix: there's the bandwidth for digital and high-speed analog circuits. The sensitivity for low signal measurements. The sweep speeds for fast logic families. A complete trigger system for digital, analog or video waveforms. And with the 2215 you get fully calibrated delayed sweep for fast accurate timing measurements. New high-performance 10X Tektronix probes are included!

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

Sensitivity: Scale factors from 100 V div (10X probe) to 2 mV div (1X probe). Accurate to ± 3%. Ac or dc coupling.

Delayed sweep measurements: 2213: standard sweep, intensified after delay, and delayed. 2215: A only, B only, or A and B alternately with A intensified by B.

Complete trigger system: Modes include TV field, normal, vertical mode, and automatic. Internal, external, and line sources, variable holdoff; separate B sweep trigger on 2215.

Probes: High performance, positive attachment, 10-14 pF and 60 MHz at the probe tip.

The price: Just $1100 for the 2213 and $1400 for the dual time base 2215*. Order direct from the Tektronix National Marketing Center, your hotline for the 2200 Series and all Tektronix accessories. Phones are staffed by sales engineers who can answer your technical questions.

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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.

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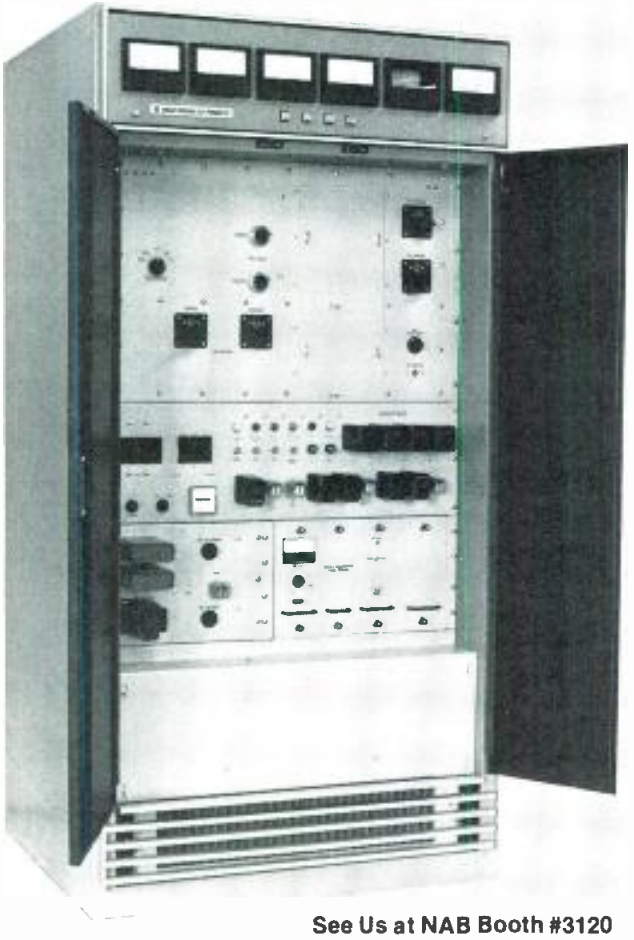

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Teletext field trial enters second phase

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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"I have never been as impressed with a new piece of gear as I am with our programmable SatCom Technologies earth station antenna."

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 N.A.B. Show!

Photographs courtesy of WWBT Richmond.

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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 Bitish 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 alphamosaic 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 Lunch, 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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associations

SMPTE

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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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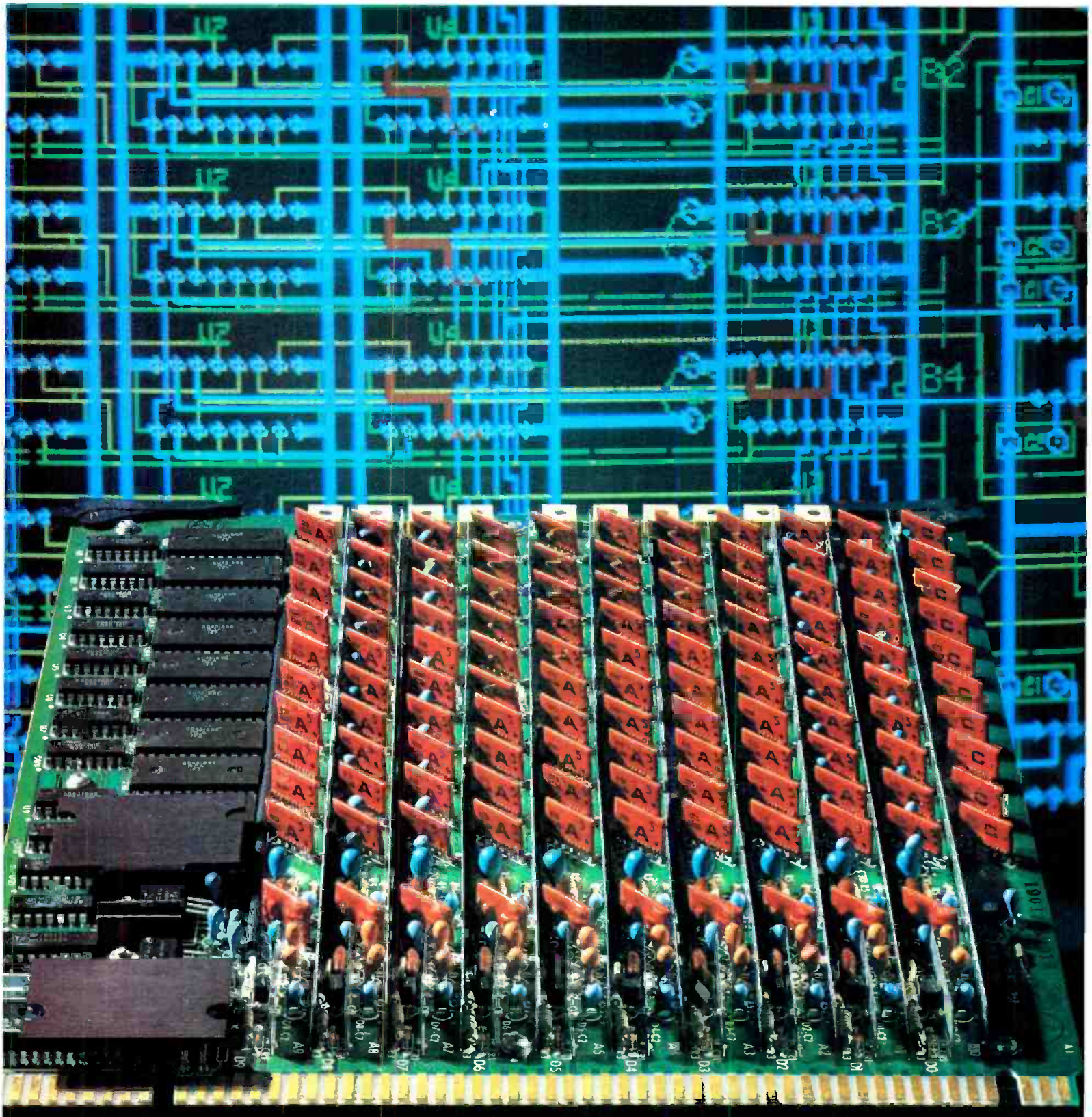

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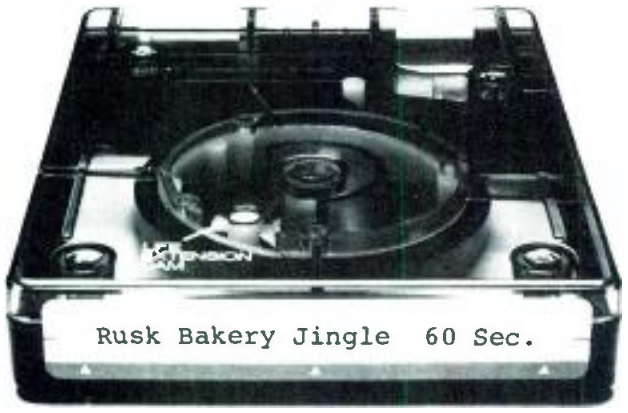

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Associations

Commercial minority broadcast ownership increases

Minority ownership of commercial broadcasting stations increased by 7.5% in 1981, according to statistics relesed 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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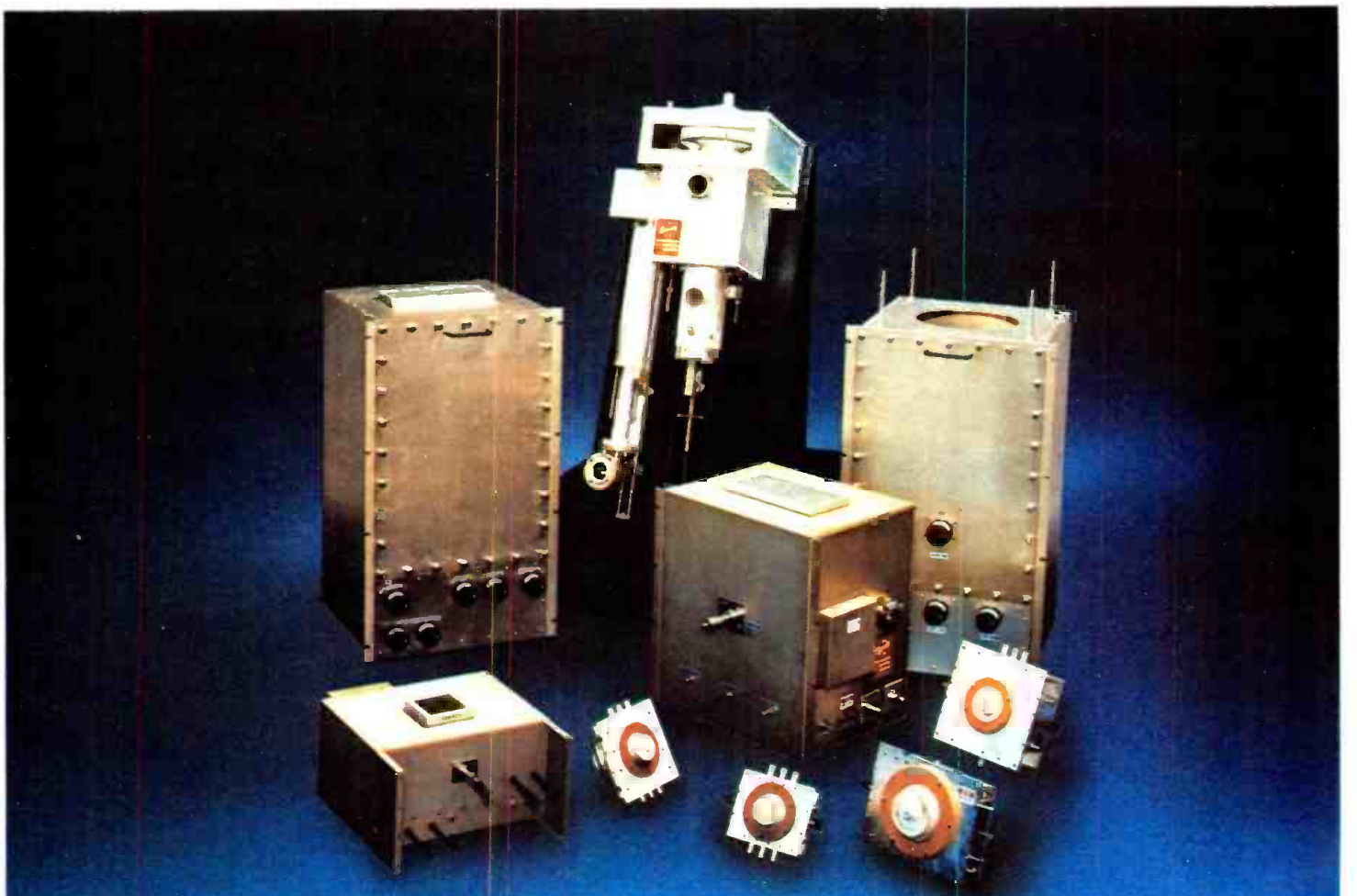

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CV-2250	3CX10,000U7	170–227	10 kW†
CV-2400	8874	420–450	300/1250 W*
CV-2800	3CX400U7	850–970	225 W
CV-2810	3CX400U7	910–970	190 W

*pulsed power
†peak sync, or 2.5 kW combined in translator service

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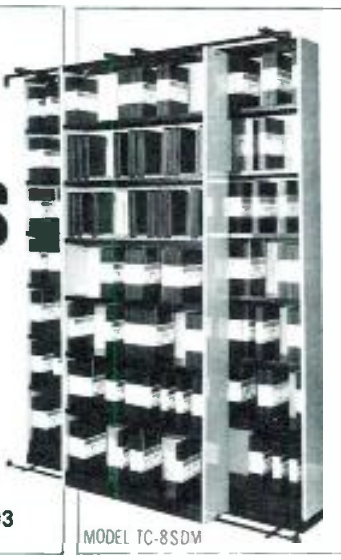

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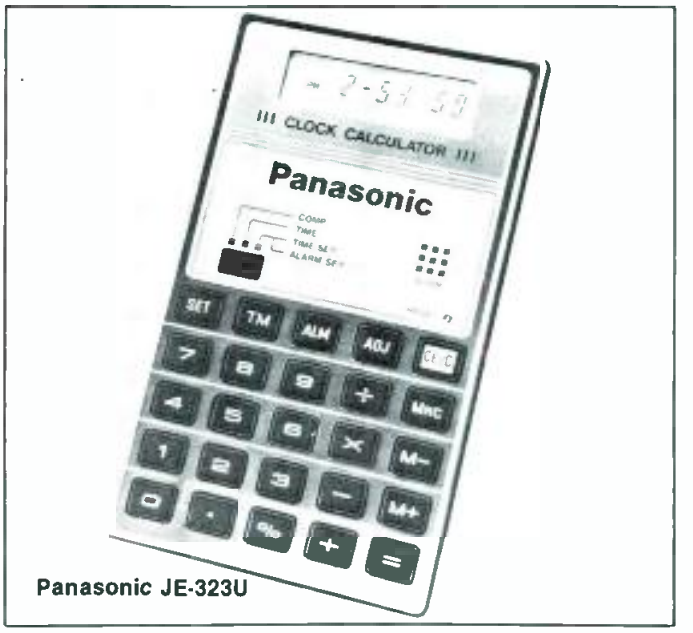
CAPTION CONTEST

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 Goeff Liston, Normal, IL, who submitted: "Sorry, Vince, I still don't do AM stereo. Maybe next year..."



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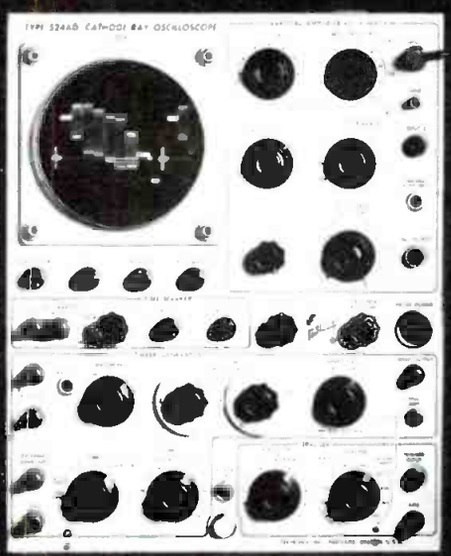

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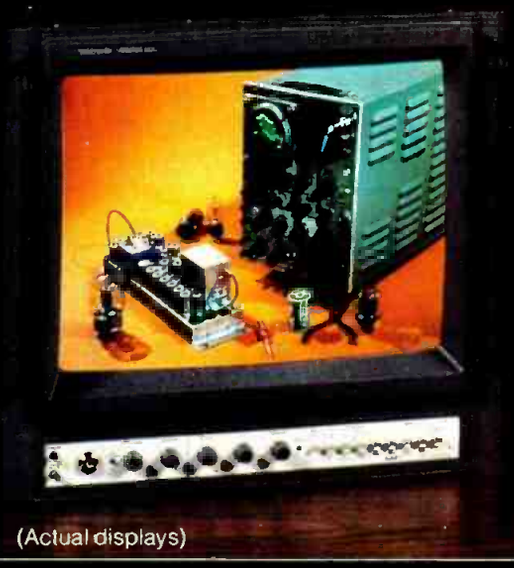

(Actual displays)

496 Spectrum Analyzer

2200 Multipurpose
Oscilloscopes

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The line includes an instrument controller, two power mainframes, 350 MHz or 135 MHz Universal Counter/Timers, a 20 MHz Function Generator, a triple power supply, a 4½ digit DMM with built-in math capability, a 350 MHz RF scanner for signal switching, and a multifunction interface for linking instruments to a device or system under test.

1980 ANSWER™ OPTION 3 NTSC MONITORING SOFTWARE

This new NTSC application program lets you operate Answer with more speed and programming ease than ever before. 1980 Answer Option 3 handles virtually every off-air signal measurement made today by the FCC using FCC or NTC-7 VITS. All automatically, with digital accuracy and repeatability. Option 3 also includes color bars and SCH Phase measurements. New PAL application software is available as Answer Option 2.

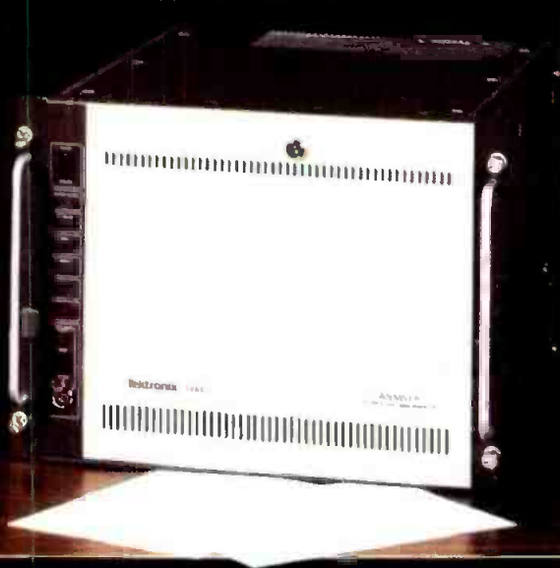
690SR WITH COMB DECODER

Our 690SR Color Picture Monitor offers added flexibility now with your choice of decoders with a notch or new comb filter. With its high resolution, precise convergence and stable color, the 690SR continues to represent the industry standard of reference for judging color picture quality.

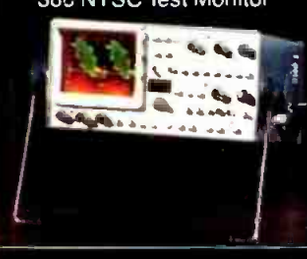
For the full story, contact our nearest Field Office (listed in major directories) or call toll-free, 1-800-547-1512. (In Oregon, 1-800-452-1877.)

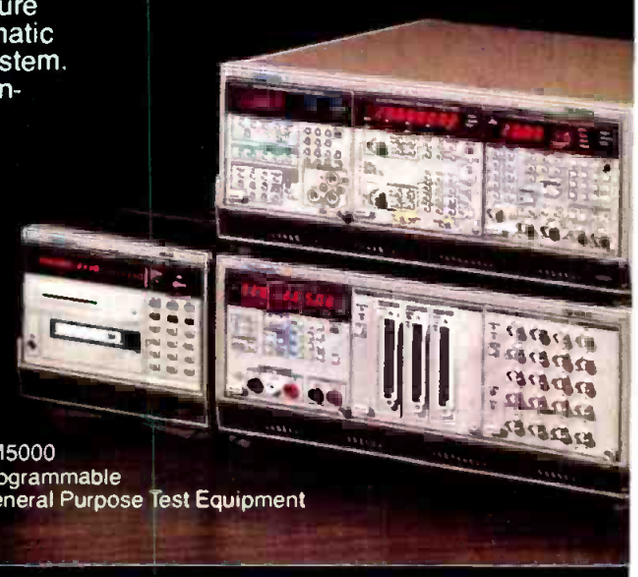
Tektronix, Inc.
P.O. Box 4828
Portland, OR 97208

1980 Answer™ Option 3 NTSC Application Software



380 NTSC Test Monitor





TM5000
Programmable
General Purpose Test Equipment

Tektronix
COMMITTED TO EXCELLENCE

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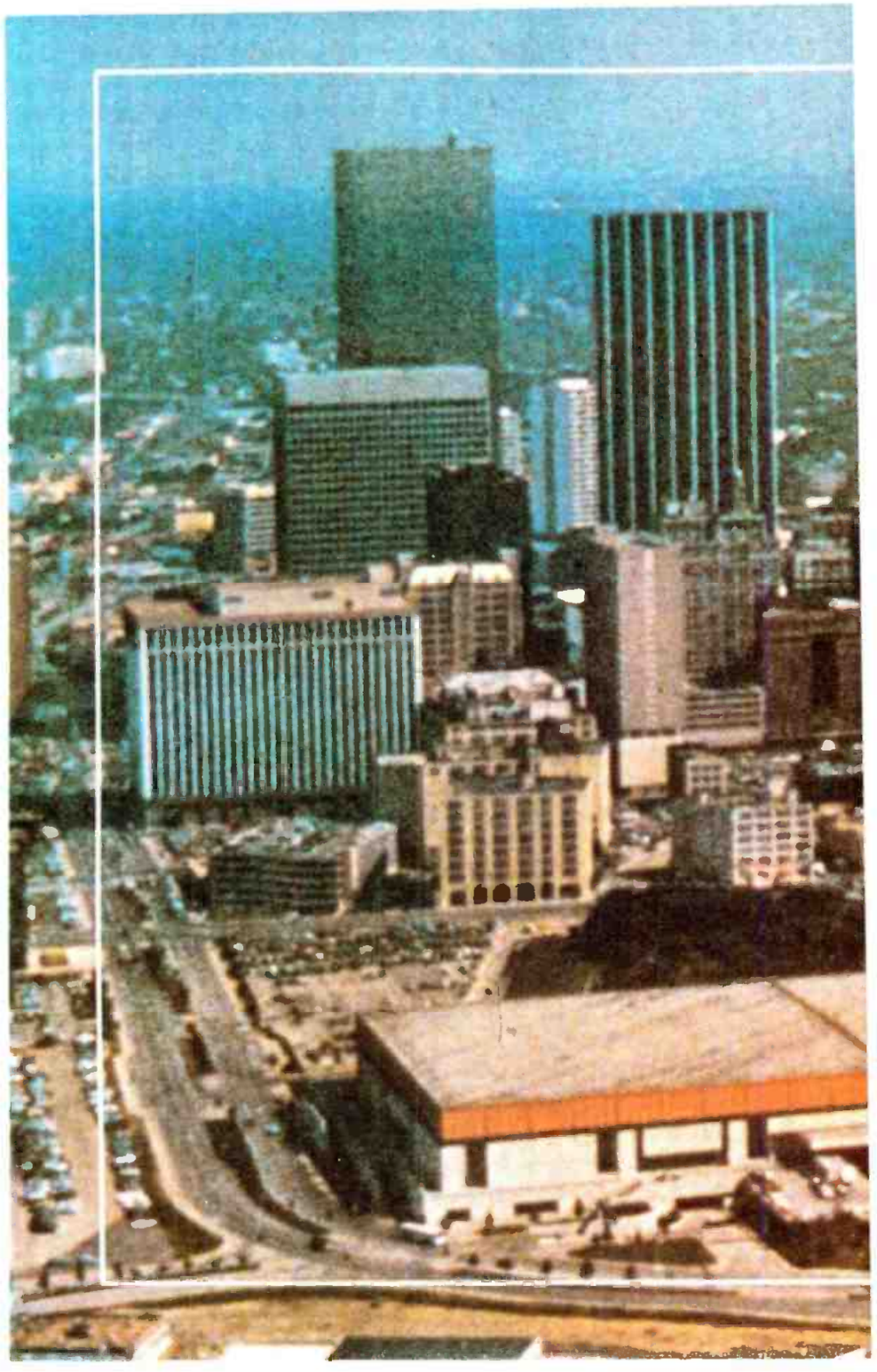

- April 4-7, 1982
- The Convention Center, Dallas, TX
- Most comprehensive exhibit for broadcast equipment
- More than 208,000 square feet of exhibit space
- Luncheon address by Mark Fowler, FCC chairman
- Entertainment by Glen Campbell and Jonathan Winters

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.

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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. □

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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

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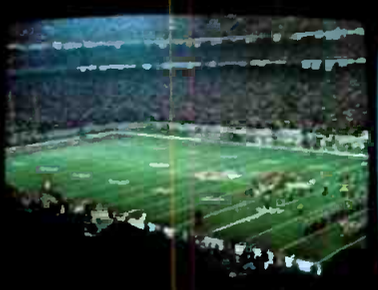
40 to 1

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 diascope-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 Stemmens 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

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See the Canon 40 to 1 at NAB Booth # 3305

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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.

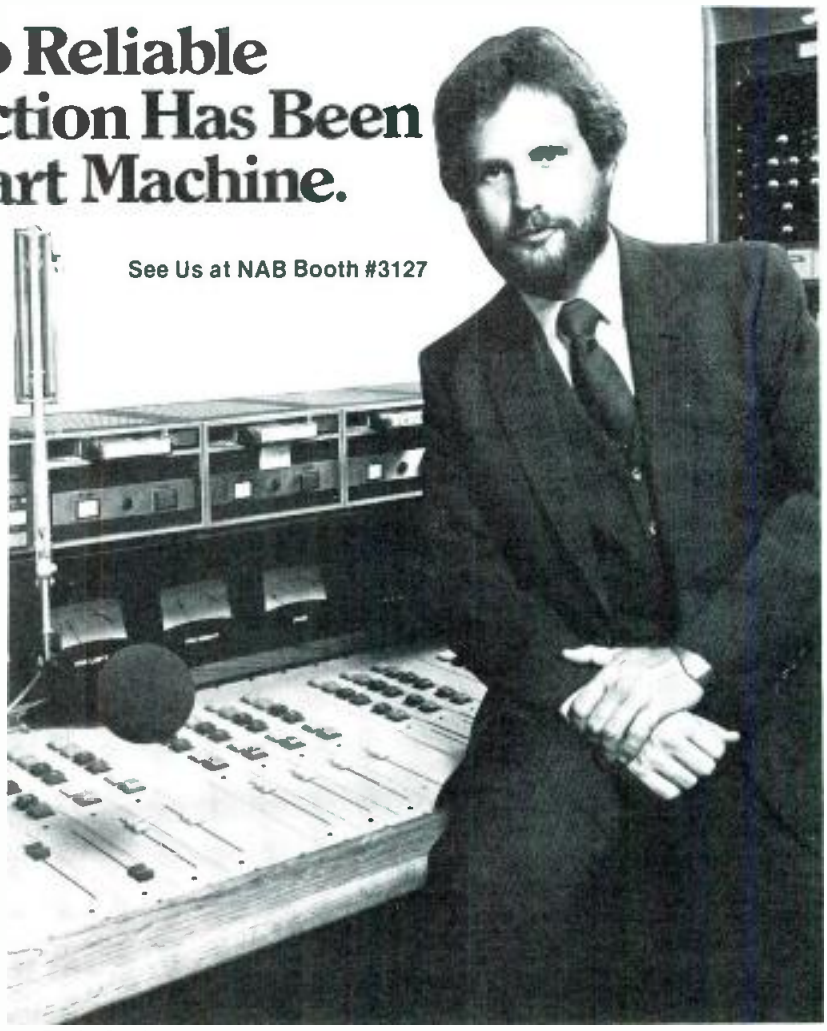
ENGINEERING

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.



See Us at NAB Booth #3127

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
Transtar Network

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

Capitol
CAPITOL MAGNETIC PRODUCTS
A Division Of Capitol Records, Inc.
6902 Sunset Blvd., Hollywood, California 90028 (213) 461-2701
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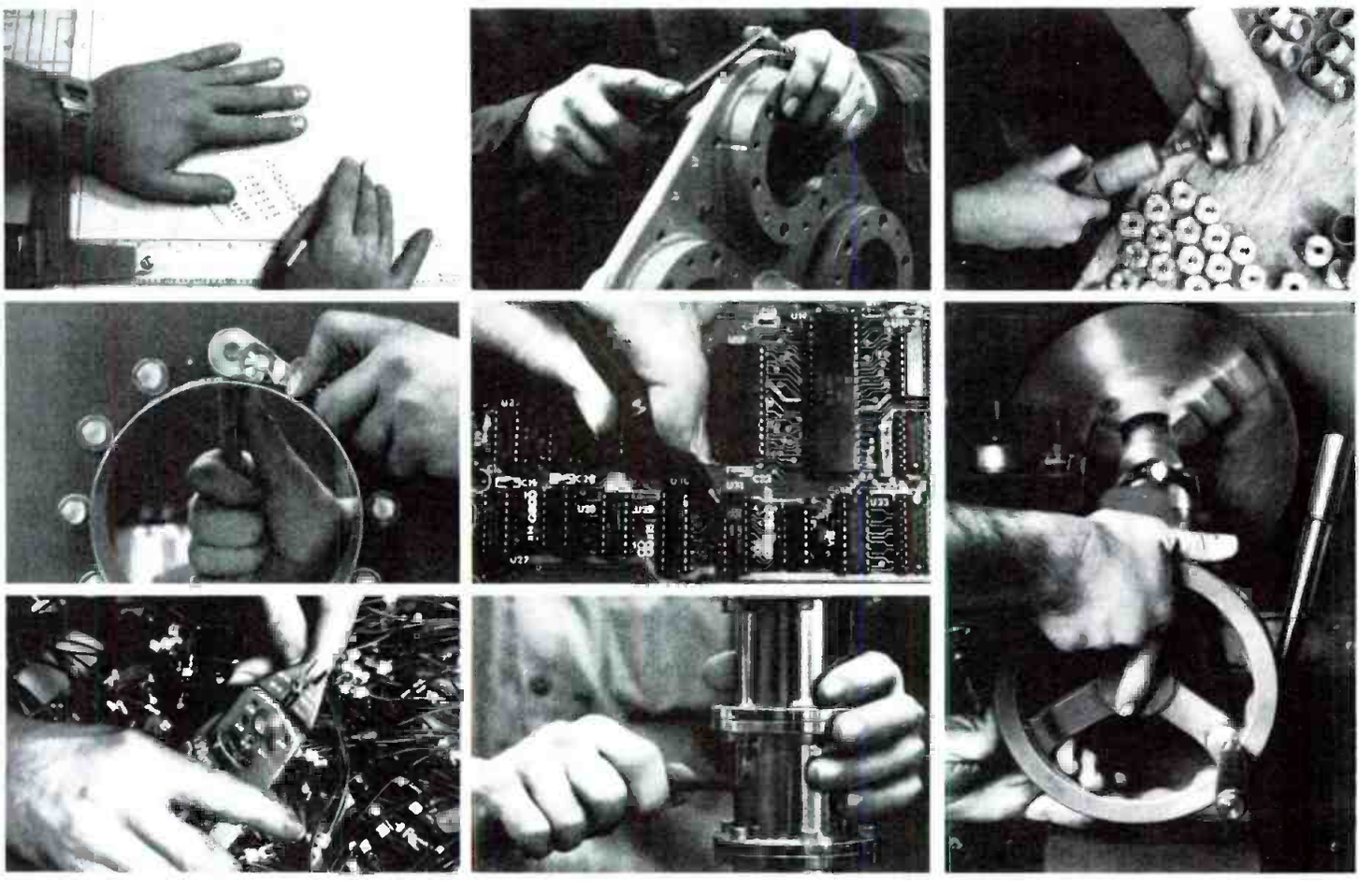
UHF Systems?
You're in capable hands with Comark.



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

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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. 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.

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 influencial 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."

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.

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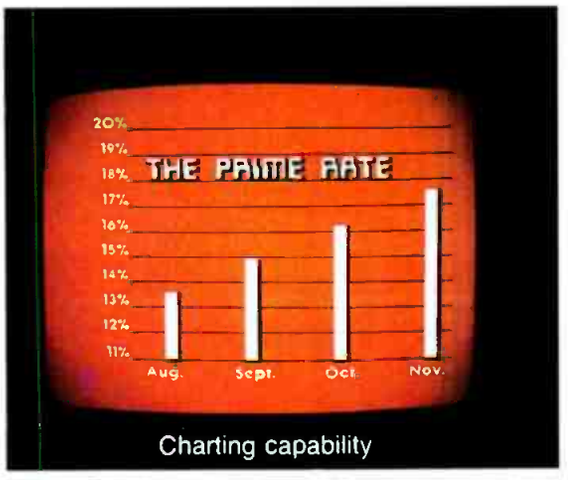
Dual channel mix

Character Flip/Rotation

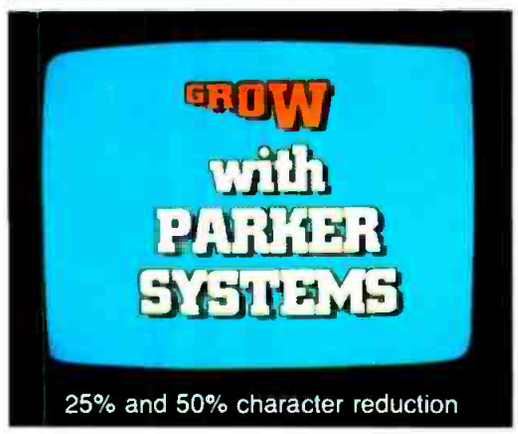


Charting capability

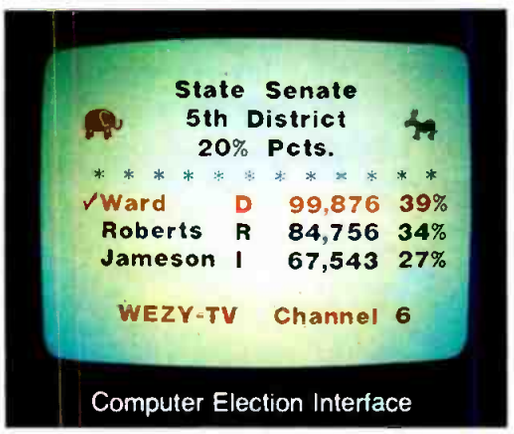
Static headline, changing copy

Keyboard logo compose

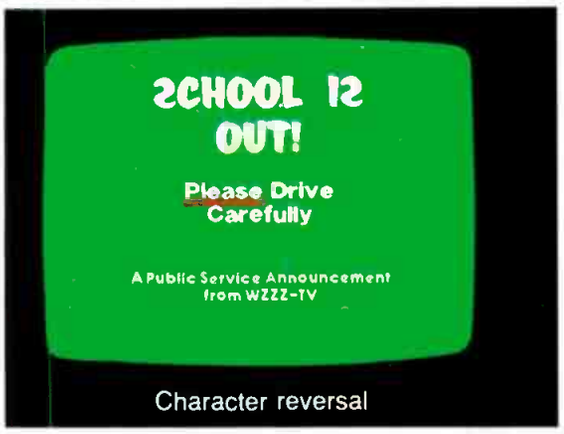
Left and right italics



25% and 50% character reduction



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...

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3M

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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 0kW, the broadcast engineer can ow have the reliability, efficiency nd low maintenance that are nherent in a one tube transmitter esign. Combine with this the oper- tional benefits of a grounded grid onfiguration power amplifier age that requires no neutraliza- on and you have the best of both ngineering worlds.

dd to This a New Exciter, olid-State IPA and Exclusive roadband, Low-Loss Ferrite ombining

The new 690A Exciter is the eart of all Elcom/Bauer FM trans- itters. Its advanced solid-state ngineering delivers great fre- uency stability while assuring you n exceptionally clean signal for rther amplification.

Our solid-state IPA consists of our power amplifier modules (2 mplifiers per module) when com- ined produce 1,000 watts of drive ower, with plenty of power in eserve. All of these modules are dentical and loss of one of the four river amplifier modules will not esult in an off-air condition. All odules are broadbanded and equire no individual tuning over ne entire 88-108 MHz FM band. he modular design gives you ack-up capability for more reli- bility in addition to an overall eduction of transmitter tuning equirements.

The exclusive Elcom/Bauer fer- le combiner is also broadband to ke full advantage of the new olid-state IPA.

Easy Access and Spacious Cabinets for Engineering Maintenance

Every component in an Elcom/ Bauer transmitter is readily acces- sible; 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 engi- neer, every safety precaution has been re-examined and no com- promises made in assurance of operator safety.

Extensive Features That Guarantee Performance/ Reliability

All important operating pa- rameters 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 indica- tor 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 indica- tion, 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 engineer- ing worlds in a new FM transmitter. And, you should investigate the advantages of flexibility and cost- savings that come with the exclu- sive Elcom/Bauer ferrite combining. A comprehensive two-year war- ranty 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 tech- nical evaluation of new FM trans- mitters 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

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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 softwear. 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 = −128.5dBv (20Hz to 20kHz). Distortion (THD or IM): @60dB gain, +20dBm(600 ohm)out = .005% @20dB gain, +20dBm (600 ohm) out = .0007%. Frequency Response: ±.25dB 20Hz to 20kHz(−3dB @ 10Hz,180kHz).

. . . 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 = −104dBv (20Hz to 20kHz). Distortion (THD or IM) : @ 20dB gain, +20dBm (600 ohm) out = ≤.05% (.007% typical). Frequency Response: ±.25dB 20Hz to 20kHz(−3dB @ 10Hz, 100kHz).

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 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!

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Now our business name is Quanta Corporation.
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NAB-'82/DALLAS PRODUCT DIRECTORY

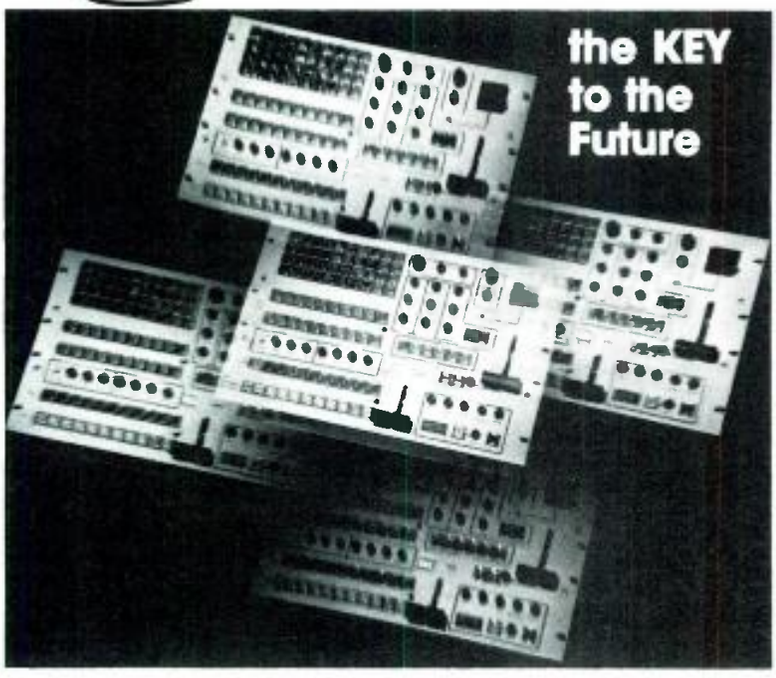
This special section provides a directory to the NAB-'82/Dallas exhibitor products. Each exhibitor was asked to complete a comprehensive checklist of products to be shown. The following section is a compilation of the data provided. It shows major equipment headings followed by the exhibitor name and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

isi 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

isi
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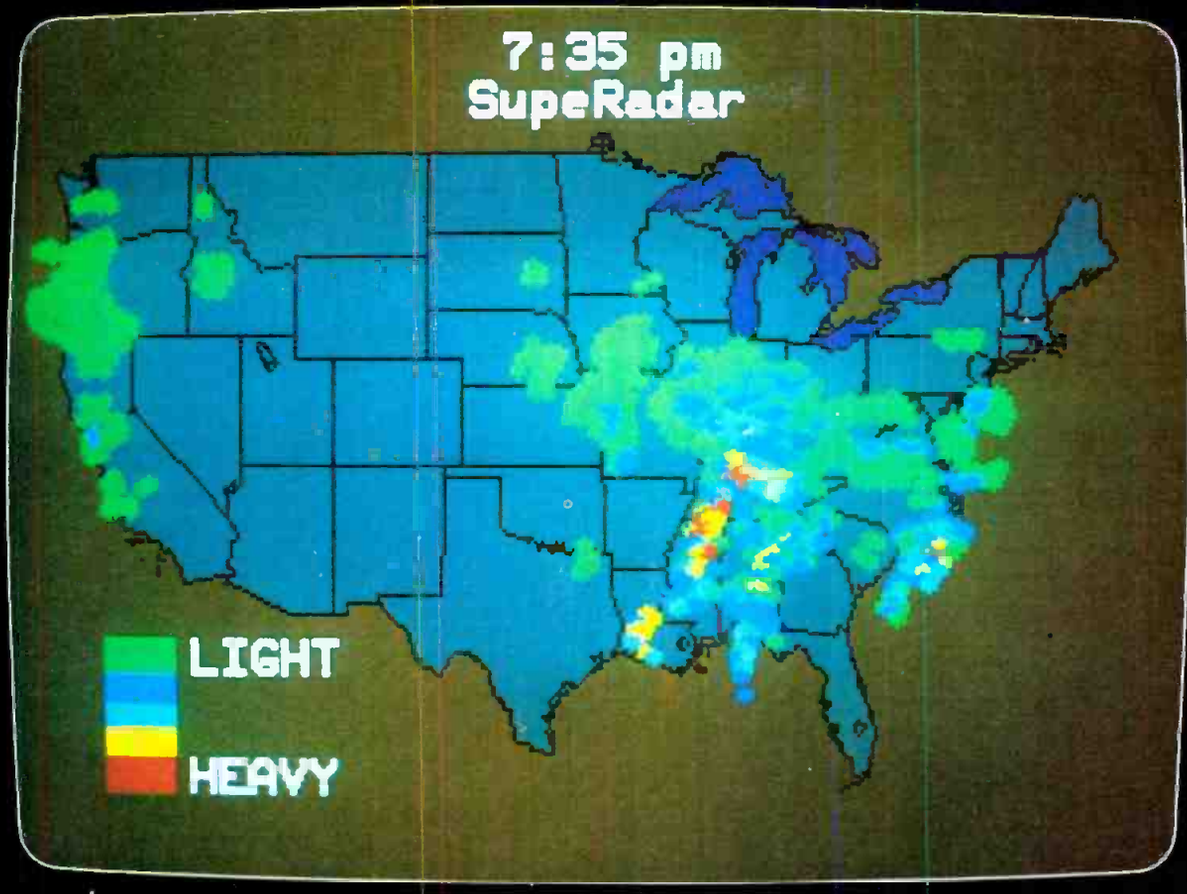
Why Buy Dial-Up Radar?



SuperRadar is included in our system!

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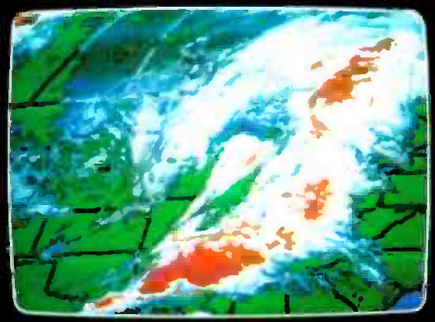
- **Animated plotting action; selectable colors!**
- **Time sequence up to 100 pictures to show movement!**
- **Overlay directly over satellite picture for striking effect!**

•Now – Highest resolution in the industry – 760 X 480!

Best of All — The Same ColorGraphics System Also Has:



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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)

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Andrew (3012)

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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)

Reading this ad may solve your next audio problem

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.

The Spectra Sonics Model 510 Bandpass Filter and the Model 802 Signal Generator are the answer to your service requirements, permanent or portable. The battery powered units are accurate, reliable, compact, affordable, and easy to use.

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The Model 802 may be used for tape machine calibration, signal to noise measurement, as well as low and high level amplifier trouble shooting.

THE MODEL 510 BANDPASS FILTER
The Model 510 is a 20Hz to 20kHz, (-3dB), bandpass filter with a gain of 60dB. The 510 may be utilized with a standard voltmeter to make unweighted noise measurements on individual pieces of electronics, or complete systems. The 510 may also be used with existing noise analyzers for unweighted noise measurement. Battery operation eliminates ground current flow between instruments, resulting in consistent and accurate measurements not previously available.

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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**

The Best Graphics and Booth 2415.

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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)

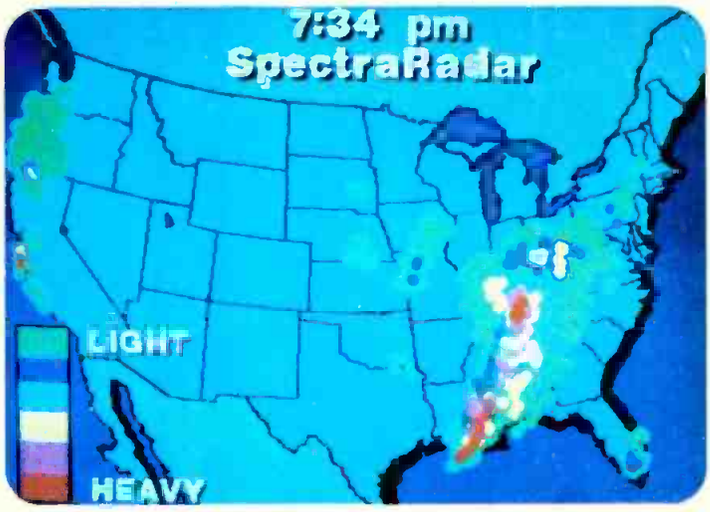
BROADCAST LOGGERS
Accurate Sound (1610)
Ampro/Scully (3307)
Hallikainen & Friends (1618)
Moseley Associates (3103)
QSI Systems (1502)
Telex Communications (3130)

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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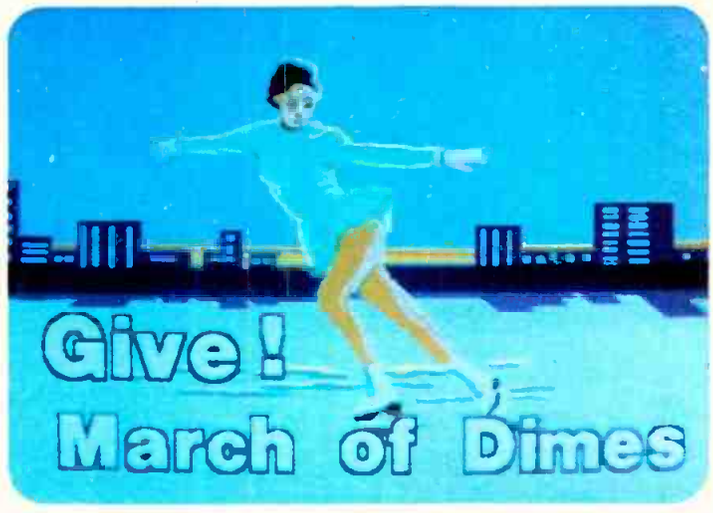

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Product directory

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)

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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)
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CHARACTER GENERATORS & TITLERS
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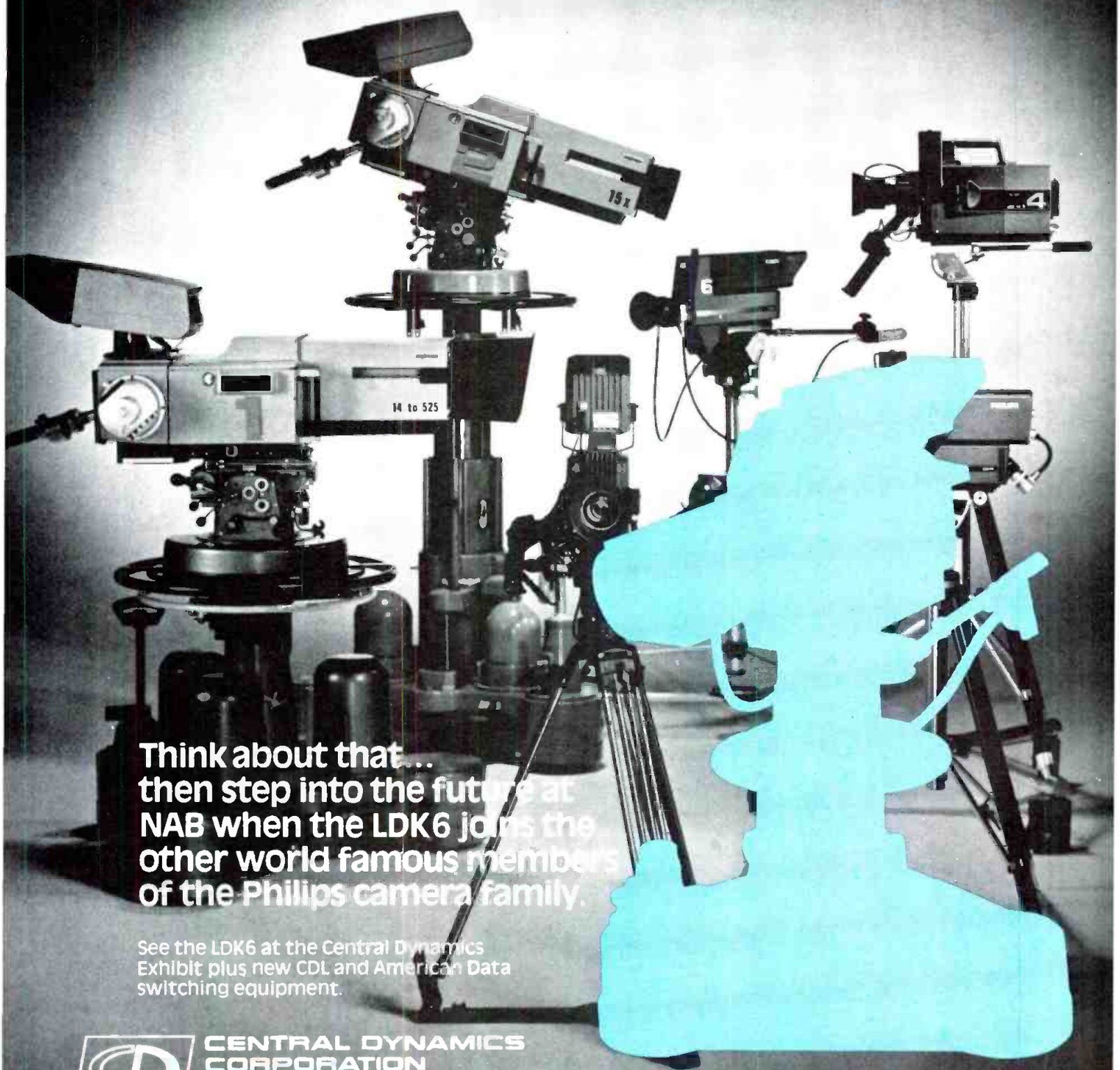

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Product directory

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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/Orrox (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/Farinon 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)
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A VERY MOVING STILL STORY.

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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.

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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)
MZB & 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)
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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)

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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/Farinon 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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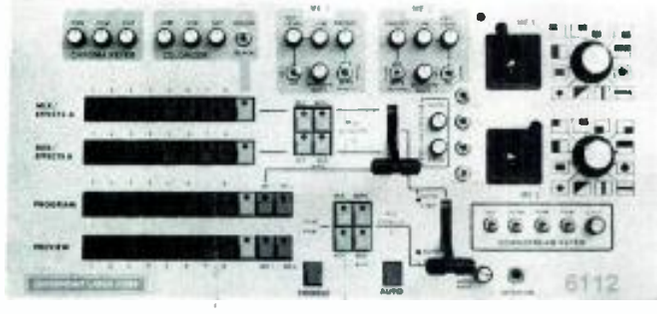

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Product directory

ESE (2305)
Elector (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)
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Television Engineering (2114)
VGR Corporation (2738)
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CMC Technology (1802)
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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)

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)
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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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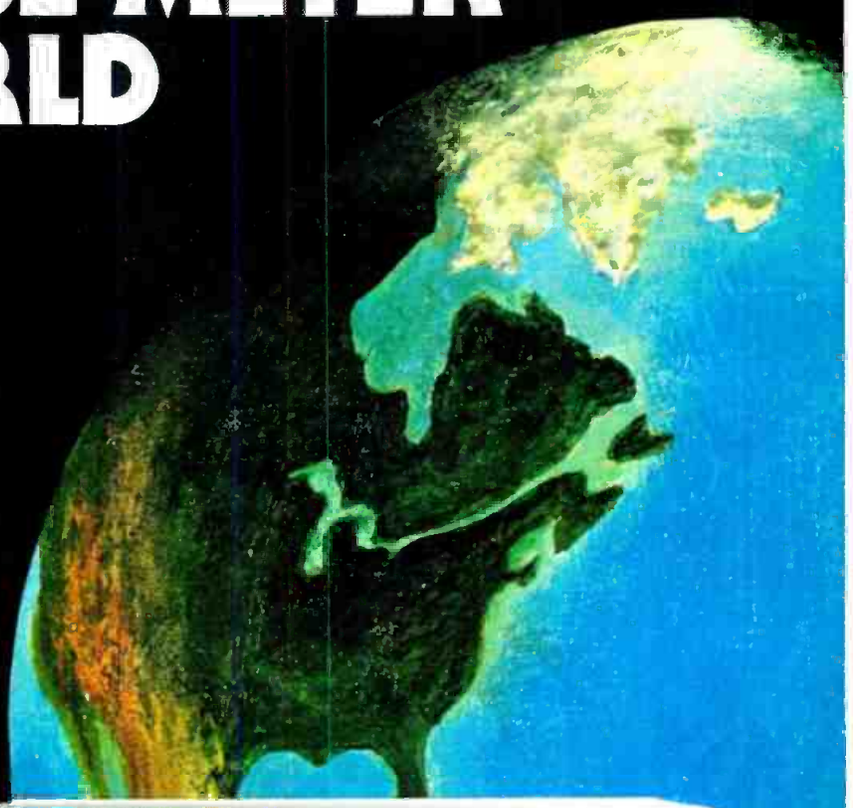

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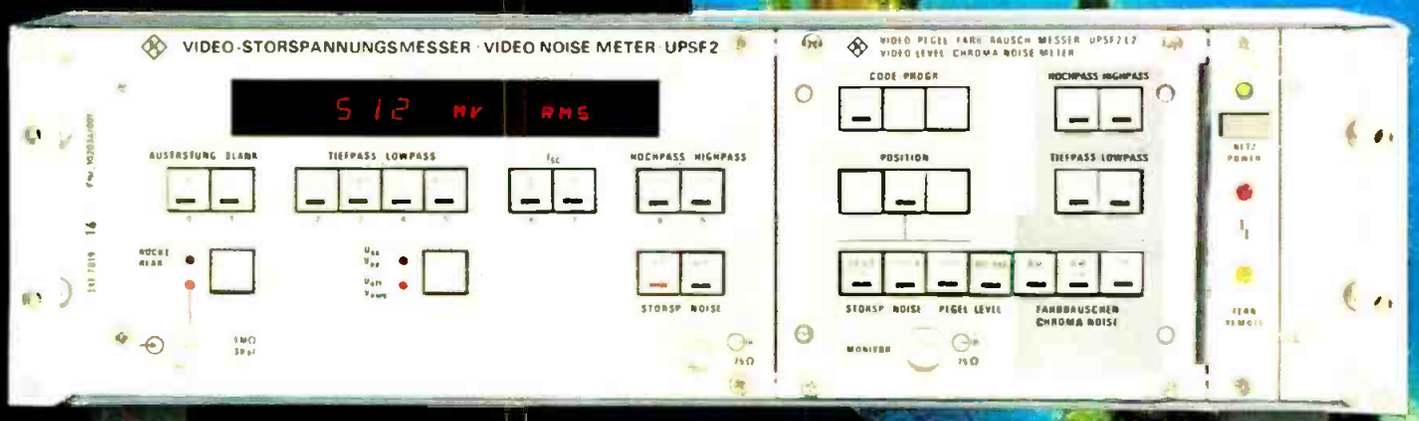

- DUAL-STANDARD: µP automatically determines standard (525/625 lines), identifies it on the display, and performs the appropriate measurement.
- Measurement Domain: Full-field, any individually selected line, any individual "spot" (4 µs x 10 lines)
- IEEE-488 (GPIB) Bus Compatible
- Video Level Measurement: Luminance-bar amplitude, or individual test-points selectable in steps of 1 µs (range: -500 to +1500 mV)
- Noise Measurement: Luminance (peak or rms) or Chrominance (AM or ϕM). Range: 0-80 dB, referenced to 714 mV (525 lines), 700 mV (625 lines), or actual liminance-bar amplitude.

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

MICROPHONES AND ACCESSORIES
AKG Acoustics (2629A)
Accurate Sound (1610)
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Broadcast Electronics (3104)
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CeCo Communications (1804)
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Fidelipac (3132)
FitzCo Sound (2540)
Alan Gordon
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HM Electronics (2402)
Karl Heitz (2515)
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Nady Systems (2711)
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Studer Revox (3123)
Swintek Enterprises (1702)
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Tascam Production Products (2734)
Telex Communications (3130)

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

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BGW Systems (2841)
Broadcast Audio (1920A)
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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)
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Telemet (3007)
UMC (1814)
Videotek (2208)

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Comex (2829)
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Delcom (2710)
Elector (2104)
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Hitachi Denshi (3202)
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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, representations, 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 psuedo-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 convertor samples incoming camera video at 10 times subcarrier 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 most 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

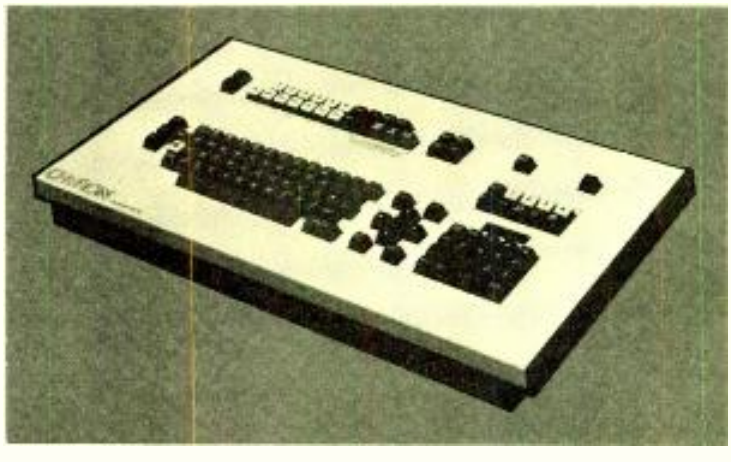
Earlier CHYRON IV's Can Be Retrofitted for New Features

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 retrofiting 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.

Follow the Leaders with CHYRON TELESYSTEMS

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

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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-

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chine that didn't solve all these persistent problems would have been negligent. To say the least, another mousetrap. 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 electromechanical 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 compatability 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 obstinence 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, sinousoidal 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.

Compatability with your present system.

The new PhaseMaster also offers you compatability 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 ⅝" 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 ±0.05% and, practically no heat generation. The speeds are field selectable: 3¾, 7½, 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 fricton-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 4½ 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 ±1.0dB. 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.

RAMKO

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

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

NOISE REDUCTION SYSTEMS
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POWER SUPPLIES
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Broadcast Technology (2115)
Camera Mart (2010)
Christie Electric (1623)
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Frezzolini Electronics (1817)
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Philips Test & Measuring (3215)
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Central Dynamics (3208)
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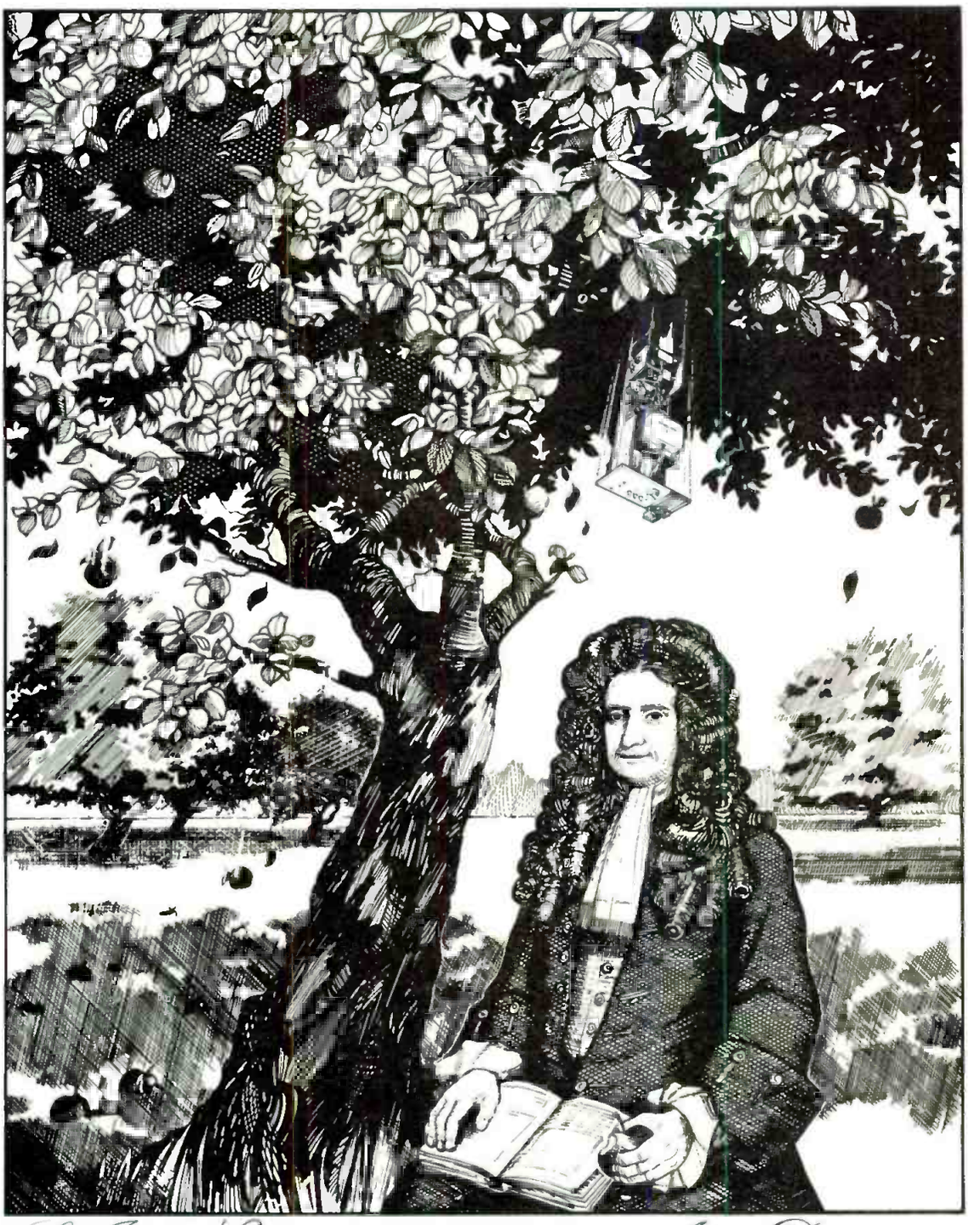

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Thomson-CSF (3201)
UREI (2530)
United Media (2504)

PROGRAM SERVICES
BPI-Broadcast Programming Int'l (1512)
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Concept Productions (2107)
Drake Chenault (1516)
Kalamusic
Network (2412)
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Valentino Music Library (1716)

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

PROMOTIONAL MATERIALS & SERVICES
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Century 21 Programming (1503)
IGM Communications (3122)
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Telescript (3015)

RECEIVERS (ALL TYPES)
Artel Communications (2624)
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Comrex (1613)
Delta Electronics (3112)
Gorman Redlich (2307)
Harris/Farinon Video (3101)
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McMartin Industries (3102)
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Stanton (3125)

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Sony (3200)

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Allsop (2718)
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Your image is on the line.

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

With the CM-33B 13" and CM-51B 19" monitors you can choose from a medium, standard, or high resolution delta dot tube. Your choice. But all three assure the broadcaster a color critical picture that lets you know exactly what is going out on line.

The medium resolution CM-33B offers a phosphor triad pitch of .43 millimeters and the CM-51B .47 millimeters. Other features include • Switchable underscan/overscan, • RG off switch for easy set-up, • Color temperature switch.

All models are fully modular and are designed for general purpose applications. The CM-33B is ideal for ENG/EFP applications and the CM-51B is perfect for studio use.

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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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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)
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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)
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Sound Genesis (2026)
Soundcraft Electronics (2003)
Soundcraft USA (2003)
Studer Revox (3123)
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Tascam Production Products (2734)
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RECORDERS (VIDEODISC, SLOW MOTION REPLAY)
Echo Sciences (3319)
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RECORDERS (1-INCH VTRS, QUAD, VIDEOCASSETTE)
AF Associates (3320)
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Delcom (2710)
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Alan Gordon
Hitachi Denshi (3202)
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Marconi Electronics (3320)
Merlin Engineering Works (1706)
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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)
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Hallikainen & Friends (1618)
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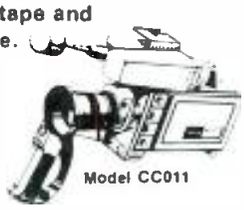

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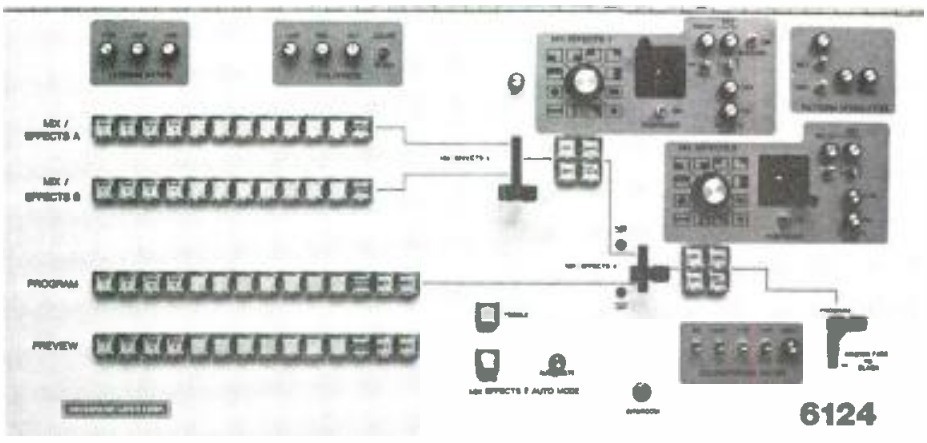
PRICES:

6124 $13,700

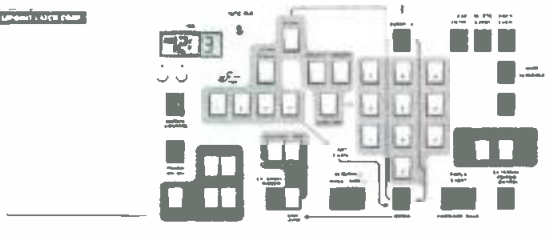
AUTO DRIVE™
7200 $12,500
Editor interfaces $3000

6803 $2500
6800 $3500

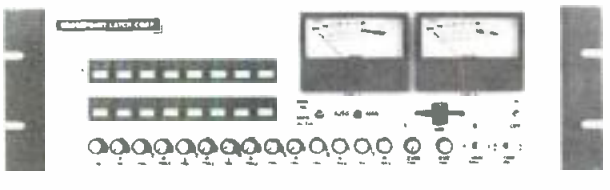
6124 PAL $14,700
(RGB Chroma Keyer Only)



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.



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Jatex (2505)
Moseley Associates (3103)
NEC America (2528)
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TFT (2838)

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McMartin Industries (3102)
Microdyne Corporation (2618)
Microwave Power Devices
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Moseley Associates (3103)
Ross Video (2310)
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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)

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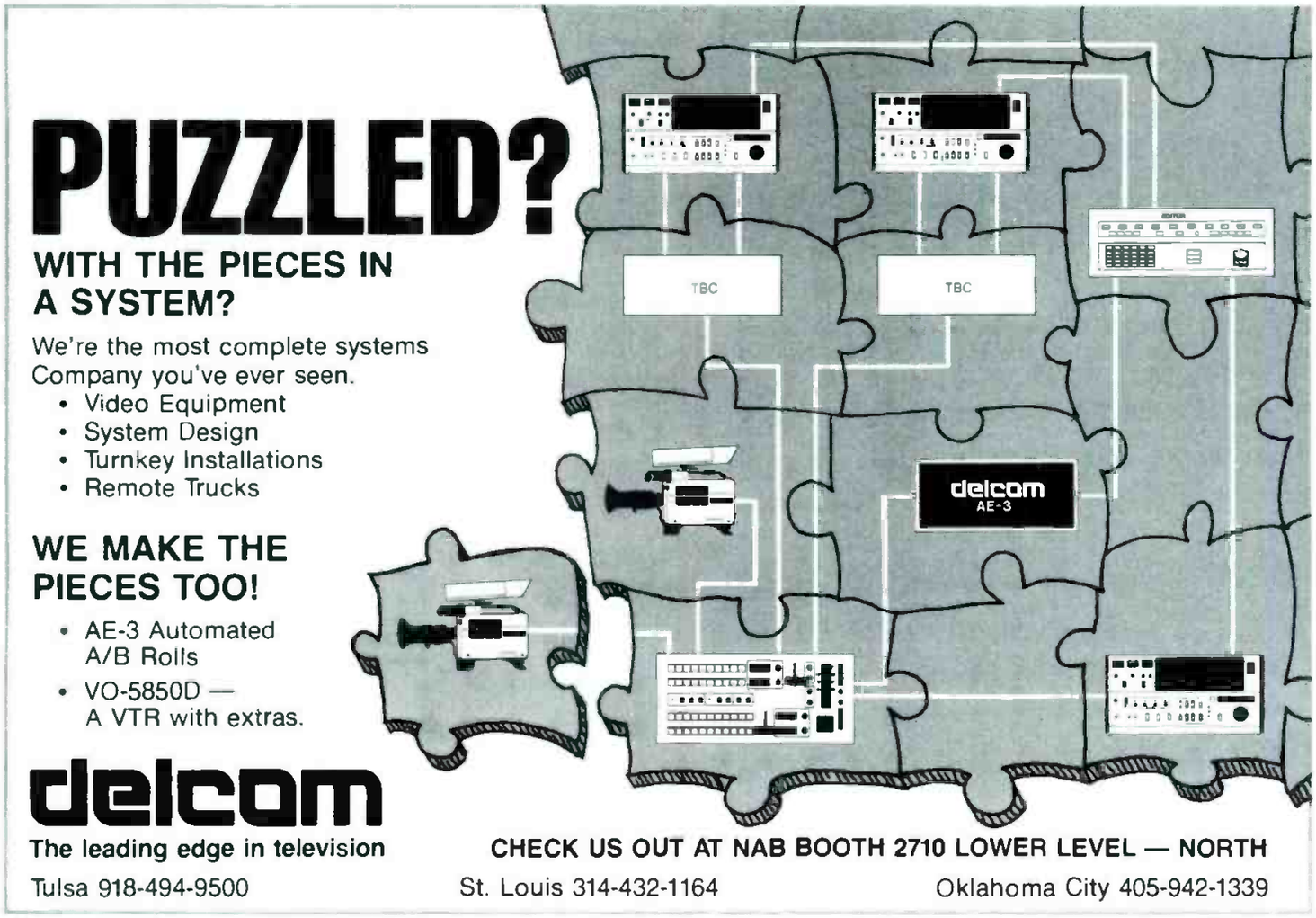
Comex (2829)

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



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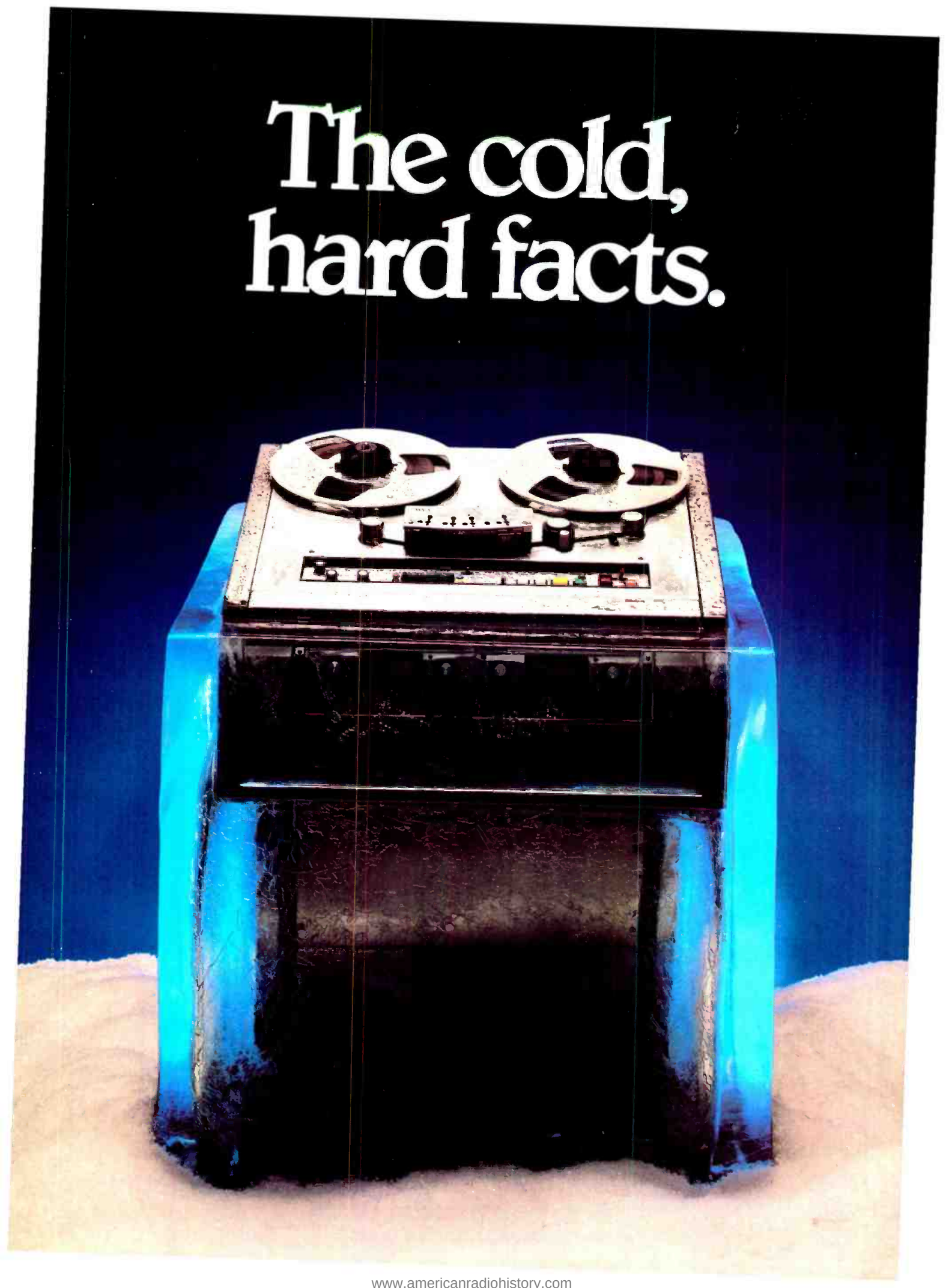
The cold, hard facts.



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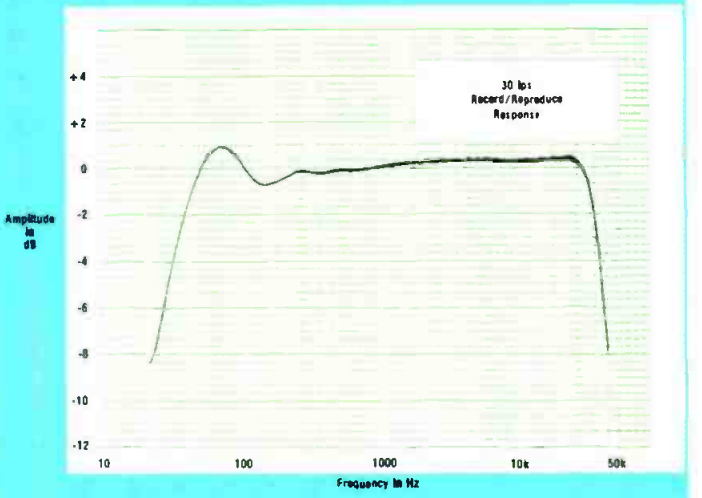
Specifications speak for themselves

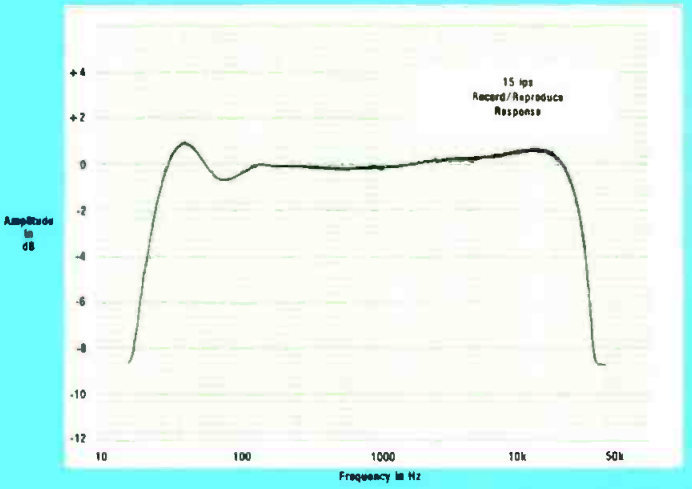
MCI invites you to compare specifications for the JH-110B against those of any othe tape recorder on the market today. No pretty pictures, no bright copy, just facts. The J 110B...unsurpassed in a field of professionals. And that is a cold, hard fact.

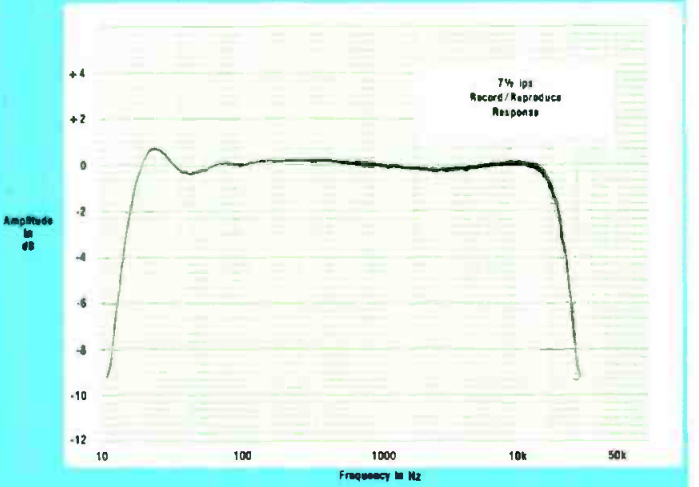
Unless otherwise specified, the following conditions apply to all graphs:

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.

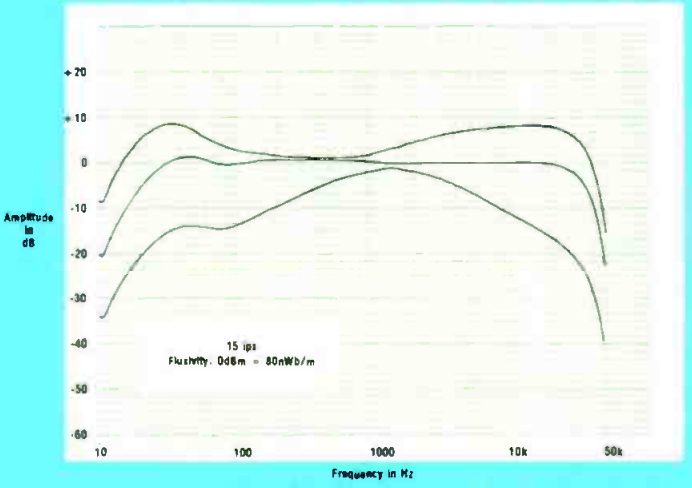


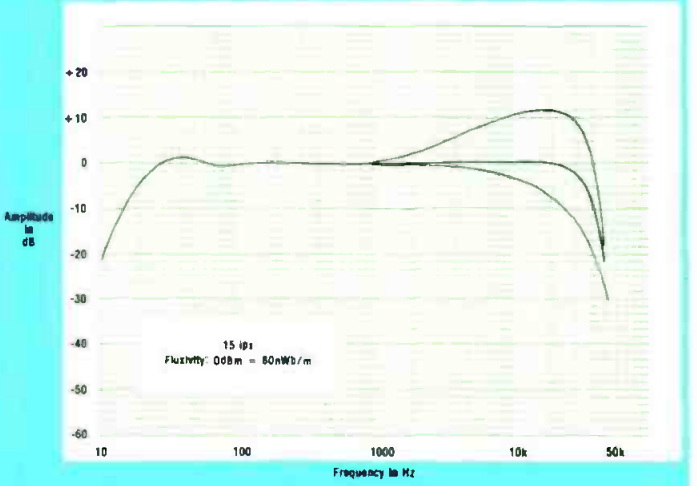




RECORD/REPRODUCE RESPONSE

These graphs represent the frequency response of the recorder on and off tape, assuming a constant input level. They demonstrate the flat an 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. T JH-110B features a wide range of adjustment to allow alignment us any of the range of tapes available today.

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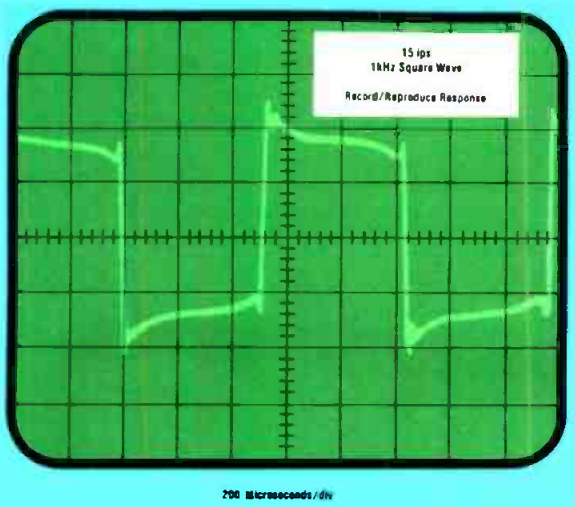
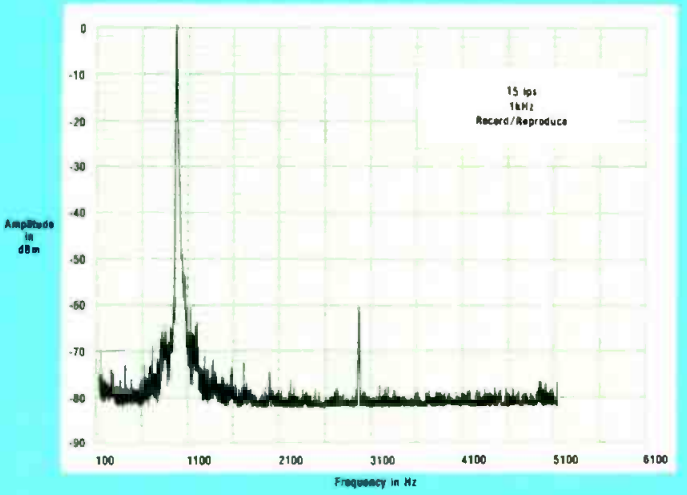


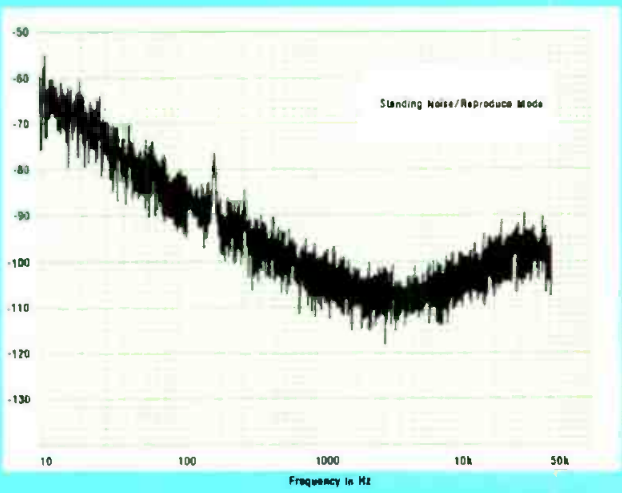
SQUARE WAVE RESPONSE

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.



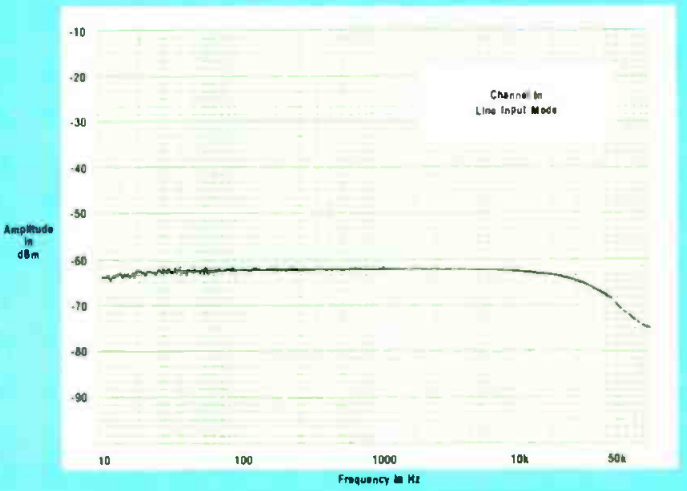
DISTORTION/PURITY OF SIGNAL

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.



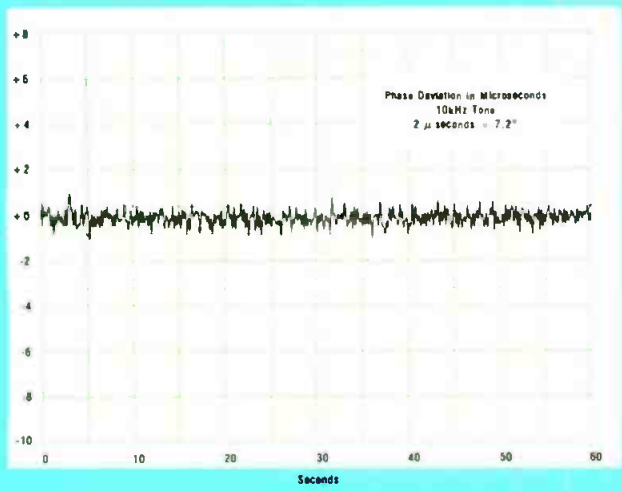
STANDING NOISE/REPRO MODE

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



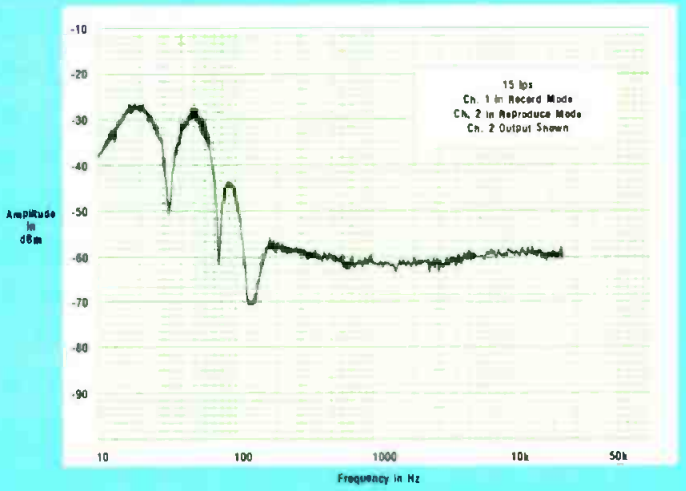
COMMON MODE REJECTION RATIO

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.



TAPE WALK

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



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.

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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: fluxivity level	30 ips, AES	1040 nWb/m
	15 ips, NAB	1020 nWb/m
	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	±20% around fixed speeds

Configurations

¼ inch	Full track
¼ inch	2 track
½ inch	2 track
½ inch	4 track

Reel sizes

Available with NAB A (3,5 or 7 inch), NAB B (10½ or 14 inch), DIN 1000m (11½ inch)

Tension

5½ oz. ± ¼ 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 o.1% DIN 45507 flutter, 10½" reels

30 ips	900 msec
15 ips	500 msec
7.5 ips	500 msec

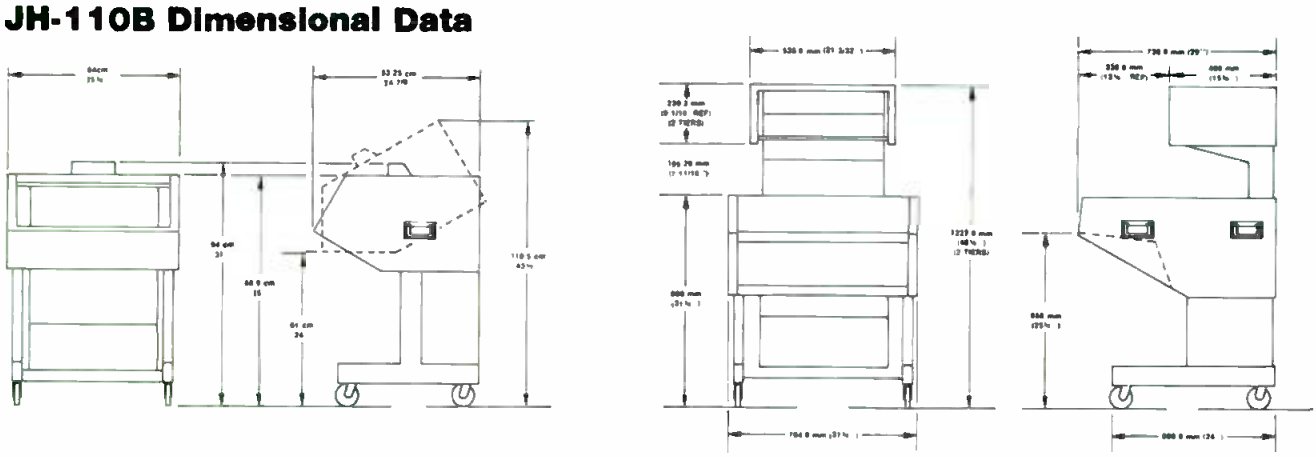
System Weight

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 ¼", ½" and 1" tape on reels from 5" up to 10½" 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



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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

For more information on the Dictaphone Veritrac SL system, fill in the coupon or call toll-free:

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(in New York call 914-967-2249)

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Station_____

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Mail to: Dictaphone Corporation
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Utah Scientific (2602)
Vital Industries (3018)

SWITCHERS, ROUTING
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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 hetrodyne capabilities in the NTC-10B to make the TT-8000 the ideal investment in 1-inch recording.

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

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 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 4GH$_z$ 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

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Product directory

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For-A (2210)
Glentronix (2008)
Grass Valley Group (3010)
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Image Video Ltd. (2600)
Industrial Sciences (1600)
McCurdy Radio (3106)
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Pacific Recorders & Engr. (1608)
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3M (3006)
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Chyron (3329)
Fidelipac (3132)
Glentronix (2008)
Nova (2411)

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.
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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

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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.

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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.

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Offer expires May 31, 1982.

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BE

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Product directory

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Moseley Associates (3103)

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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.

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60th Annual Convention & International Exposition
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Studio/Company _____

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PHONE: (213) 841-0970

www.americanradiohistory.com

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.

Greg Silsby

Market Development Manager,
Professional Markets

Electro-Voice®
a gulton company

600 Cecil Street, Buchanan, Michigan 49107

In Canada:
Electro-Voice, Div. of Gulton Industries (Canada) Ltd.,
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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.

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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

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Product directory

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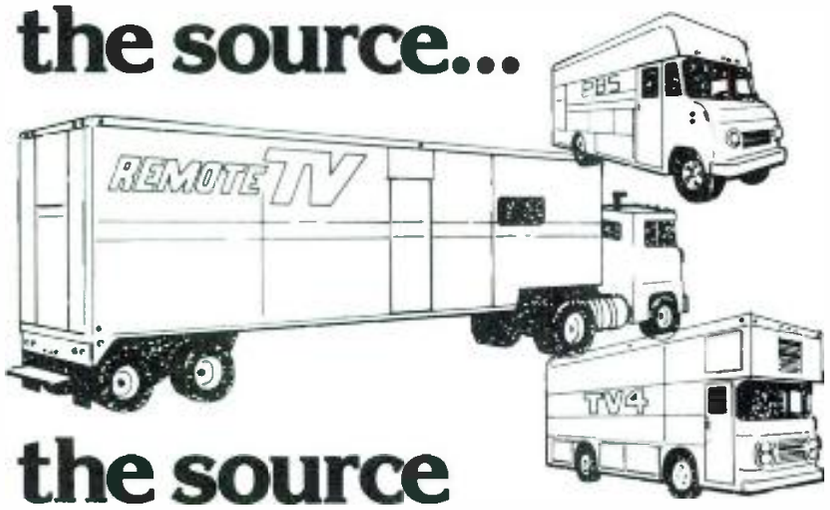
When you cover the action from the source...



the source for mobile studios should be Gerstenslager.

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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.

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

(EMCEE TU-100
100 watt UHF translator)

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VACUUM TUBES (TRANSMITTING/TWTs)
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Shook Electronic Enterprises (2628)
Television Engineering (2114)

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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)
Newscan/McInnis-Skinner (2502A)
Spectra Computer Systems (2415)

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A sophisticated, computer-controlled
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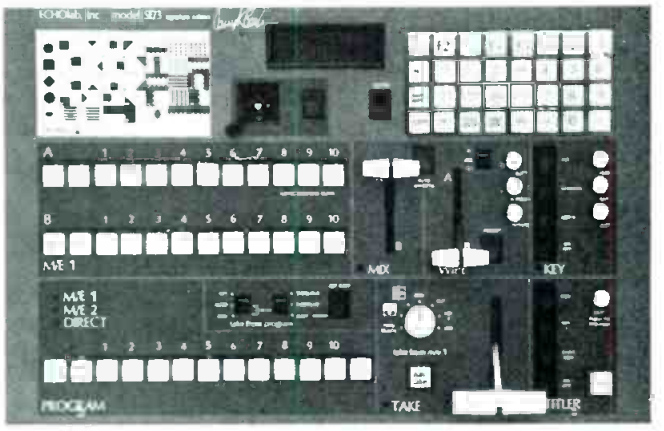

The SE/3 is a new-generation, programmable Switcher/Special Effects Generator that offers extremely sophisticated control, editing and effects capabilities at an astonishingly low price. The secret of both price and performance lies in a powerful microcomputer that replaces most of the digital logic 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 lockouts. 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 1¾" deep) can be installed remotely from the main chassis for maximum flexibility. Yet the SE/3 costs only $14,000.

Send for complete details.

An ECHOlab Signature Instrument

ECHOlab, Inc.

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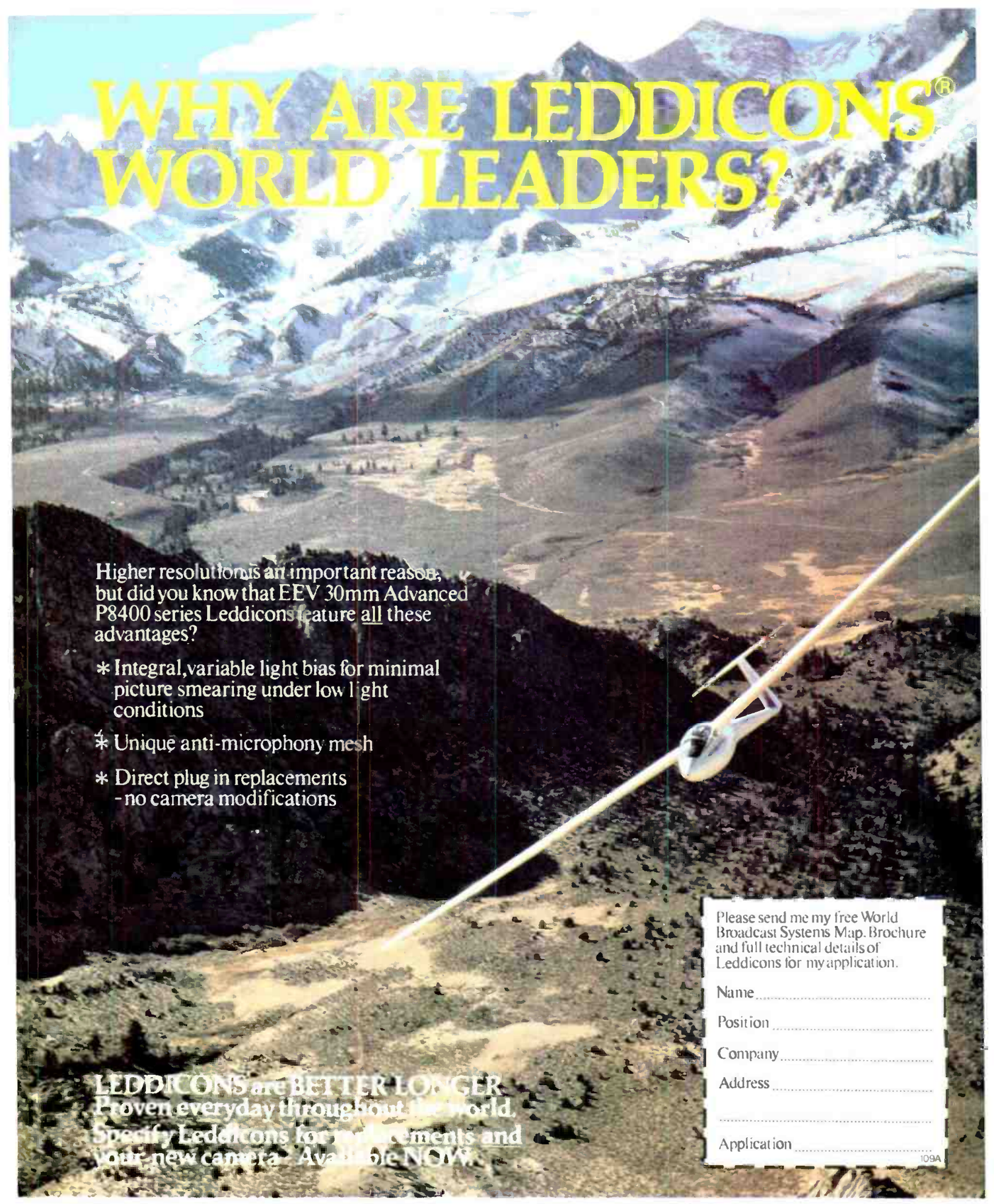

EEV, INC.

See Us at NAB Booth #2216

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In Canada: EEV Canada Ltd., 67 Westmore Drive, Rexdale, Ontario M9V 3Y6, 416-745-9494, Telex 06-989363
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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
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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
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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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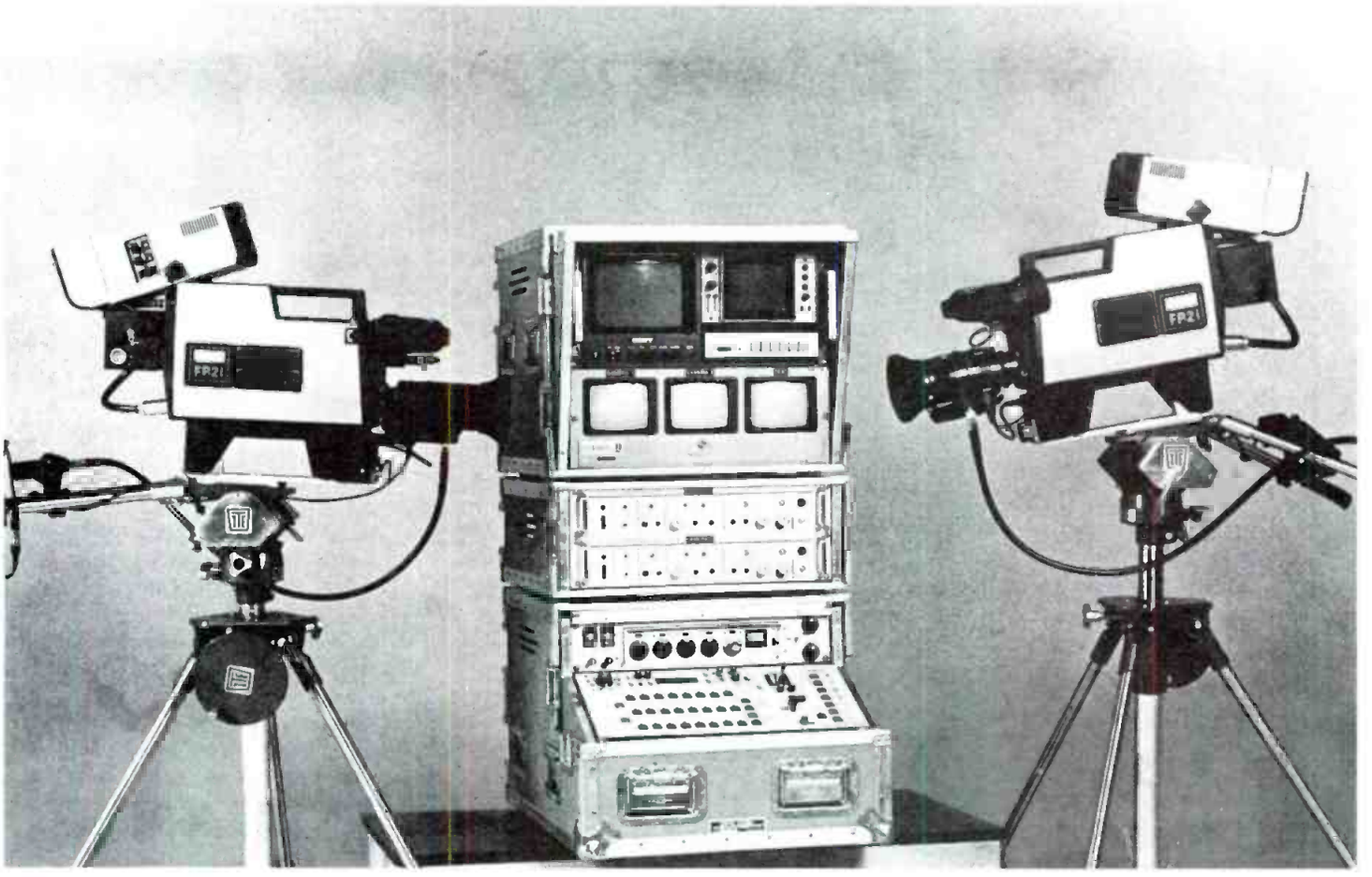
HITACHI

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.

LERRO
ELECTRICAL CORPORATION
COMMUNICATIONS SYSTEMS DIVISION
3125 North Broad Street, Philadelphia, PA 19132

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

Full line distributor for all Hitachi video products.

Circle (74) on Reply Card

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Exhibits roundup

AF Associates
Booth 3320
Estoblished 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

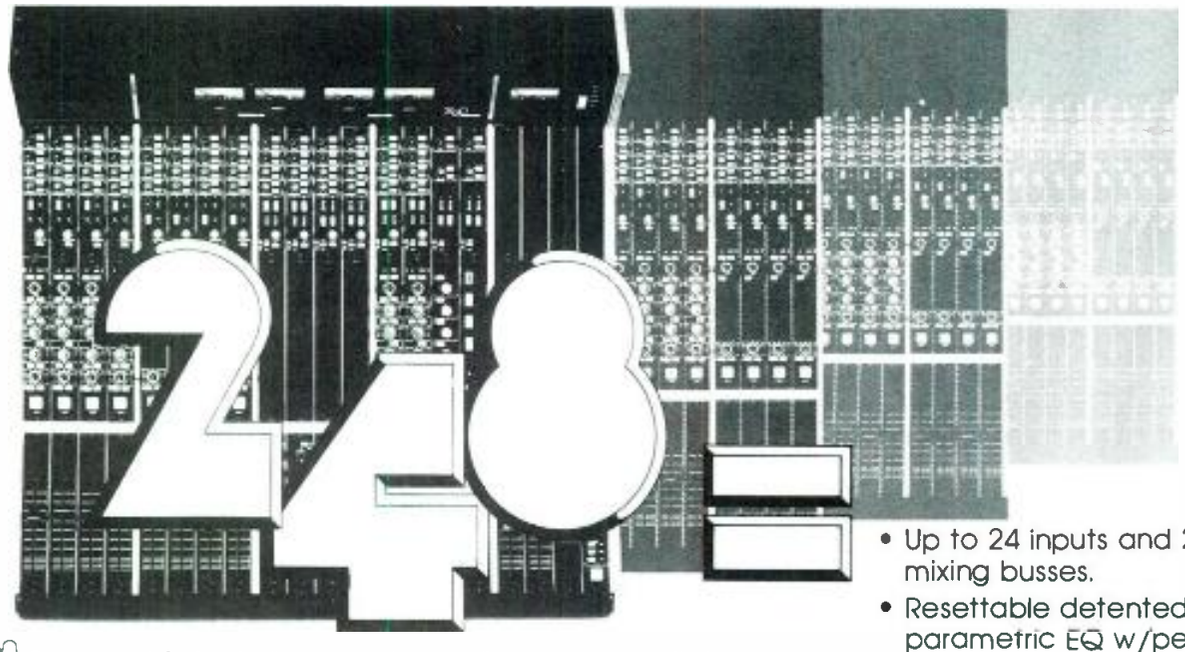
Accurate Sound Corporation
Booth 1610
Established products
AS-100: Duplicator, magnetic tape, high speed
Series: Reel and loop bin master
Formats: Cassette and reel-to-reel
Starbird: Microphone boom
New products
AS-100: Recorder, audio, reel-to-reel
Circle (403) on Reply Card

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



248 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.

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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.

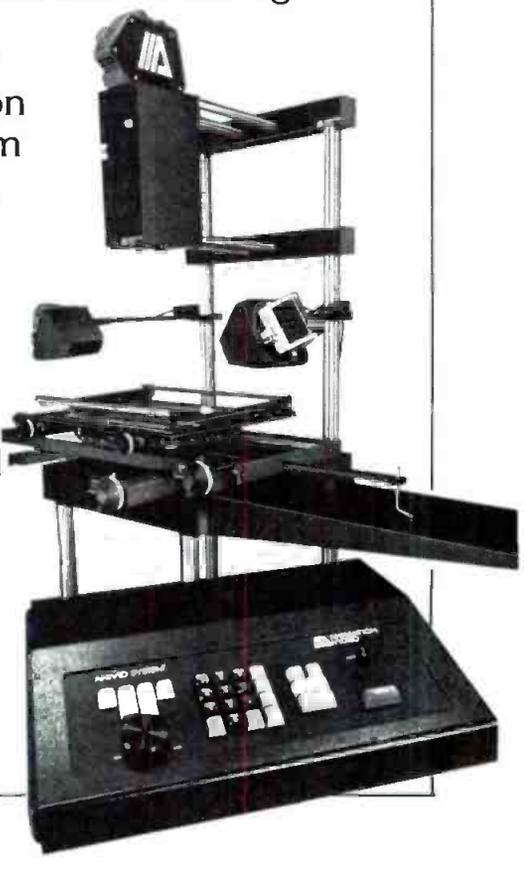
Now, topical animation can be produced quickly to accompany news, sports, weather or similar short deadline projects. Then, when you have more time, use the AniVid System for more entertaining station or advertising production.

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

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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

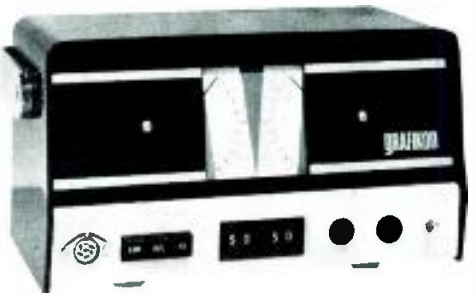
Amperex Electronic Corporation
Booth 3210
Established products
XQ1410/15: 30mm Plumbicon TV camera tubes
XQ1070/75: 25mm Plumbicon tubes
XQ2070/75: 25mm diode gun Plumbicon tubes
XQ1427: 18mm Plumbicon tubes
XQ3427: ⅔-inch high resolution diode gun, low capacitance Plumbicon tubes
80XQ: ½-inch Plumbicon
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_{65} 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_{65} 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

See us at NAB Booth # 3113

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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.

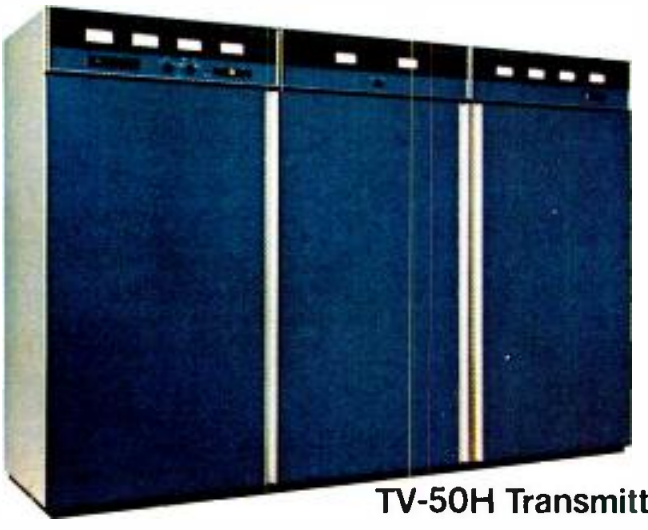
The system includes Harris TV transmitters with power ratings up to 100 kilowatts; Harris CP antennas designed with low windloading specifications or multiplexed to permit multi-channel operations on the same tower; and Harris' 9100 Facilities Control, offering un-manned operation. Cyclotran improves 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

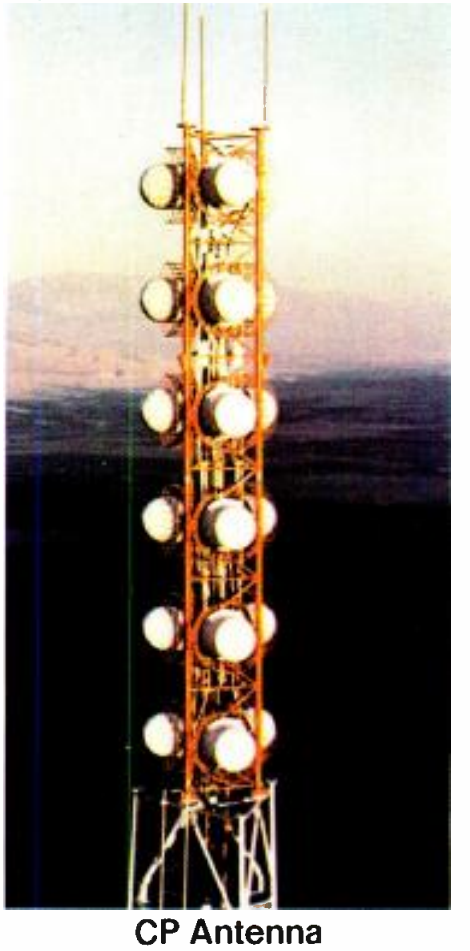
*Circular Polarization

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

www.americanradiohistory.com

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
Heliax: Coaxial cables
Heliax: 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 ⅔-inch prism cameras
New products
15X7: ENG zoom lens for ¼-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

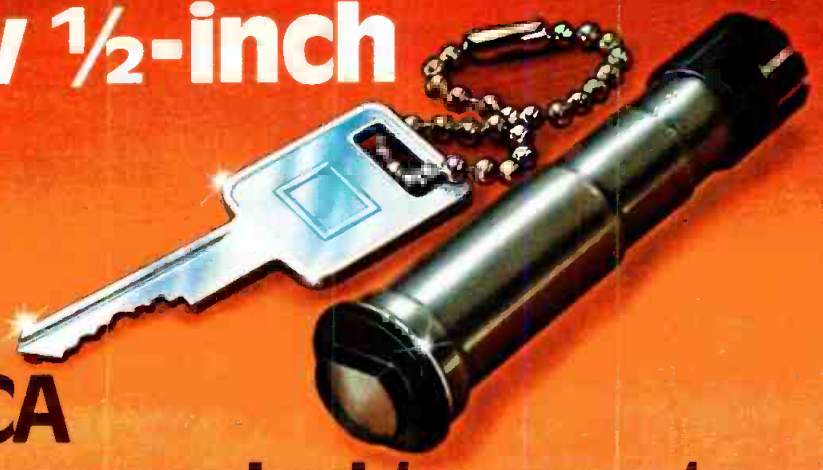
6710 ALDER • HOUSTON, TEXAS 77081 • (713) 660-0100

See Us at NAB Booth 1620A

Circle (79) on Reply Card

www.americanradiohistory.com

Unlock HAWKEYE's Performance with this Plumbicon* tube, the new ½-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 ½-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:

	with 80XQ Plumbicon	with ½-inch Saticon
Weight	8.8 lb	9.6 lb
Power	18.0 w	23.0 w
Sensitivity	46.0 fc	70.0 fc

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.

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

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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: Compex-limiter
F769X: Stresser combination compex-limiter and 4-band sweep equalizer
EZ: Easy-Rider compressor-limiter
E560: Selective limiter
E900: Sweep equalizer
E950: Paragraphic equalizer
Scamp: Card Modular system
New products
F601: Broadcast limiter
Circle (427) on Reply Card
see ad on page 131

Audio Kinetics (UK) Ltd.
Booth 1505

www.americanradiohistory.com

Slow Motion
Sync Roll Coincidence Disk
SplitsMathTagComments

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

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www.americanradiohistory.com

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.

www.americanradiohistory.com

HISTORY IS RECORDED ON SCOTCH VIDEO TAPE.

3M hears you...

3M

www.americanradiohistory.com

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

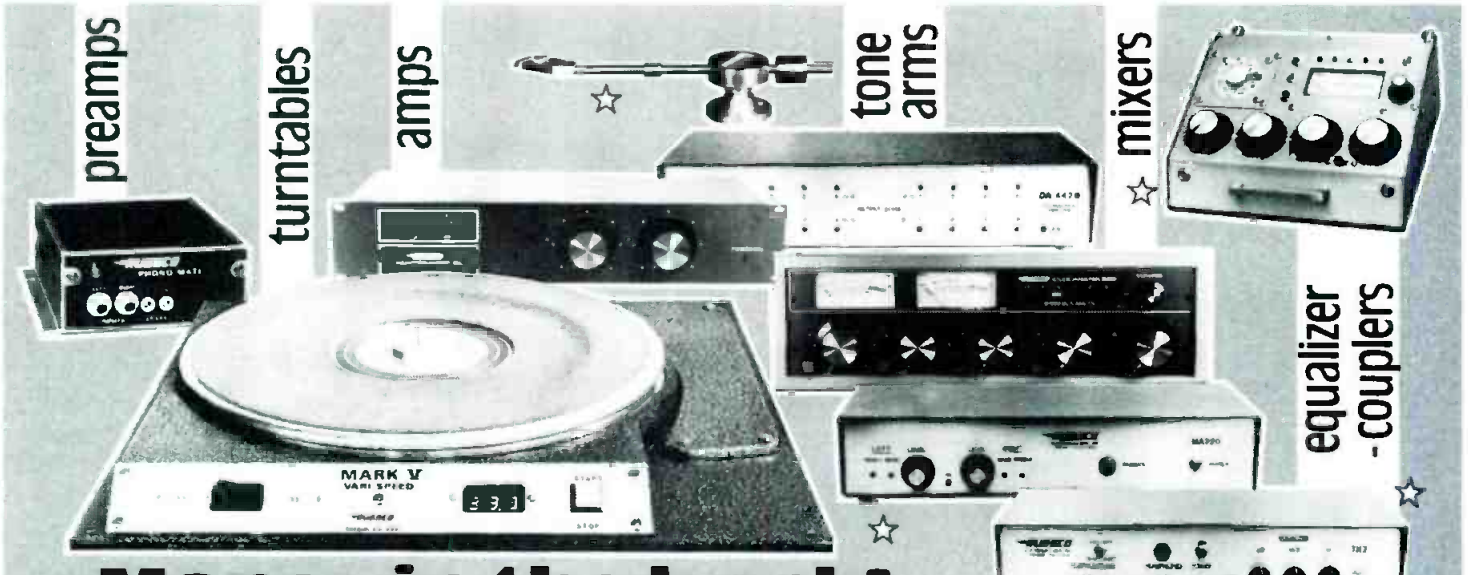
BCS/Kaman
See Kaman Sciences

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



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

RUSSCO ELECTRONICS INC. • 5690 E. Shields Ave., Fresno, Calif. 93727 • Phone (209) 291-5591

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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

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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/alarm
3171: Hi-speed transmission line monitor/alarm
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
Hollywood
Maury 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 Filipo (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

SONY

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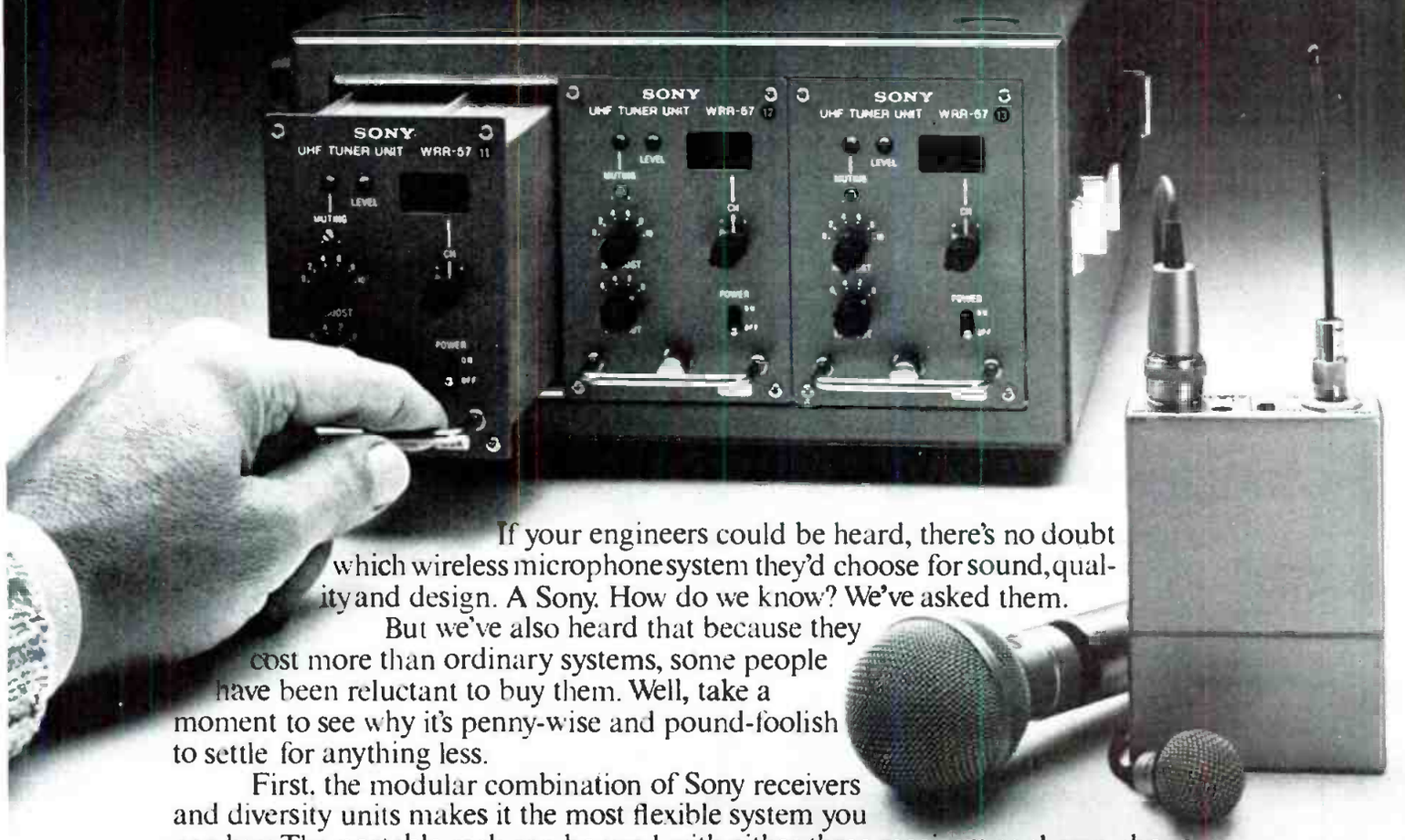
THE SYSTEM EVERY SOUND ENGINEER WOULD BUY IF HE CONTROLLED THE PURSE STRINGS.



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, consult our dealer listing.

SONY®
Professional Audio

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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

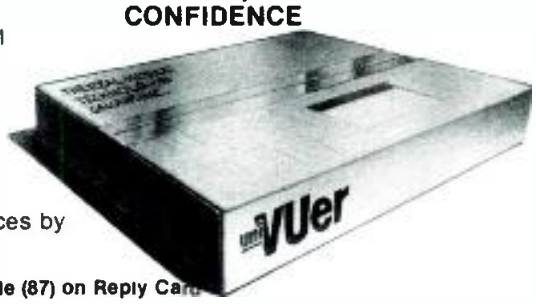
The uniVUer puts it all together!

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/EFP — 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
(215) 542-7000 Telex: 846358 (800) 523-2596

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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- KLEANLINE ELECTRONIC FILTERING SYSTEMS TO PROTECT AGAINST LIGHTNING STRIKES AT > 8800 JOULES PER PHASE PLUS AN RFI/EMI FILTER TO HANDLE RF INTERFERENCE FOR SENSITIVE SOLID STATE EQUIPMENT.
- TRANSIENT ELIMINATORS FOR DATA LINES, PHONE LINES, COMMUNICATIONS EQUIPMENT WITH A FREQUENCY RESPONSE FROM D.C. TO 1 GIGAHERTZ.
- LIGHTNING WARNING SYSTEMS PROVIDING ½ HOUR ADVANCE WARNING OF AN APPROACHING STORM.
- SURGE AND TRANSIENT GENERATORS
- GROUND SYSTEMS
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- PERFECT POWER VOLTAGE REGULATORS

LIGHTNING ELIMINATION ASSOCIATES

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Santa Fe Springs, CA 90670
(213) 944-0916
TWX: 910-586-1381

See Us at NAB Booth #1616

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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
FMI2000E: 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 ⅔-inch studio camera; focal length 8.5 ~ 928mm; f/1.6 with built-in 2X extender
J15X9.5B: For ⅔-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

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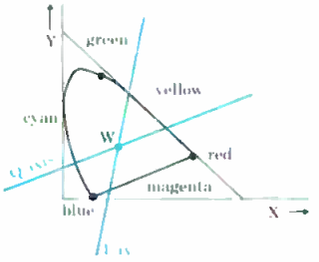
HIGH I/Q

ASACA/ Shibasoku's CMM Series monitors decode color on the I/Q axis.

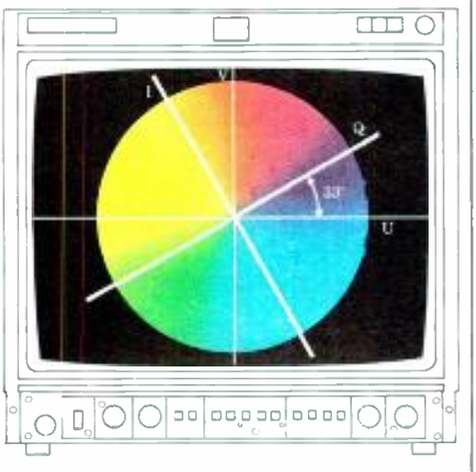
Asaca/Shibasoku's new high resolution monitors have the I-Q to deliver color performance other monitors simply cannot produce. Using R-Y, B-Y decoding no longer meets the demands of today's professional standards.



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/SHIBASOKU CORP. OF AMERICA

1277 Rand Road, Des Plaines, Illinois, 60016
Telephone (312) 298-4380
New York Office (212) 772-2863
Sales/Service (800) 323-2498
Telex: 72-6351

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.

Circle (90) on Reply Card

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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

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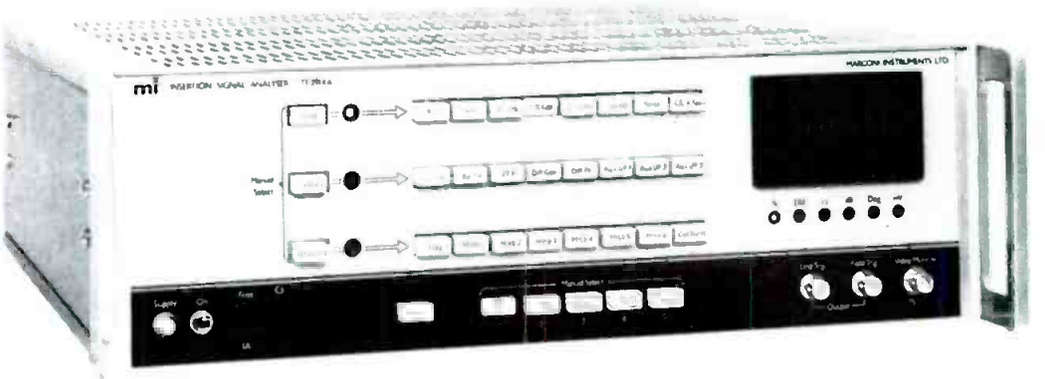
MARCONI HAS BROADCAST TRANSMISSION TEST UNDER CONTROL

SEE US AT NAB BOOTH 3320

QUICKLY IDENTIFY VIDEO DISTORTIONS
in your transmitter, studio or tape production facility!



MARCONI 2914A INSERTION SIGNAL ANALYZER

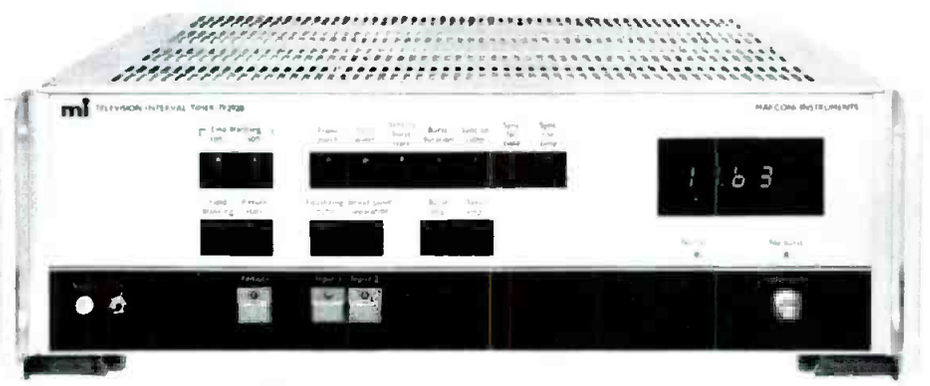
VIDEO QUALITY

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

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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

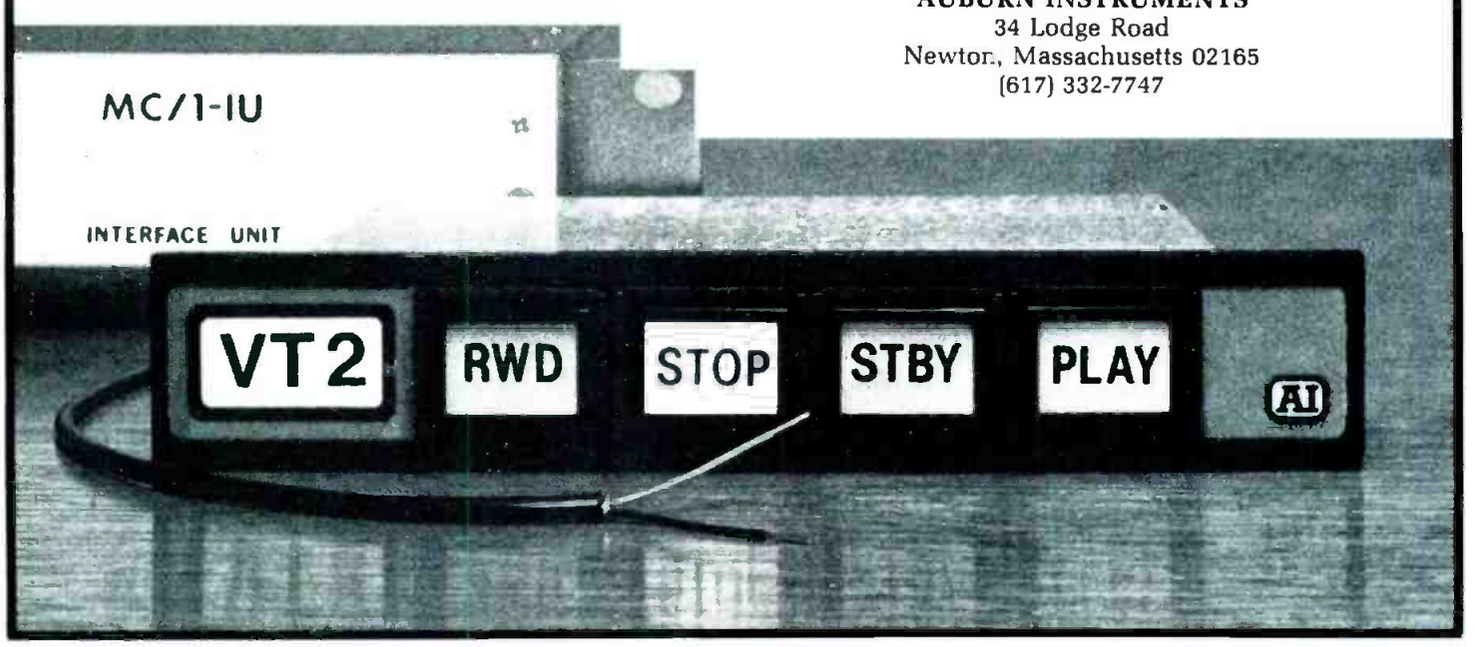
Introducing the Auburn Instruments

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



Circle (93) on Reply Card

www.americanradiohistory.com

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

HITACHI HEARD YOU.

AUTO SETUP

Don't want much, do you?

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

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

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

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

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

The SK-110 is not only self-correcting, but self-diagnostic as well. It gives both video screen display and hard copy 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.

Circle (94) on Reply Card

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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 diplexers
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
Ultamatte: 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

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CONRAC

INNER VIEW:
A closer look at Conrac Monitors

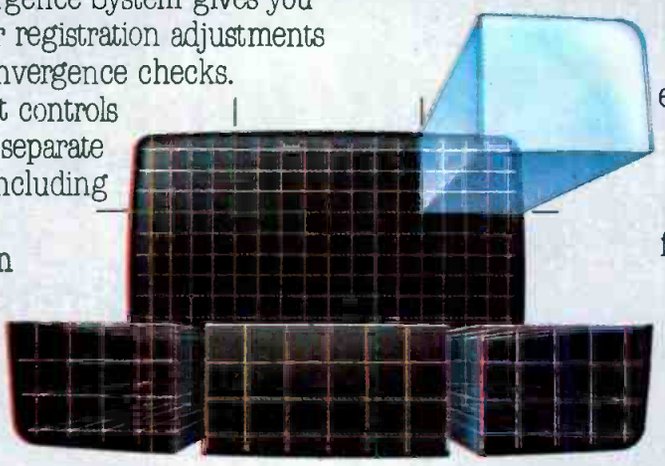
Active Convergence: Registration made simple.

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.



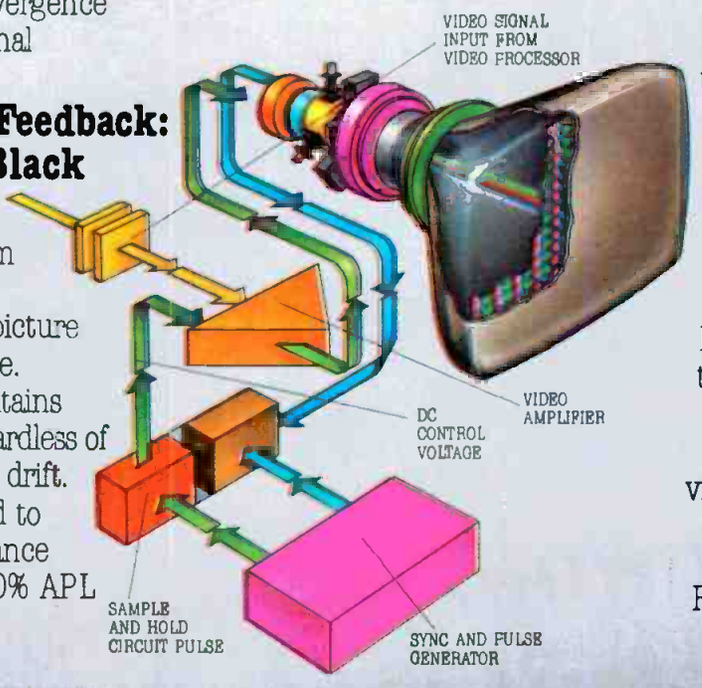
Conrac's Active Convergence system lets you adjust color registration on nine separate areas of the CRT.

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 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

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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.

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RFORMANCE

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.

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

Circle (96) on Reply Card

Ampex Corporation • One of The Signal Companies

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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°F to +150°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

5730 GENERAL WASHINGTON DRIVE
P.O. Box 11268 • ALEXANDRIA, VIRGINIA 22312
TELEPHONE: 703/354-3350 TWX: 710-832-0273

Circle (97) on Reply Card

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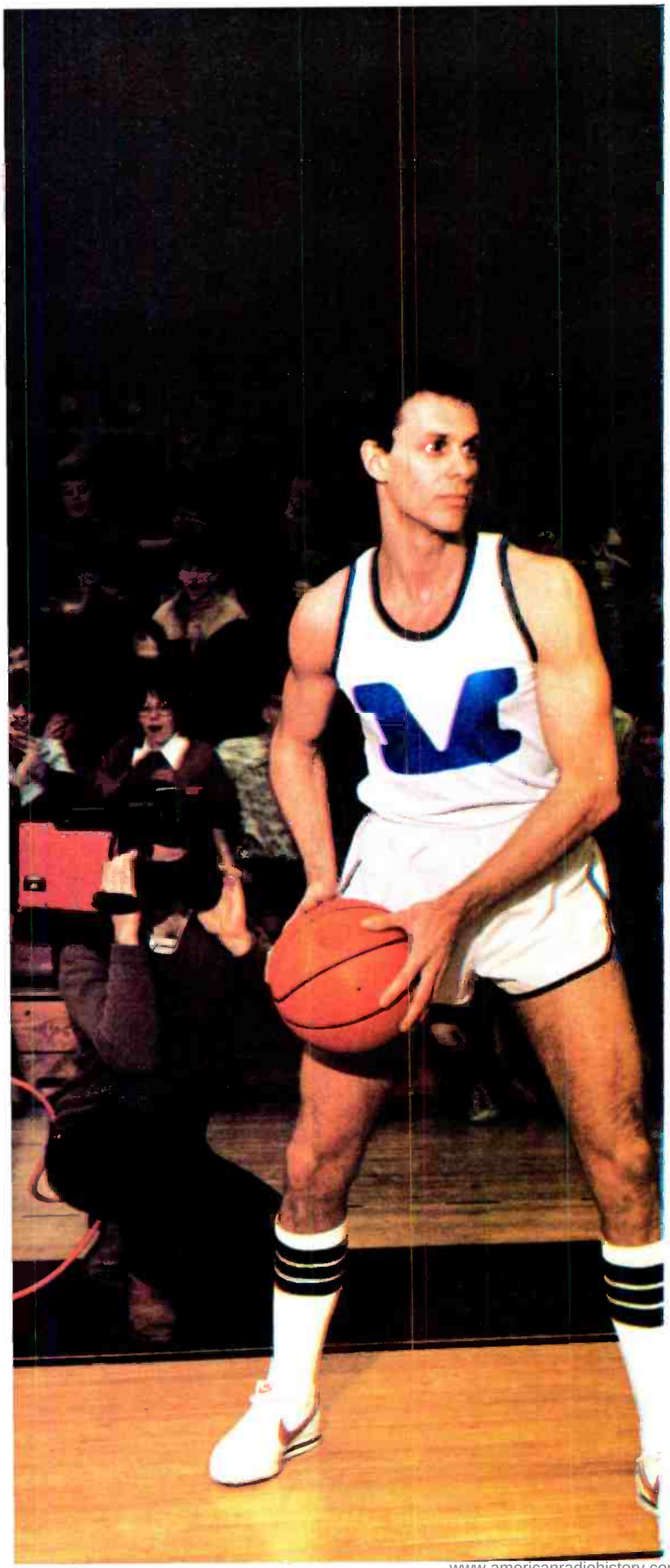
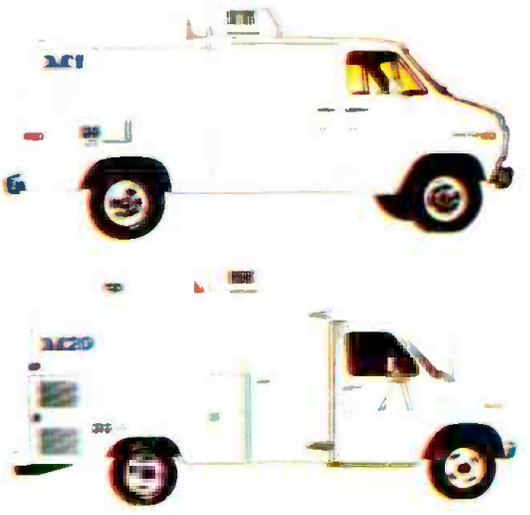


Midwest and JVC put you where the action is!



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

MIDWEST CORPORATION

1021 West 8th Street
Cincinnati, OH 45203

A UNR Company

Authorized Distributor for JVC Products
Cincinnati, OH 513-651-1904
Columbus, OH 614-476-2800
Cleveland, OH 216-447-9745
Detroit, MI 313-689-9730
Indianapolis, IN 317-251-5750
Louisville, KY 502-491-2888
Lexington, KY 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

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Exhibits roundup

Datametrics *(continued)*
716: 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

Dorrough 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

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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:

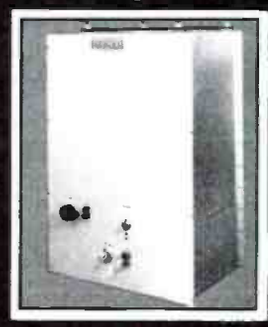
Tube Type	Output	Gain	Efficiency	Cavity Model
8986	15kW	20db	80%	Y1393D-V1
8985	25kW	20db	80%	Y1393D-V2
9011	30kW	21db	80%	Y1393D-V3
8984	55kW	16db	78%	Y1369

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.

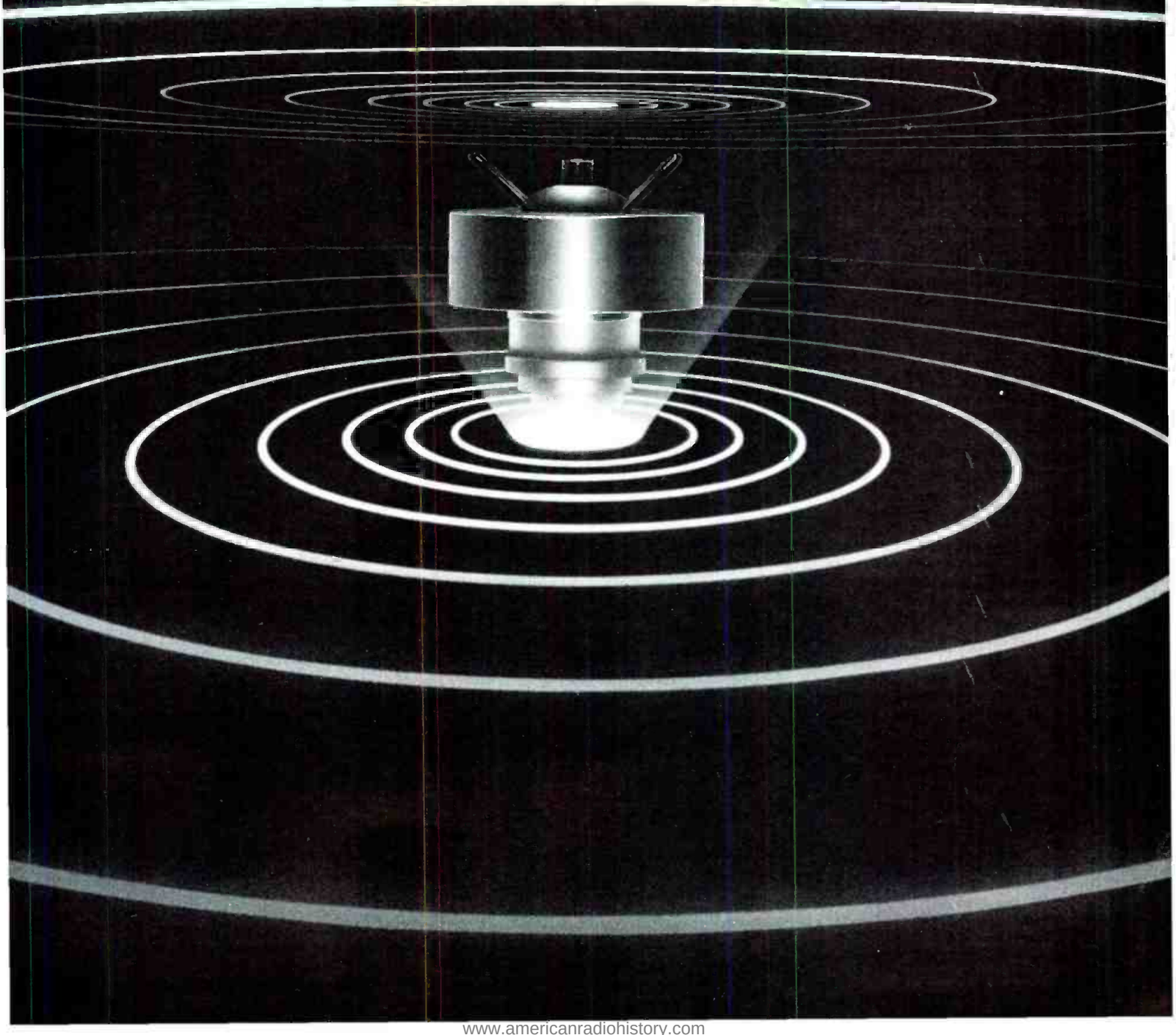
Along with our power tubes, and the cavities that bring out their best performance, we also supply service and application engineering. Find out more today. Contact RCA Power Tube Marketing, New Holland Avenue, Lancaster, PA 17604. Call (717) 397-7661. Or get in touch with RCA, Brussels, Belgium. Sao 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



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CREATIVE LIGHTING

An OPEN . . .

. . . and SHUT Case

Next time you go on location travel first class with the new ***Video Matth-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 Matth-Pak*** on for size. You'll be impressed.

matthews
STUDIO EQUIPMENT, INC.

HEAD OFFICE:
2405 Empire Avenue
Burbank, California 91504
(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 49
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 16, 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

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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

2276 SOUTH 2700 WEST, SALT LAKE CITY, UTAH 84119
PHONE (801) 973-6840
TWX: 910-925-4037

Circle (101) on Reply Card

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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: Monstermat; 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 ¼-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 Bargen

ISC Interactive Systems Co.
2425 6th St., Boulder, CO 80302
(303) 447-2013

Circle (102) on Reply Card

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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, MICROTIME 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

THERMODYNE INTERNATIONAL LTD

Superiority in every case.

Laurel and Hardy® Larry Harmon Pictures Corporation
Licensed by Larry Harmon Pictures Corporation

Circle (103) on Reply Card

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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 Lighthead
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: ¾-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: ⅔-inch format EFP lens; focal length 6.5~23mm; f/1.7
A17X8.5 ESM: ⅔-inch format EFP lens;

Digivision® MONITOR PROMPTING SYSTEM

from the people who bring you Vinten.

- Lightweight
- Totally Independent of Camera and Lens
- Directly Compatable with all Vinten Heads and easily adapted to others.
- Can be used with ENG and film cameras.
- Complete systems in stock.

SEE US AT NAB BOOTH # 3325

- *Call or write for complete Vinten Camera Mounting & Digivision Catalog.*

Listec

LISTEC TELEVISION EQUIPMENT CORP.
39 CAIN DRIVE / PLAINVIEW, NEW YORK 11803 / (516) 694-8963 / Telex: 640470
1619 COSMIC WAY / GLENDALE, CALIFORNIA 91201 / (213) 247-9247 / Telex: 182686

Circle (104) on Reply Card

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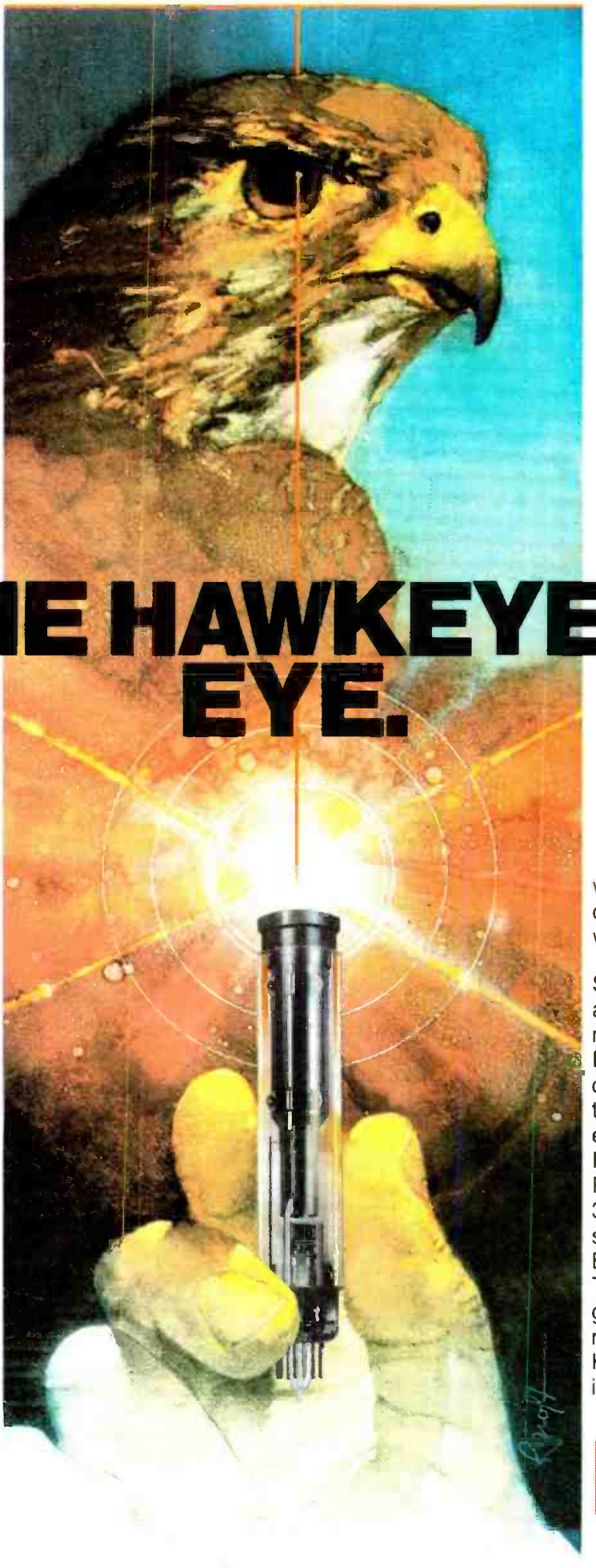
INTRODUCING



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

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Exhibits roundup

Fujinon *(continued)*
focal length 8.5 ~ 145mm; f/1.5
A14X9.5 ERM: ⅔-inch format ENG/EFP lens; focal length 9.5 ~ 133mm; f/1.7
A30X11ESM: ⅔-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 Larcan 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 squeezer
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

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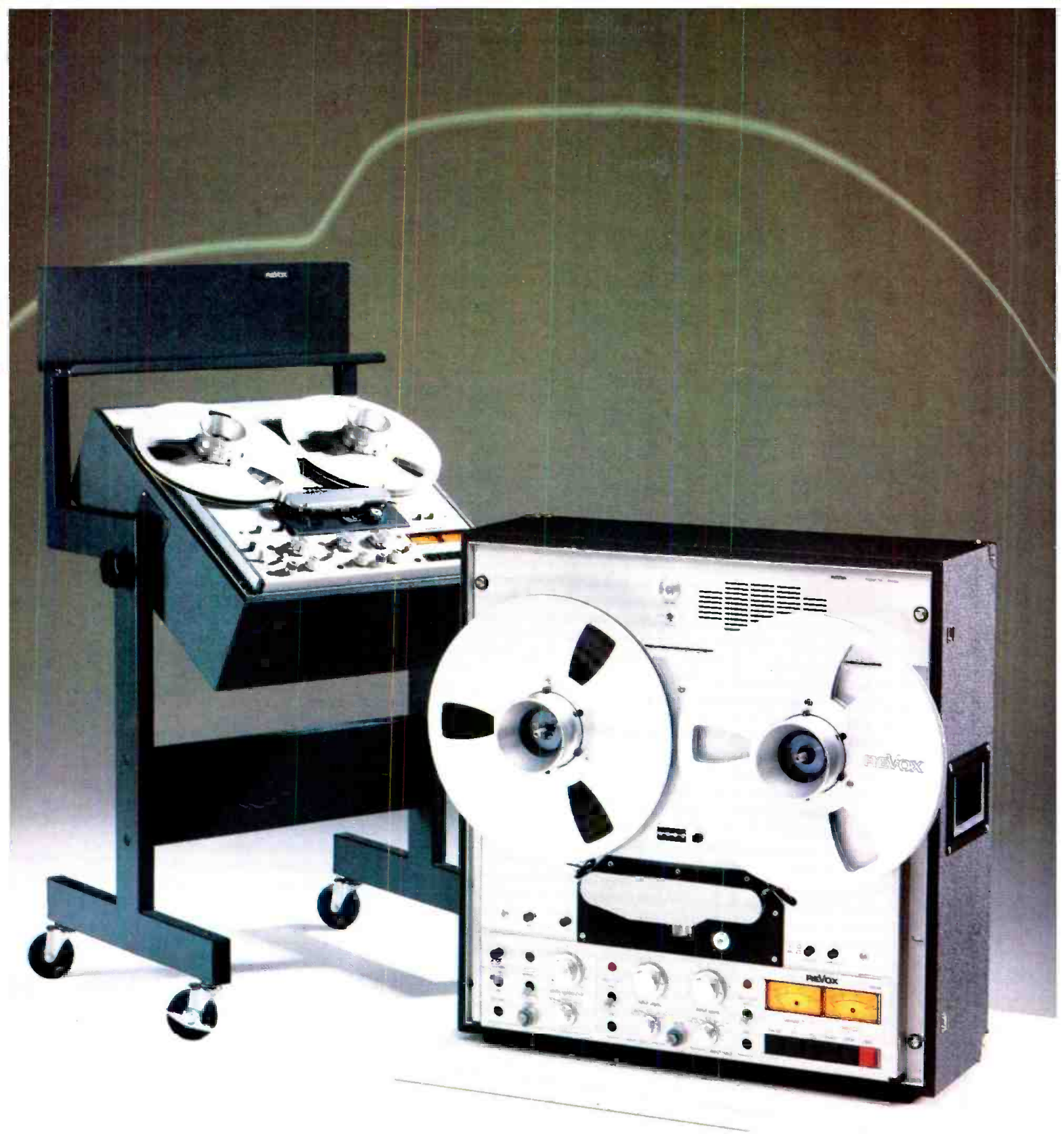

Does the Revox PR99 remind you of something?

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 demonding 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-cost chassis • Precision machined headblock • Balanced line in and out switchable for calibrated or uncolibrated mode • Servo-controlled capston motor • Edit mode switch • Tape dump • Self-sync • Choice of 3.75/7.5 or 7.5/15 ips • Remote contral and vari-speed ovailable.

In short, the PR99 is so versatile, so dependable, and so downright sensible that you could almost call it a "volkscorder."

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

www.americanradiohistory.com

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 ⅔-inch studio camera
FP-10: High resolution single-tube camera
FP-22: ⅔-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

Circle (107) on Reply Card

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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

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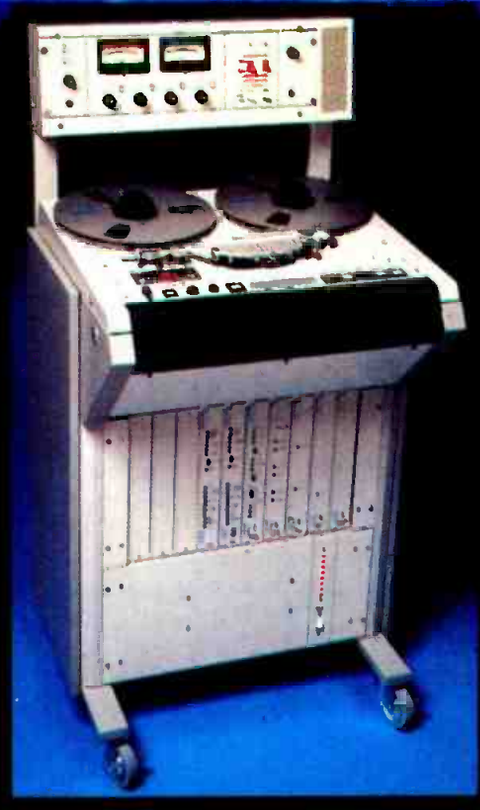
The Performance a Broadcaster Expects,

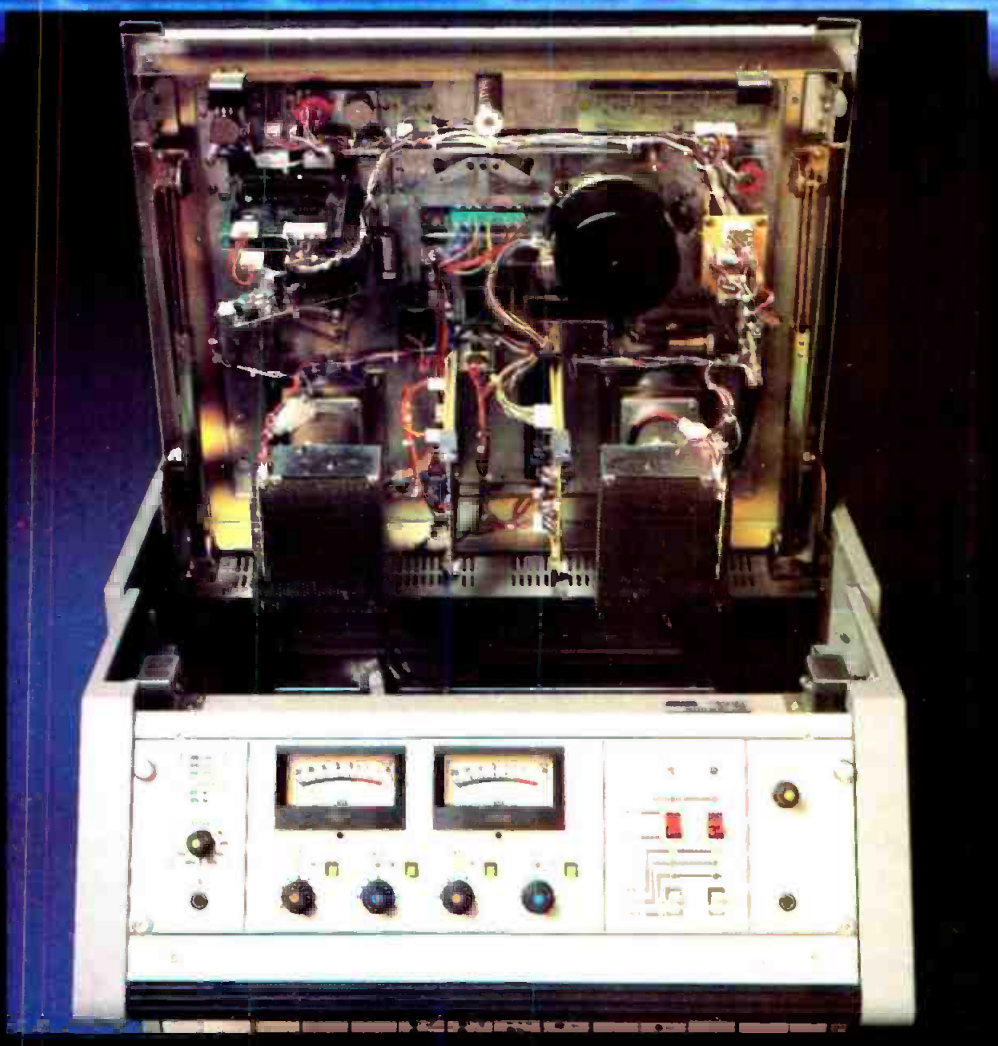
The Features and Reliability He Demands.



www.americanradiohistory.com

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.

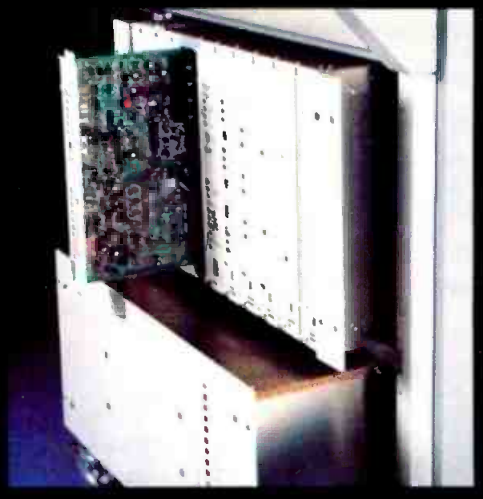


THE ULTIMATE IN PRODUCTION EFFICIENCY

- Three speeds: 3¾, 7½, 15 or 7½, 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.
- ±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: ~75dB 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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Circle (109) on Reply Card

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ALL NEW, WITH OVER EASY TOO. $420.* We took an industry workhorse—the dbx Model 160—and made it even more versatile. We gave it Over Easy® so you can choose soft knee or hard knee compression at the touch of a button. We've also made it strappable for dual channel compression. 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.

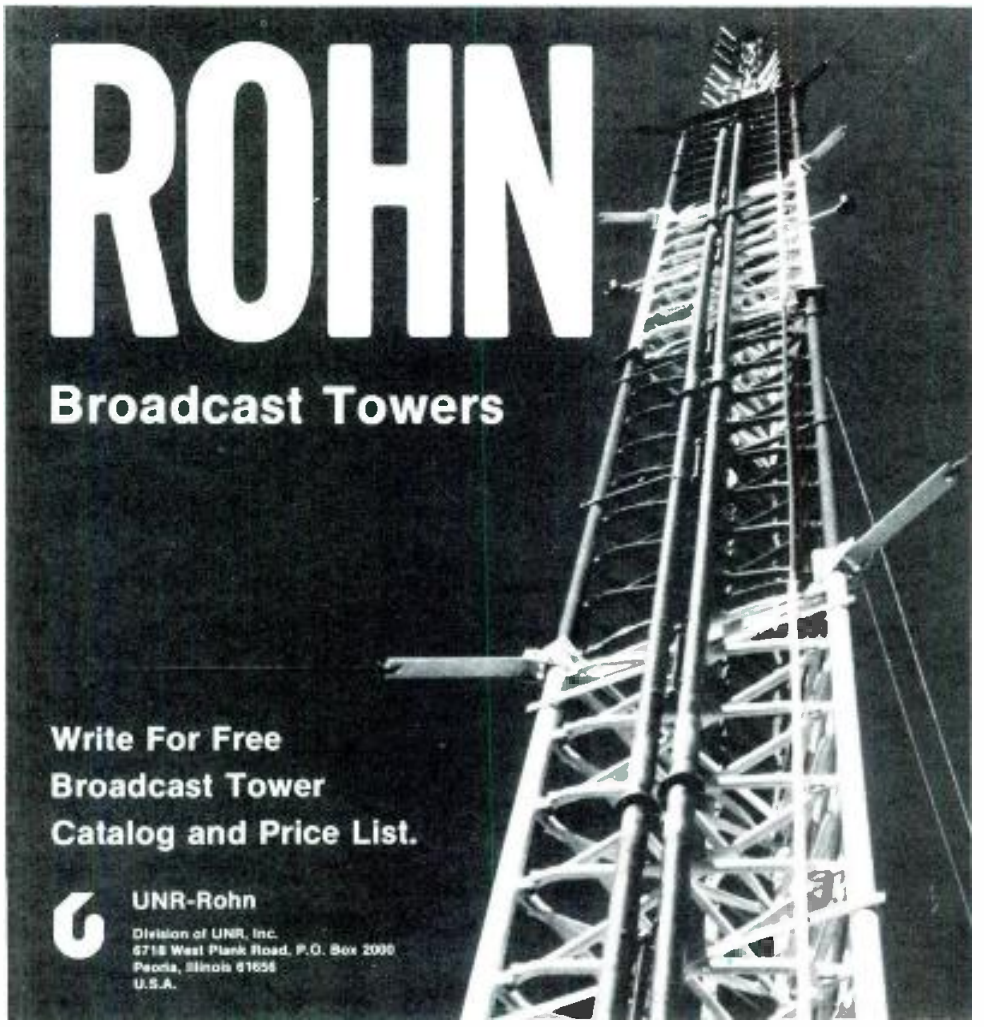
*Manufacturer's suggested retail price.

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



Circle (111) 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

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On the other hand, our routing switchers handle channel growth very nicely.

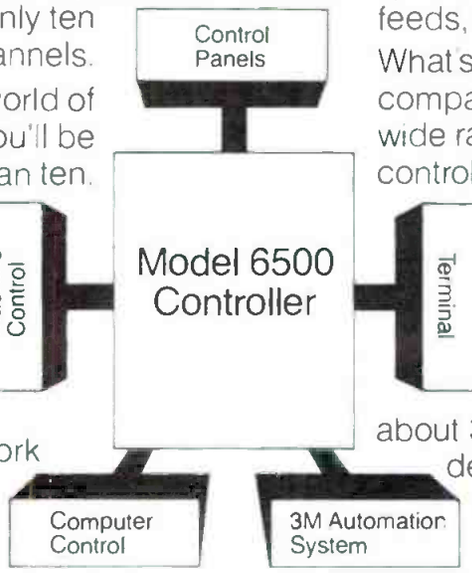
A patch panel will work just fine in your system. If you plan to limit yourself to only ten channels.

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

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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 "memry", 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 castered 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...

3M

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: ⅓-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 Crd
see ad on page 247

JVC, Professional Video Divison
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: Videocasette 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

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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 COMPEX 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.
- WIDE BAND VCA LIMITER AT THE SYSTEM OUTPUT FOR ABSOLUTE OVERMODULATION PROTECTION.
- SELECTABLE 0, 25, 50 OR 75 μS 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.

AN AUDITION IS THE ONLY WAY TO FULLY APPRECIATE THE **TRANSDYNAMIC**. CALL TODAY, TOLL-FREE **800-426-6170** FOR FURTHER INFORMATION.

SYSTEM INSTALLATION BY FACTORY PROFESSIONALS IS ALSO AVAILABLE.

Audio+Design

THE HIT SOUND IN BROADCAST SCIENCE.

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CALL TOLL-FREE **800-426-6170**

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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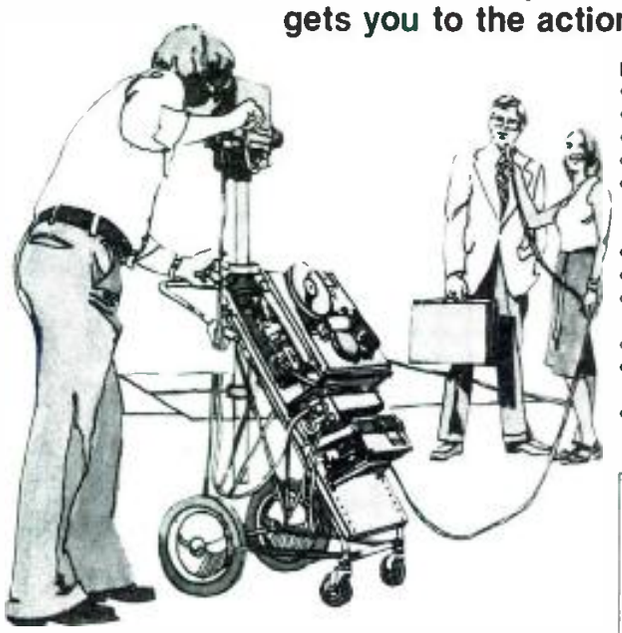
New Wheelit ENG-1 Folding Camera Cart

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
- 5¾" 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.

wheelit

GRUBER PRODUCTS COMPANY, BOX 7350, TOLEDO, OHIO 43615
(419) 531-4900

Circle (115) on Reply Card

PREMIUM NICKEL-CADMIUM "FREZZI"™
direct-replacement for SONY BP-90 battery

Made in U.S.A.

SEE US at N.A.B. Booth 1917

FREZZOLINI® Model FBP-90 Battery Pack offers
- lower price
- full 4AH capacity.
- rugged serviceable plastic case.
- fuse & thermal protection.
- internal spare fuse—field-replaceable.
- optional Frezzolini® universal chargers.

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 Crd

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
Estabished 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, amoritization 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

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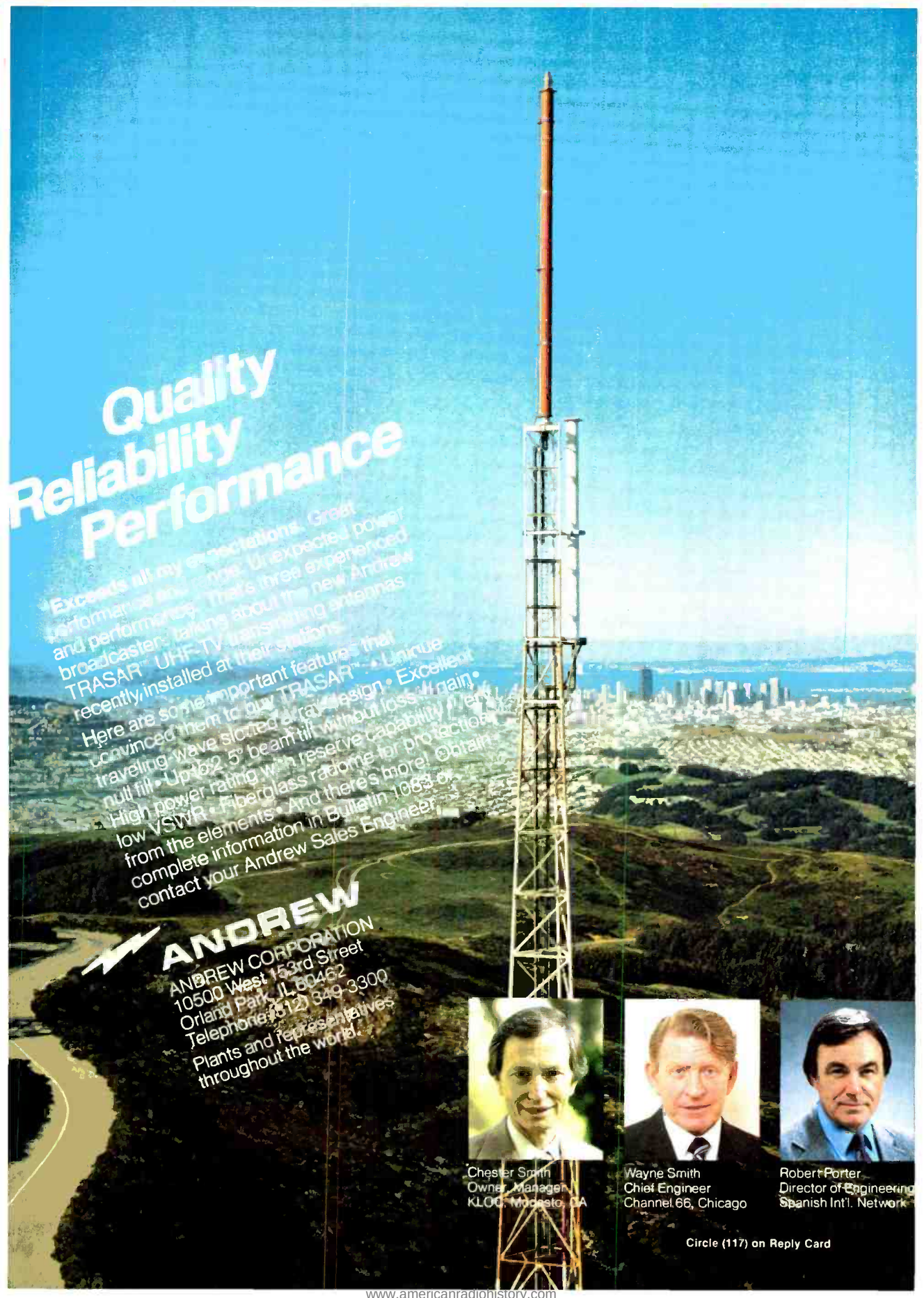

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With flexible, field-proven, electrically transparent Phillystran® high-performance tower guys . . .

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 Sanguineti, 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

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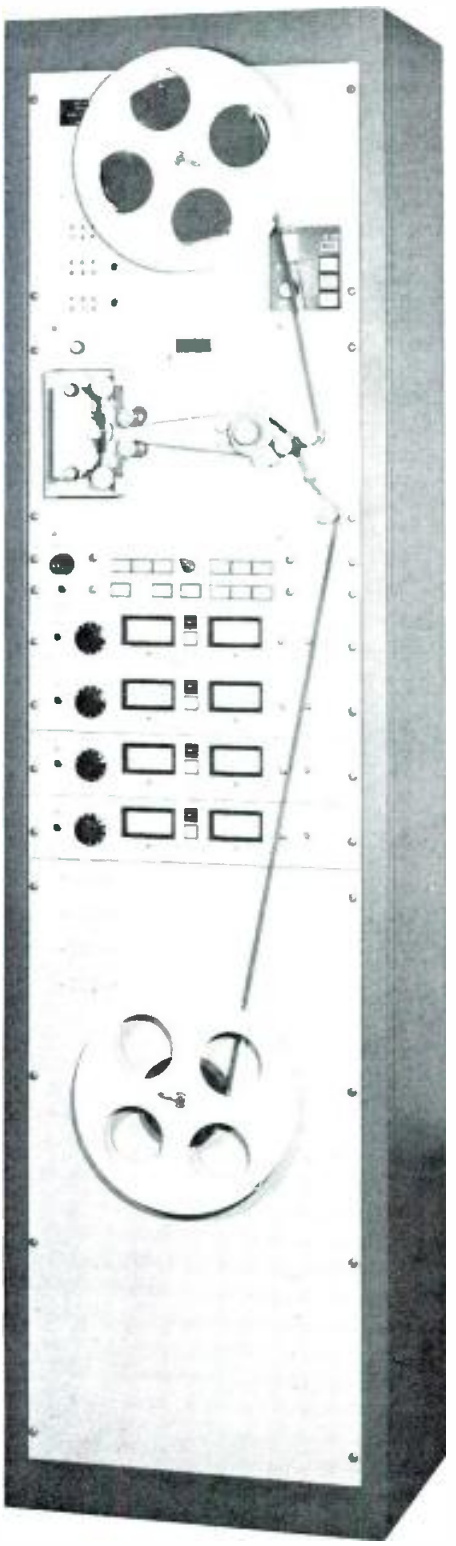

MAGNA-TECH
THE SOUND HEARD AROUND THE WORLD

Magnetic Film Recorders and Reproducers for Television and Film Sound Post-Production

HIGH SPEED

Telecine Magnetic Followers
Video Tape-Film Interlock
Electronic Looping
Dubbing Systems
16 and 35mm Electronic Projectors
Total Facility Engineering

WORLDWIDE SALES OFFICES

Paris
Hi-Fidelity Services
4 Rue Semard
75009 Paris. France

Sydney
Magna-Techtronics (Aust.)
PO Box 150
Crows Nest NSW 2064
Australia – Telex 24655

Johannesburg
General Optical Co., Ltd.
15 Hulbert Road
Johannesburg 2001,
South Africa

Rome
Alberto Sciaretta
Via Siria 24
Rome 00179
Telephone 7943618

Brussels
A.R.C.
Rue de Boisde Linthout 45
1200 Brussels Belgium

Hong Kong
Paul Yang and Associates
901 Star House
3 Salisbury Road
Kowloon, Hong Kong

Bombay
Capt. P.K. Vishwanath
234/4 Rama Baug,
Deodhar Road
Bombay 400 019, India

Kehl West Germany
Zenon GMBH
Postfach 1743
Hauptstrasse 128
Kehl am Rhein
Tel: 07851/2991
Telex: 753537

London
Branch & Appleby
42 High Street
Harrow-on-the-Hill
Middlesex HAI 3LL.
England

Kuala Lumpur
Kinematronika Sdn. Bhd.
2852, Jalan Selangor/
Persekutuan.
Federal Hill
Kuala Lumpur, Malaysia

Caracas
Cine Materiales srl
Apartado Postal 61.098
Caracas 106 Venezuela

MAGNA-TECH ELECTRONIC CO., INC.
630 Ninth Avenue, New York, N.Y. 10036
Telephone (212) 586-7240 Telex 126191 Cables "Magtech"

Circle (119) on Reply Card

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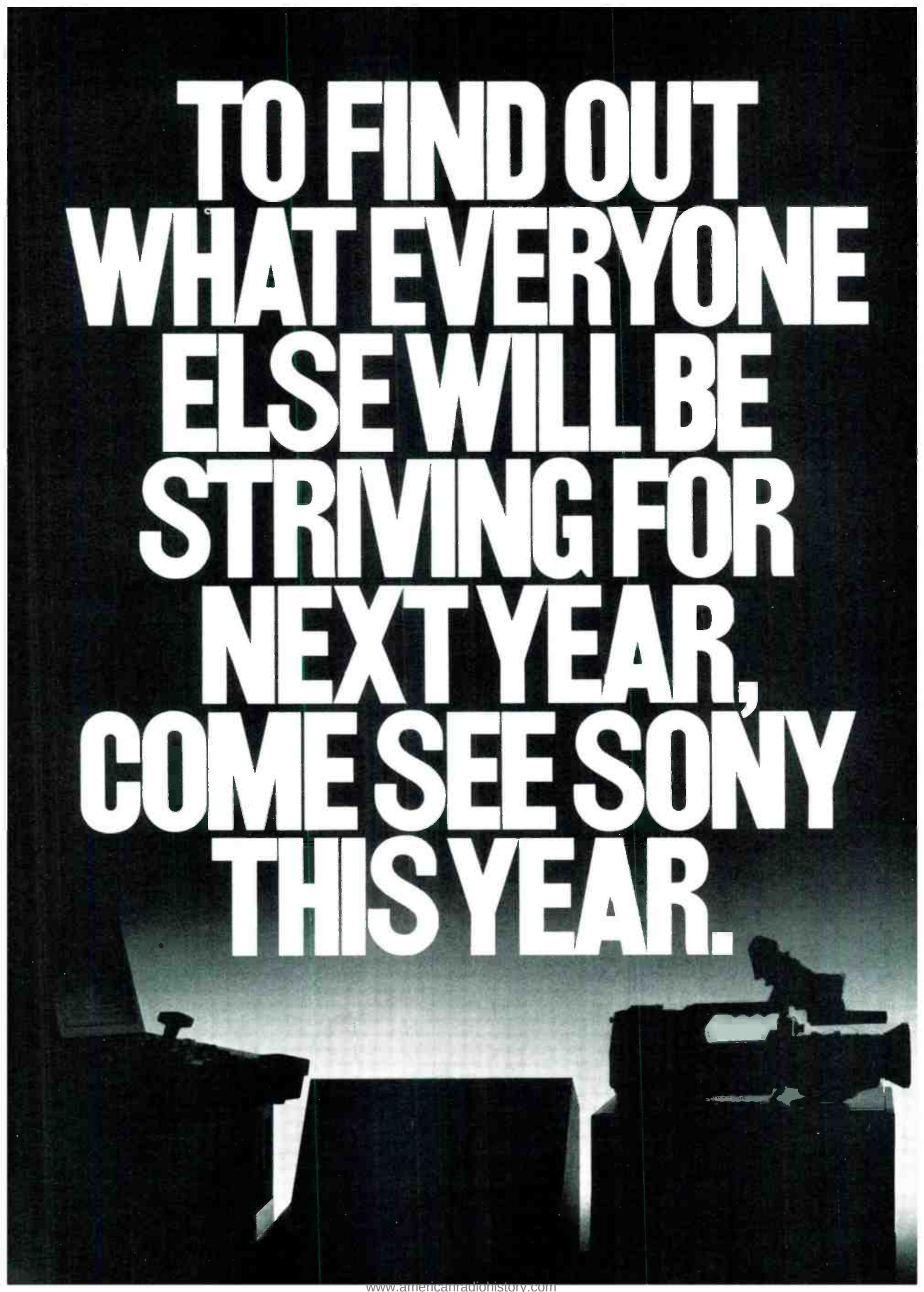
TO FIND OUT WHAT EVERYONE ELSE WILL BE STRIVING FOR NEXT YEAR, COME SEE SONY THIS YEAR.



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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.

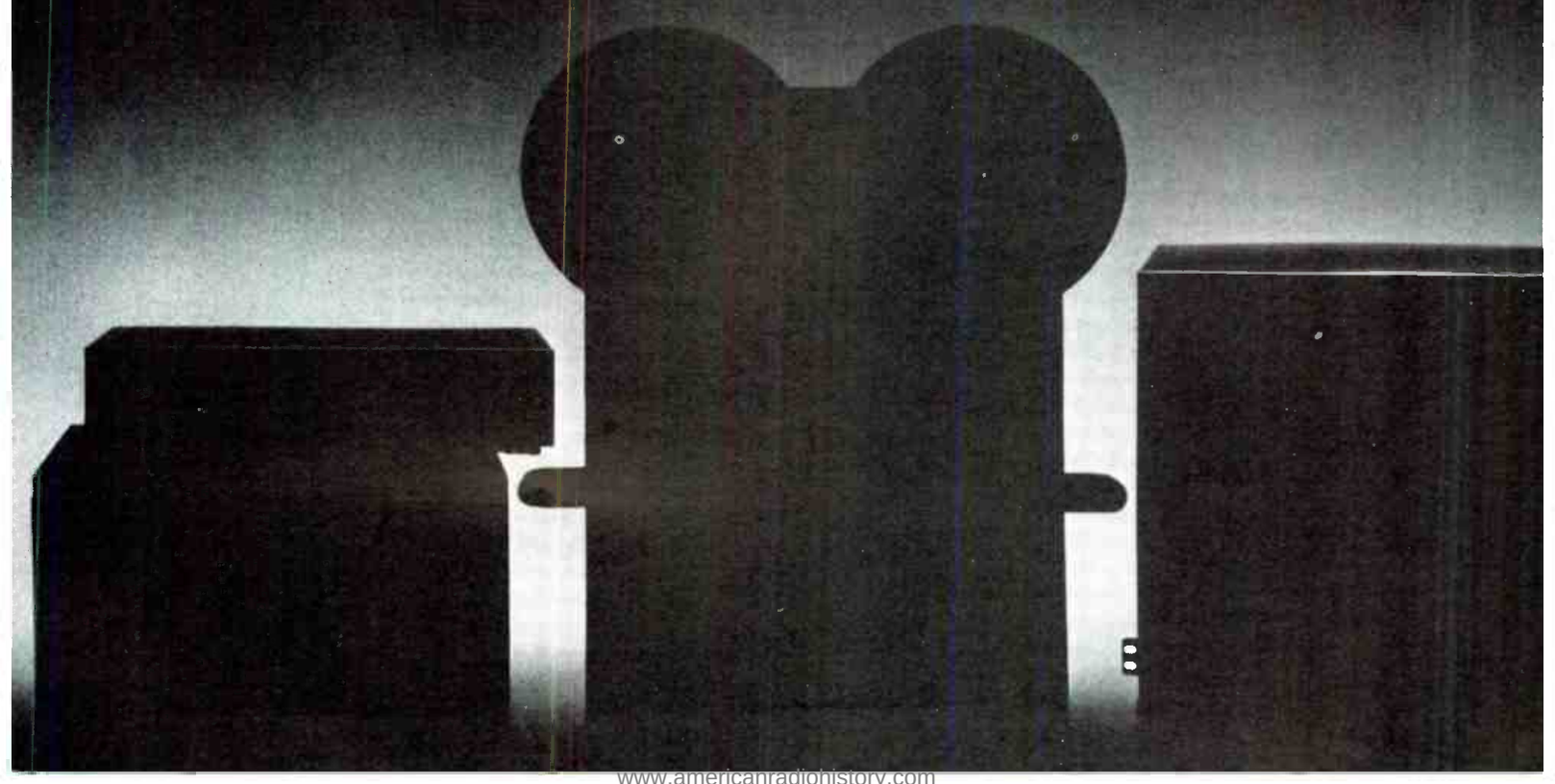
The answer: only at Sony.

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



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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/EFP 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 EFP 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: Tota-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
New products
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 recorders
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

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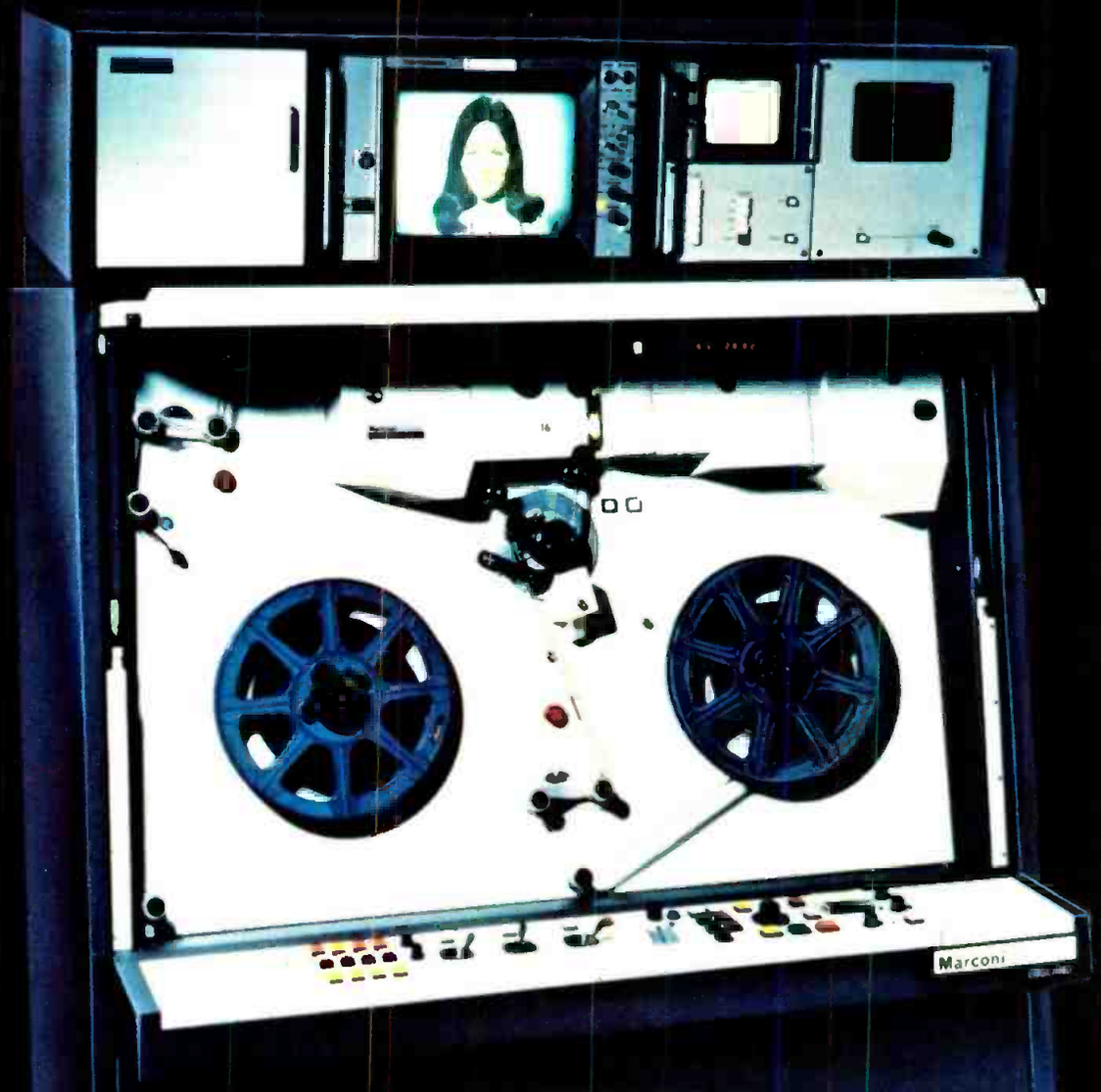
Marconi deserves an Oscar



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

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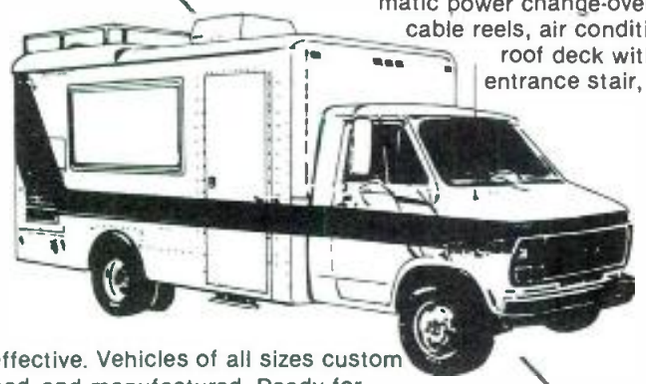
Mobile Television Production Systems

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.

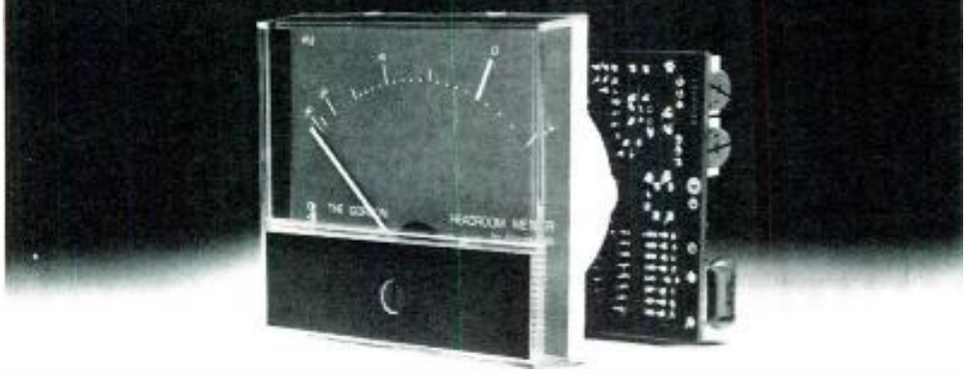
Shook Electronic Enterprises, Inc.

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

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"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 anc 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

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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

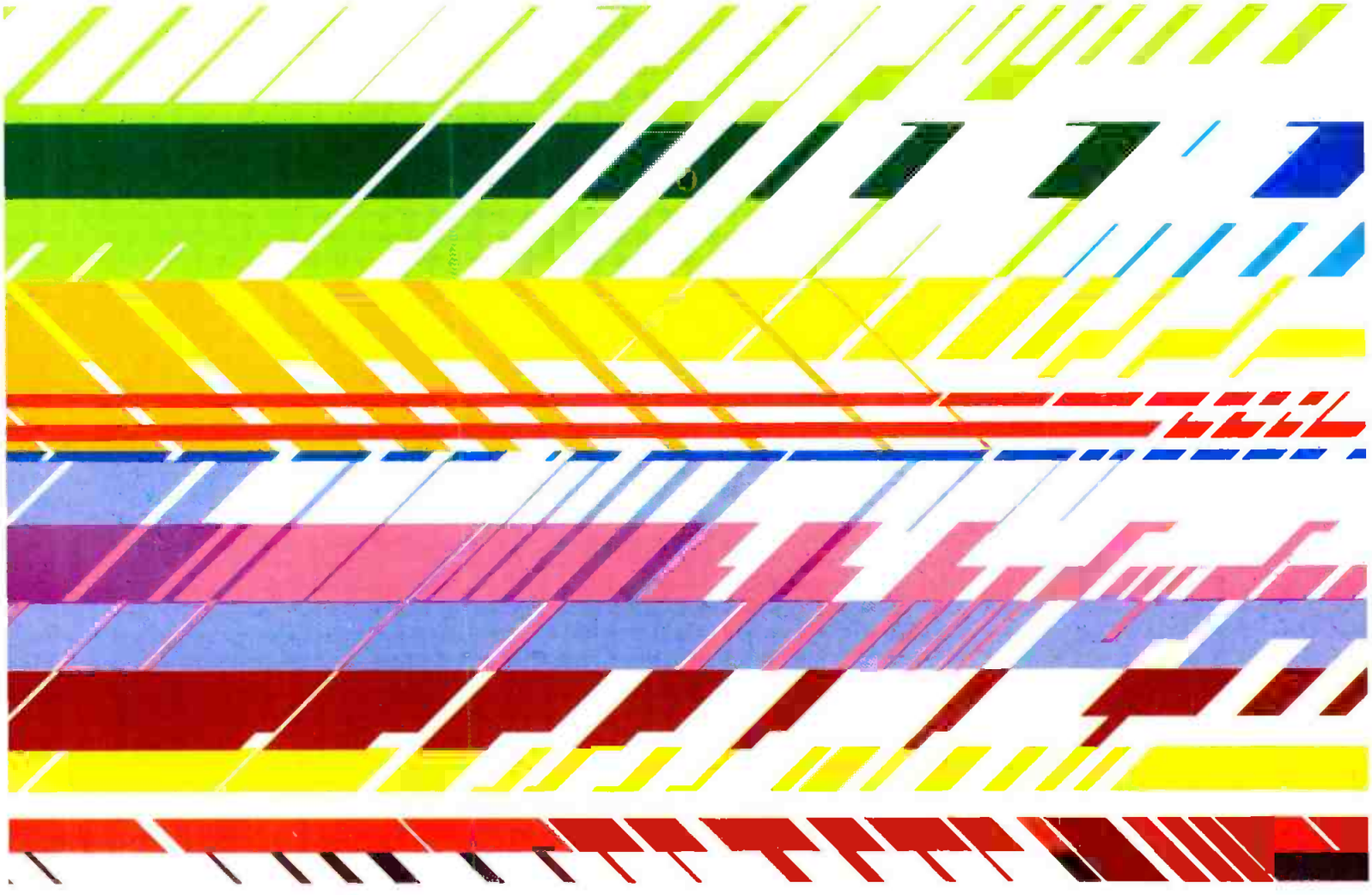
MICMIX Audio Products
Booth 3142
Established products
XL-515: Full stereo reverberation system
XL-305: Full stereo reverberation system
XL-210: Full stereo, low-cost reverberation system
XL-121: Monaural reverb with a built-in preamplifier
New products
D-2B: Non-encode/decode noise reduction system
Circle (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



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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 triped 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/EFP 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

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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)

Newscan/McInnis-Skinner & Associates
Booth 2502A
Established products
Weathergraphics: High performance graphics system
Newscan: 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 guages
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.

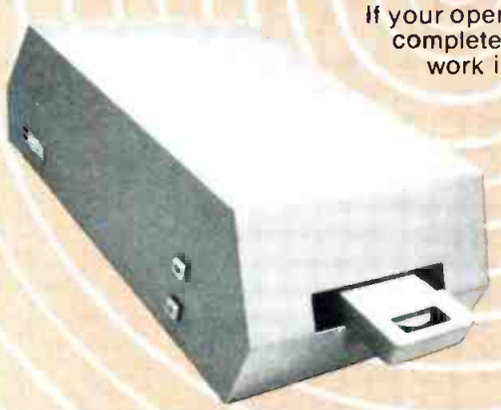
THE GARNER 1100

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 ¾" 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

garner

Circle (126) on Reply Card

www.americanradiohistory.com

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

If we had set out to give you only the features our competition gives you, this is where we'd be today.

www.americanradiohistory.com

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, ¼ 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 (8¾" high by 17½" deep by 18½" 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

www.americanradiohistory.com

#1 SELLER

PCL-505/C and PCL-505A/C

- TRUE COMPOSITE STEREO FM
- CARRIES STEREO WAVEFORM PLUS TWO SUBCARRIERS
- ON-FREQUENCY RF AMPLIFIER

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.

- 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

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5050B-MKIII/8: ½-inch 8-track production recorder
ARS-1000: ½-track stereo PB machine
MTR-10: ¼-inch ½-track stereo or ½-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: ¼-inch 2-track
5050MKIII/4: ½-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

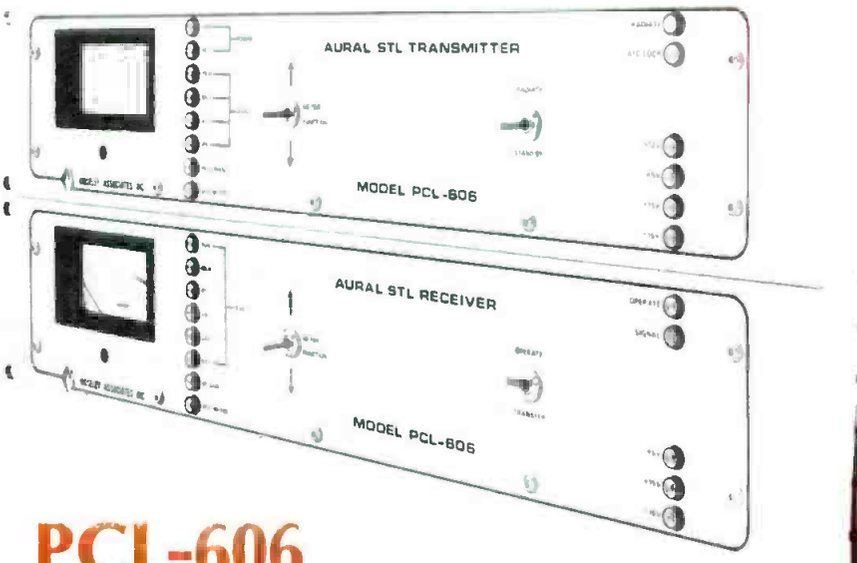
Circle (654) on Reply Card
see ads on pages 76, 154

Panasonic Company (Video)
Booth 3217
Established products
Series: ½- and ¾-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 braodcaster 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 emulsioned 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

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rewe

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.

FIVE METER ANTENNA SHOWN ON LOCATION WITH HIGH EFFICIENCY CASSEGRAIN FEED.

Circle (132) on Reply Card

made of fiberglass, which provides

eliminating the need for cranes, helicopters, or heavy hoisting gear.

recommendations contained in CCIR 465 and Report 391-1.

one inch damage to

www.americanradiohistory.com

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
DEMOD400: 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

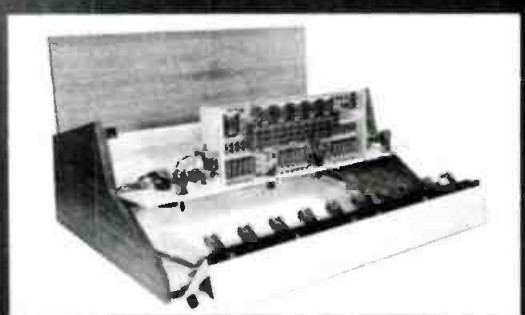
Howe 7000 Series Stereo Consoles . . . The $10,000 console for only $5300.

"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

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*

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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 distrihution 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
¾-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.

Howe Series 2000 Phase Chaser™

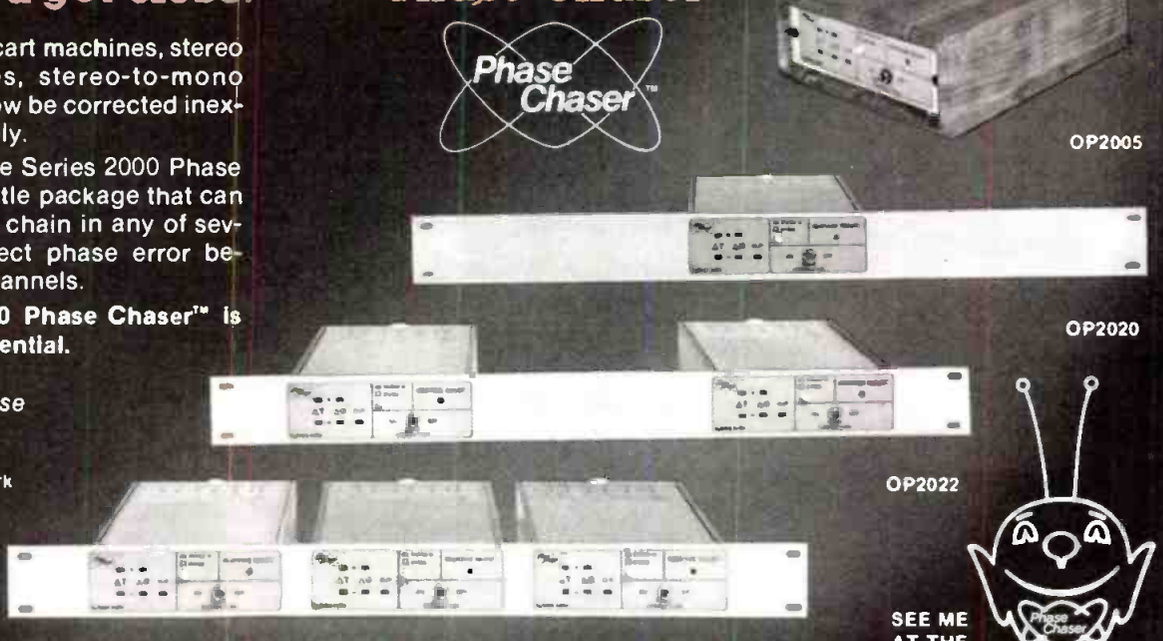
Phase errors in stereo cart machines, stereo reel-to-reel machines, stereo-to-mono dubs, and more can now be corrected inexpensively and effectively.

The revolutionary Howe Series 2000 Phase Chaser™ is one neat little package that can be placed in the audio chain in any of several locations to correct phase error between 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



SEE ME AT THE 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

www.americanradiohistory.com

Introducing the only ¾" time code editing system that performs 20 automatic edits from multiple sources. The Panasonic 700 B-2 Series Time Code Editing System.

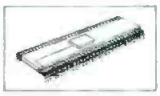
700 B-2 SERIES

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.



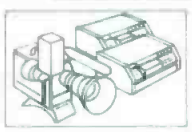
Another touch of ingenuity is the AU-700's microprocessor controls. Designed to work perfectly with the AU-A70 editing controller, they give you the speed, accuracy and versatility of full-logic, mode-to-mode switching. The AU-700 will accept SMPTE time code on a separate track or on audio track one as well as standard CTL pulses. And its electronic

www.americanradiohistory.com

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 ¾" and ½" 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 network 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

www.americanradiohistory.com

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 compandor

Circle (689) on Reply Card

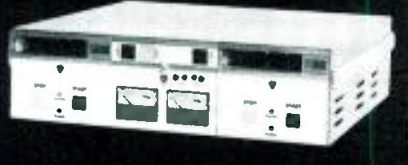
AUDI-CORD: A GOOD SOUND INVESTMENT!!

"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:

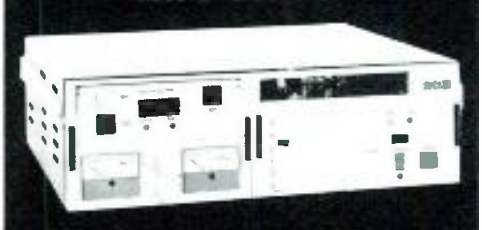
- 28 Model variations
- Modular constructed for easy service.
- Interchangeable transports and other assemblies.
- 1 or 3 tone — mono or stereo.
- Replay reminder system.
- Full remote control — automation compatible.
- Meets the needs of the 1976 NAB standards.
- Latching connectors — slip/lift cover.

RACK CABINETS OPTIONAL FOR ALL MACHINES

See us at NAB, Booth 1510

Modu-Cart 100 Series

RECORD-REPRODUCER



REPRODUCER

AT AUDI-CORD VALUE IS NOT EXPENSIVE

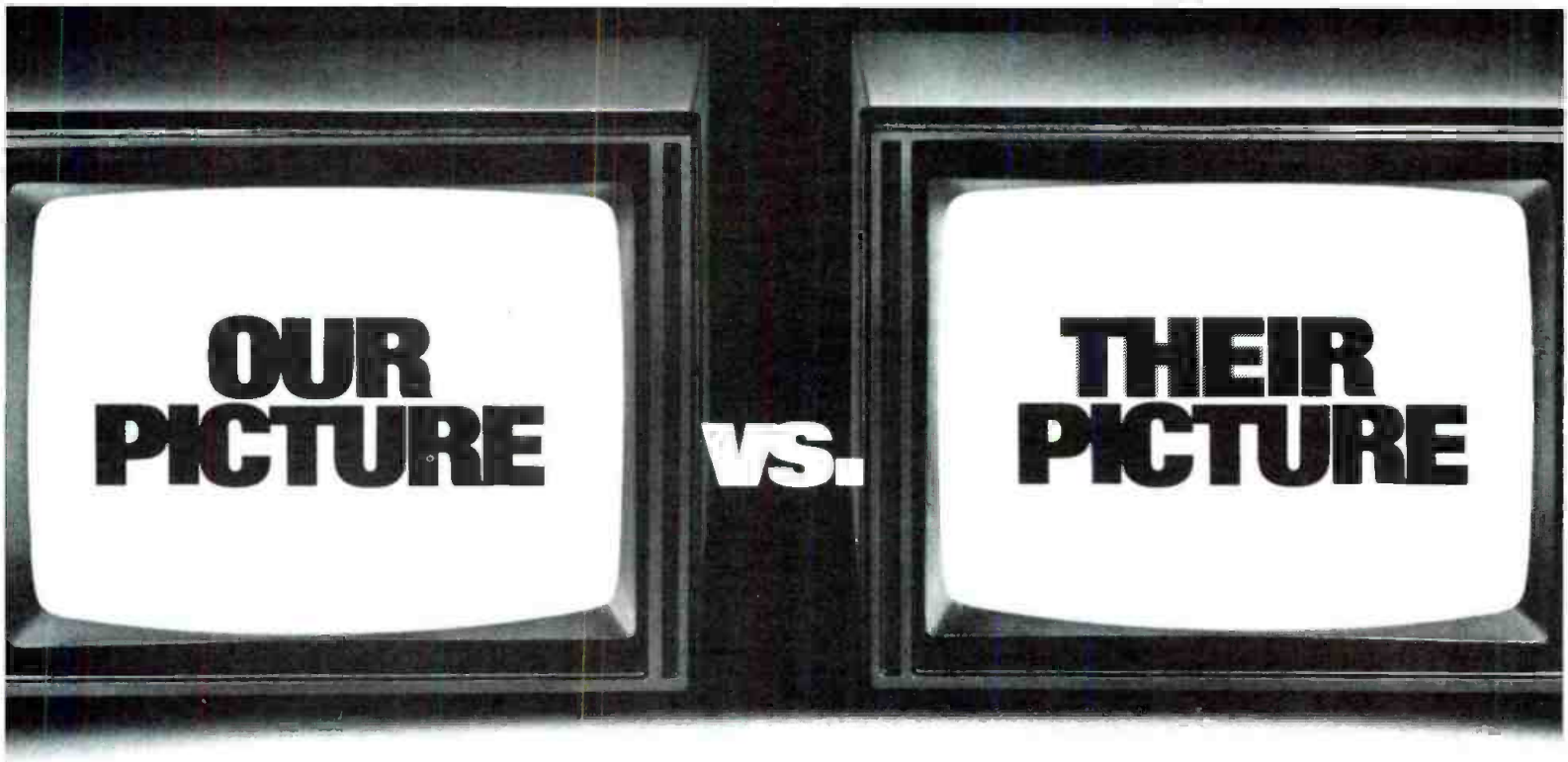
AUDI-CORD CORPORATION

1845 W. Hovey Ave., Normal, Ill. 61761
(309) 452-9461

GIVE US A CALL AND TALK CARTRIDGE NEEDS

Circle (135) on Reply Card

www.americanradiohistory.com



LENCO'S NEW PCE-462 COLOR ENCODER WILL SHOW YOU THE BEST RGB TO NTSC IN THE BUSINESS — FOR BROADCAST AND COLOR COMPUTER GRAPHICS.

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 ± 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

Circle (136) on Reply Card

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

www.americanradiohistory.com

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: Subtitler
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 condensor 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

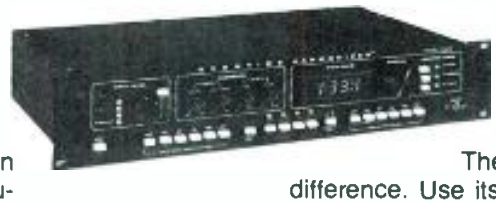
Why Your Radio Station Should Own An Eventide H949 Harmonizer.®

• 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 wih 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.

*List price in domestic U.S.

Eventide
the next step

265 West 54th Street
New York, N.Y. 10019
(212) 581-9290

Circle (137) on Reply Card

www.americanradiohistory.com

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 ⅔-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 ½-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

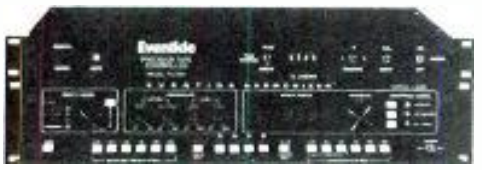
Spectra Computer Systems
Weathercaster
Booth 2415
Established products
CT-1000: Color graphic-weather forecasting computer system
NTSC RS-170A gen-lock signal
S-1010: Digital fine art system
Circle (698) on Reply Card
see ad on page 40

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 thumbwheel 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

www.americanradiohistory.com

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: ½-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/Ianiro 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/Ianiro 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: ½-inch open-reel tape

New products

PT-120 Series: VHS videocassettes for all educational/industrial broadcast applications

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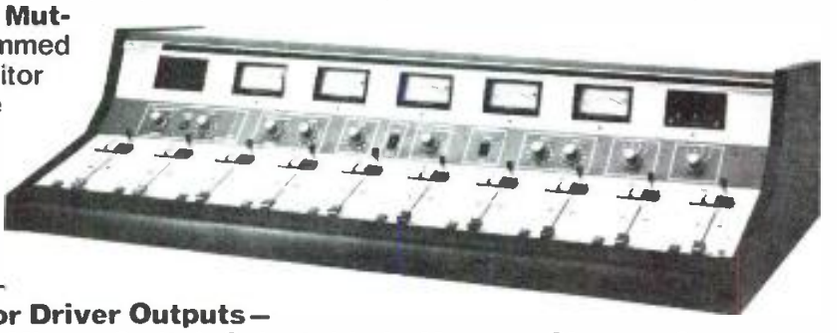
Everything you want in an audio console:

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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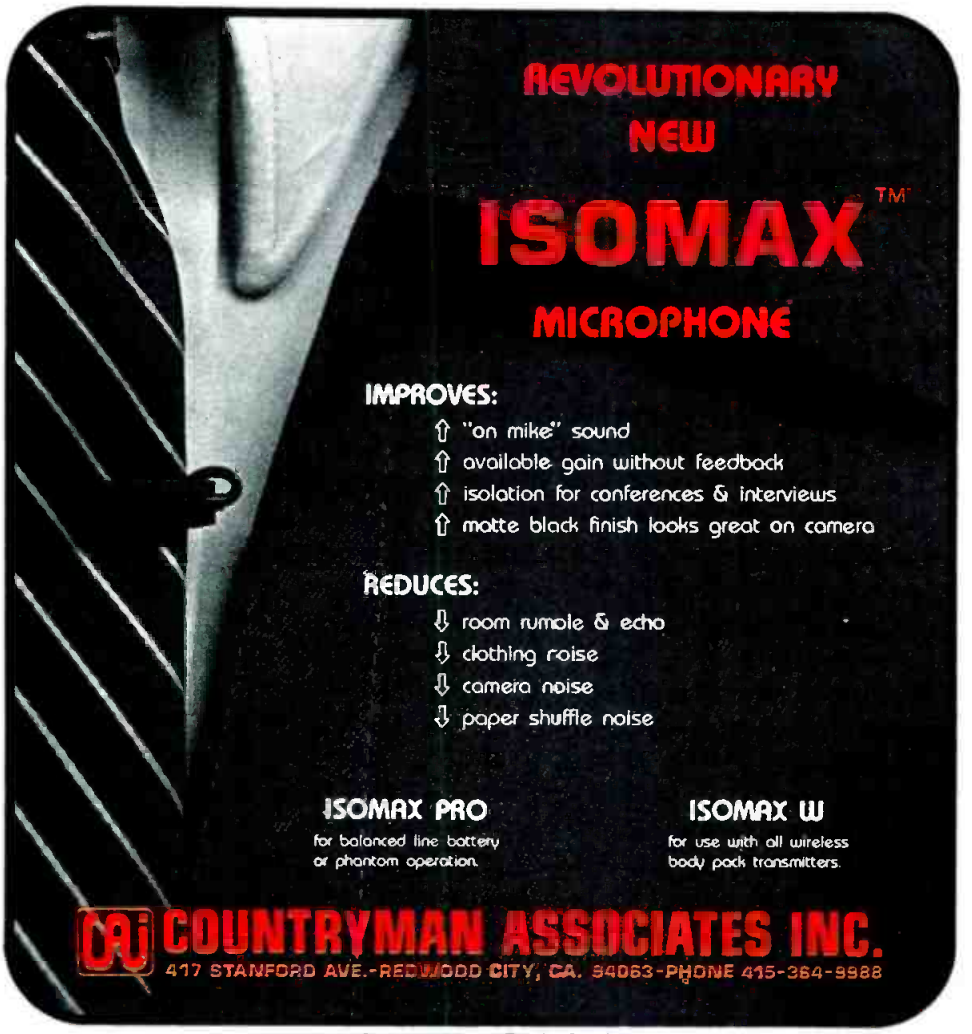

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Want MORE Information on Advertised Products?
Just refer to the Bingo # beneath each ad. Circle the appropriate number on the Reader Service Card in the back of this issue.
Complete the remaining information and mail!

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

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The UREI Compressor/Limiters

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.

UREI **From One Pro To Another**

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8460 San Fernando Road, Sun Valley, California 91352 (213) 767-1000 Telex: 65-1389 UREI SNVY
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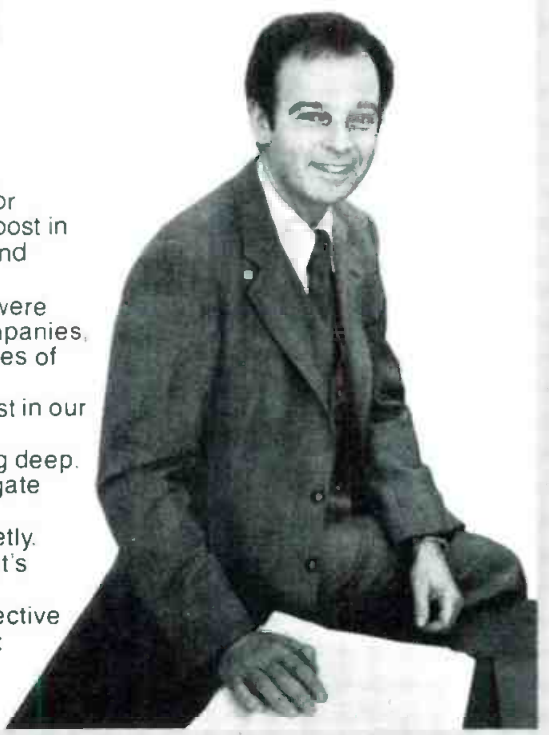
"The person you describe is the person we'll deliver"



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We've successfully recruited for virtually every kind of executive post in broadcasting, cable television, and publishing. At every level.
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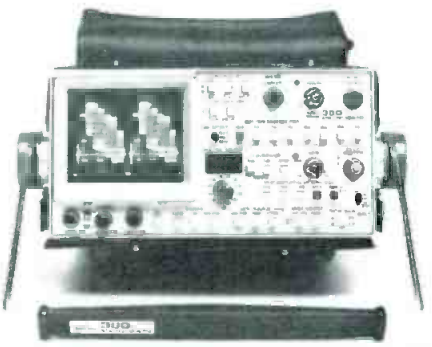
Exhibits roundup

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 printout, 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

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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 μV 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
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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

varian

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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 diascope-type lenses.
New products
Series: 14X ENG lenses for ⅔- and ½-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/prompters
Transports: Telecue with script feed assy—remote foot pedal control
Beam-splitters: 30/70 coated both sides; multilayer low reflectance coating
Telepod: Monitor/prompter and LensView Assy adjustable support assy
New products
M/P 17: 17-inch 1000-line resolution monitor/prompters
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.

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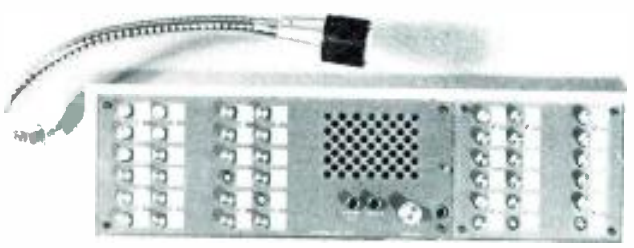
INTERCOM SYSTEMS

Proven Performer in The Top TV Stations of the U.S.A.



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FARRTRONICS MANUFACTURES QUALITY INTERCOM SYSTEMS, AUDIO PATCHFIELDS, DISTRIBUTION AMPLIFIERS AND AUDIO CONSOLES.

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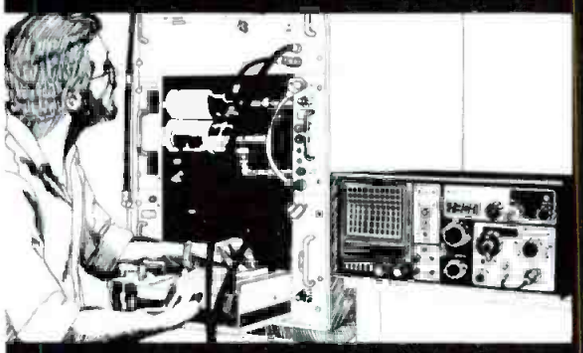
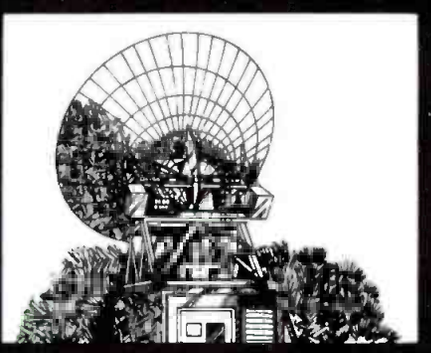
NEW SPECTRUM ANALYZERS

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.

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Polarad Electronics, Inc. 5 Delaware Dr. Lake Sucess N.Y. 11042 Tel: 516-328-1100 TWX: 510-223-0414

Circle (150) on Reply Card

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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

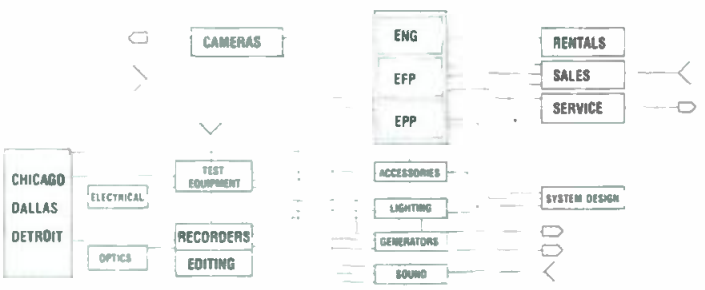
Theatre Service & Supply Corporation
Booth 1900
Established products
Series: Studio cyclorama curtains and tracks
Series: Studio and portable lighting equipment
Circle (726) on Reply Card

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 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.

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MCi

CIRCULAR WAVEGUIDE HIGHEST EFFICIENCY TRANSMISSION LINE AVAILABLE

save up to 50kW RF Power

MICRO COMMUNICATIONS INC.

BOOTH 3312

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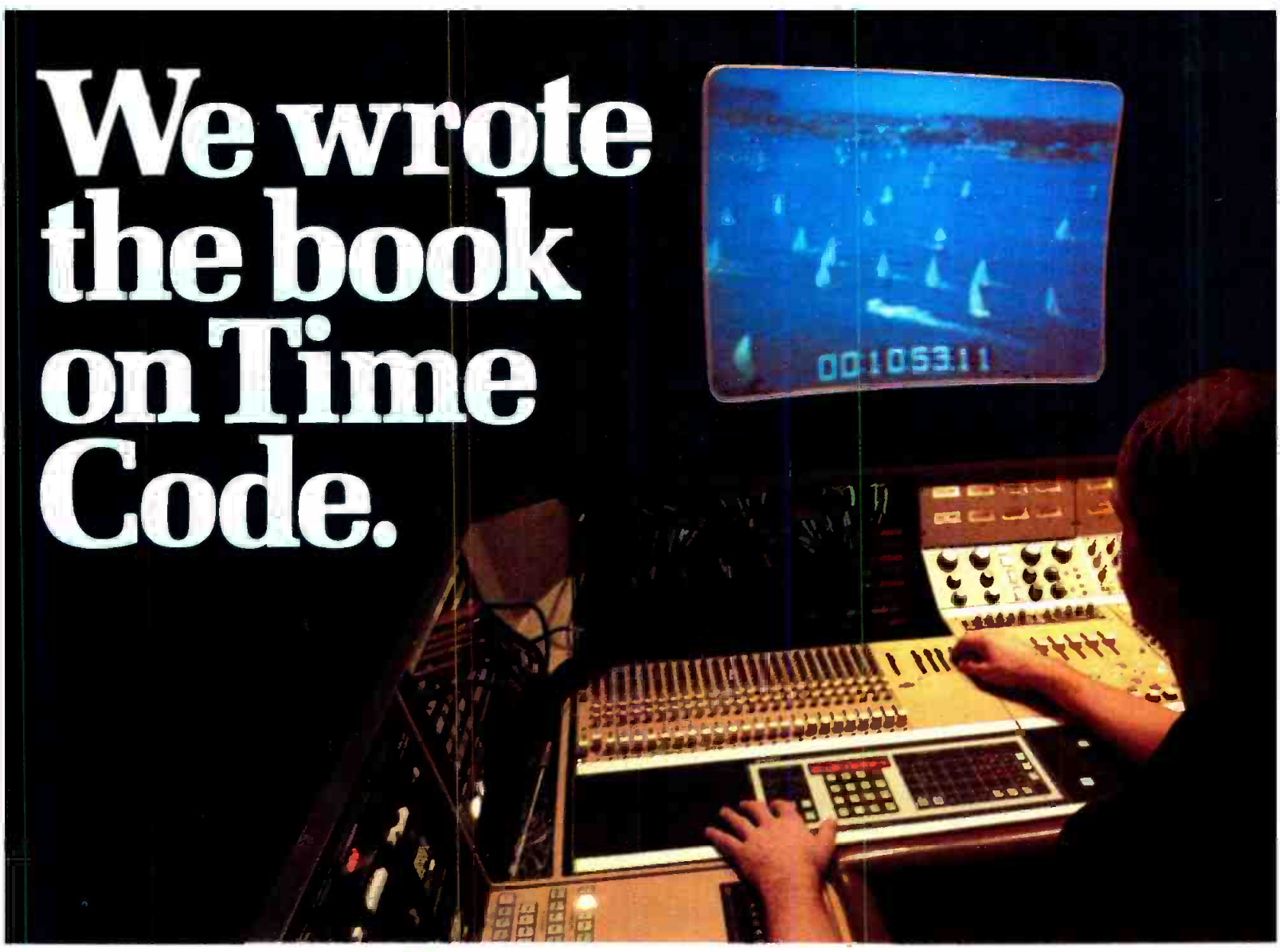
We wrote the book on Time Code.



And now it's yours free.

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 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,

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Santa Ana,
CA 92702-0659
Phone: 714/835-6000.

EECO
Incorporated

See us at NAB booth #1819

Circle (153) on Reply Card

www.americanradiohistory.com

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
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.

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.

www.americanradiohistory.com

The new advanced-design MQ-Series mixers.

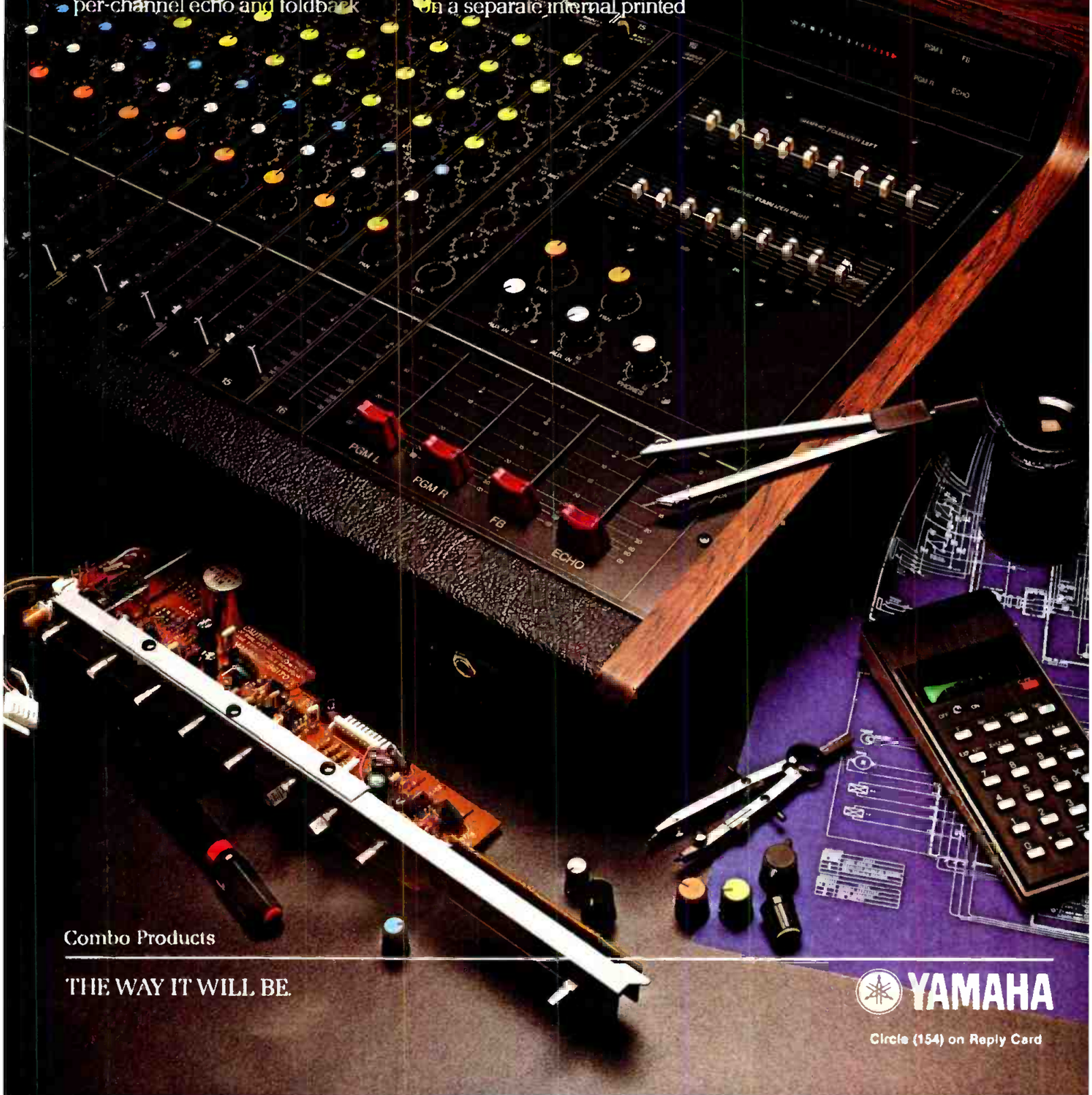
RIGHT ON THE MONEY.

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

www.americanradiohistory.com

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

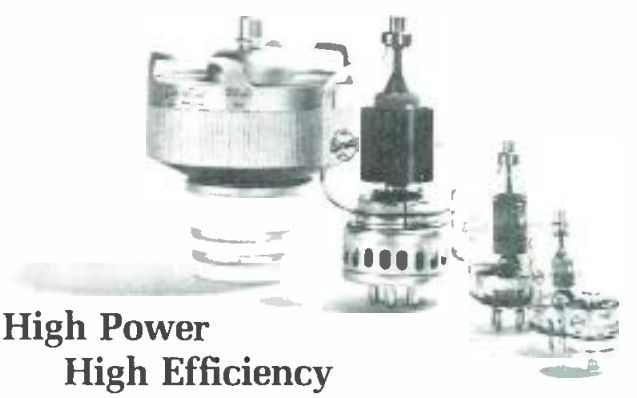
"A DECADE OF DEREGULATION!"

PLEASE VISIT BOOTH NO. 1808 (Lower Level) AT THE SHOW IN DALLAS.

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

Circle (155) on Reply Card

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

ECD INDUSTRIES
2034 Armacost Avenue
Los Angeles, California 90025
Tel (213)820-3009 Telex 194537 TWX 9103427550 Cable ECDE

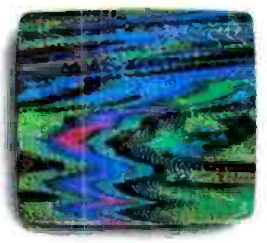
Circle (156) on Reply Card

www.americanradiohistory.com

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.

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.

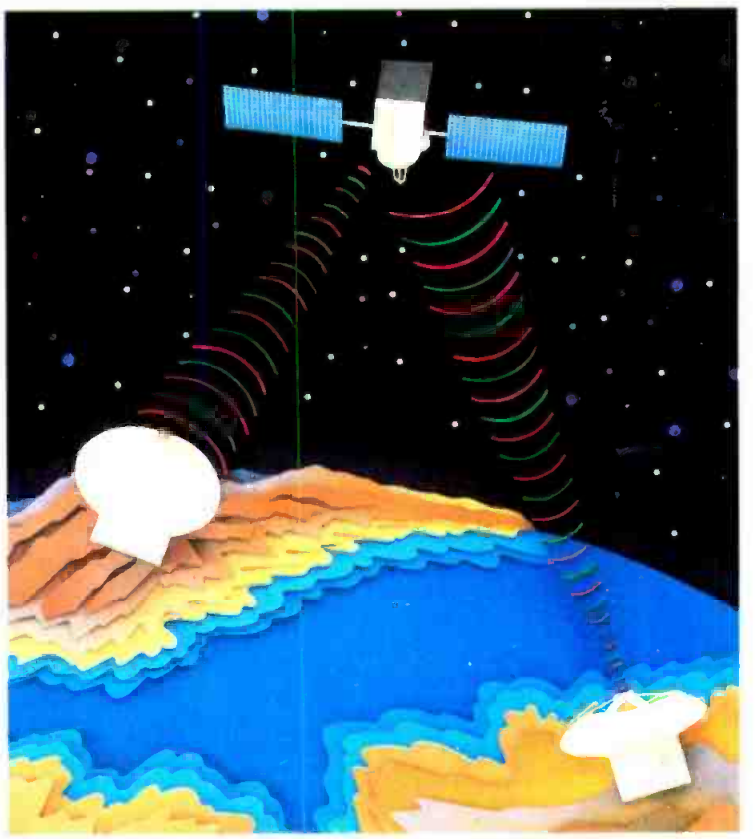
Only authorized viewers equipped with an ORION decoder can recover the original television signal.

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.

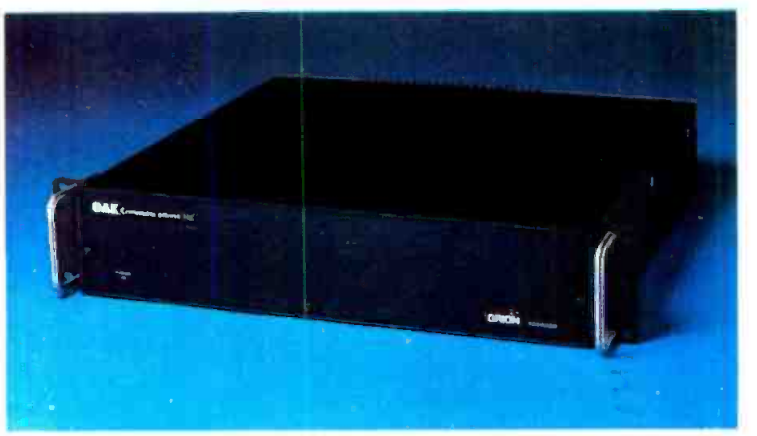
In entertainment program distribution, program level tiers might correspond to regional news, movies, sports or any other desired category of programming. Pay-per-view events in particular may offer significant opportunities, not only in increased direct revenues, but also in competing for subscribers.

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

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

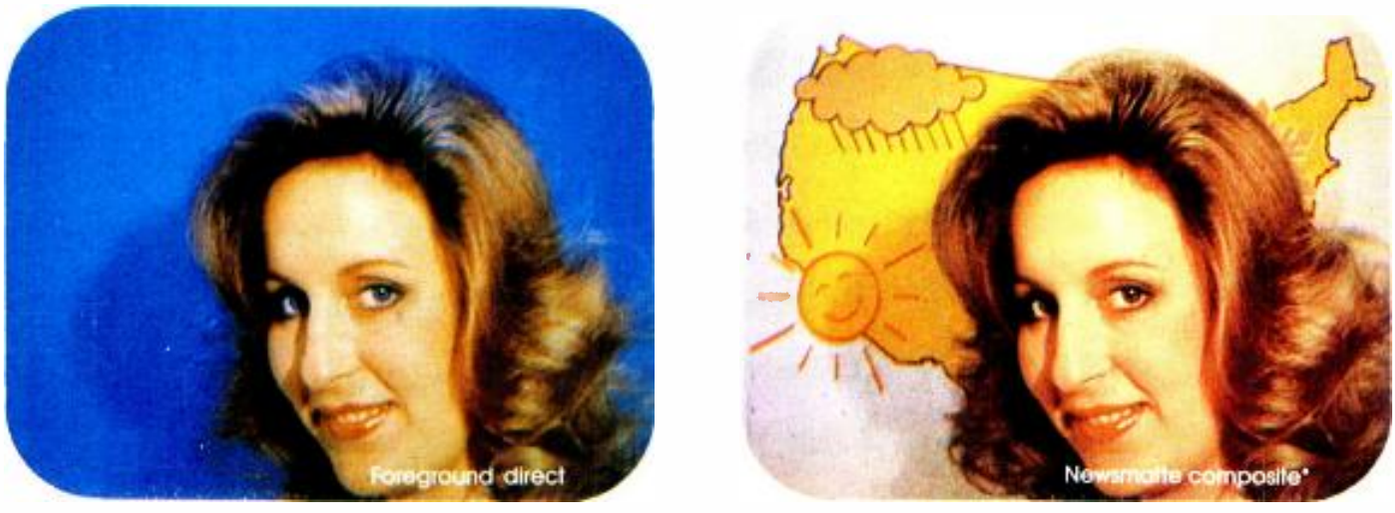
Videomagnetics
Booth 2320
Established products
Service: Refurbishing for quad video heads for Ampex and RCA video recorders and conversion of lowband RCA heads to highband configuration
New products
See at booth
Circle (759) on Reply Card

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
SqueeZoom 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

www.americanradiohistory.com

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 ± 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.

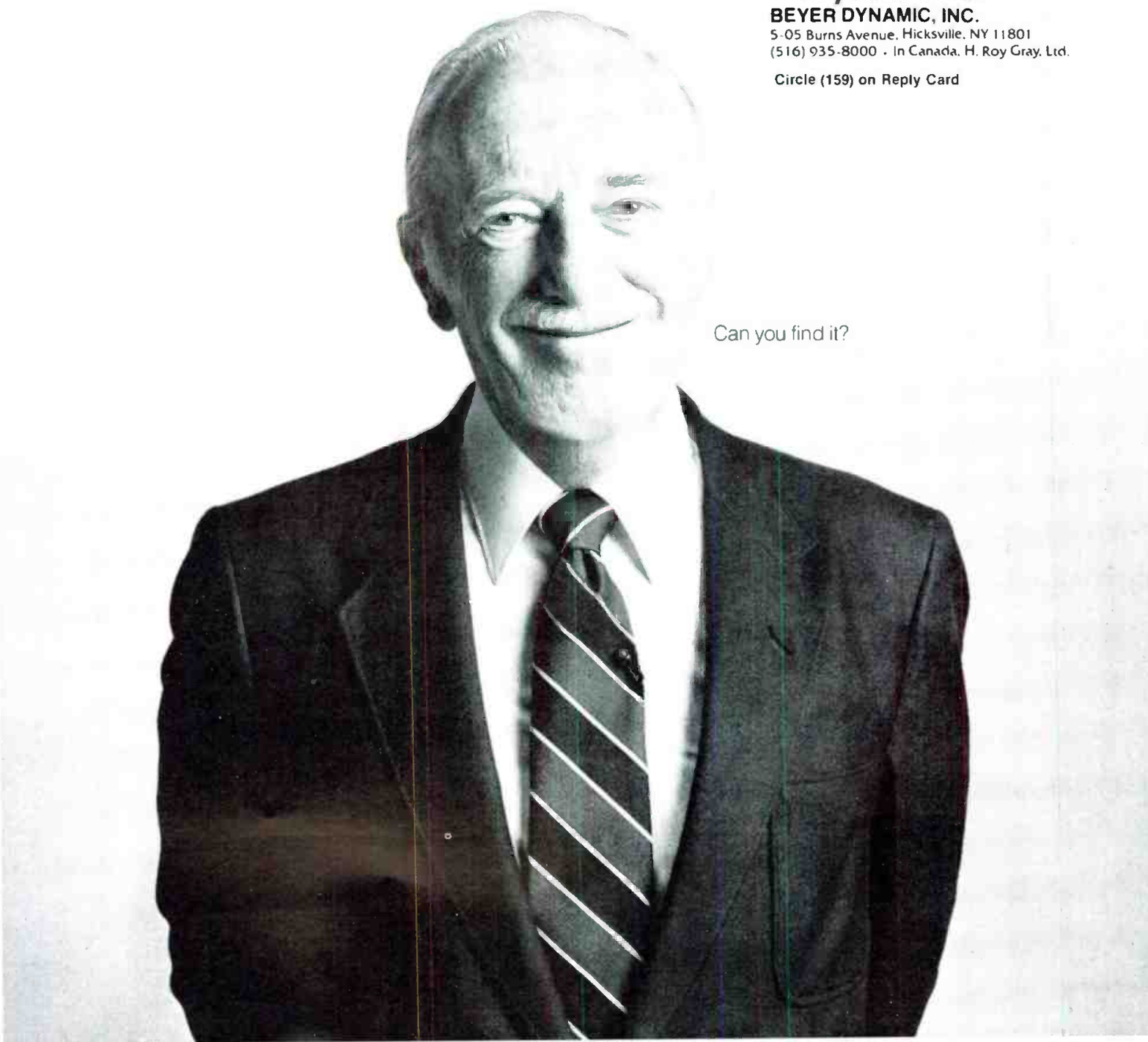
The Beyer MCE 5 is available in a variety of configurations and connectors including: balanced. unbalanced, XLR, ¼-inch and open end; as well as phantom and self-powered with its own battery.

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



www.americanradiohistory.com

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 BC

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

Circle (755) on Reply Card
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.

Circle (756) on Reply Card

Frank Woolley & Company
Booth 2930
Established products
Motionmaster: Video animation stand
Polarized animation
New products
Motionmaster: Colortint sheets

Circle (757) on Reply Card ☐

Winsted

THE PERFECT MATCH
for your video equipment

SYSTEM/85
MODULAR
VIDEO
CONSOLES

MODEL
85-20

A new generation of professional modular systems, developed by Winsted for use with the Sony "800 and Type 5" series video equipment.

See Us at NAB Booth #1703

These rugged 19" EIA modular units offer easily assembled welded and bolted stability. Units assemble in any configuration to suit your needs. The basic module is expandable to any size system with add-on-units.

FOR FULL-LINE CATALOG of the most complete line of customized videoproduction equipment, call or write:

THE WINSTED CORPORATION
8127 Pleasant Ave. So., Minneapolis, MN 55420 • 612-888-1957

PHONE TOLL-FREE 1-800-328-2962

Circle (160) on Reply Card

VCR
IN-CASE OPERATION

See Us At NAB Booth 2103

SPEED UP YOUR SET-UP...
OPERATE YOUR VCR IN THE CASE!

- SLIDE-OFF LIDS, GROOVED TRACKS
- REAR CABLE ACCESS
- ETHAFOAM SOUND PROOFING
- VENT SPACE UNDERNEATH
- AIR FLOW THROUGH REAR

THE INCASE BY EXCALIBUR.

CALL FOR INFO
213/899-2547

EXCALIBUR INDUSTRIES
12427 Foothill Blvd., Lake View Terrace, CA 91342 · (213) 899-2547

Circle (161) on Reply Card

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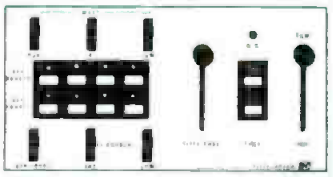
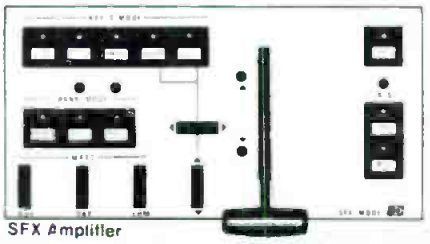
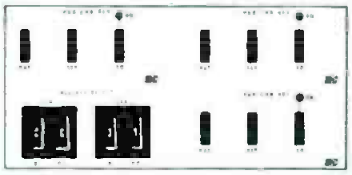


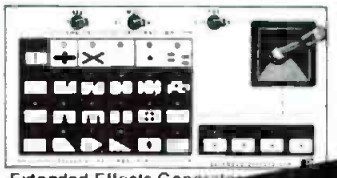
Title Keyer



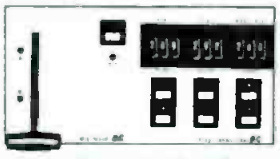
SFX Amplifier



Chroma Keyers...RGB and Encoded



Extended Effects Generator



Master Mix & Auto Transitions

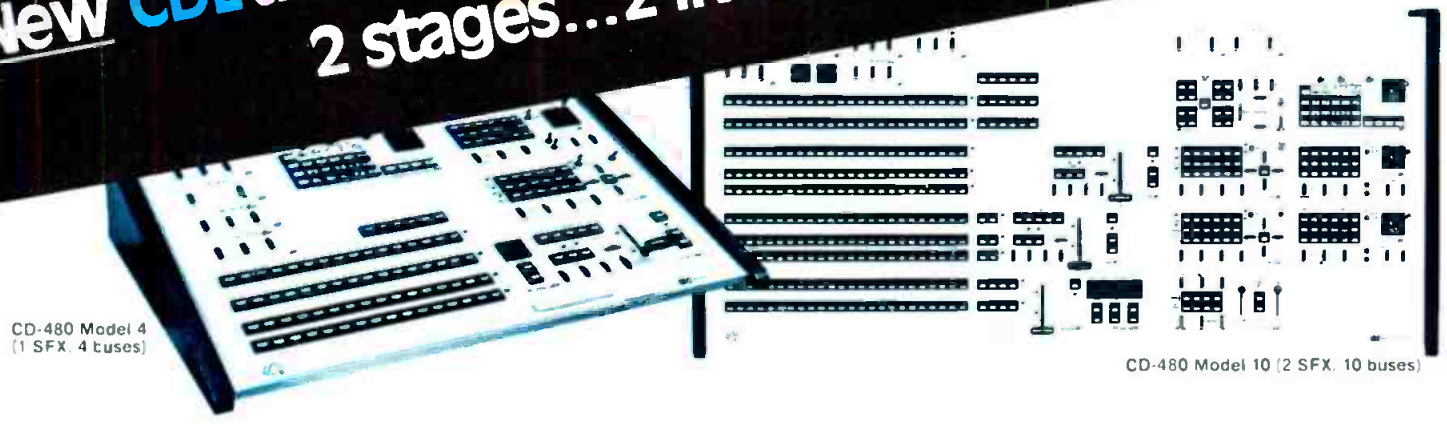
CD 480

Central Dynamics at NAB '82

New Philips LDK6...the 'thinking' camera.

New CDL and American Data switching equipment.

2 stages...2 live presentations.



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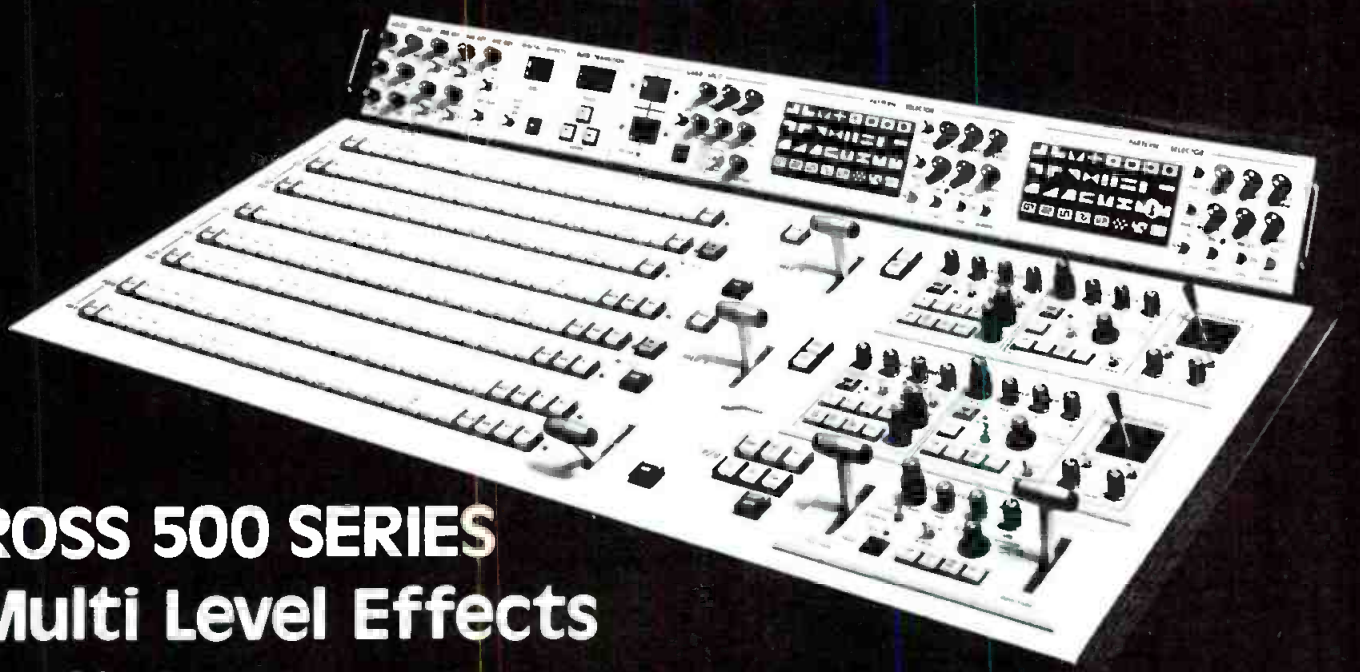

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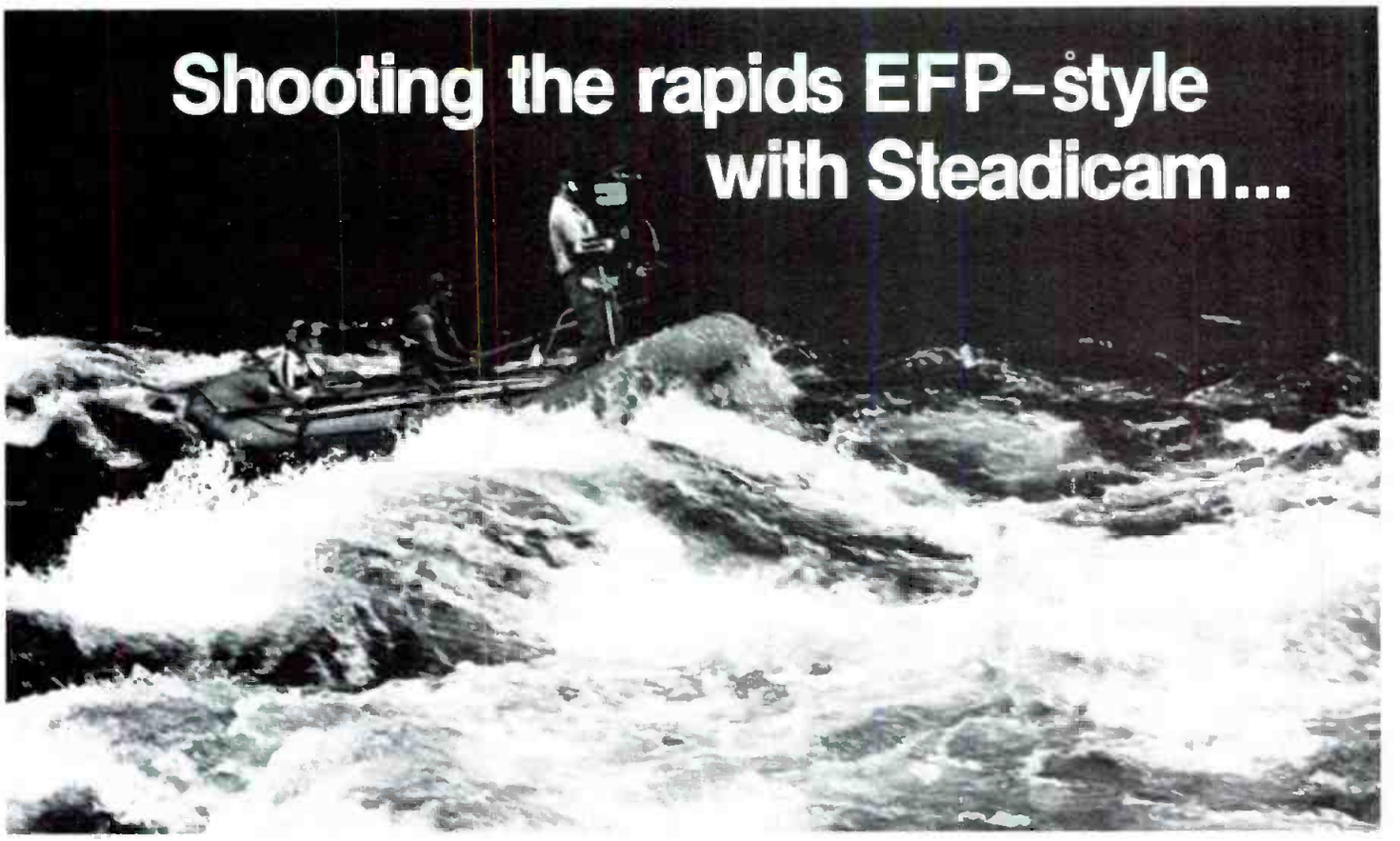
Shooting the rapids EFP-style with Steadicam...



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.

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cinema products CORPORATION

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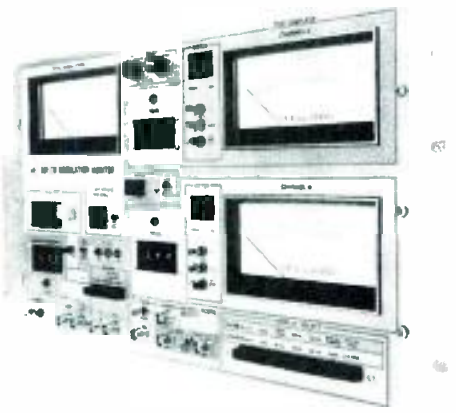

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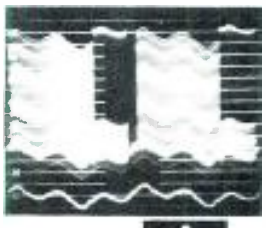

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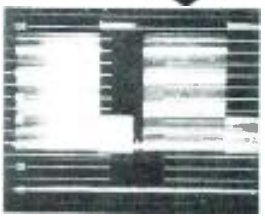

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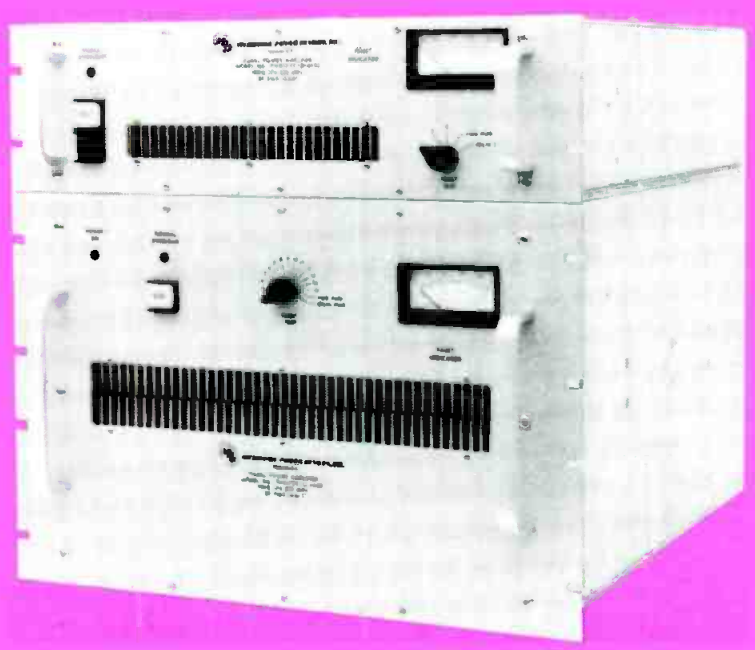

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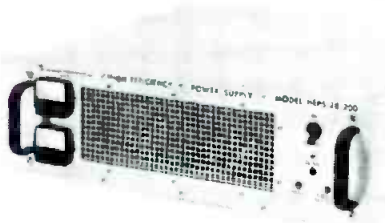

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Audio switching systems:

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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Dispersion	20 KHz-1000 MHz	50 KHz-1000 MHz	.5 KHz-1000 MHz
Frequency Accuracy	±.005%**	20% of Dispersion ± 5 MHz	20% of Dispersion ± 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)	±3.5 dB	±3.5 dB	±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 In³	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. **Using internal cyrstal comb markers.

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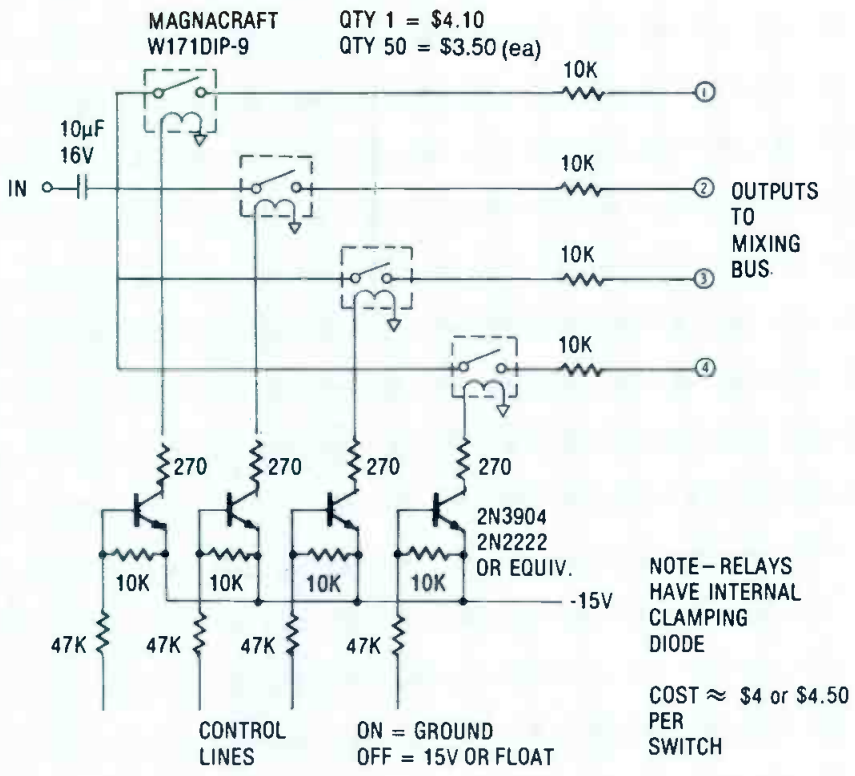

Figure 1. Reed relay switch building block.

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 Babyon, 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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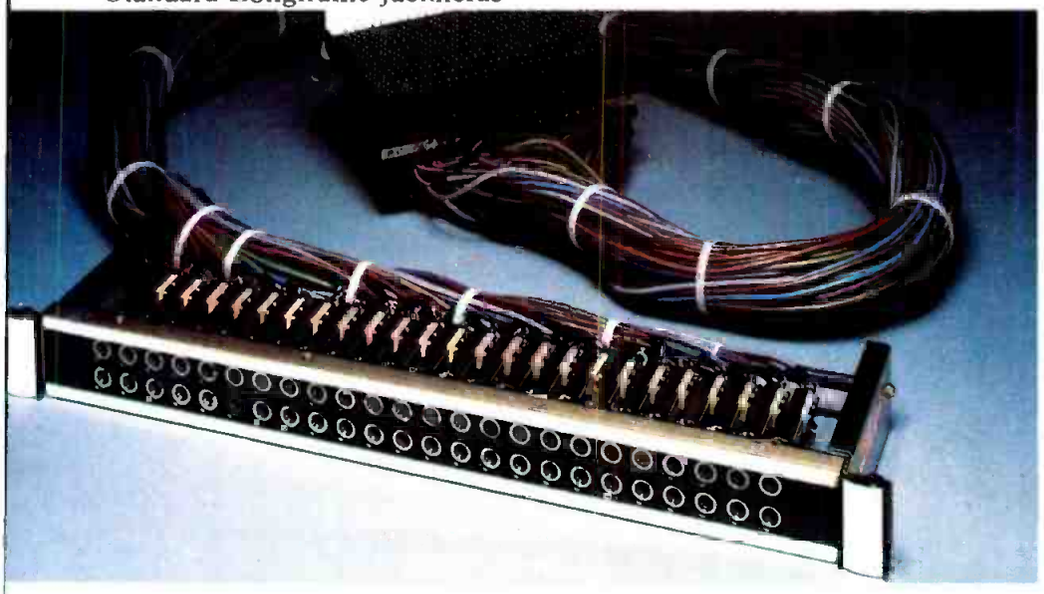

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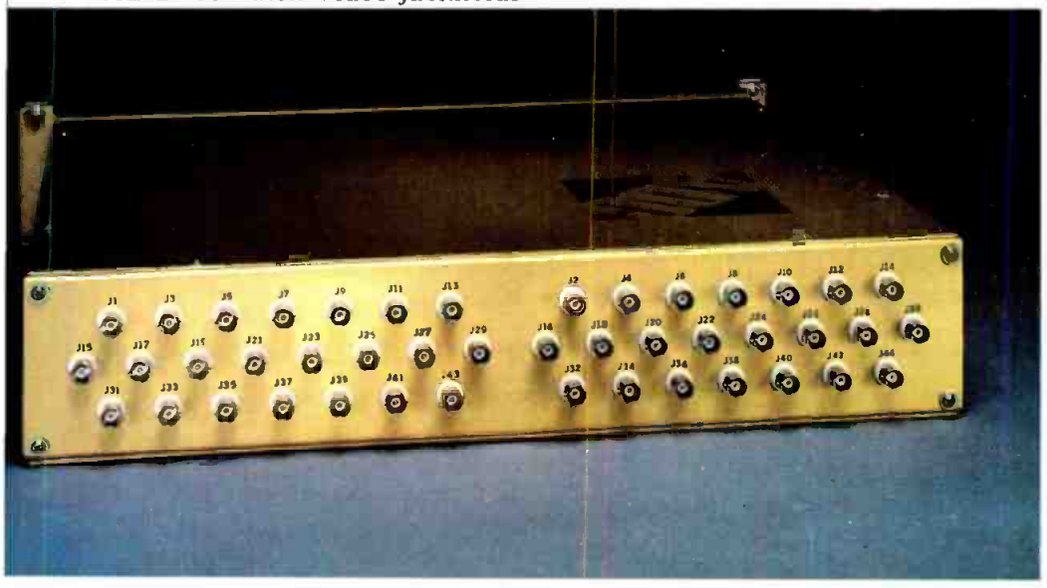

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It is easy to understand the widespread use of patch panels and rotary switches when you contrast the $200 price of a 24-by-24 stereo patch panel or $150 price of an 8-by-8 stereo switcher using rotary switches with the $3000 plus price for an 8-by-12 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 Chrontrol timer 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 bleedthrough. 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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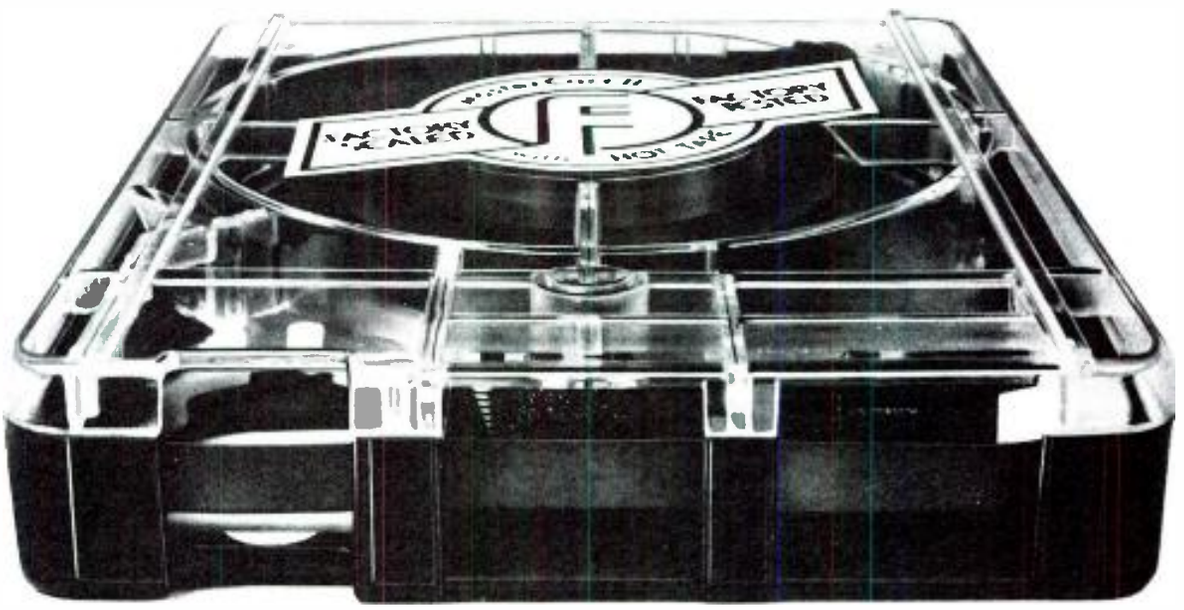

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tive. To form an idea of future price trends, I spoke to several engineers and marketing managers at a number of manufacturers. The opinion was unanimous. Although prices have decreased about 30% in the last five years, everyone expects prices to begin 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 10,000Ω 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

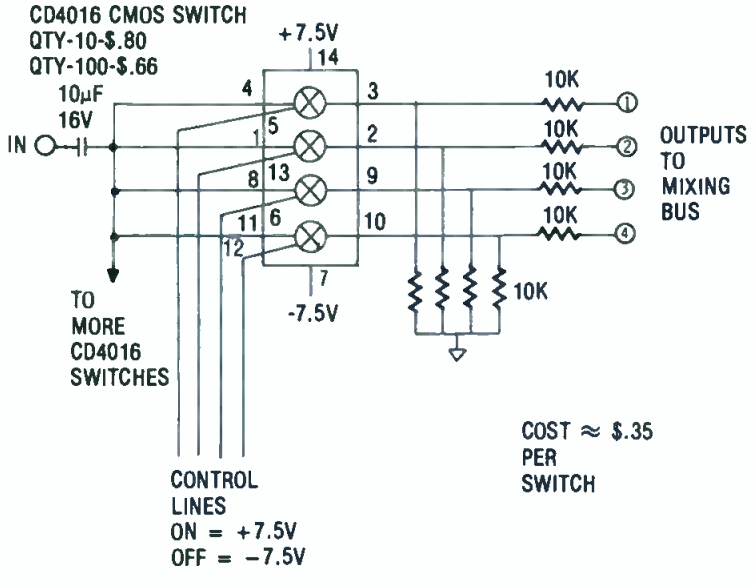

Figure 2. CMOS IC switch module.

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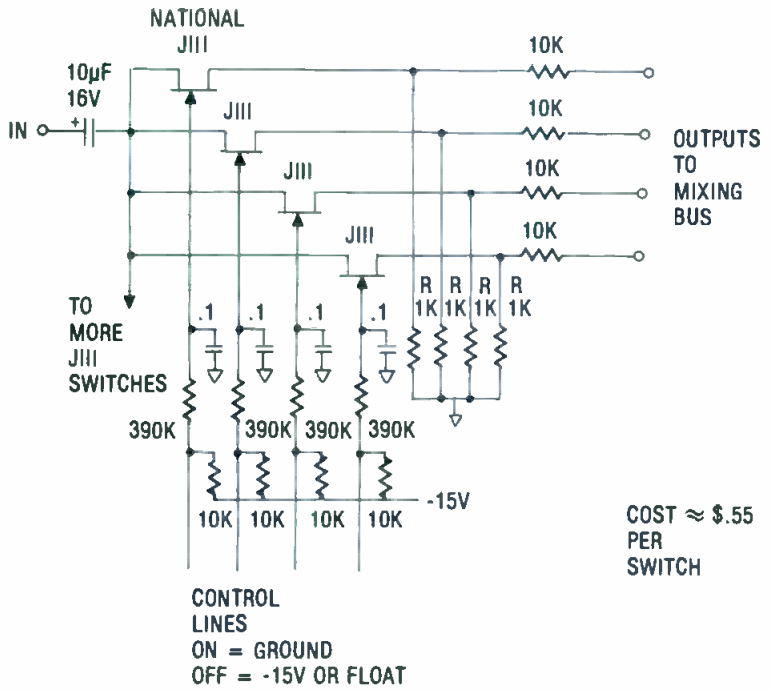

Figure 3. JFET switch building block.

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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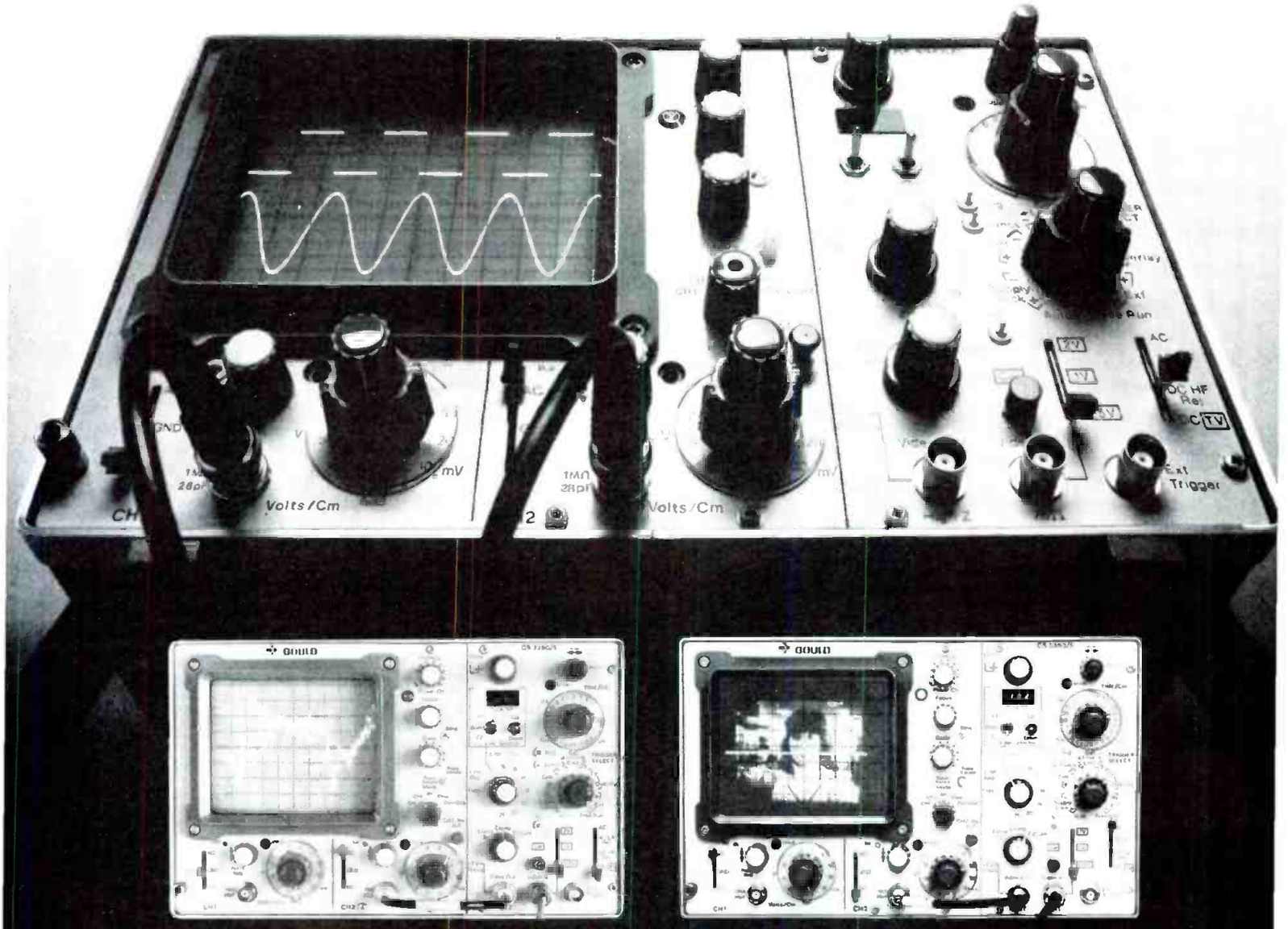

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be used in series or in a series-shunt arrangement. The series switch is self-explanatory. The series shunt switch uses a series JFET and then a JFET to ground. The first JFET is on while the second is off and vice versa. The primary purpose of this 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, cir cuit 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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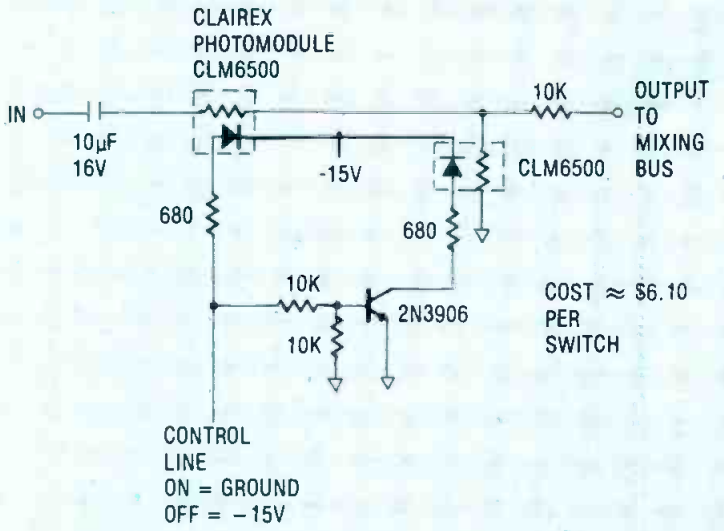

Figure 4. Photomodule SPST switch building block.

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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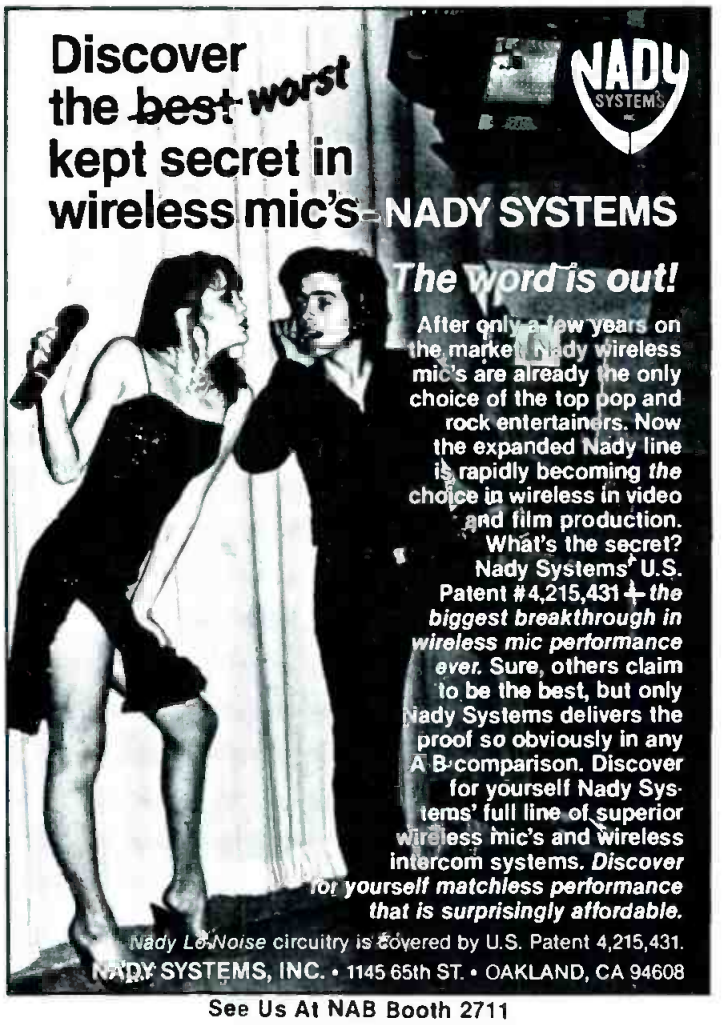

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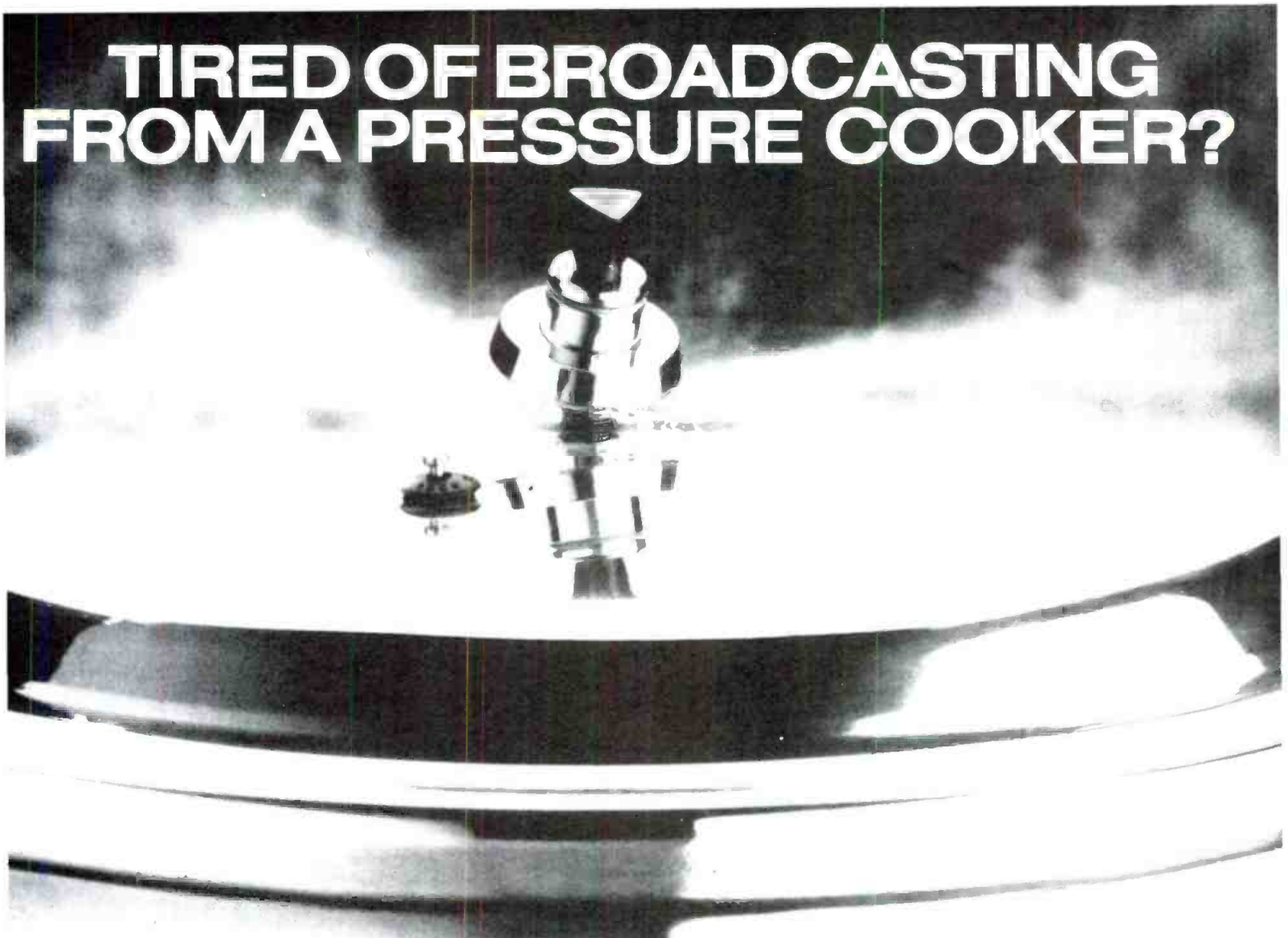

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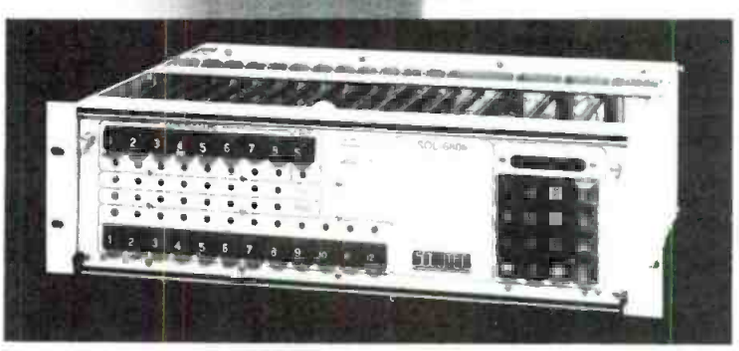

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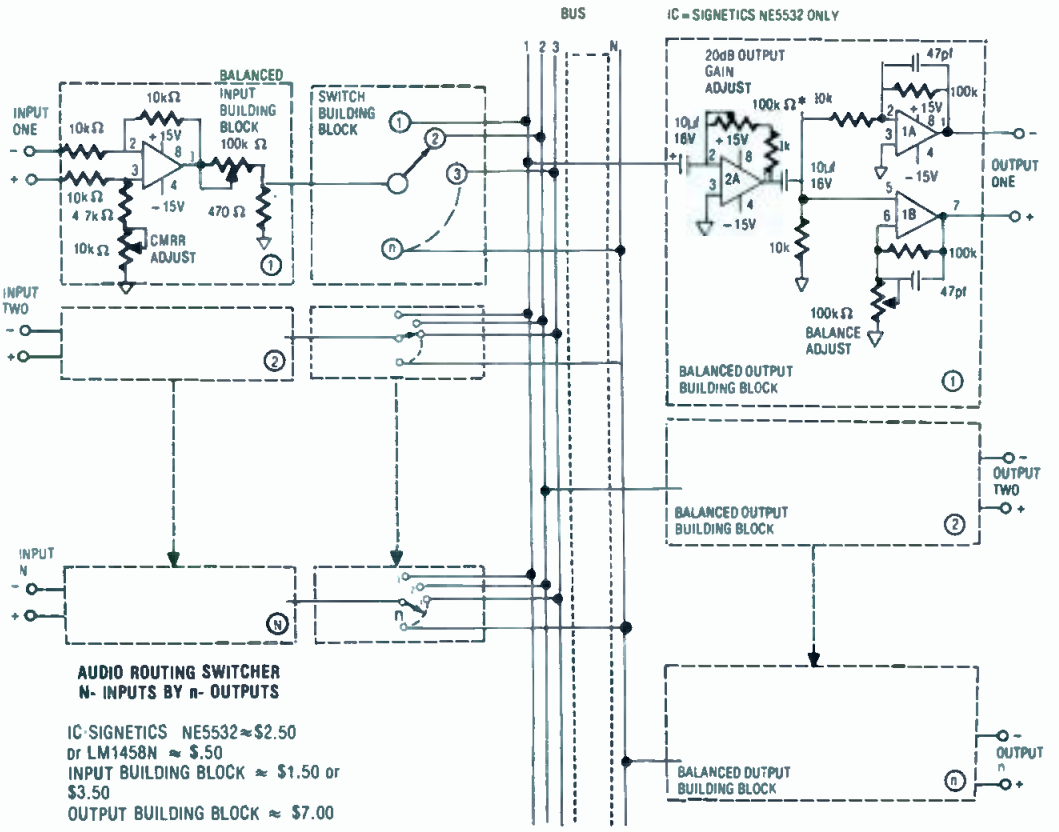

Figure 5. Audio routing switcher, N-inputs by n-outputs.

Custom designing studio routing switchers

Small audio routing switcher can be cookbook designed to meet custom needs in broadcast applications. The design is built around three basic building blocks: an input buffer with level adjust, a switch building block, and a balanced output building block. By combining these building blocks as indicated, an audio routing switcher with the number of inputs and outputs that you specify can be readily assembled.

Four different switch building blocks are presented (See Figures 1-4). Choice will depend on cost and personal preference. All switches are capable of less than 0.1% THD with 18dBm into the switcher. The reed relay and the photomodule switches have no distortion but are considerably more expensive. Attenuation at 20kHz is better than 60dB for all 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.

Noise is determined more by the op amp circuitry than by the choice of switch. The reed relay however, will add no noise to the circuit. The input buffer is set up as unity gain followed by an attenuator. There is 40dB of gain in the balanced output module. The attenuator will per force be adjusted to keep the input signal from clipping the output amp. This will assume that the maximum signal that the switch will see is 300mV peak-to-peak at 21dBm input. At this level, the CMOS and JFET switches are exceptionally linear and overall distortion of the entire switcher should be less than 0.1%. If the reed relays or photomodules are used, all resistors with * on the output module should become 10kΩ. This makes the entire switcher roughly unity gain and the signal-to-noise ratio greater than 80dB. With a plus and minus 15V supply, the switcher is capable of 22dBm input and output.

Output select switching for each input has been purposely left out. The control lines for the JFET, photomodule, and reed relay switch building blocks need only be taken to ground to turn the switch on. The CMOS switch must be taken to −7.5V to be turned off and +7.5V to be turned on. The first three switches have pull-down resistors so that if the control line is disconnected from ground, then the switch turns off. This makes for very convenient control. The simplest and least expensive control is a rotary or thumbwheel switch. Beyond these simple switches, the options are endless.

Construction of an audio routing switcher, whether small or large, is not a simple undertaking. Even for an experienced engineer, I recommend building one each of the building blocks to test function and performance. Electronics is magic, and the same circuit built by two different people never works the same.

Audio switching

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A 50-by-50 audio switcher would no longer require a whole rack of electronics and 2500 switches with a maze of interconnecting bus wires. It would instead be made up of 50 A/D converters, one bus wire, 50 D/A converters, and associated timekeeping circuitry. Every bit of this is capable of using large scale integrated circuit technology.

There is one final point to be made about time division switching. As digital recording becomes standardized, all other parts of the audio chain will gradually become digital as well. This includes audio routing switchers. □

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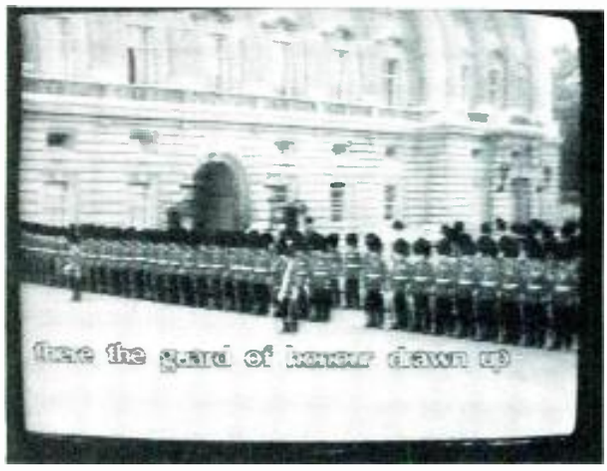
Real time subtitles for the Royal Wedding were inserted by the BBC to help the hearing impaired. This was the second time in history for such captioning, the first being for President Reagan's Inaugural Address.



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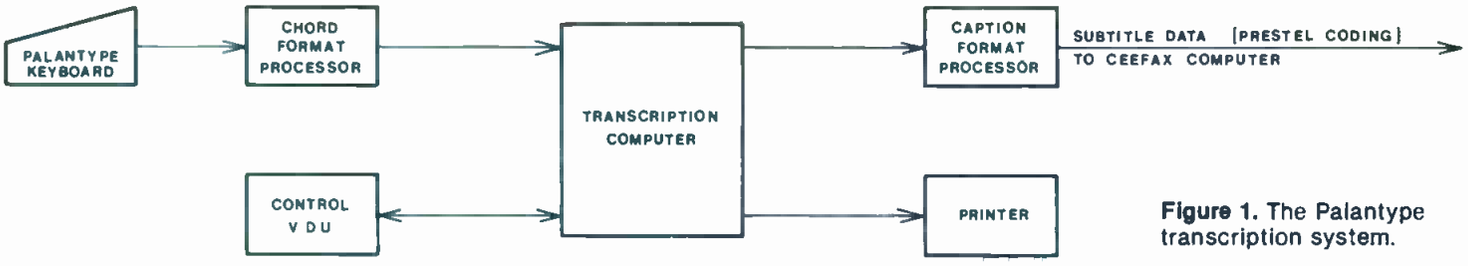

Figure 1. The Palantype transcription system.

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

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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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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 transcribed 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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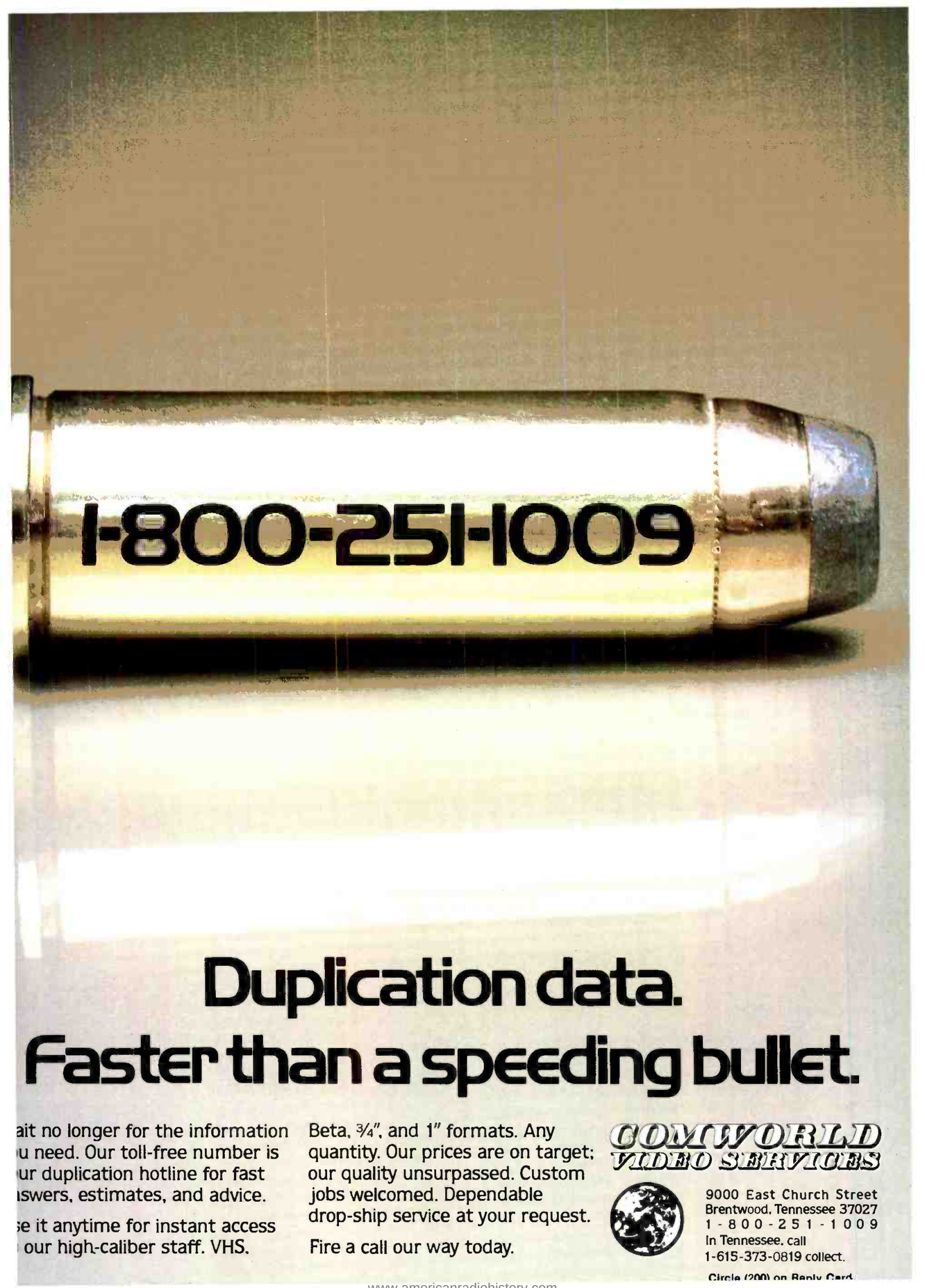

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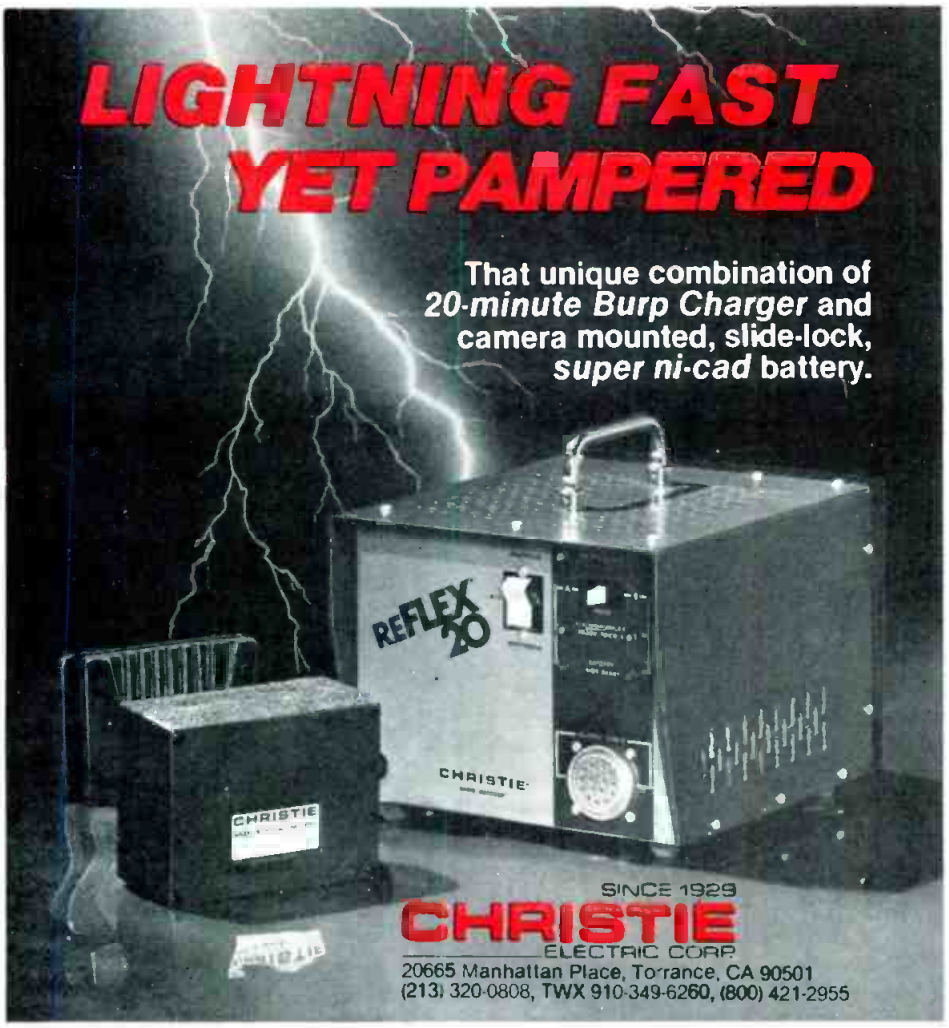

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may be incorporated.

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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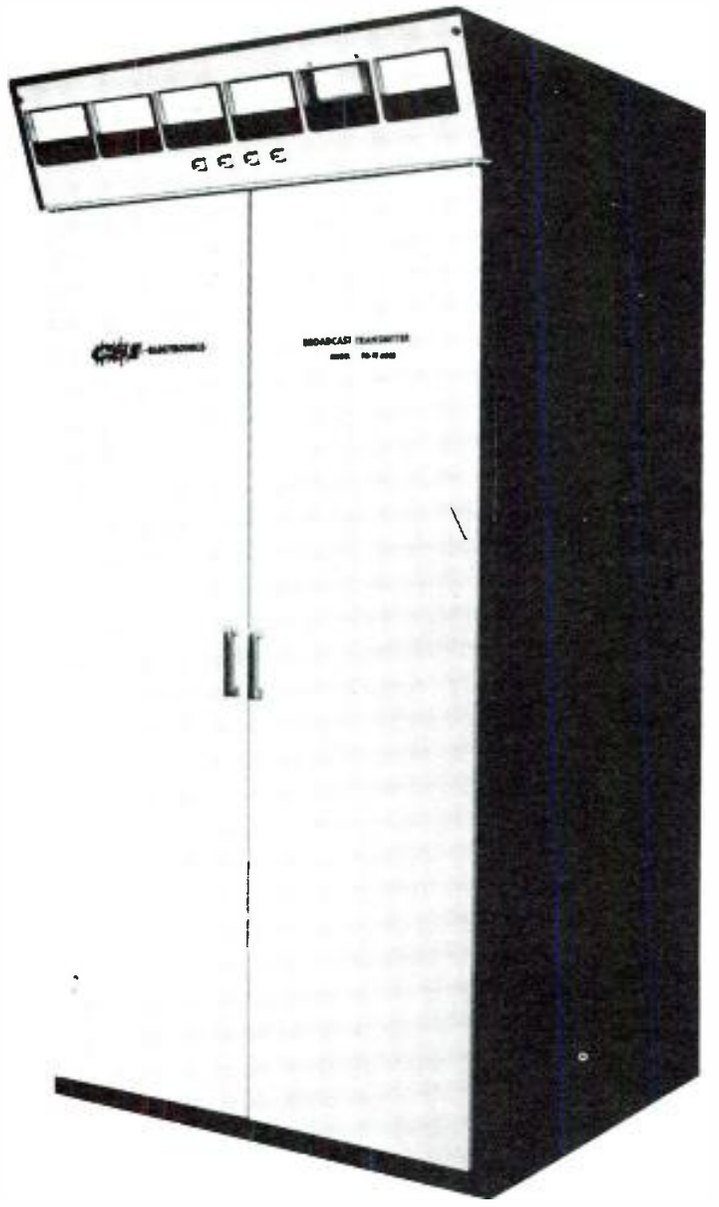

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Problem solving:

Stereo tape cartridge phasing

By Dave Howe, president, Howe Audio Productions Inc., Boulder, CO

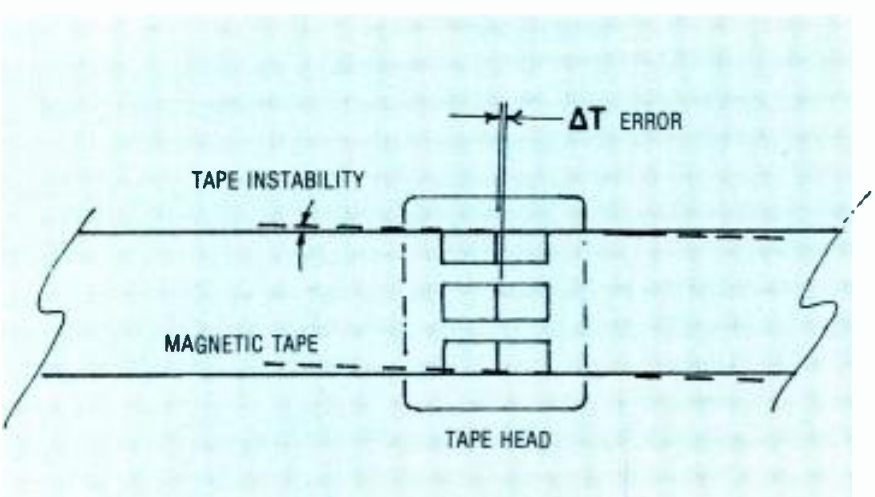

Figure 1. Instability in the motion of the tape past a tape head causes a subsequent time (hence, phase) error between audio tracks.

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 cancellaton 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

This article expresses the personal views of the author, not necessarily those of this publication nor its advisory board. The author's views are presented here as information for BE's readers, and readers are urged to write concurring or opposing views to our *Feedback* column.

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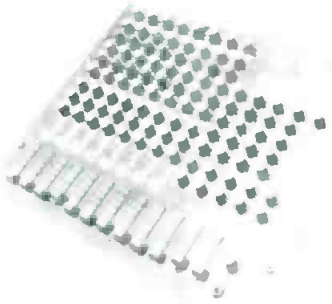

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audio. A voice announcement driving both left and right equally in-phase has no L-R audio. The L + R track must be recorded 6dB lower in this case vs. the conventional L and R 2-track method (because L + R equals twice L or R). Furthermore, additive 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.

The device incorporates four separate voltage-controlled time delays, two per channel. This lowers

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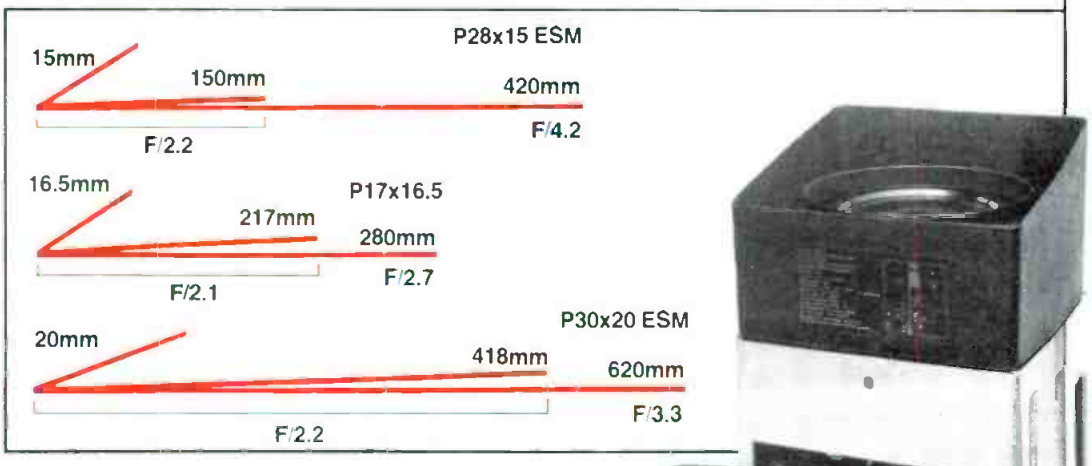

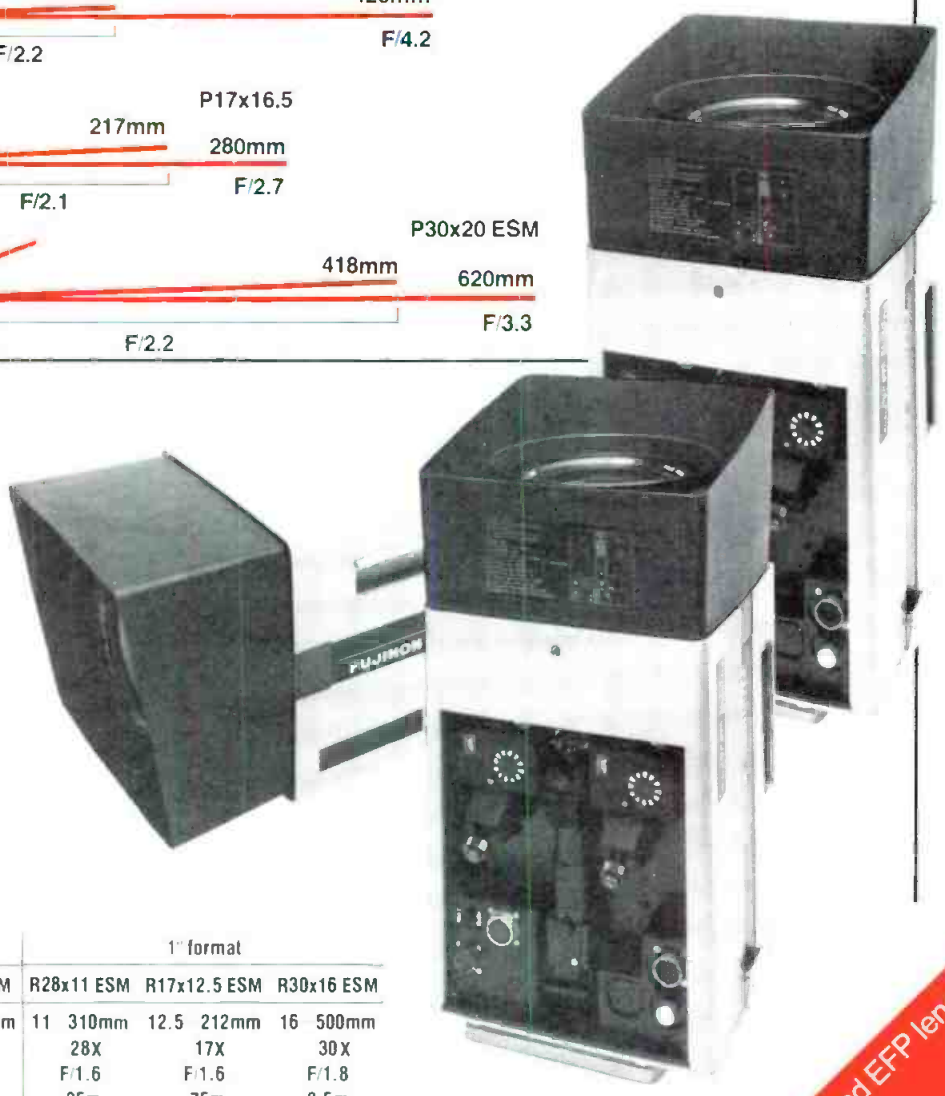

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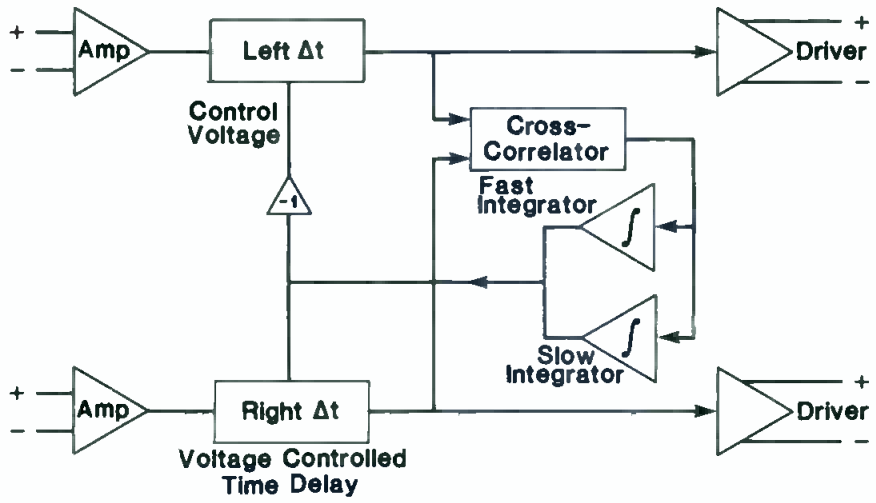


Figure 2. Block diagram of the active phase corrector. Output signals are time-aligned, thus eliminating a stereo phase error. A detector performs a time-phase analysis on regular program material to sense a phase error. Feedback loops to analog display lines correct the error.

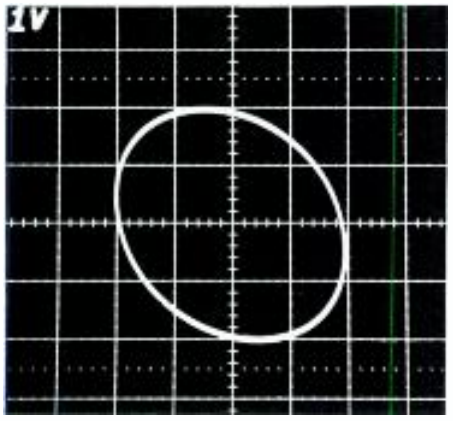


Figure 3a.

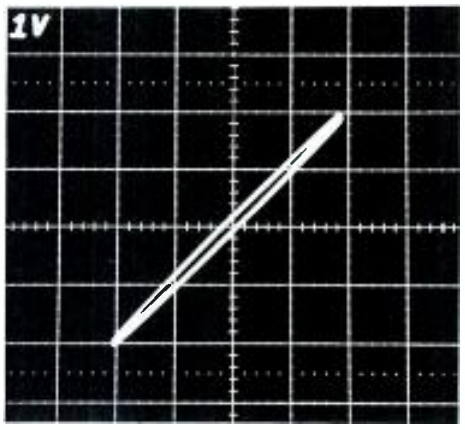


Figure 3b.

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.

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.

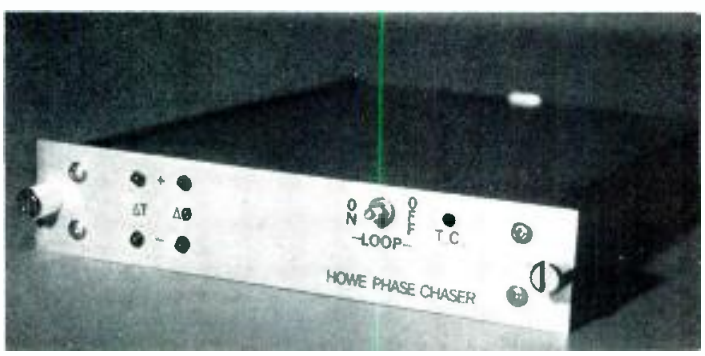
This new circuit can be accurately described as an *active phase corrector*. The active phase corrector discussed here is aptly referred to as a phase-chaser. For comparison, a passive phase corrector describes a fixed delay network used to compensate for a fixed error such as in the matching of stereo telephone line remotes.

Phase-chasers

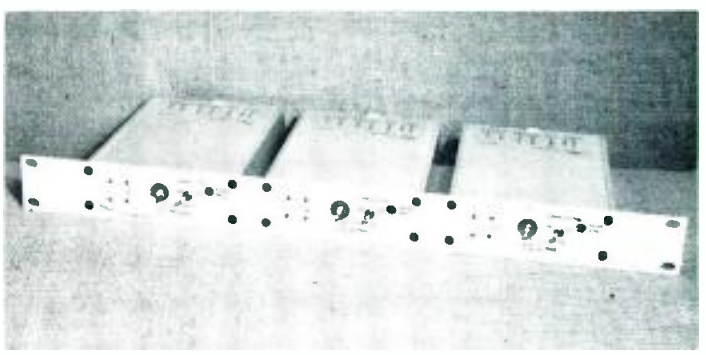
The phase-chaser automatically aligns the time relationship of two audio signals. It uses the audio program material to sense a uniform time difference between the signals, then applies a correction time delay (via feedback loops) to one signal to compensate for a system-related time lag.

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-



Active phase corrector module.



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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 ± 20° 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°. After correction, left and right outputs show a minimal error (Figure 3b).

Figure 4 shows input and output

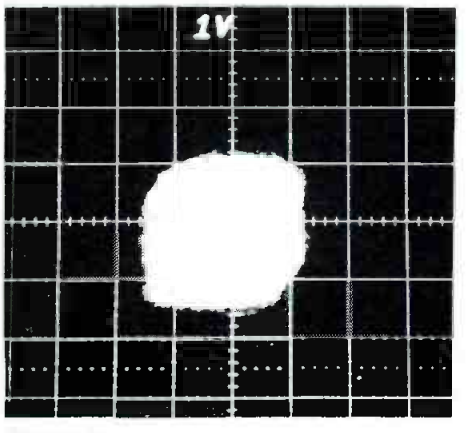

Figure 4a.

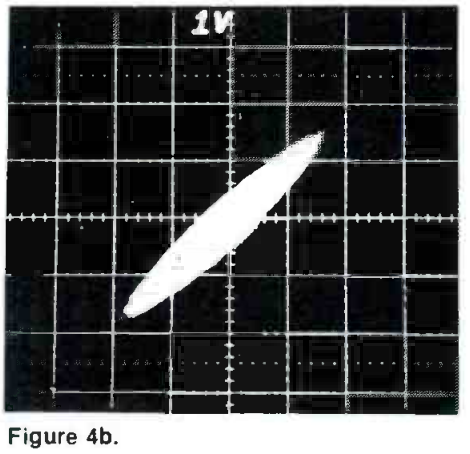

Figure 4b.

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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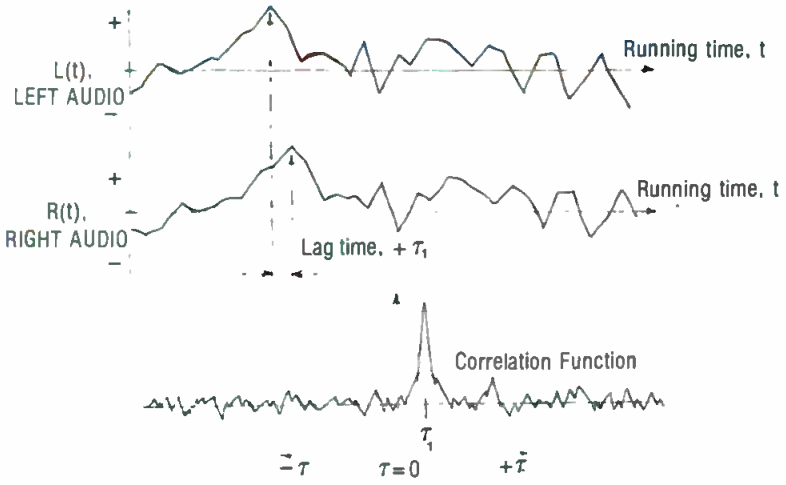

Figure 5. The detection of time and phase errors using the cross-correlation method.

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 τ is described by:

$$\text{Corr}(\tau) = L(t) \cdot R(t + \tau)$$

and the correlation function (C.F.) is the integration over all possible τ 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 τ_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 τ 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 τ 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 (τ_1) is converted to a voltage and subsequently used to servo τ_1 to zero. This represents an in-phase condition for L(t) and R(t).

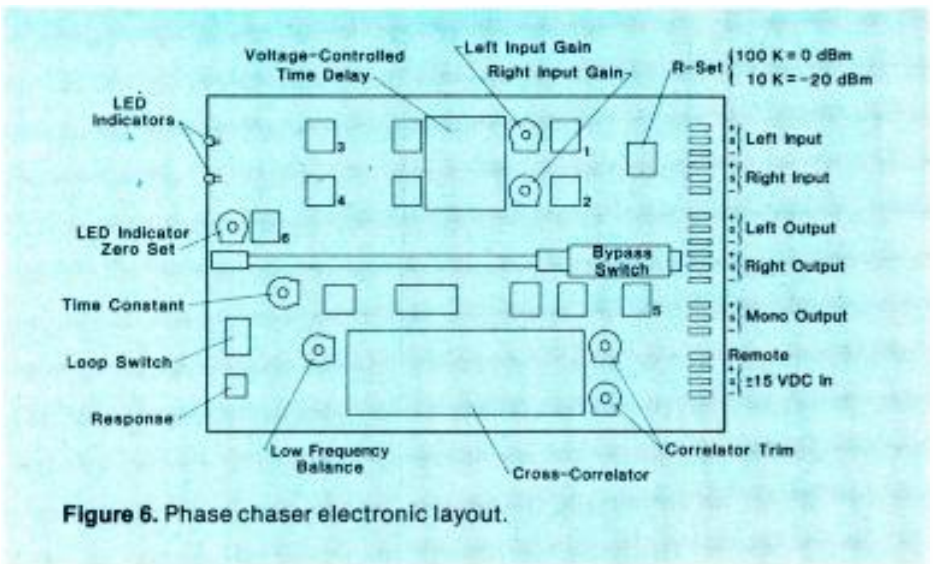

Figure 6. Phase chaser electronic layout.

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 ± 360° and instantaneous correction to ± 20° (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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Despite all the technological advances in the broadcast, recording and sound reinforcement industries, the 635A continues to be the "audio man's screwdriver" a microphone tool that can be used anytime, anywhere, for almost anything. When a product is designed right to start with, there's no need for it to become obsolete. All Electro-Voice professional microphones are designed with the same goal in mind. That's why people think of Electro-Voice as their microphone expert.

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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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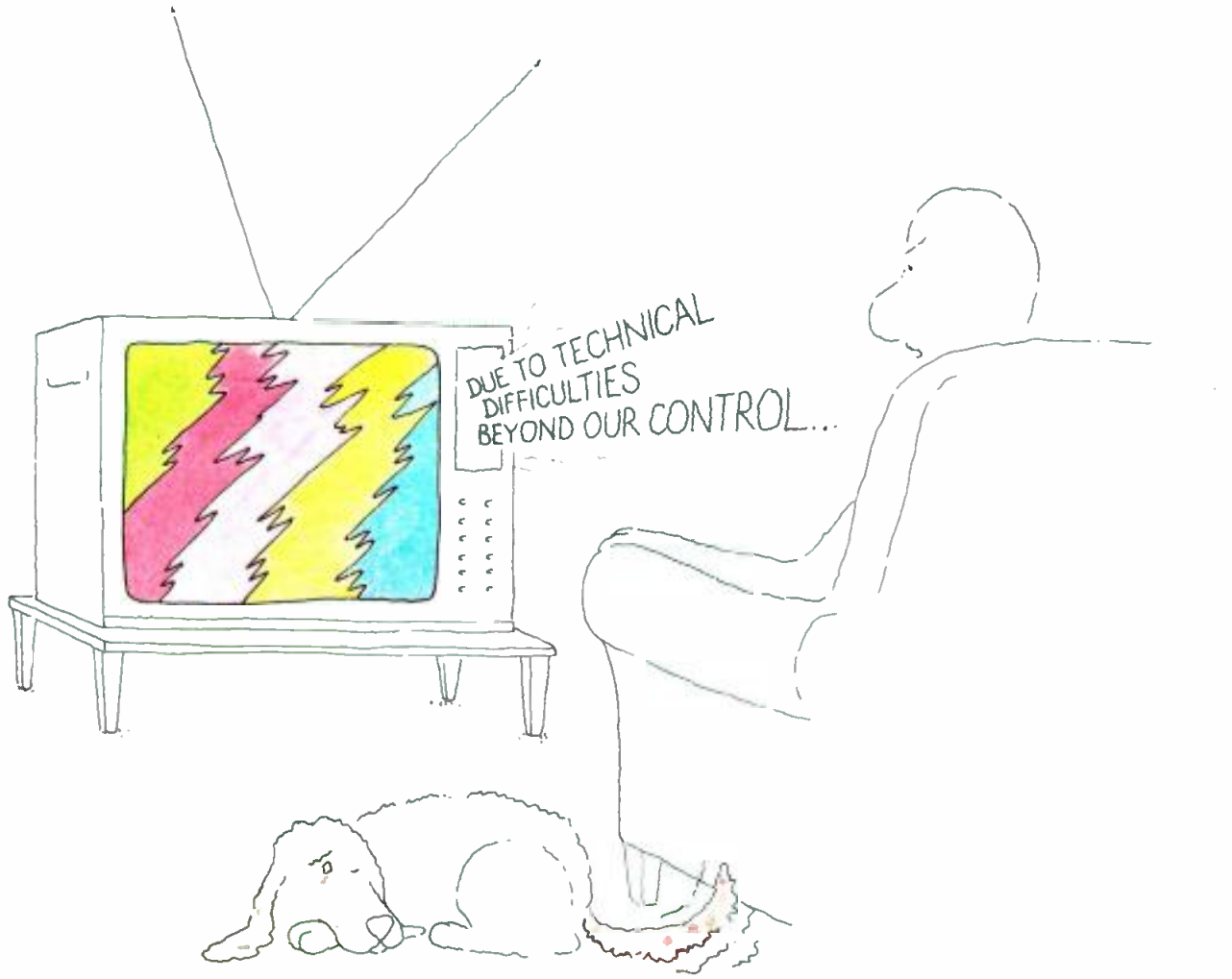

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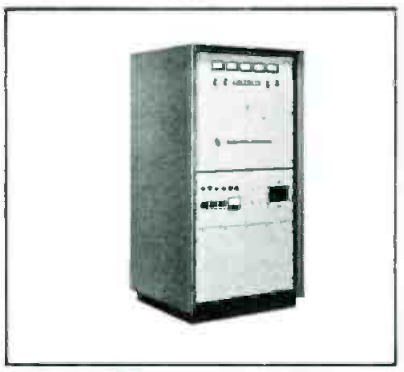

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Field report

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	⅔ 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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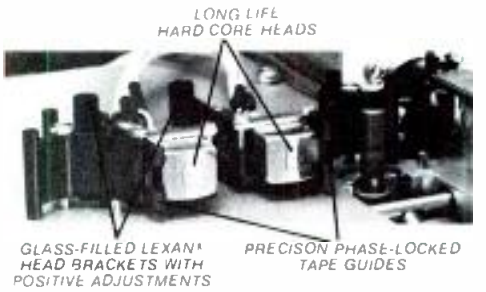
The dc servo, Hall effect motor with flutter-filter belt drive, provides exceptional speed stability (to 0.05%), totally unaffected by line voltage or frequency fluctuations. And it runs so cool, no ventilation is required.

Full Broadcasting Features
Unlike some other cart machines, the Magnecord MC-II comes with the extra features broadcasters desire at no added cost. Built-in full remote control capability. Automation compatible cue tones (stop, secondary, tertiary) with LED indicators and contacts for external cue switching. Cue track input and output access for FSK logging. A universal mic/line input and front panel headphone jack to "preview" or time new carts and for servicing convenience.

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.

Rugged Magnecord Design
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.

Convenient Service Access
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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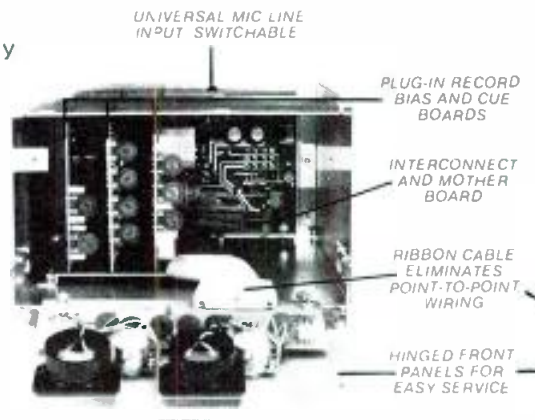

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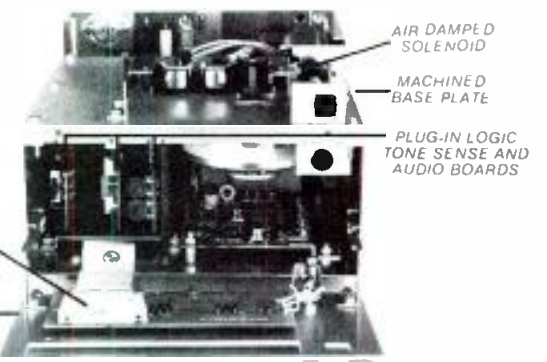

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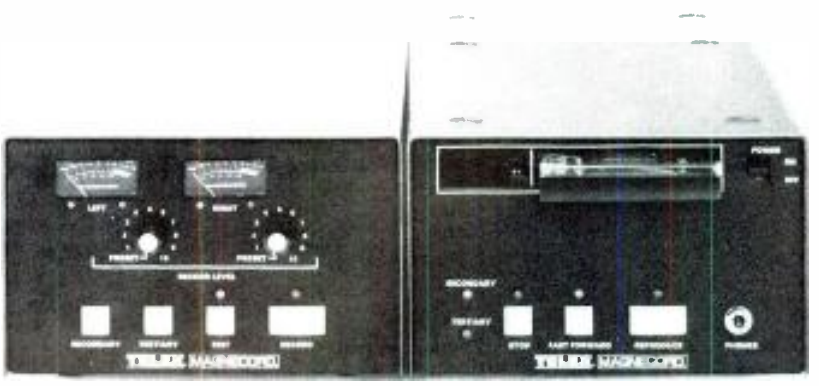

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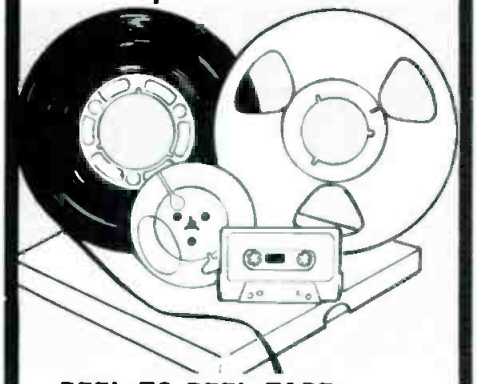

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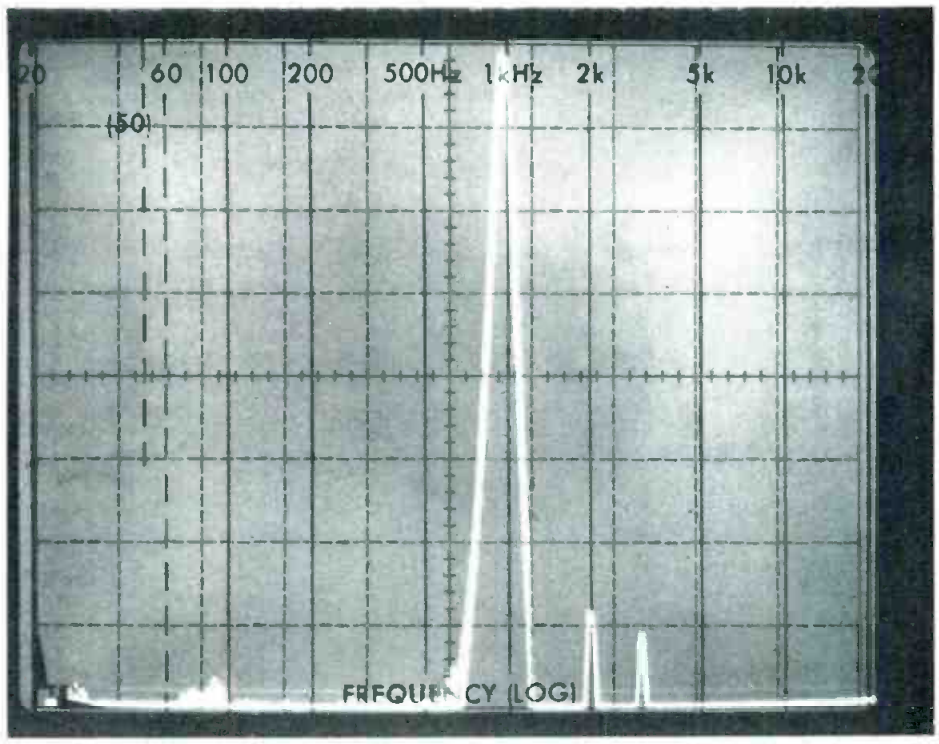

Log scale, 10dB/div.

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 ± 0.5dB
Input impedance	10kΩ (resistive)
Output impedance	Less than 100Ω
Output level (maximum)	+ 10dBm
Output loading	600Ω to infinity
Frequency response	20Hz (– 3dB) at 18dB/octave, 20kHz (– 3dB) at 18dB/octave, passband flat to ± 0.2dB
Connections	Male banana for output. Binding post for input
Physical dimensions	approximately 2¼" wide, overall depth 4⅕", case approximately 2¾" in depth, approximately 2" high
Weight	½ pound

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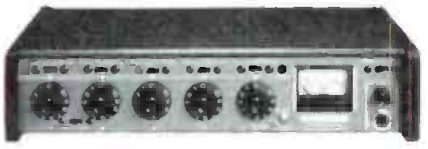

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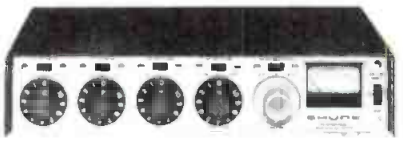

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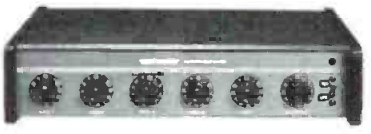

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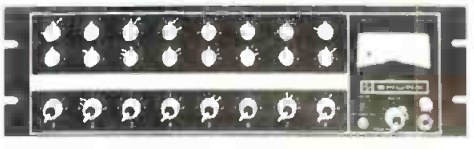

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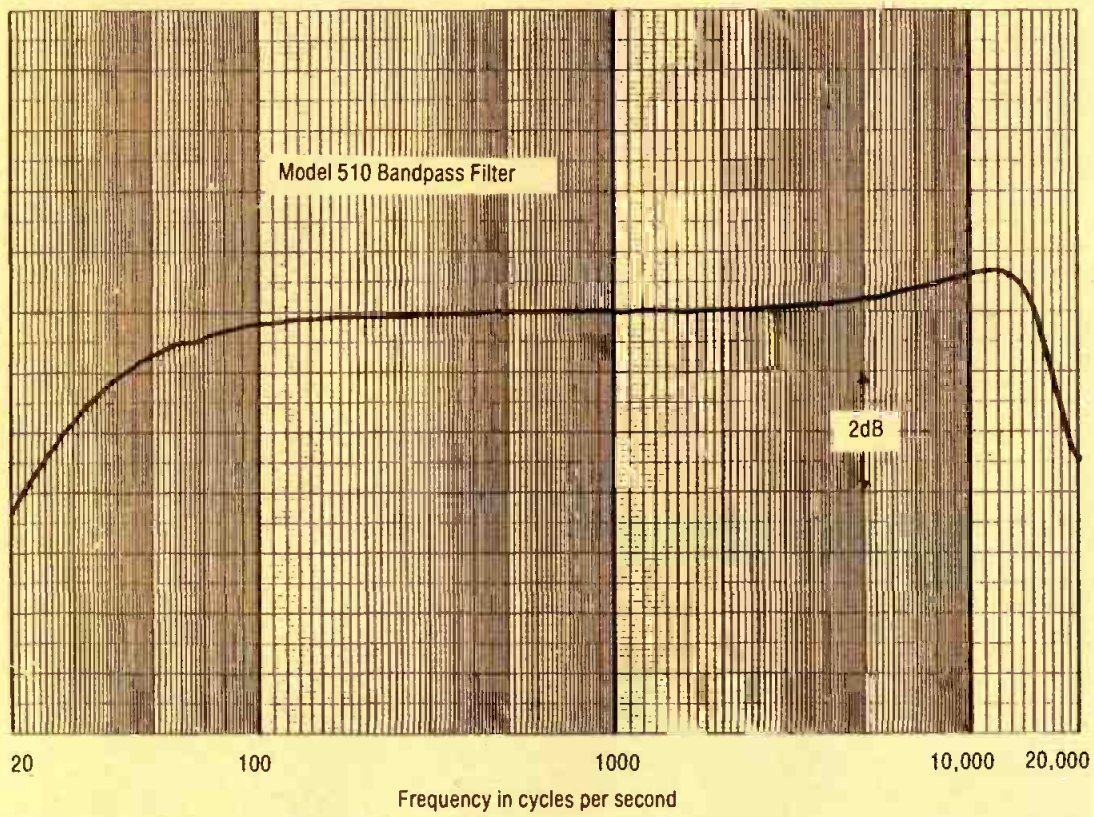

Figure 2. Audio passband of 510 Filter.

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 passband 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 frequencies 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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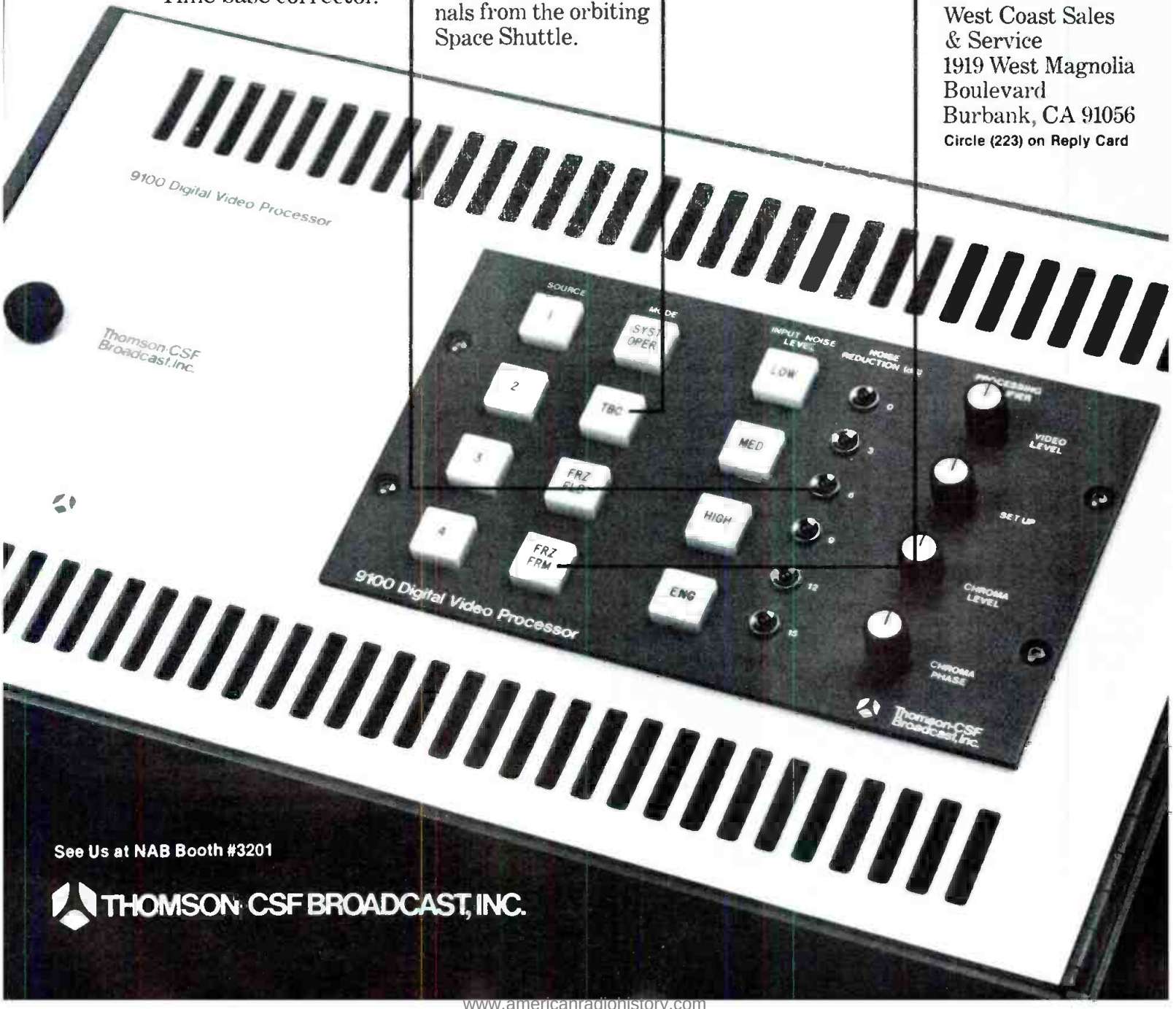

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TV studio lighting systems

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

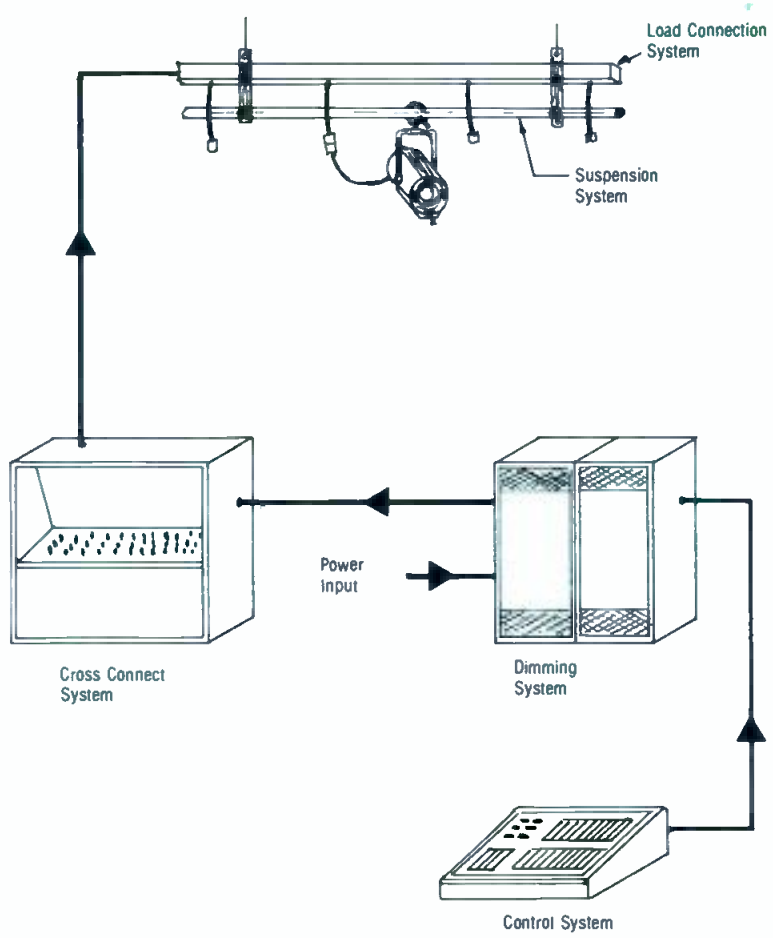

Figure 1. Lighting system components.

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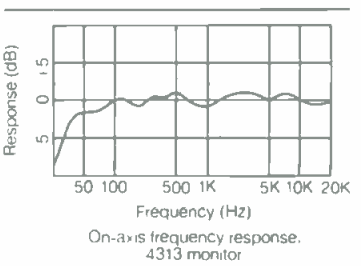

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use of any desired lighting technique.

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.

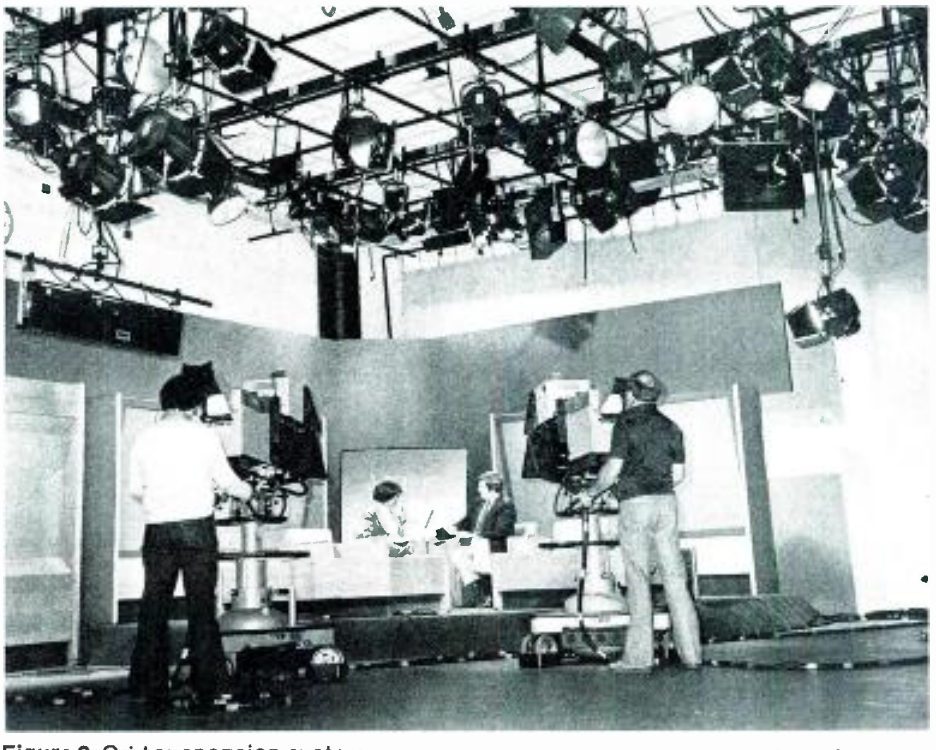

Figure 2. Grid suspension system. *Courtesy of Strand Century Inc.*

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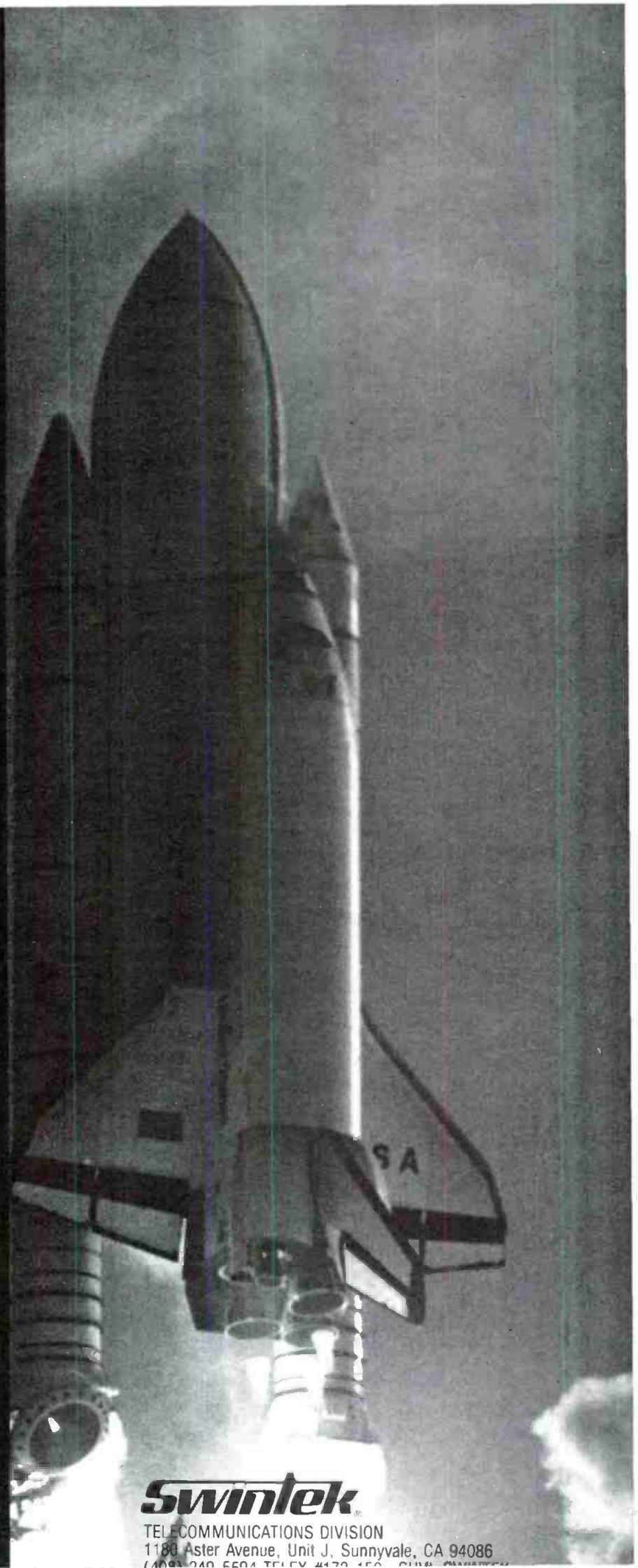

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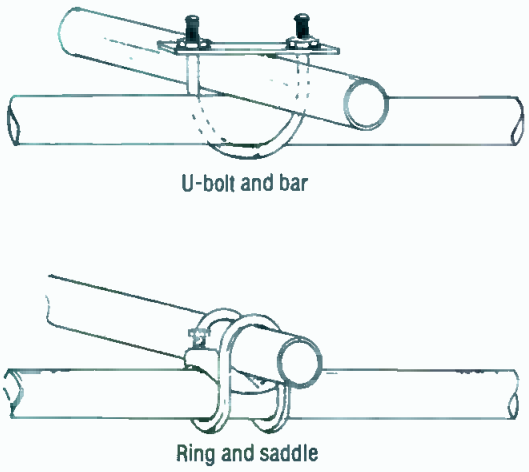

Figure 3. Grid crosspoint joints.

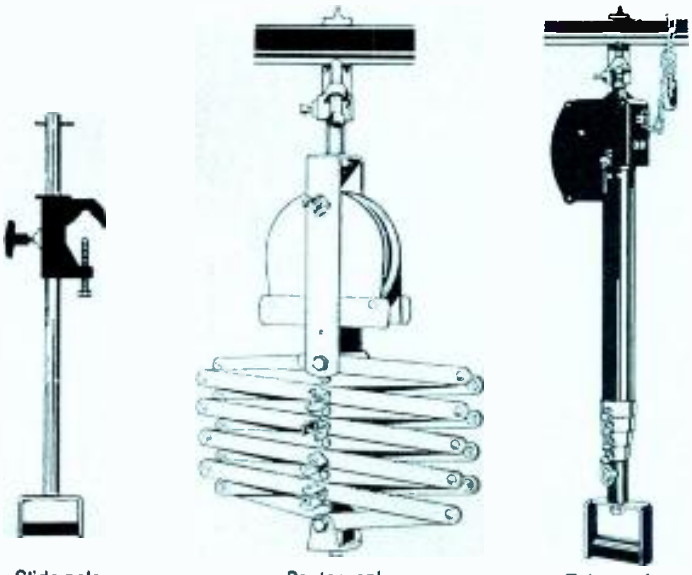

Figure 4. Vertically adjustable fixture hangers.

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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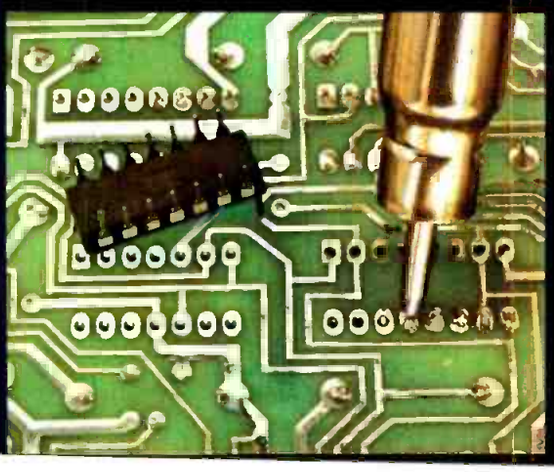

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ment after the pipe batten is raised to its proper operating position.

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

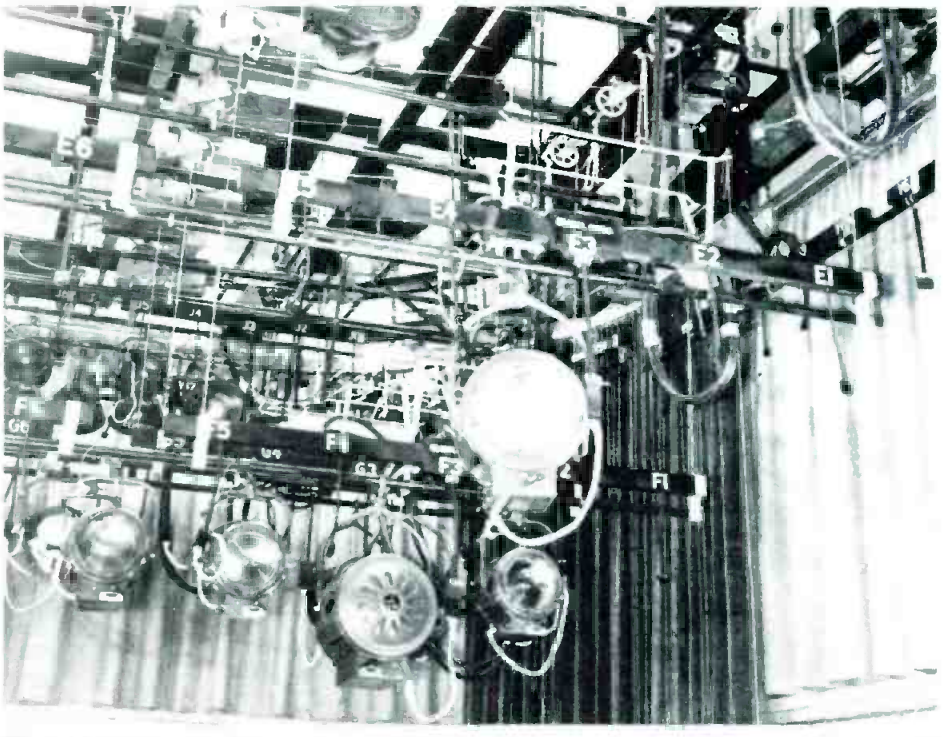

Figure 5. Adjustable batten suspension system. *Courtesy of Peter Albrecht Corporation.*

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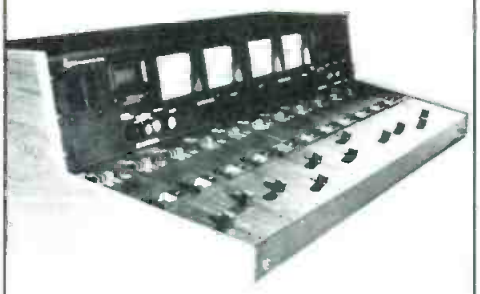

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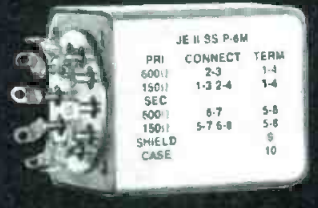

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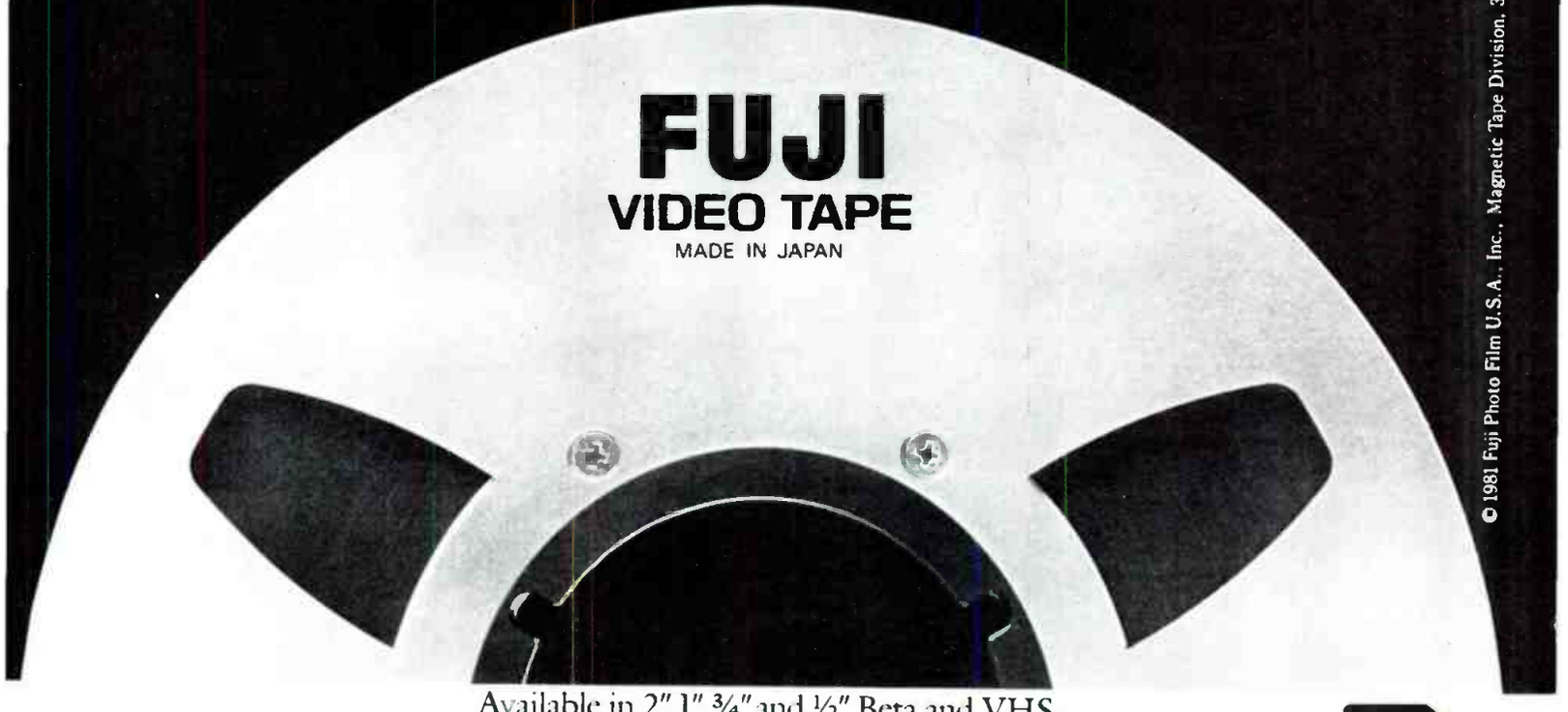

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feet. The higher density is desirable for a production studio that requires maximum lighting flexibility and scene lighting changes. The lower density is ample for a minimum studio with little need for other than basic fixed lighting.

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

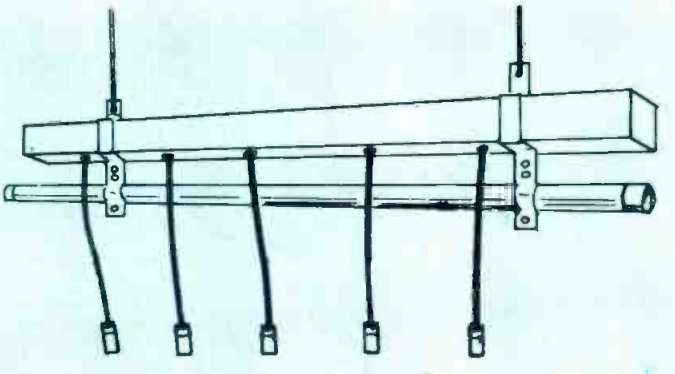

Figure 6. Load connector strip.

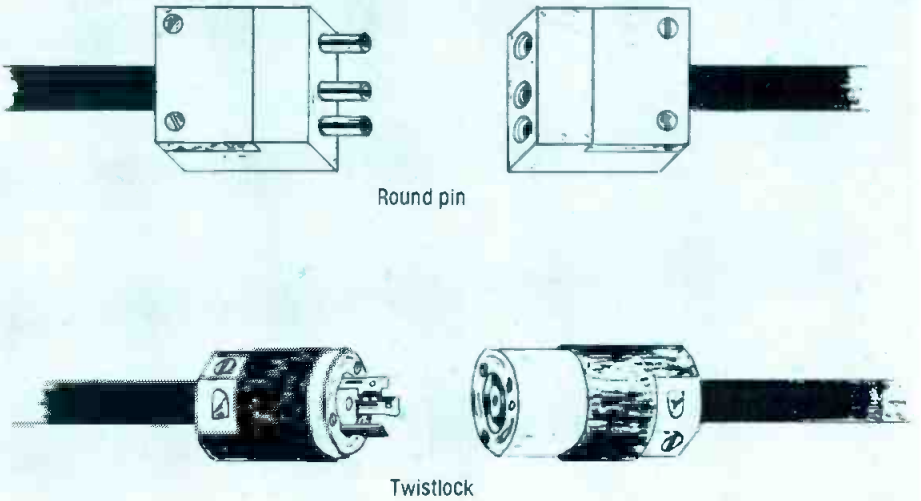

Figure 7. Load connectors.

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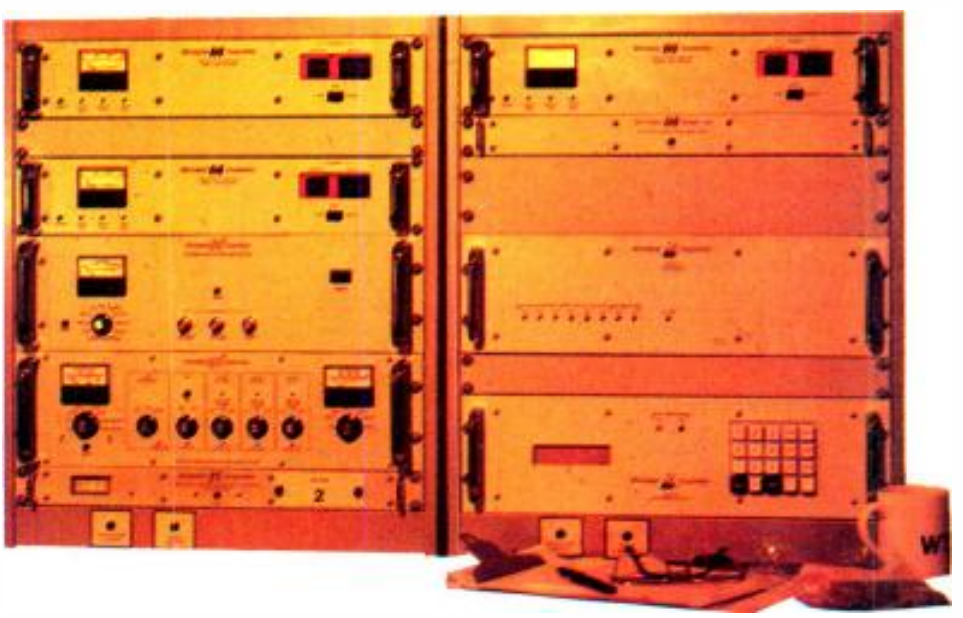

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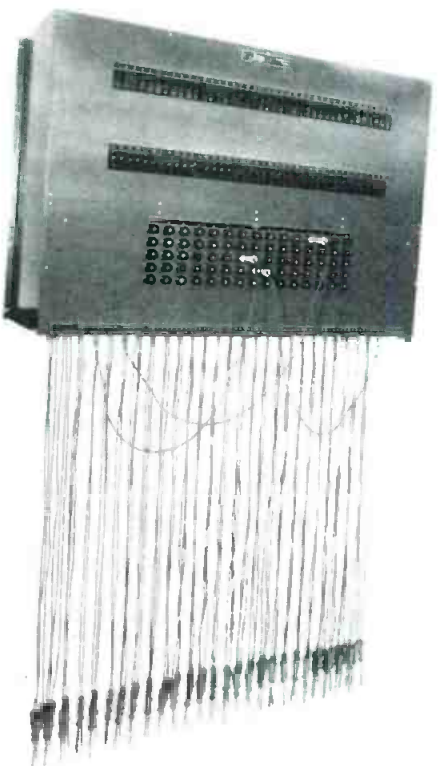
used at a particular time. A cross connect system allows any outlet in the studio to be connected to any dimmer and also permits several outlets to be grouped to a single dimmer.

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.

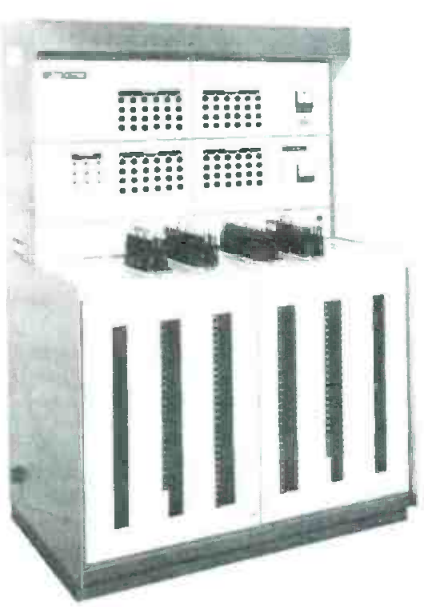


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Figure 8b. Retractable cord patch panel.

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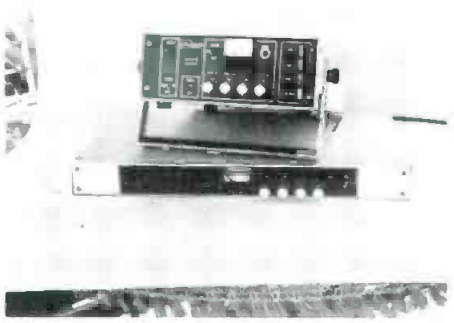

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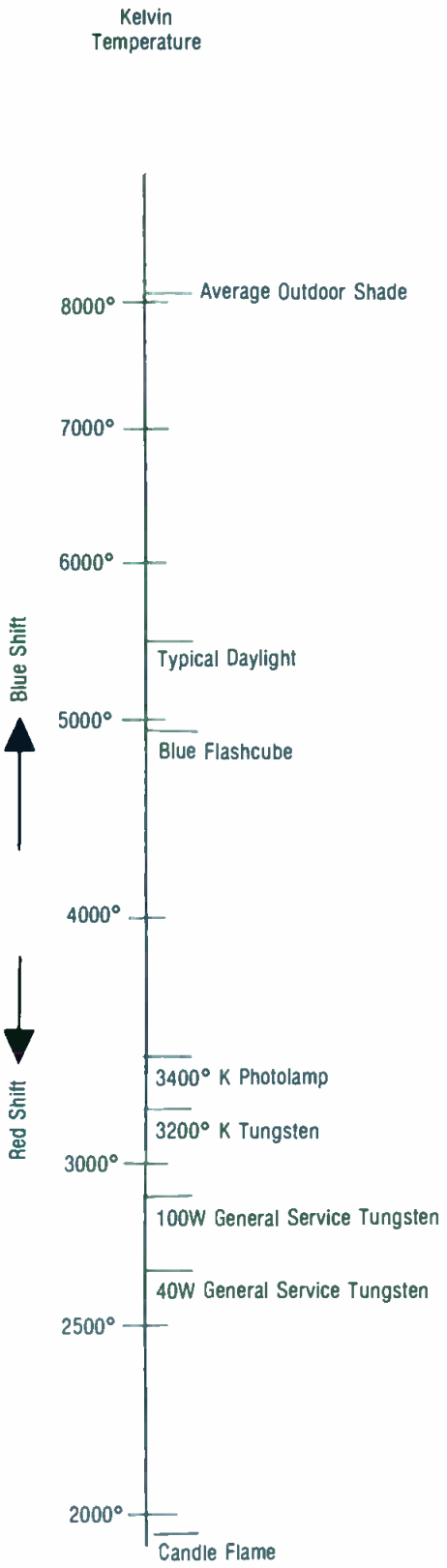
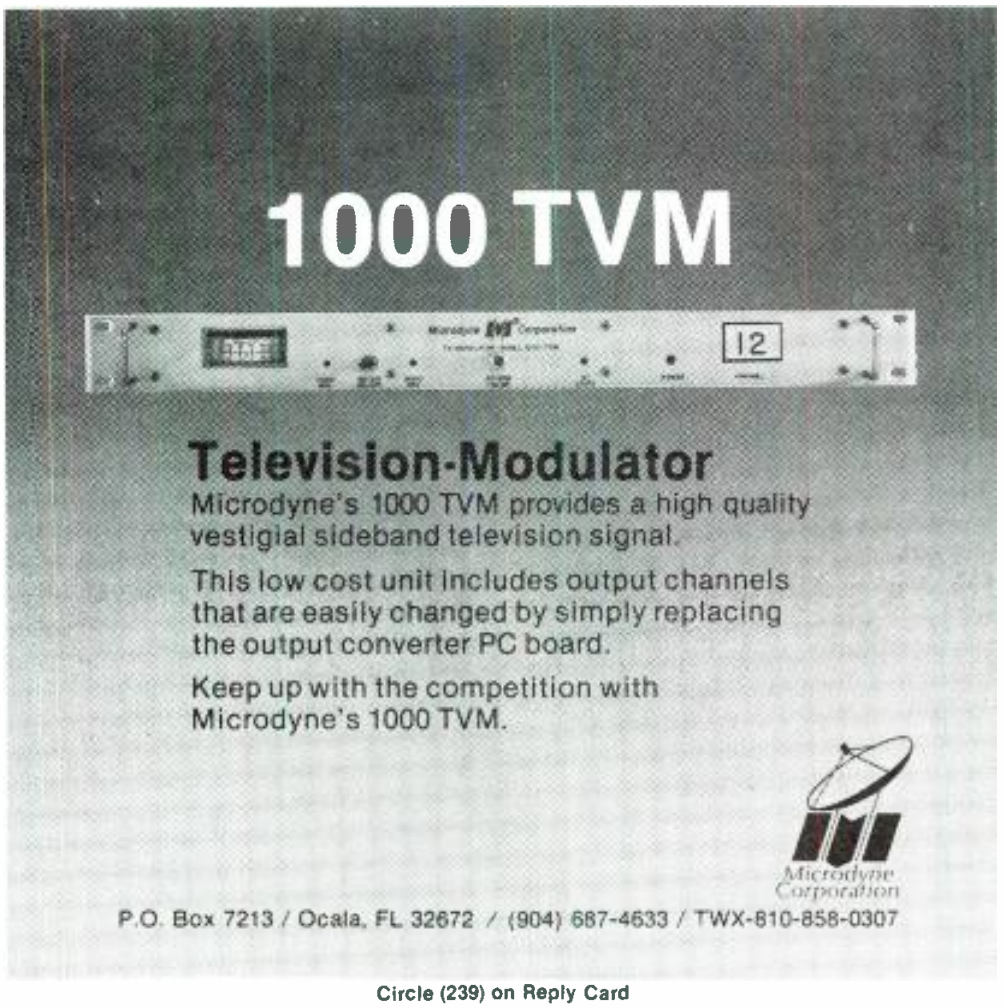


Figure 9. Kelvin temperature of typical light sources.



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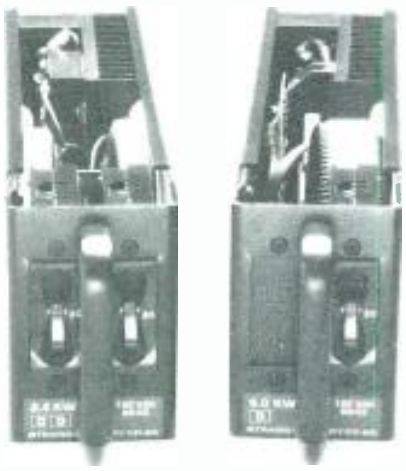

Courtesy of Strand Century Inc.

Figure 10. SCR dimmer modules.

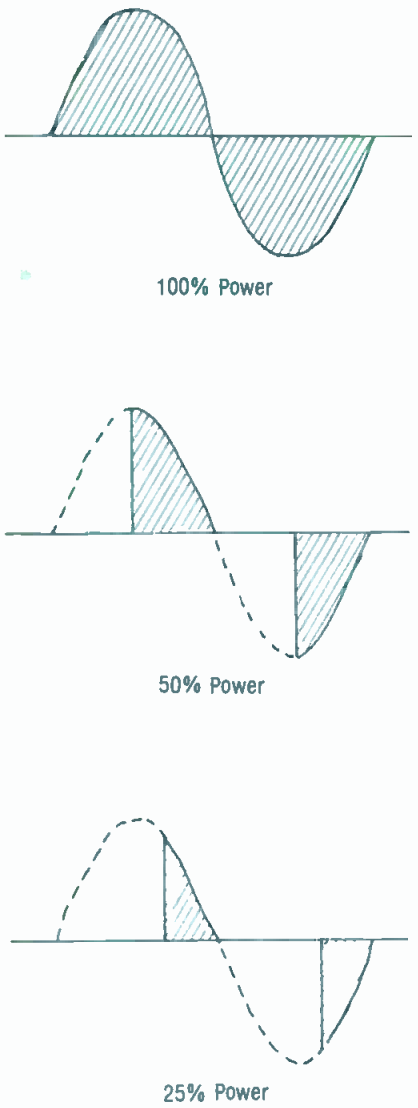

Figure 11. SCR dimmer output waveforms.

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

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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, thyratrons, 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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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.

Courtesy of Kliegl.

Figure 12. Dimmer rack.

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

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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 500μs 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.

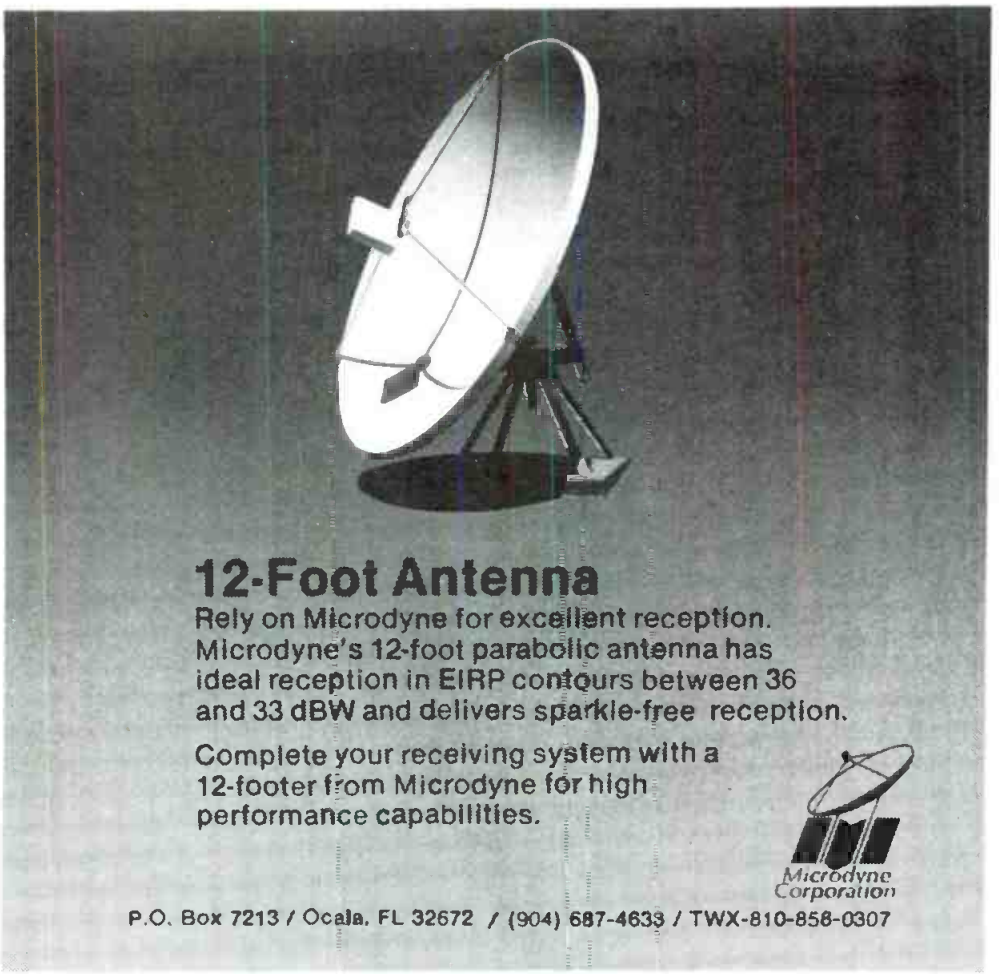
Some engineers in the industry believe that this traditional rise time method of specifying a dimmer is inadequate. They point out that the generation of radio frequency interference is proportional to the *rate* of current rise. Accordingly, two dimmers of different current capacities can have the same 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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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.

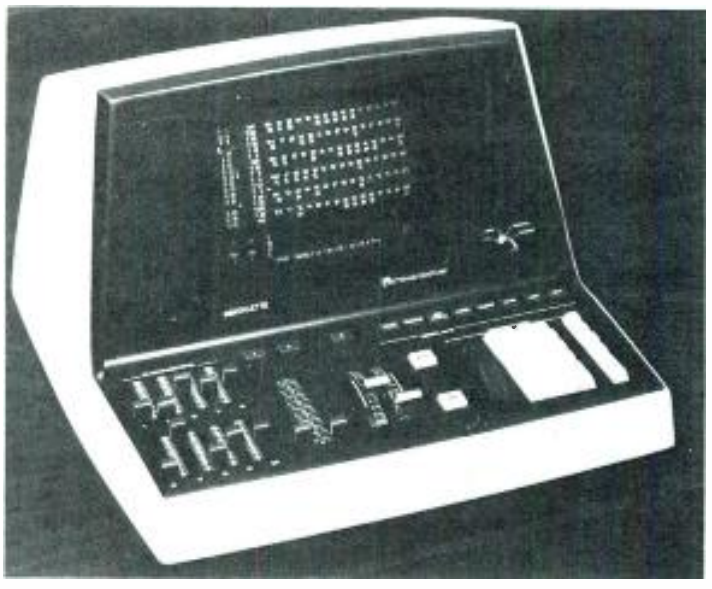

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Figure 14. Microprocessor-based control console.

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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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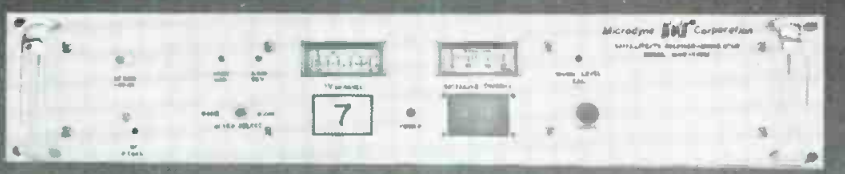

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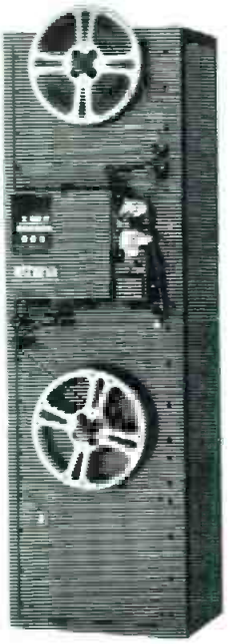

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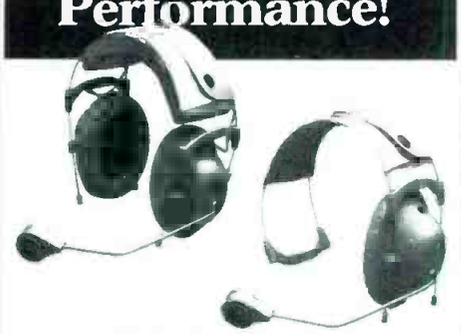

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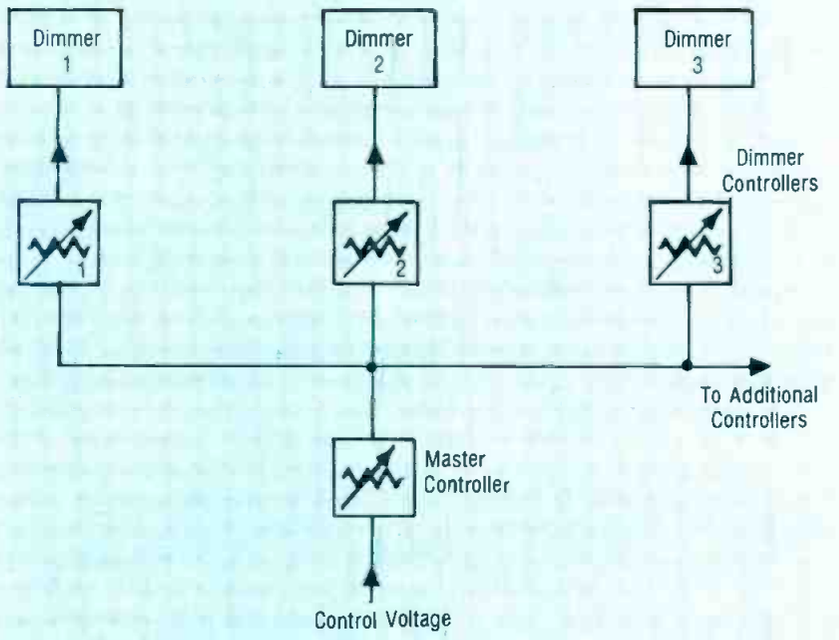

Figure 15. 1-scene control system.

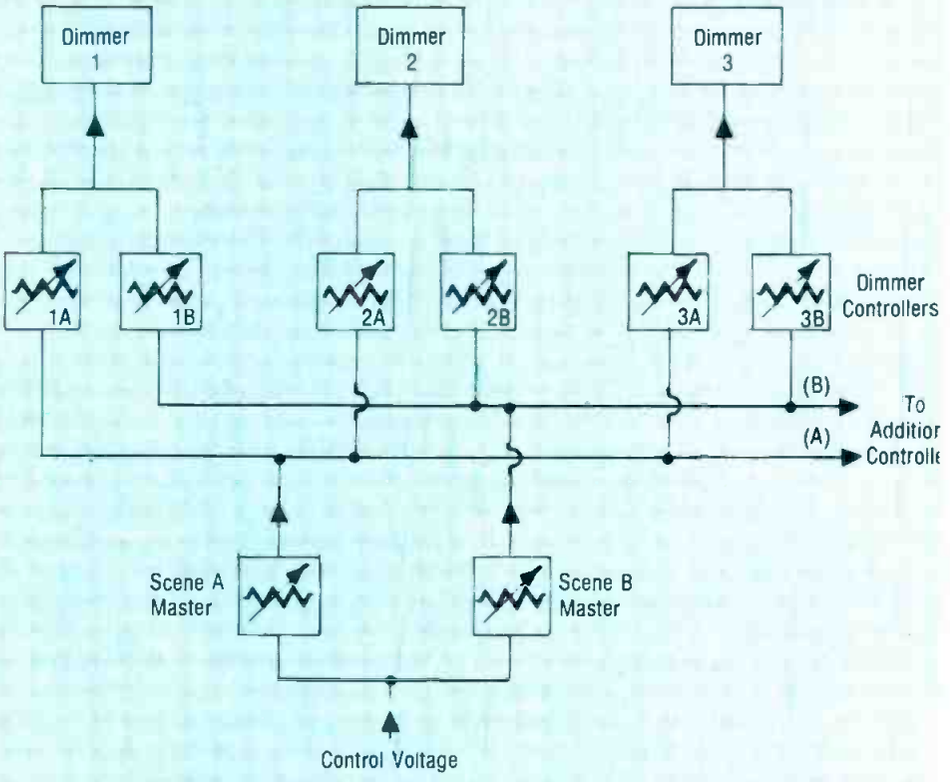

Figure 16. Basic 2-scene preset control system.

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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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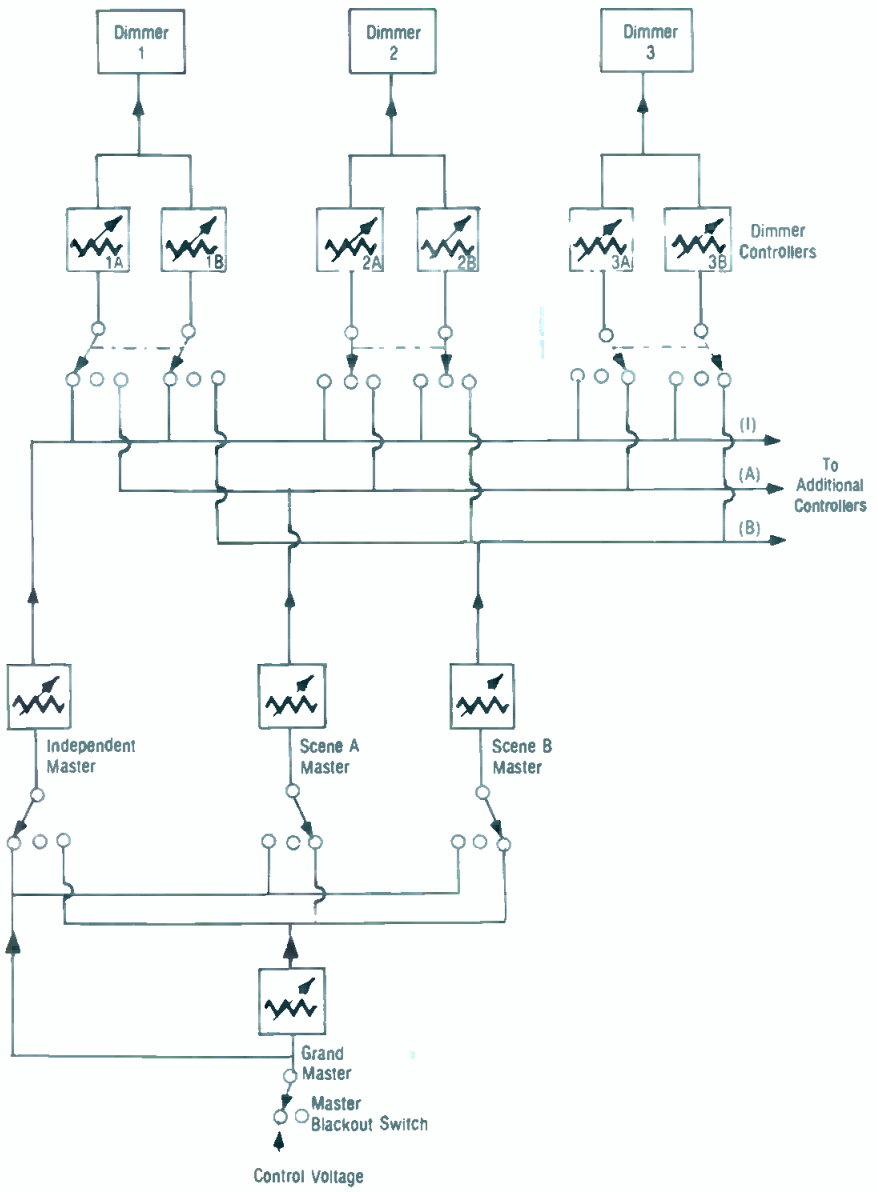

Figure 17. 2-scene preset control with independent master and grand master.

TV lighting

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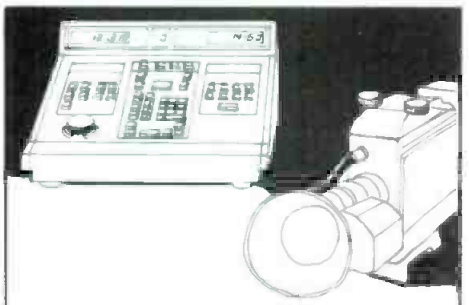

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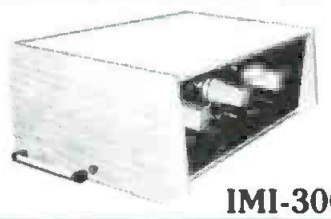

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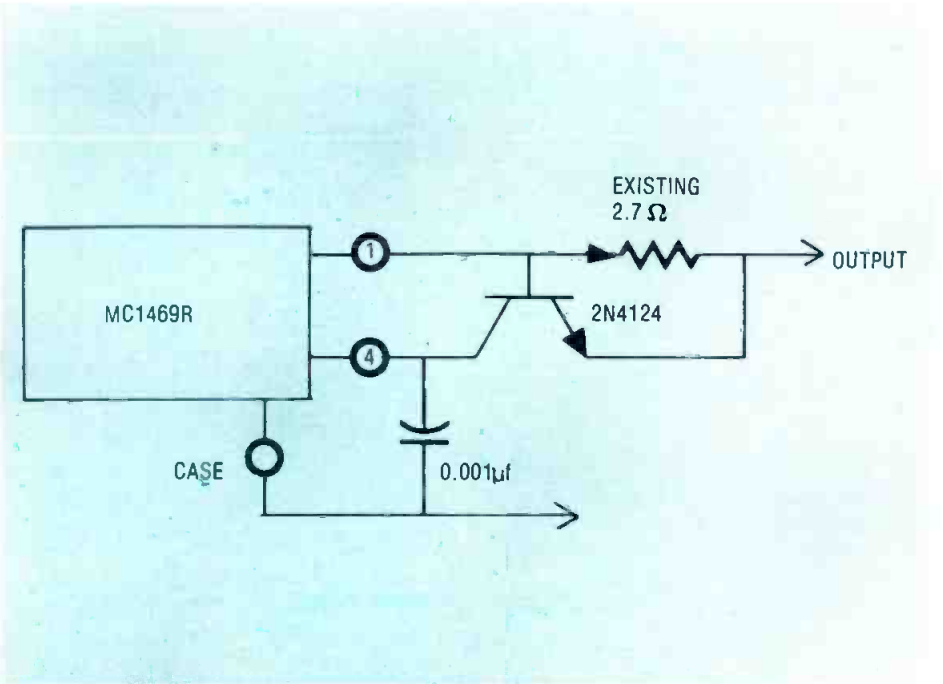

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By Edgar Lee Howard
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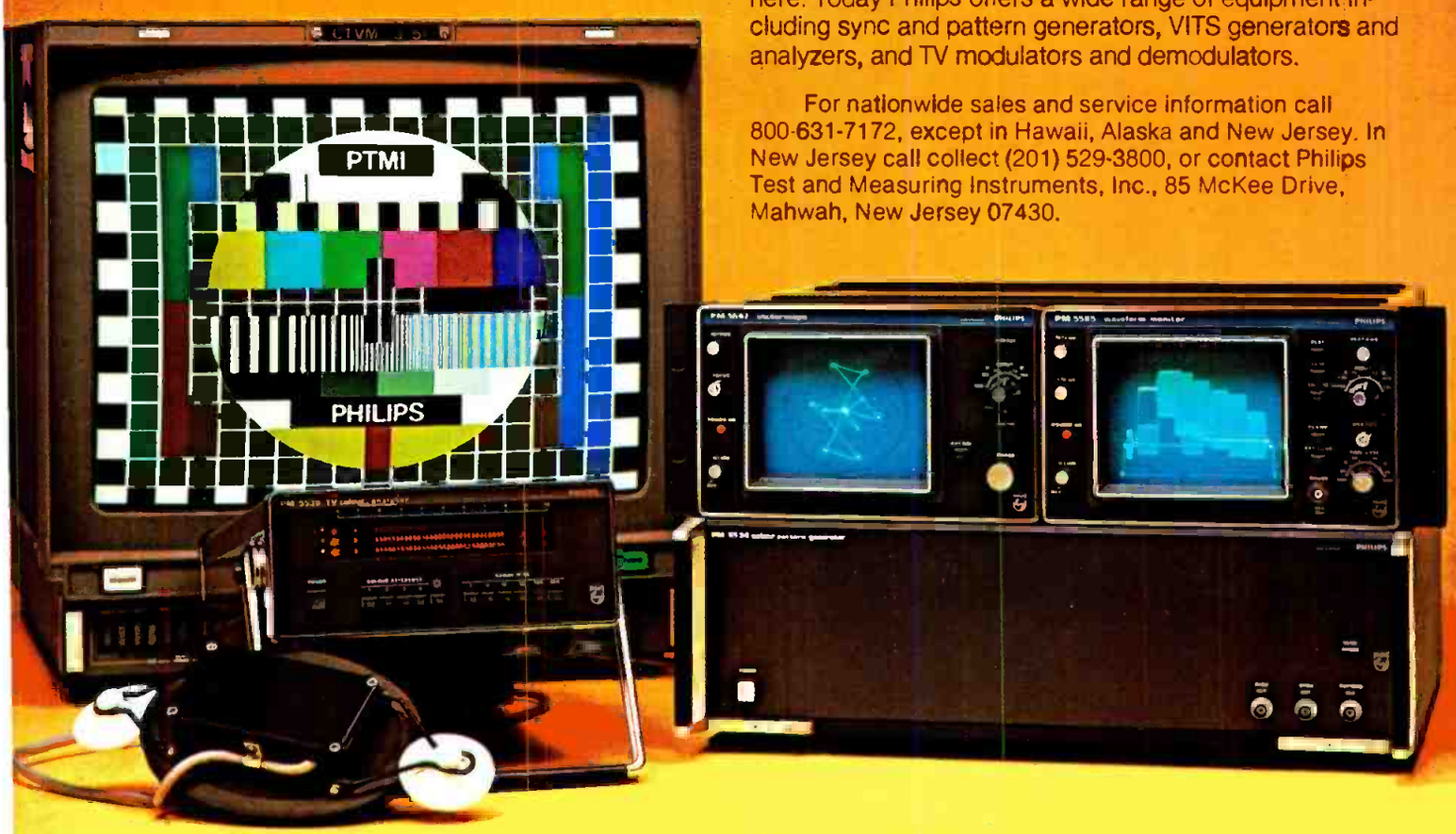

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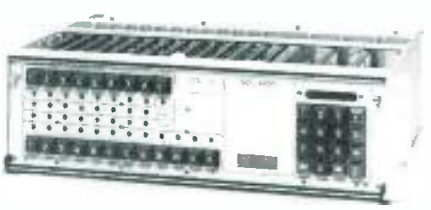

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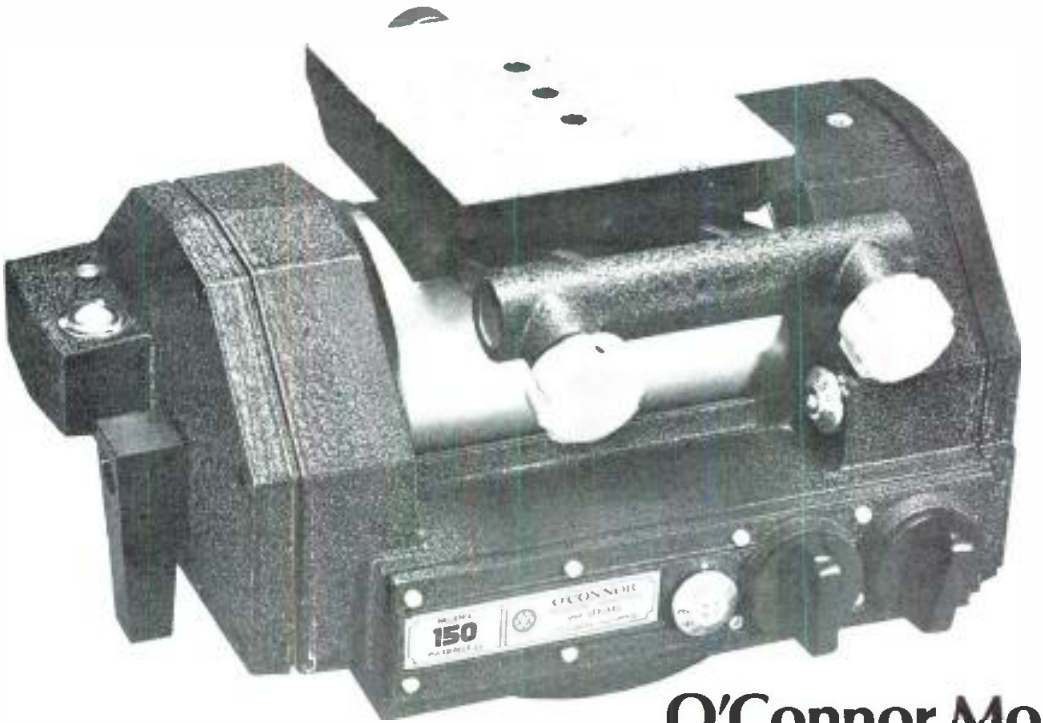

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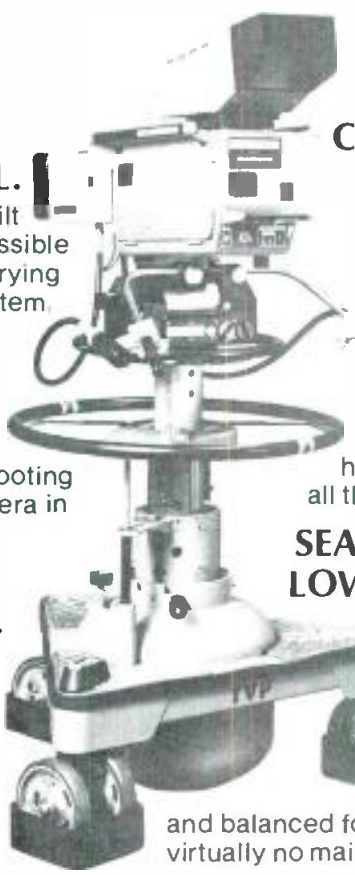

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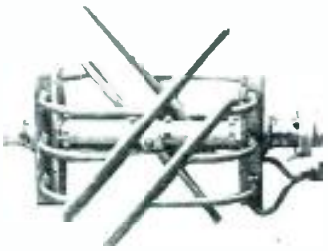

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New products

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 preprogrammed 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

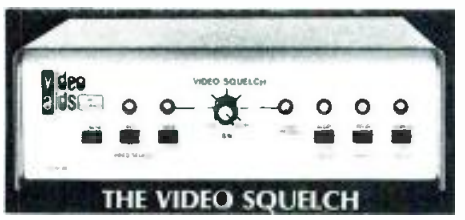
to other lavaliers. It operates with equal ease on phantom power or internal batteries and has a balanced output with standard XLR-3 type connector

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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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.

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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 ± 0.5dB, 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 ± 6kHz 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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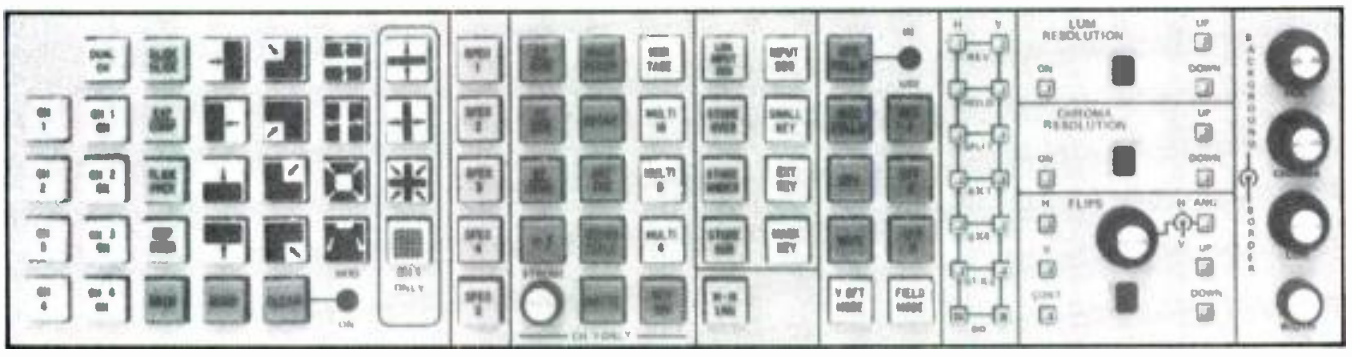

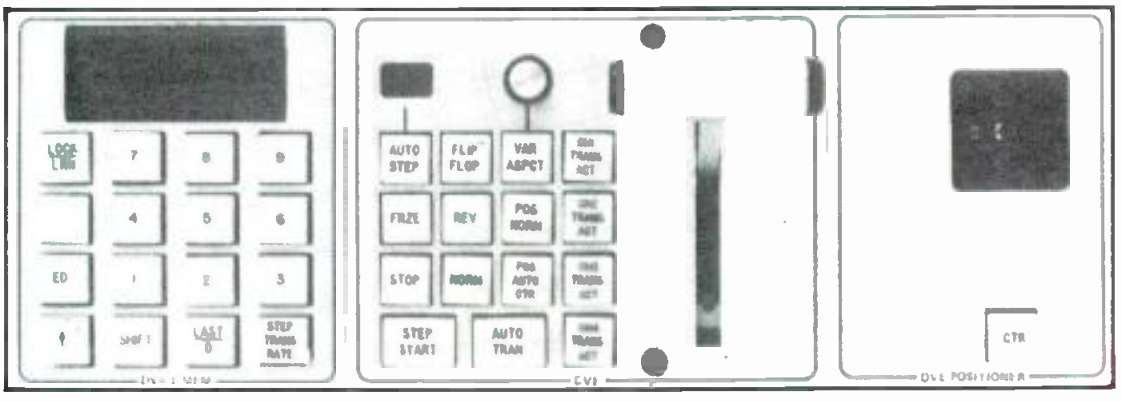

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calendar

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 (NSESC)*. The NSESC 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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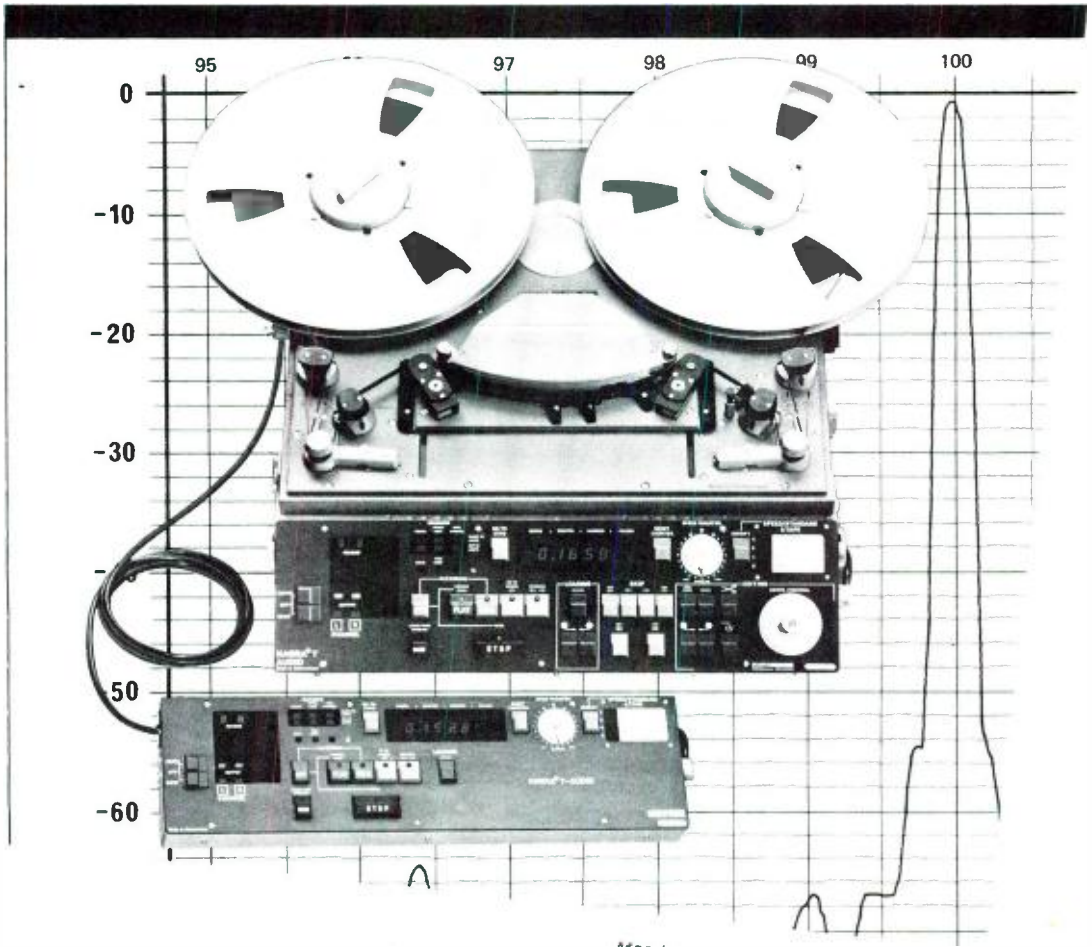

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and Japan is scheduled.

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 wil 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 national 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
March 12-17	National Association of Television Program Executives, (NATPE), 18th Annual Conference, Las Vegas Hilton
April 4-7	National Association of Broadcasters (NAB), 60th Annual Conference, Dallas
April 17-22	National Public Radio (NPR), Marriott Hotel, Washington, DC
May 2-5	National Cable TV Association, Las Vegas, NV
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
Sept. 18-21	IBC International Broadcasting Convention, Brighton, UK
Sept. 30-Oct. 2	Radio Television News Directors Association International Conference, Caesars Palace, Las Vegas, NV
Oct.-Nov.	AES, Los Angeles
Nov. 2-4	Scientific Atlanta Earth Station Seminar, Atlanta
Nov. 7-12	SMPTE 129th Annual Conference & Exposition, Hilton, New York □

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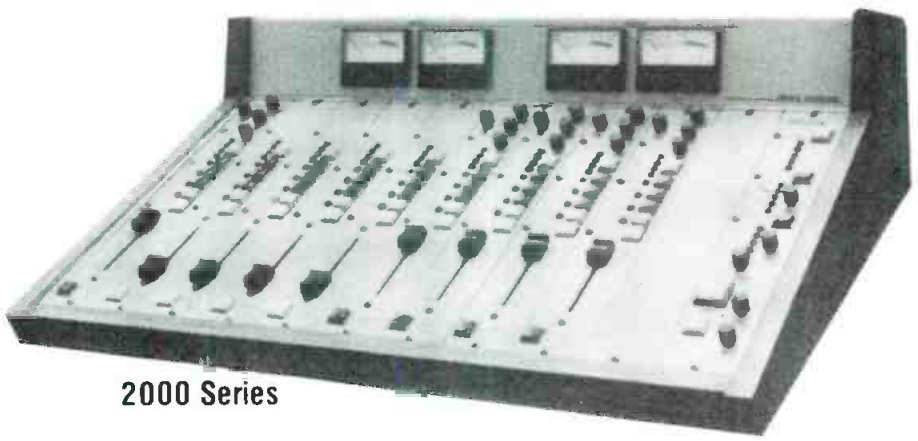

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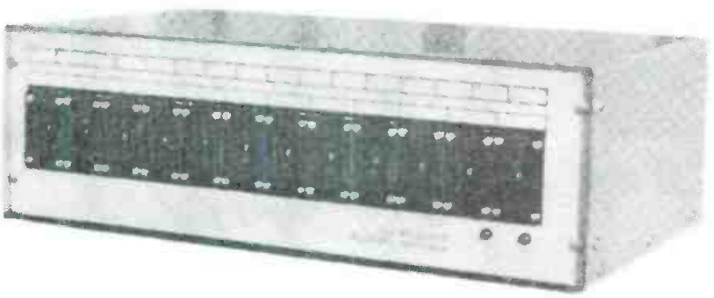

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Shook distributes mobile production system

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 ⅔-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-

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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 I 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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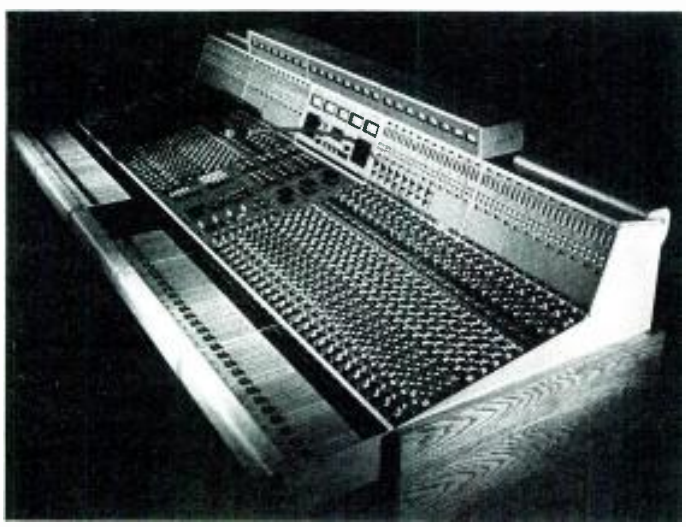
nounced by the company is the 5322 on-air console. The 5322 caters to a wide diversity of operational requirements with the minimum of top panel controls. This is achieved by using a flexible design with the provision of preset links and switches, ena bling the configuration to be matched to the requirements 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 I 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 helicoptor 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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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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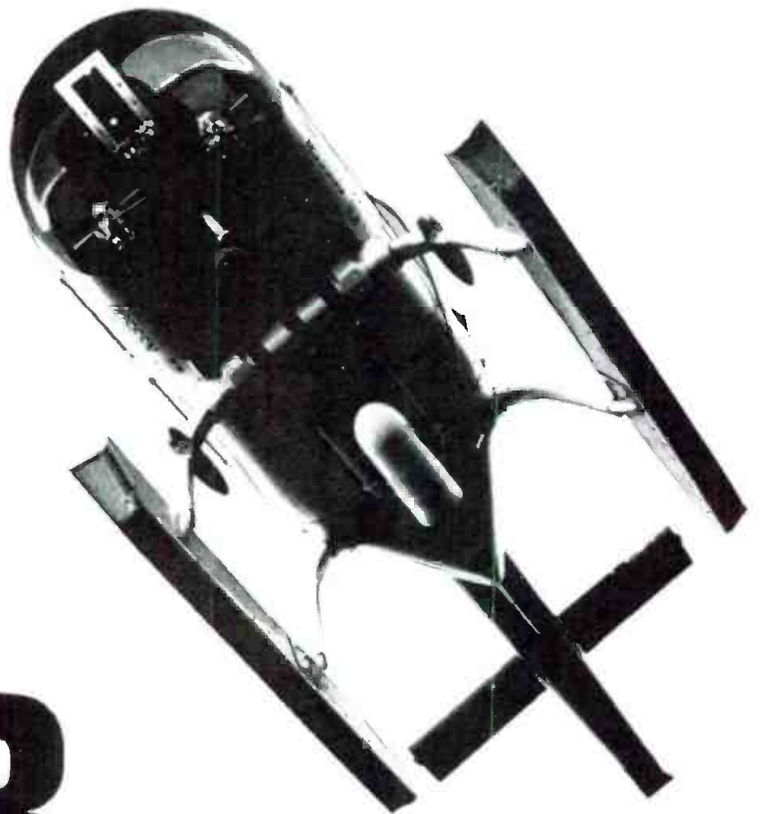

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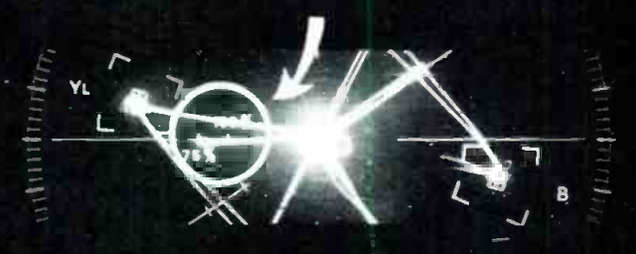

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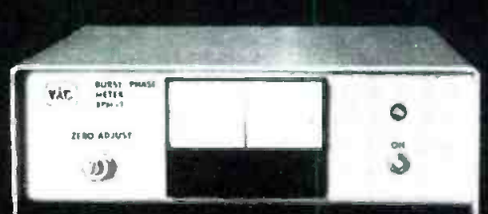

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Business

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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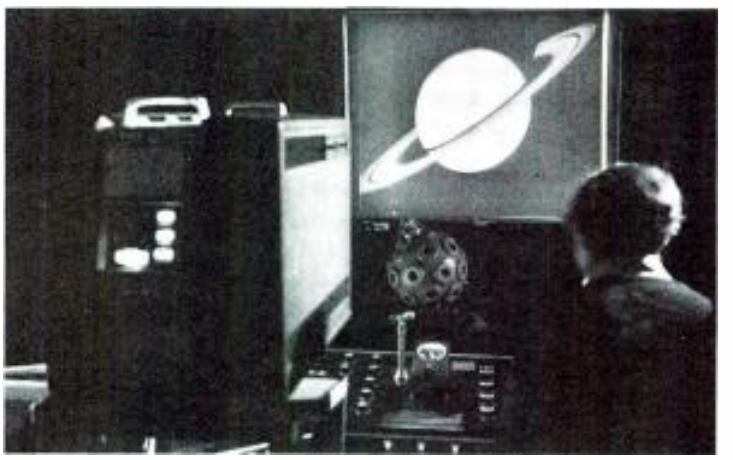

SELL-OUT CROWDS at Fiske Planetarium, Boulder, watched live NASA transmission presented by General Electric projector.

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COLOR PROJECTORS									
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
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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 Tuston, 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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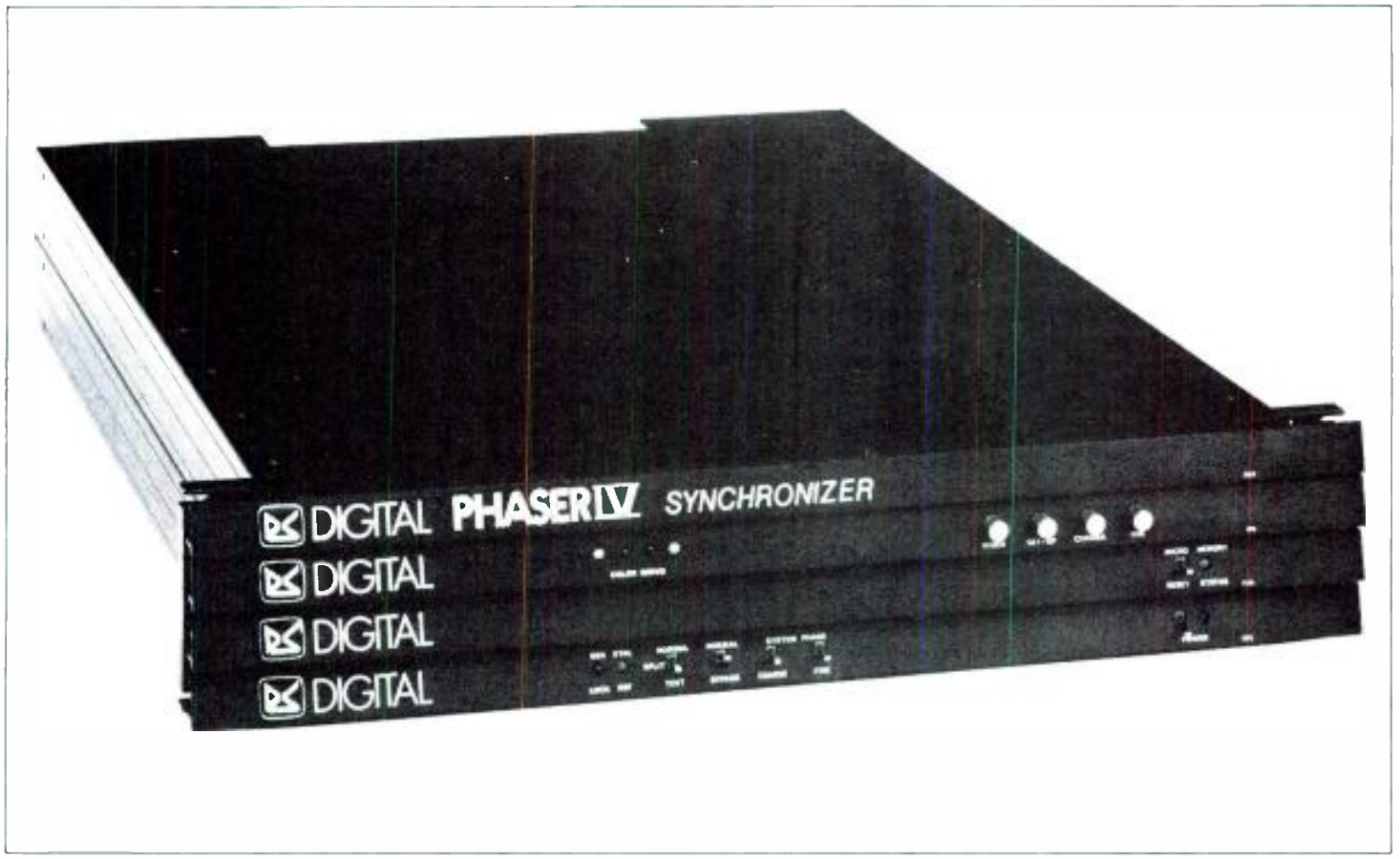

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The Phaser IV also has 5 TV line hysteresis. Motion discontinuities due to frame deletion or insertion are virtually invisible.

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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 ½-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 ½-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

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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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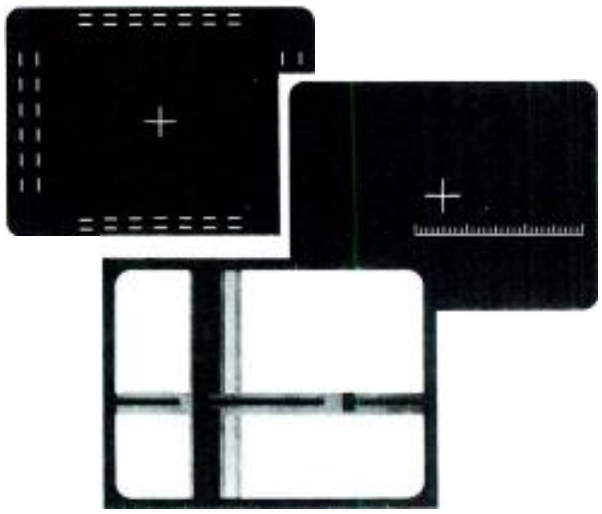

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people

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 Coovert** 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.

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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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BROADCAST CRYSTALS: for AM, FM or TV transmitters, frequency change, repair or replacement of oven types. Also vacuum types for RCA, Gates, Collins, CCA, etc. transmitters. High quality products, reasonable prices and better delivery! Don't be without a spare crystal. Frequency change for FM and AM nomitors. Over 30 years in this business. Eidson Electronic Co., Box 3751, Temple, Texas 76501. Phone (817) 773-3901. 4-81-tfn

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VIDEO T-SHIRTS. TV DESIGNED, preshrunk T-Shirts. Our four designs are; "ENG" and Reg. Chart, "GLITCH", "RESOLUTION" and chart, and "VIDEO PEOPLE DO IT IN SYNC". $8.50 each and $2 handling. Send check and size to: AaRLO ENTERPRISES, 109 MINNA ST., SUITE 254, SAN FRANCISCO, CA 94105. 8-81-tfn

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USED FIDELIPAC CARTRIDGES, $35.00 per 100, $250.00 per 1000. CART MART, Box 50003, Fort Worth, TX, 76105. 9-81-6t

RAZOR BLADES, Single Edge RALTEC. 25884B Highland, Cleveland, OH 44143. 12 81-12t

EQUIPMENT FOR SALE

55KW. UHF TRANSMITTER. Visual Electronics VTU-55A, complete, tuned to Ch. 47. Reliable, well-built unit. Ten years old. Includes: IF-modulated exciter, diplexer, set of Varian klystrons, demod., Marconi sideband analyzer. $80,000.00. Gary Breed, WTVP, (309) 676-4747. 3-82-1t

REMOTE TRUCK—3 Philips LDK-11's and 1 JVC KY2000, Grass Valley sync, Tektronix monitoring, ISI SEG w/chroma key, downstream keyer, 3M C.G. w/1,000 page memory, RCA quad, Altec audio, 2 Onan generators. Extras. Good condition. Priced to move. H.S. Productions, Inc. (312) 972-0078. 3-82-1t

TUBES, HIGH POWER, SPECIAL PURPOSE WANTED: 304TL, 4CX1000A, 4-1000A's, 5CX1500, etc. Also some receiving types, 53, 7F7, 7N7, 6HU8, etc. DCO, 10 Schuyler Ave., No. Arlington, N.J. 07032, (201) 998-4246, (800) 526-1270. 3-83-3t

RE-BUILT BROADCAST EQUIPMENT in stock ready to ship. Broadcast Products, Box 846, Ft. Pierce, Florida 33454, (305) 466-0000. 3-82-2t

IKEGAMI HL-35, CANON ZOOM, cables, batteries, cases. $7500.00. SONY 3800 VTR, $1500.00. Dave Marlin, VIDEOIMAGE, ONE Bulfinch Place, Boston, Mass. 02114. 617/742-8895. 3-82-1t

(2) HITACHI FP-1212, 3-tube cameras with extended red tubes & 16-160 F1.8 Fujinon lenses in excellent condition. Used only in studio. Broadcast plumbicons, less than 1,000 hrs., no spots. 50-foot cables, extender boards, $12,000 or best offer. **(3) Houston Fearless cradle heads** (250 lb. cap.) 2 with dual handles, in excellent condition, plus 1 more head needing parts. **(3) Houston Fearless heavy-duty** (400 lb. cap.) **Field** tripods in excellent condition (quick-set Gibraltar equivalent), plus one more with missing foot. **(4) Houston Fearless dollies** for above in excellent condition. $2,000 or best offer. **WRITE: EMORY MEDICAL TELEVISION NETWORK,** 69 Butler St., S.E., Atlanta, GA 30303. PH: (404) 588-3556. 3-82-2t

USED EQUIPMENT BARGAINS: RCA TT—IOAL 11KW Transmitter; RCA TT-35 CHW/CHW/Driver & Diplexer just removed from service; GE Film Chain; CVS 504B TBC; Envirozone Air Filters, Chyron III Character Generator; 12 to 15 Fonts; B/V 1400 Production Switcher W/D.S. Key; 3 Gates Criterion 80 Stereo PB and 1 Stereo Rec/PB carts. Call Ray LaRue, Quality Media Corp., 800-241-7878. In GA 404-324-1271. 3-82-1t

REMOTE PRODUCTION CRUISER: Beautiful Crown chassis, carpeted, full AC, camera platform on roof, 1600 mi. on diesel & drive train, good tires and brakes, includes (5) GE PE-350 Cameras, working well, 3-10:1 & 2-18:1 Lenses, motorized reels & TV-81 cables, Grass Valley Sync & line gear, new color prog. monitors, 12X6 prod sw'r w/effects, 8X2 GE Audio, well designed & professionally built $130,000. Call Ray LaRue, Quality Media Corp., 800-241-7878. In GA 404-324-1271. 3-82-1t

EFP PRODUCTION VAN: Like new (2) Hitachi SK-70 Cameras; JVC ¾" Editing pkg; port ¾" VCR; CVS 504B TBC w/noise reduction; 3M-1114 sw'r; 3M-D3000 c. gen; complete 8-in. audio; patching-monitoring; custom platform and AC Generator in service now, excellent condition. Call Ray LaRue, Quality Media Corp., 800-241-7878. In GA 404-324-1271. 3-82-1t

ENG UNIT-79 4 WHEEL DRIVE Ford Bronco. Excellent condition. Equipment includes Tektronix 650 color mon. 528 waveform mon. Eight channel audio system and complete power. All mounted and wired. $16,000. Also available with camera and tape machine as complete unit, call for price Contact John Buchan Mobile Systems. 408-734-0834. 2-82-2t

FOR SALE: TWO RCA TK-44-B's. Good condition with lens & pedestals. $45K or best offer Call (312) 280-2200 2-82-2t

UHF TV EXCITER: RCA MI-560382-B1 Visual Exciter and BTE-10C FM Exciter. Tuned to CH-43. With books, spare crystals and parts. Excellent condition. Call Rex Rickly at 216-845-6043. 2-82-2t

USED BROADCAST TELEVISION EQUIPMENT. Hundreds of pieces wanted and for sale. Please call System Associates to receive our free flyer of equipment listings. (213) 641-2042. 1-82-6t

EQUIPMENT FOR SALE (CONT.)

CHANNEL 10 TRANSMITTER PACKAGE: 25 KW, complete RCA TT-25 BH, good condx; 3⅛" xmission line, antenna, $35,000. Call Ray LaRue or Bill Kitchen, Quality Media, 800-241-7878. In GA 404-324-1271. 3-82-1t

VTR's. RCA TR-70, Full Cavec, SS Rec Amps, DOC, $22,000; RCA TR-60 updated, w/TBC ex-condx, low hours, $9,000; RCA TR-22 Hi-Bank, $7,000; Ampex 1200B Amtec, Colortec, Auto Chroma, Vel Comp, RCO, DOC, $22,000; IVC 870, $500. Call Ray LaRue, Quality Media Corp., 800-241-7878. In GA, 404-324-1271. 3-82-1t

COLOR CAMERAS—NEW: Thompson-CSF, Ikegami, Panasonic; Used: GE PE-350 $2,500 ea; GBC CTC-7X, Minicam, plumbs, $10,000. Call Ray LaRue, Quality Media Corp., 800-241-7878. In GA, 404-324-1271. 3-82-1t

BROADCAST AUDIO/RADIO GEAR—New: CSI AM-FM Xmtrs; LPB Mixers; Microtrak Consoles/Equipment; Otari Recorders; Ramko; Russco; Studer Revox; Shure; Thompson-CSF. What do you need? Call Ray LaRue, Quality Media, 800-241-7878. In GA, 404-324-1271. 3-82-1t

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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. 3-82-1t

$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. 3-82-1t

INTERIOR MODULES FOR OLD COLLINS 212-F-1 console including power supply; Volumax 400 peak controller; old Magnecord tapedecks; RCA 44 ribbon mike; RCA ribbon mike desk stand; old roundback carts. KVXL, Box 4, Bisbee, Arizona 85603. 3-82-1t

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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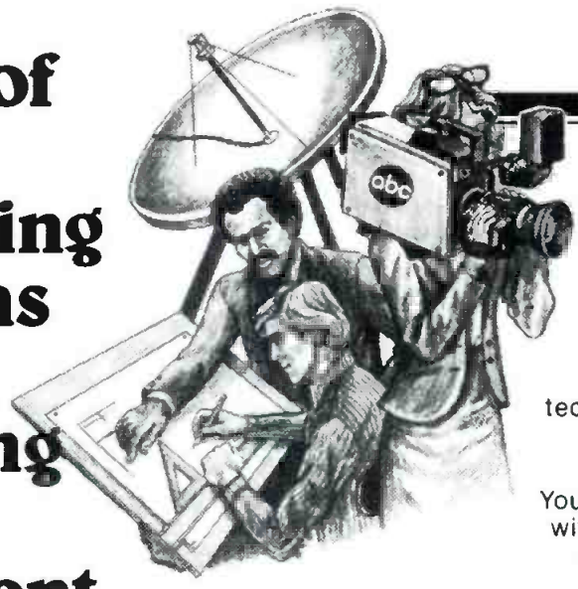

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RCA Commercial Communications Systems Division
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HELP WANTED (CONT.)

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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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. 3-82-1t

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-Flint, Flint, Michigan 48503, Attn: Guy Beverlin, Chief Engineer. 2-82-2t

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, nondiscriminatory employer. 3-82-1t

SOFTWARE/HARDWARE ENGINEER: A position is available for an individual with a strong hardware and software background in 8080/380 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. 3-82-1t

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. 3-82-1t

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. 3-82-1t

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. 3-82-2t

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. 3-82-2t

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. 3-82-1t

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. 3-82-1t

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.
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- 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.

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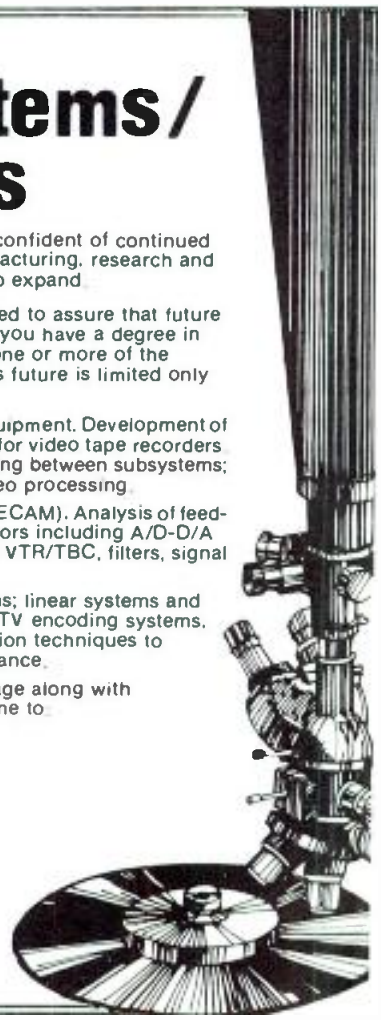

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HELP WANTED (CONT.)

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HELP WANTED (CONT.)

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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, KLTV-TV, P.O. Box 957, Tyler, Texas 75710. Equal Opportunity Employer. 2-82-2t

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-tfn

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. 4-82-1t

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.

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Chief TV Engineer: BSEE, 8 years related experience (2 as supervisor) in the design and maintenance of CCTV systems and other AV equipment.

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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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