

BROADCAST[®] engineering

June 1984/\$3

Radio Hoyer: Solar power

Video editing update

New equipment at NAB - '84

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The journal of broadcast technology

June 1984 • Volume 26 • No. 6

NAB-'84/LAS VEGAS: NEW EQUIPMENT

- 22 New equipment at NAB-'84/Las Vegas**
By Carl Bentz, television editor
- 24 Radio exhibitors**
- 53 Television exhibitors**

25th ANNIVERSARY

- 126 The SBE and Broadcast Engineering**
By Brad Dick, director of engineering, KANU/KFKU Radio, University of Kansas, Lawrence, KS, and secretary of the SBE
- 144 Preserving technology**
By Jerry Whitaker, radio editor

OTHER FEATURES

- 100 Station profile: Radio Hoyer**
By Ekke J. Huisman, managing director, marketing, Industrial Electronics (antilles) NV, Curacao, Netherlands Antilles
- 104 Technical deregulation: How radio engineers have been affected**
By Rick Garofalo, staff engineer, WGN-TV, Chicago, IL
- 110 Field report: IGM BASIC-A**
By Jerry Whitaker, radio editor
- 118 Selecting an analog video fiber-optic system**
By Pete Mountanos, fiber-optic business manager, Grass Valley Group, Grass Valley, CA
- 128 Update on editing**
By Carl Bentz, television editor
- 136 Buying the ultimate editor**
By Art Schneider, A.C.E., BE post-production consultant, Agoura, CA
- 154 Broadcast transmitter maintenance**
By Jerry Whitaker, radio editor

DEPARTMENTS

- 4 AM stereo update**
- 6 FCC update**
- 10 Editorial**
The 20th century: A lost media culture?
- 12 Satellite update**
- 14 News**
- 16 Associations**
- 160 Calendar**
- 162 People**
- 164 Feedback**
- 170 Index of advertisers**
- 171 Classified ads**

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BROADCAST[®] engineering

June 1984/83

Radio Hoyer: Solar power
Video editing update
New equipment at NAB-'84

THE COVER this month shows the recently completed transmitting facility of Radio Hoyer-FM, located in Curacao, Netherlands Antilles. The project includes an innovative use of solar energy power arrays, shown in the lower portion of the picture. The transmitting site is located on the highest ridge of Curacao's eastern-most mountain, the Tafelberg. See "Station Profile: Radio Hoyer" on page 100. Cover photo is courtesy of Photo Art Studio in Curacao.

Coming events

- Aug. 26-29**
NAB Radio Programming Conference, Atlanta, GA
- September/October**
LPTV East
- Sept. 6-8**
Southern Cable TV Association, Atlanta, GA
- Sept. 16-19**
Radio Convention and Programming Conference, Los Angeles, CA
- Sept. 20-21**
IEEE 34th Annual Broadcast Symposium, Washington, DC
- Sept. 21-25**
International Broadcasting Convention (IBC), Brighton, England
- Oct. 8-11**
AES 75th Technical Meeting & Exhibits, New York, NY
- Oct. 27-Nov. 3**
SMPTE 126th Annual Conference, New York, NY
- Oct. 28-Nov. 1**
Scientific-Atlanta Earth Station Seminar

NEXT MONTH:

- NAB: New technology
- Routing switcher update

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Motorola urges caution

Motorola, developer of the C-QUAM AM stereo system, has urged the FCC to proceed with caution on any move to expand the use of AM ancillary signals. The commission has issued a Notice of Proposed Rulemaking and solicited comments on a suggestion to open AM SCAs to a wide range of possible uses.

Motorola told the commission that it "generally supports the concept that ancillary use of the AM broadcast spectrum be increased where it does not conflict with other public interest considerations." The company urged the commission to ensure that no ancillary signals be permitted that would interfere with the pilot tone signals of the AM stereo systems vying for marketplace support.

The company provided documentation to show how AM SCA signals could interfere with stereo pilot tones of the various systems now in use. In

its comments to the FCC, Motorola said, "Because there are presently four frequencies being used in AM stereo for pilot indicators (5Hz, 15Hz, 25Hz and 55Hz), it is nearly impossible to use a low frequency angularly modulated tone in that frequency range without activating one or more stereo system's receivers. For this reason, it is advisable for the commission to defer action on the expanded use of the AM carrier until the AM stereo marketplace choice is resolved."

Stations form AM stereo association

Four New Orleans AM stereo radio stations—trying to boost interest in AM stereo operation—have banded together to form what may be the first local-area AM stereo association. New Orleans radio stations WNOE, WQUE, WWIW and WYLD are charter members of the group, and

more than a dozen additional Louisiana radio stations reportedly have expressed an interest in joining. The organization's primary goals are to promote the common business interests of AM stereo broadcasters and foster the exchange of ideas among member stations.

The non-profit Louisiana AM Stereo Association, which has been incorporated under Louisiana state law, has two classes of members. The voting membership is limited to AM stations operating in stereo. Non-voting associate membership in the organization is available to AM stations not broadcasting in stereo, and manufacturers, advertisers, distributors and retailers with an interest in AM stereo's development.

Retail marketing strategy is an important part of selling AM stereo to listeners accustomed to high fidelity FM stereo. Phil Zachary, general manager of station WQUE, said that recent focus group testing has shown that persons in the key 12- to 20-year-old age group did not have any bias against AM radio, and that they would listen to an AM station programmed to their taste as long as the audio quality approached that of FM stereo.

The Louisiana AM Stereo Association
Continued on page 164

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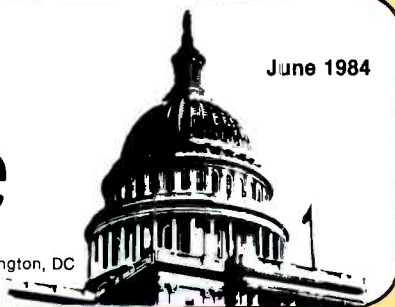
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FCC update

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

June 1984



Nighttime use of Canadian, Mexican and Bahamian clears

In late March, the FCC proposed amendments to its rules looking toward authorization of unlimited time operation on the Canadian, Mexican and Bahamian Class I-A clear channels.

The new US-Canadian AM agreement permits nighttime operation on the Canadian clears (540kHz, 690kHz, 740kHz, 860kHz, 990kHz, 1110kHz and 1580kHz), as long as interference protection is given to Canadian stations. Regarding Mexican clear channels (540kHz, 730kHz, 800kHz, 900kHz, 1050kHz, 1220kHz and 1570kHz), the United States and Mexico are in the process of completing a new bilateral AM agreement that would permit nighttime operation on those channels on a basis similar to that agreed to with Canada. The single Bahamian clear channel (1540kHz) will become available upon disengagement of the Bahamas from NARBA, which is expected to occur soon.

The commission proposes to apply existing eligibility criteria to applications for full-time stations on the 14 frequencies being made available. The criteria, stated in Section 73.37(e)(2)(i-v) of the FCC's rules, are as follows:

- ownership by minorities of more than 50% of the applicant;
- proposed non-commercial operation;
- a showing of first primary nighttime aural service to 25% of the area or population within the proposed interference-free contour;
- provision of a first or second nighttime aural transmission service for the proposed community of license and no FM channel is available; or
- a showing that at least 20% of the area or population of the community receives fewer than two daytime aural services and no FM channel is available.

Daytime AM stations now operating on one of the Canadian, Mexican or Bahamian Class I-A channels that can meet the requisite interference standards would be eligible to apply for authority to operate at night only if they would provide a first or second

nighttime aural service to their communities (or some nearby community). Power would be limited to 1kW at night unless the applicant can demonstrate that with a higher power (of up to 50kW) it would be able to meet the third criterion mentioned previously. The new or improved stations would be required to protect each other to their 10mV/m contours, making possible interference-free service over areas within roughly a 10-mile radius of their transmitters.

Attribution rules amended

The FCC has revised its standards for attributing interests in broadcast, cable TV and newspaper properties for the purposes of applying its multiple-ownership rules and reporting media interests to the FCC. The specific changes include:

- raising the basic ownership benchmark for attribution to 5%, regardless of the size of the licensee, and eliminating the distinction between closely held (in other words, those having less than 50 stockholders) and widely held licensees;
- raising the attribution benchmark for institutional investors, such as mutual funds, insurance companies and banks, to 10%;
- clarifying the status of non-voting stock and limited partnership interests as non-attributable under the multiple-ownership rules;
- providing release from attribution to officers and directors of companies whose duties are not related to any station or its operations;
- applying the higher attribution limits in a limited fashion to the cross-interest policy, which generally prohibits a party from owning an interest in one station while having a business relationship with another in the same market; and
- modifying existing ownership reporting requirements to make them conform to the new rules.

With regard to reporting requirements, the commission will continue to require the filing of an ownership report (Form 323) upon the grant of a construction permit of consummation of a station sale. However, periodic reporting of ownership interests will

include only "attributable" interests under the new rules and will be on an annual basis only. Further, the difference between the information required to be reported by widely held and closely held corporations will be eliminated.

Regional concentration of control rules repealed

The FCC has repealed the regional concentration of control provisions of its multiple-ownership rules. The affected rules generally prohibited any party from owning, operating or controlling three commercial AM, FM or TV stations in cases in which any two were located within 100 miles of a third and there was overlap of the primary service contours between any two of the stations.

In making this rule change, the commission stressed that other multiple-ownership rules, particularly the duopoly and one-to-a-market rules, remain in effect.

Fairness doctrine examined

The FCC has initiated a broad inquiry to reassess its policies under the fairness doctrine, which requires broadcasters to cover controversial issues in their communities and provide contrasting viewpoints on such issues.

The commission has invited comments on the purposes, effects, relevancy and legality of continued enforcement of the fairness doctrine. To ensure compilation of a complete record, the commission plans an open, *en banc* meeting for legal scholars, communications experts, government policymakers and members of the public to discuss the First Amendment issues involved in governmentally imposed fairness regulations.

Change in

FM modulation standards adopted

The FCC has increased the maximum permissible modulation deviation level for FM stations using two SCAs (not including stereo subcarriers) from 100% to 110%. FM stations using only one SCA are permitted a maximum modulation deviation of 105%.

The commission said that by permitting such increases, multiple subchannels can be operated without degrading the main channel and without adversely impacting short-spaced stations.

Pre-sunrise authorizations on Canadian clears

In March the FCC began sending pre-sunrise authorizations to stations that operate on the Canadian Class I-A

Continued on page 166

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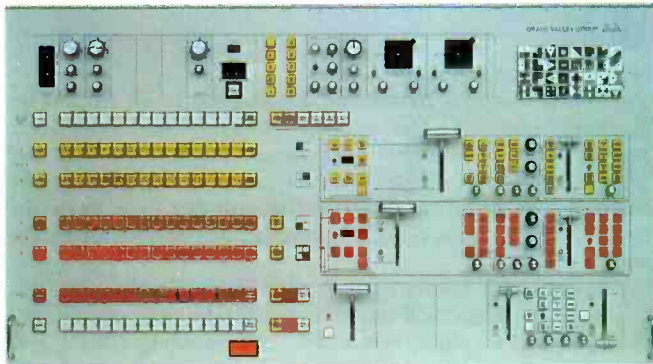
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The 20th century: A lost media culture?

Guest editorial by Peter Hammar,
Museum Concepts, La Honda, CA, and
consulting curator, Ampex Museum of
Magnetic Recording, Redwood City, CA

1984 marks the 25th anniversary of **Broadcast Engineering**, an important chronicler of the key technologies of our culture for radio and television. Broadcast entertainment forms an increasingly large part of the cultural heritage that we are passing on to the future. We can preserve this heritage by supporting media archives and museums across the country. We have the technology—and the collective resources—to preserve programming for future generations to appreciate.

You might ask, "Why bother with media preservation?"

With today's recording and program storage capabilities, we should not deprive our descendants of a clear view of our society—both our accomplishments and our failures. Our own lives would be richer if we could view films or videotapes of Shakespeare's plays as they were performed in the 16th century, listen to Bach's own recorded interpretations of his organ and choral works, or hear interviews with the framers of the Constitution in 1789. However, these experiences have been lost forever, because of a lack of technology at the time.

The 20th century media culture is being lost, not from a lack of technology, but from insufficient organization and funding. For example, Edison brown wax cylinders from the turn of the century in some public and private collections are rotting from mold in their grooves. In less than a decade, many will be irretrievably ruined.

Archives are missing opportunities because of lack of money and organization. One of the most surprising film discoveries in recent years has been the unearthing of Edison's Kinetophone films, theatrically released synchronized-sound motion pictures from 1913. Using his own time and money—with help from Reeves Teletape, The Sound Shop and Ampex Corporation—media restorationist Art Shifrin in New York discovered the films and cylinders and organized the reprocessing of image and sound into usable material. Yet, the Kinetophone project has been shelved temporarily because of a lack of funds.

Radio air checks from the '30s and '40s recorded on acetate discs—some in private hands—often are poorly preserved, with hundreds of thousands of them already thrown out by broadcasters over the years. Even discs that have been spared often are improperly stored.

Kinescopes from the pre-tape era of television frequently suffer the same fate as radio discs. Many quad and even helical-scan videotapes are poorly preserved, erased or tossed out by organizations more interested in saving money on storage space than in preservation. A few years ago, a US network threw out much of its stored programming produced from 1947 to about 1974. We should know better by now.

Some of us assume the government will handle the job of media preservation. Yet, we are entering a time of reduced government support of the arts and sciences. The National Archives, the Smithsonian, the Library of Congress and the Edison National Historic Site do the best they can within their limited budgets, but their resources are thinly spread for the huge preservation task at hand.

Private support of radio, TV and film archives and museums offers the only real hope of comprehensively preserving and chronicling our culture this century and into the 21st.

This issue of **BE** contains profiles of some fine organizations dedicated to media preservation. (See "Preserving Technology," page 144.) More and more, these groups are cooperating with one another, and deserve our support, through donations of money, labor and media expertise.

In our support of preservation efforts, we should not forget about donating or loaning privately held programming or equipment. Someone may feel good about his quad copy of that rare old TV show from the '50s, stuck away for safekeeping. There is little doubt, though, that the videotape and its copyright can be protected better and do society (and the donor) more good in a place such as the Academy of Television Arts and Sciences/University of California, Los Angeles (ATAS/UCLA) Television Archives than in a closet.

A broadcaster who has written off a VR-2000 or an AVR collecting dust in a

Continued on page 166

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PROFESSIONAL BROADCAST

CASSETTE



Satellite update

By John Kinik, satellite correspondent

Launching risks

The satellite communication industry has always lived with risks associated with launching satellites. These risks primarily were caused by the uncertain state of rocket technology in the early days, when a 10% risk of failure of the primary rocket was considered reasonable, but also included secondary failure modes such as apogee rocket failures and, in later years, solar panel deployment failures. The recent loss of two satellites—Westar 6 and Indonesia's Palapa B2—on one space shuttle mission (STS-10) has forced the industry to take action to reduce launching risks substantially, if the projected growth of satellite communication technology is to be achieved over the next decade.

The primary impact of the catastrophic double satellite loss is on the cost of launches in the next few years, just when a relatively large number of launches is scheduled. The cost of launches will increase, in general, because the risk factor suddenly has increased again, causing launch insurance rates to rise dramatically. Even launches that do not use the technology involved in the two failures will experience insurance cost increases because of the general nervousness of the world insurance community. The secondary effects on the industry are the temporary shortage of in-orbit transponders and delays in future launches until the failure mode is understood and solved.

The increase in insurance costs will adversely affect new companies that plan satellite launches in the 1986-'87 time frame and now are seeking funding, while the launch delays will affect existing satellite communication companies expecting to launch new satellites in the near future that use the technology in question. These companies' customers also are af-

fectured as they must anticipate delays in service commencement dates. On the other hand, companies not using the affected launching technology will realize a competitive gain, because they will have satellites in orbit with months of advantage over their competitors. Also, the competition between launch vehicles will be enhanced as new companies in the launching game scramble to take maximum advantage of the situation.

For example, Arianespace, the new European launching entity, is expected to realize tremendous gains from the shuttle's double loss over the next few years. Because the shuttle's orbit around the earth is a low altitude orbit, a rocket motor is required on all satellites launched via the shuttle to boost the satellite from the low circular earth orbit to the elongated elliptical orbit required to insert the satellite into geostationary earth orbit, at an altitude of 22,300 miles. Shuttle launches are 3-stage procedures: initial launch into earth orbit, secondary boost into elliptical transfer orbit and final insertion into geostationary orbit. Conventional rocket launches, such as Ariane, involve only two steps, with the initial launch achieving the elliptical transfer orbit. The Ariane rocket has the additional advantage that it is capable of carrying two satellites of the typical domestic type at a time, significantly reducing the per-satellite launch cost compared to single-satellite launchers.

Anatomy of failure

When Satcom 3 was lost in December 1979, the apparent cause of failure was the malfunctioning, and possibly explosion, of the apogee rocket motor fired to insert the satellite into geostationary orbit. Whether this was caused by operator error on the ground or rocket failure has never been clearly established. The failure mode in the recent double satellite loss has been pinpointed relatively clearly, however, because of identical failures on two consecutive launches, which removes the possibility of random failures.

The booster rockets, called Payload Assist Modules (PAMs) were manu-

factured from the same materials batch, and it seems that the problem centers on imperfections in the material used for the PAM exit cones, which guide the rocket's thrust. The material, a so-called 2-dimensional carbon material (called carbon-carbon), apparently disintegrated, causing the rocket thrust to be reduced significantly. The carbon-carbon material originally was selected for its weight and heat resistant properties and for cost-effectiveness. The dramatic failure of the material to do its job, resulting in the loss of two satellites (with expected insurance claims of \$175 million) displayed for all to see that the satellite communication industry had some house cleaning to do.

NASA has a significant interest in the matter also, because a faulty PAM stage means no shuttle launches until the problem is cleared up. Also, NASA has found similar failure mode effects in the nozzles of solid rocket boosters recovered from the STS-8 mission last year.

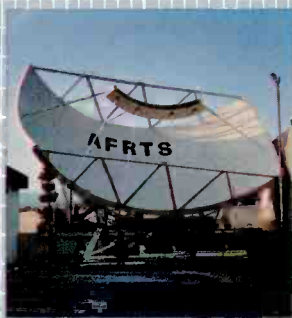
The manufacturer of the faulty PAMs, McDonnell Douglas, has formed a senior review committee to investigate the problem, and is working closely with satellite manufacturers requiring PAMs. The general industry consensus is that the process of manufacturing the carbon-carbon material must be much more closely monitored to ensure that the exact properties required are met from batch to batch. Some properties are less predictable than others, requiring a much tighter quality control procedure than has been used in the past.

Rocket manufacturing techniques must, in all aspects, be brought up to the high quality procedures employed by the satellite industry for the communication payload. Perhaps the PAM catastrophe will, in the long run, result in a much higher confidence factor for the rocket boosters, which play such a critical role in any satellite launch.

Launching options

The first real alternative to a NASA launch is the Ariane rocket, manufac-

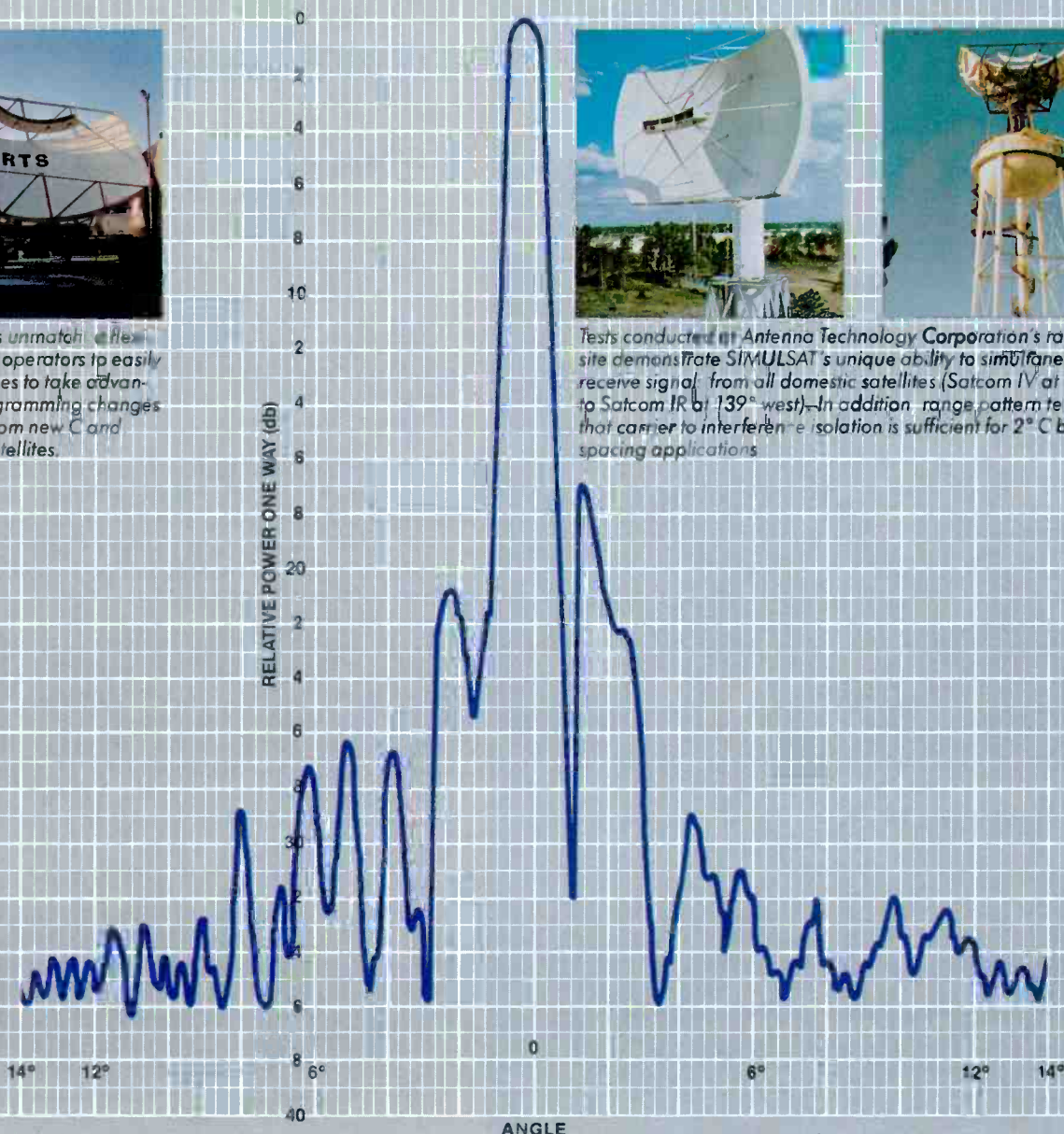
Continued on page 165



SIMULSAT's unmatched flexibility allows operators to easily add feed lines to take advantage of programming changes or signals from new C and KU band satellites.



Tests conducted at Antenna Technology Corporation's range site demonstrate SIMULSAT's unique ability to simultaneously receive signal from all domestic satellites (Satcom IV at 83° west to Satcom IR at 139° west). In addition, range pattern tests show that carrier-to-interference isolation is sufficient for 2° C band spacing applications.



SIMULSAT: Range-tested and job-proven quality and flexibility

Independently monitored far range tests prove that SIMULSAT can see all domestic satellites simultaneously with the consistent broadcast quality of a conventional parabolic antenna capable of viewing only one satellite. In fact, SIMULSAT quality is a reality now, and it will continue to be a reality even with the FCC ruling allowing satellites to be positioned at 2° orbital increments.

SIMULSAT OPERATIONAL AT 2° SATELLITE SPACING.

While many earth station operators are concerned about the FCC's 2° orbital allocation, most C band spacings will occur at 2.5°, 3° and 4°, with the majority at 3° and 4°. In addition, signals will be transmitted on two separate bands: the C band (3.7GHz to 4.2GHz) and the new KU band (11.7GHz to 12.2GHz). This means that C band and KU band satellites will be interwoven

throughout the orbital arc. As a result, the incidence of satellites spaced at 2° transmitting on the same band will be substantially reduced.

Flexibility Key to SIMULSAT superiority.

SIMULSAT's unique one-antenna concept combines high performance and unmatched flexibility. That means you'll save money on real estate now (one foundation, one installation, one site), plus you'll save even more as C band "and" KU band satellites are added or programming is changed. You can easily add a feed to SIMULSAT in minutes to take advantage of extra profit-opportunities.

SIMULSAT's unequalled advantages have been demonstrated repeatedly on our test range and on the job. We welcome the opportunity to prove SIMULSAT's capabilities to you with test data and user testimonials.



Please send me additional technical data and benefits on SIMULSAT 3, 5 & 7 meter equivalent earth stations and their two-year warranty.

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BE6/84

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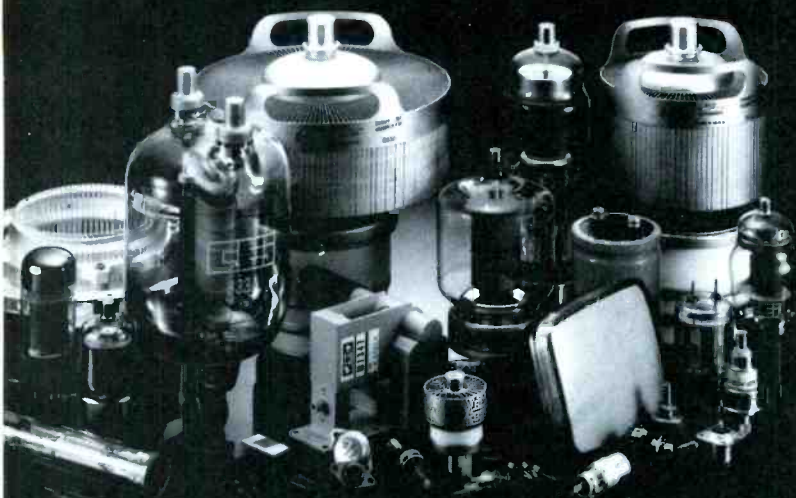
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news

Mutual, Texaco, Metropolitan Opera to launch opera series

The Mutual Broadcasting System has entered into an agreement with the Metropolitan Opera and Texaco to expand the stereo coverage of the MET's Saturday afternoon radio series via Mutual's fine arts satellite distribution system. The system incorporates 150 radio stations.

Under the agreement, Mutual will broadcast 20 consecutive Saturday afternoon programs of the Metropolitan Opera, beginning Dec. 1, 1984, as the MET enters its 101st season.

17 PBS stations to fund klystron project

A 3-year, \$1 million project to develop a new power- and cost-saving klystron amplifier is under way, funded by 17 public TV stations through PBS, NAB, NASA and Varian Associates. The Corporation for Public Broadcast funded a "shortfall" needed to complete the public TV stations' contribution.

When available, the new klystron tube will provide significant savings to UHF stations by dramatically reducing power consumption. Currently, UHF stations incur higher power costs than do VHF stations because they use more power—both to offset the UHF reception handicap and because current UHF transmitter klystron power amplifiers are relatively inefficient. Varian Associates will develop the klystron power amplifier from a NASA prototype. The project, now in the first stage, is expected to be completed by 1987.

Broadcast satellites to target special TV interests

Almost 48 million North Americans will be tuning in to TV programs broadcast directly from satellites by 1994, according to a new study from Frost & Sullivan.

According to "Direct Broadcast Satellite Market," these DBS channels will offer viewers an alternative to "lowest common denominator" programming by creating shows that appeal to special interests, such as cooking, opera and sporting events. Pay-per-view (PPV) programming will be offered extensively on DBS.

The long-term business potential of DBS is seen as great: By 1994, revenues from satellite transponder rentals will reach \$764 million, programming fees will reach \$2.8 billion, and equipment sales will amount to more than \$3 billion.

The DBS market is not without risk, however, particularly for operators who launch high power satellites early in the game. Many industry observers indicate that high power satellites, which have fewer transponders to lease, could be priced out of the market by later operators offering more transponders at medium power.

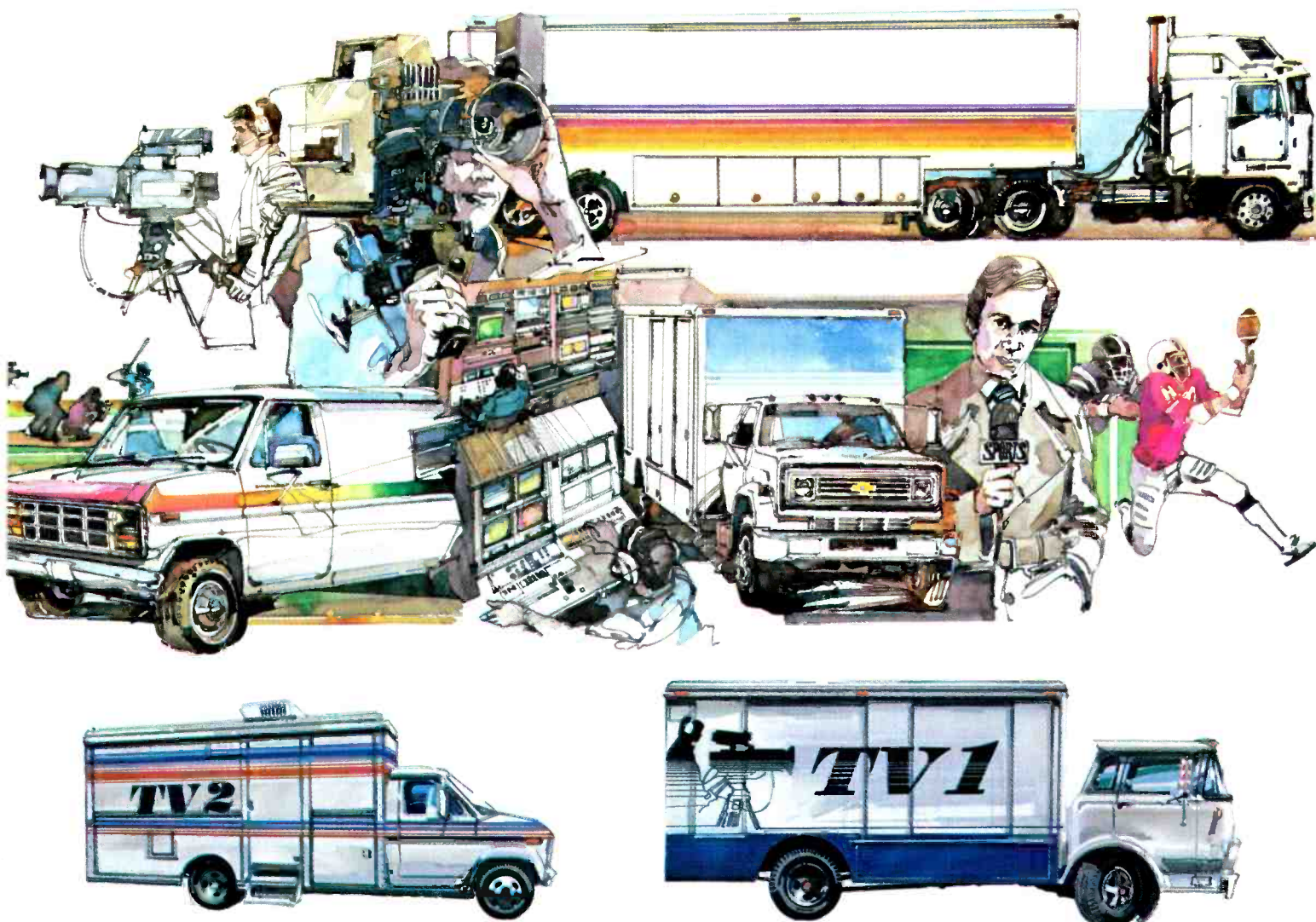
Specialized business programming will be a unique feature of DBS. These programs are expected to serve a purpose similar to that of trade periodicals and professional journals. Also, DBS is expected to offer such innovative video and audio services as stereo sound, dual-language soundtracks and HDTV.

Although DBS still is in an experimental stage, it is well on its way to becoming a reality in North America. In the United States, eight DBS applications have been granted, with United Satellite Communications and the Private Satellite Network already in operation. In Canada, broadcasters have used satellites since 1973 to extend geographic coverage of their programming. Mexico has a DBS system in the planning stage.

According to Frost & Sullivan, an important element in

Continued on page 166

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National Association of Broadcasters

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202-293-3570

Convention committee holds initial meeting

The Radio Convention Committee recently met in Chicago to discuss the overall plan for the Radio Convention and Programming Conference to be held Sept. 16-19 at Los Angeles' Bonaventure Hotel. The conference will combine the best features of NAB's Radio Programming Conference and NRBA's annual Radio Convention.

Edward O. Fritts, NAB president, told the committee, "The spirit of cooperation between the two associations has been going on for some time as staff members of both organizations have been meeting frequently to frame the new convention." Bernard Mann, NRBA president, said, "This is an opportunity for the two associations to share their energies and knowledge and to do something good and unique for our industry."

FCC urged to adopt paging system proposal

The NAB supports an FCC proposal to authorize TV stations to provide paging and a variety of data transmission services in the TV signal vertical blanking interval.

It said the proposal echoes an NAB petition of last July urging the agency to expand its definition of authorized teletext services to include paging, video games, computer routines and other "interactive" services. It said the decision to use these services should be left to the marketplace.

In its filing, NAB said the services should not be subjected to common carrier regulation. NAB also asked the agency to prohibit cable systems from stripping the new offerings from their "must carry" signals, at least where the services are related to main channel programming.

Fritts hails subcarrier decision

Edward O. Fritts, NAB president, recently applauded the FCC's decision to remove non-federal barriers to FM subcarrier use. "Pre-emption of restrictive state common carrier regulation—especially entry regulation—is a very important step toward the fulfillment of the FCC's policy of maximizing FM subcarrier use," Fritts said.

The FCC, acting on a petition for reconsideration filed by NAB, decided to pre-empt state and local laws which had acted to prohibit or inhibit broadcasters' entry into radio paging and other common carrier-like enterprises.



Society of Broadcast Engineers
P.O. Box 50844
Indianapolis, IN 46250
317-842-0836

SBE releases coordinator list

The SBE National Frequency Coordinating Committee has released an updated list of contact persons in 71 locations across the United States. The list includes several additions and changes to previously published coordinator lists. Any user of radio or TV remote transmitting

equipment is requested to check with the designated frequency coordination contact person before using RF equipment in the areas affected.

These local coordinators do not assign channels. They instead make possible the licensee-to-licensee contact asked for in Part 74.24 of the FCC Rules. A copy of the new frequency coordinator list is available from the SBE.

SMPTE

Society of Motion Picture & Television Engineers

862 Scarsdale Ave.
Scarsdale, NY 10583
914-472-6606

Working Group tentatively agrees on format

The SMPTE 1/4-inch Working Group, comprised of technical experts concerned with the use and manufacture of cassette-based ENG recording equipment, has tentatively agreed on a compromise draft standard format. This format provides 20-minute recordings on a single cassette. The cassette uses oxide tapes currently being sampled. The agreement requires that members of the group be satisfied that the format-related requirements of the User's Report have been met. It is expected that an additional period of time will be necessary to finalize the format. In the interim, the group continues to be receptive to alternate format considerations.



National Radio
Broadcasters' Association
2033 M St., NW, Suite 506
Washington, DC 20036
202-466-2030

Virginia station cited for life-saving efforts

A Virginia Beach, VA, radio station, WVAB-AM, has been awarded the NRBA Certificate of Merit—for virtually saving a child's life. NRBA's Certificate of Merit is presented monthly to radio broadcasters who have contributed significantly to their communities.

Two hours after hearing of the plight of Erika Helen Wood, a 3-year-old Norfolk, VA, girl with a rare form of cancer requiring expensive treatment, WVAB's management pre-empted its regular music programming and devoted its airwaves to a day-long appeal for donations—to pay for Erika's \$10,000 admission to the Sloan Kettering Institute in New York. Timing was critical because of a 3-day deadline to raise the required funds.

Radio information hot line to aid broadcasters

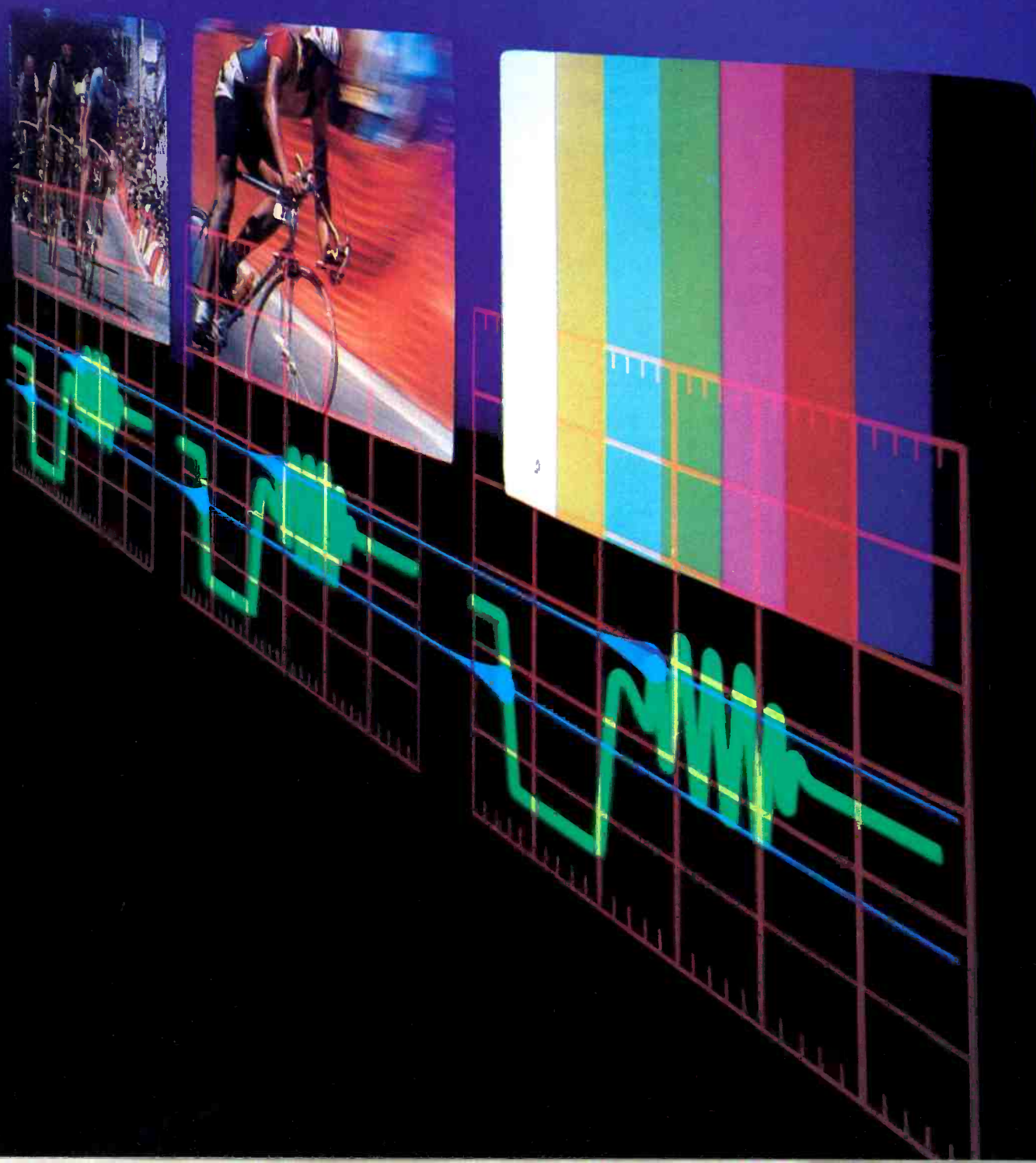
NRBA has recently established the Radio Information Line, a special phone number for writers, researchers and industry members to call direct for answers to their radio questions. The number is 202-466-5540.

"We receive requests for information on a daily basis, ranging from questions about AM stereo to what's the most unusual radio programming in the country," said Jane Rulon, NRBA's director, member services.

The Radio Information Line is open from 9 a.m. to 5 p.m. (EST) Monday through Friday.

[: 7 :)]]]]

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Tek's new waveform/vector monitor saves space, power consumption and cost. Both dc power and battery pack options are available. It's ideal for mobile vans and field applications.

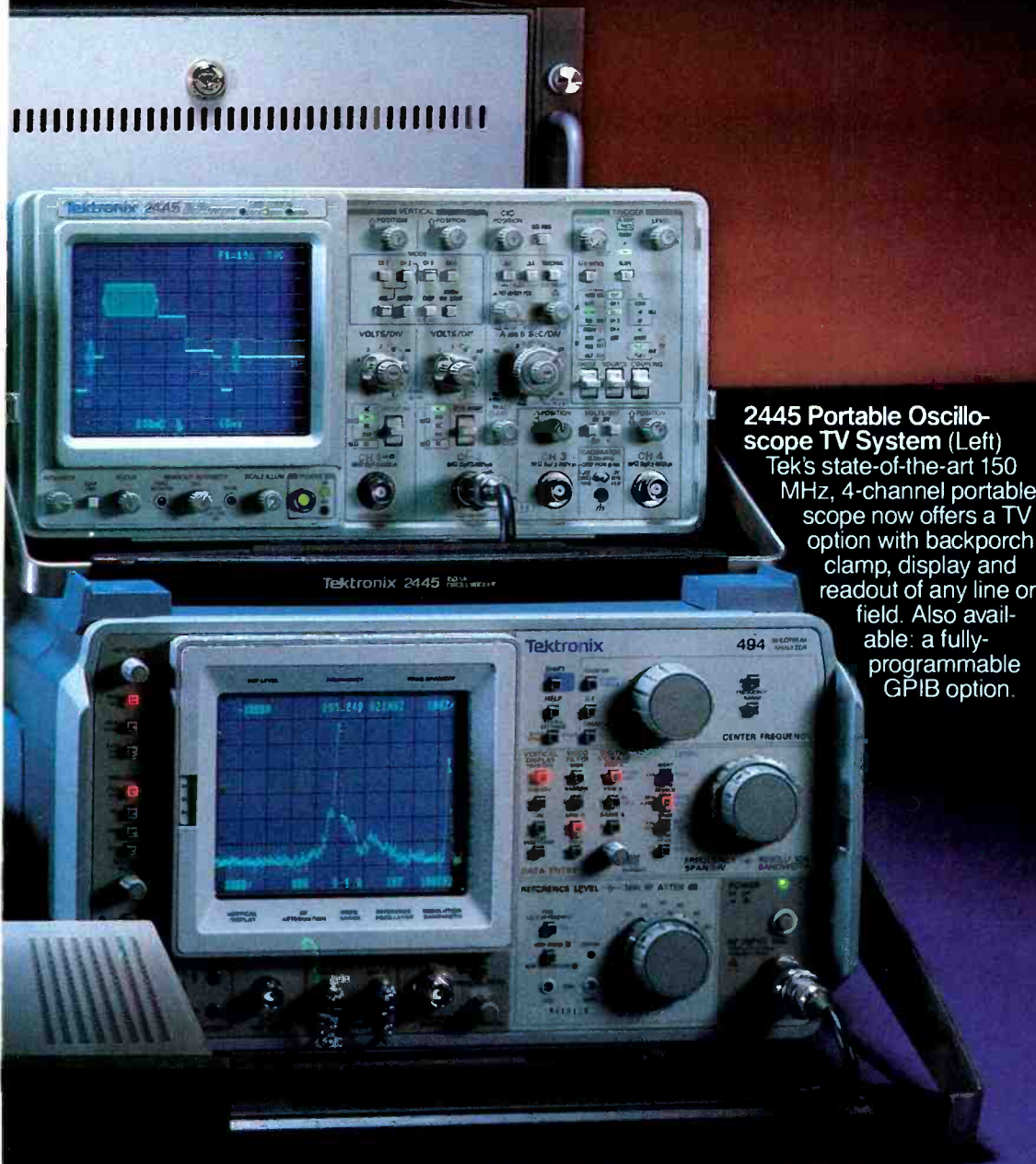


(Above) Now joined by Tek's new 118-AS Audio Synchronizer that eliminates lip sync problems! It provides a practical solution to the audio-to-video delay caused by four-field memory video synchronizers. The 118-AS features wide dynamic range, low distortion and automatic and manual delay correction.

(Top center) Tek's Answer System permits continuous, unattended monitoring of all your incoming and outgoing video feeds. It generates complete reports automatically, alerts you when measurements exceed specified limits, and can be programmed to meet your changing needs.

Tek's newest product for television:—new measurement capabilities detailed on the following page. Take a look!

PICTURE OF YOUR SIGNAL WITH TEKTRONIX!



Behind the sets, the programming, the glamor of television, success still depends on signal quality.

2445 Portable Oscilloscope TV System (Left)
Tek's state-of-the-art 150 MHz, 4-channel portable scope now offers a TV option with backporch clamp, display and readout of any line or field. Also available: a fully-programmable GPIB option.

No one gives you better tools for measuring and maintaining video signal quality—quickly, consistently, confidently—than Tektronix.

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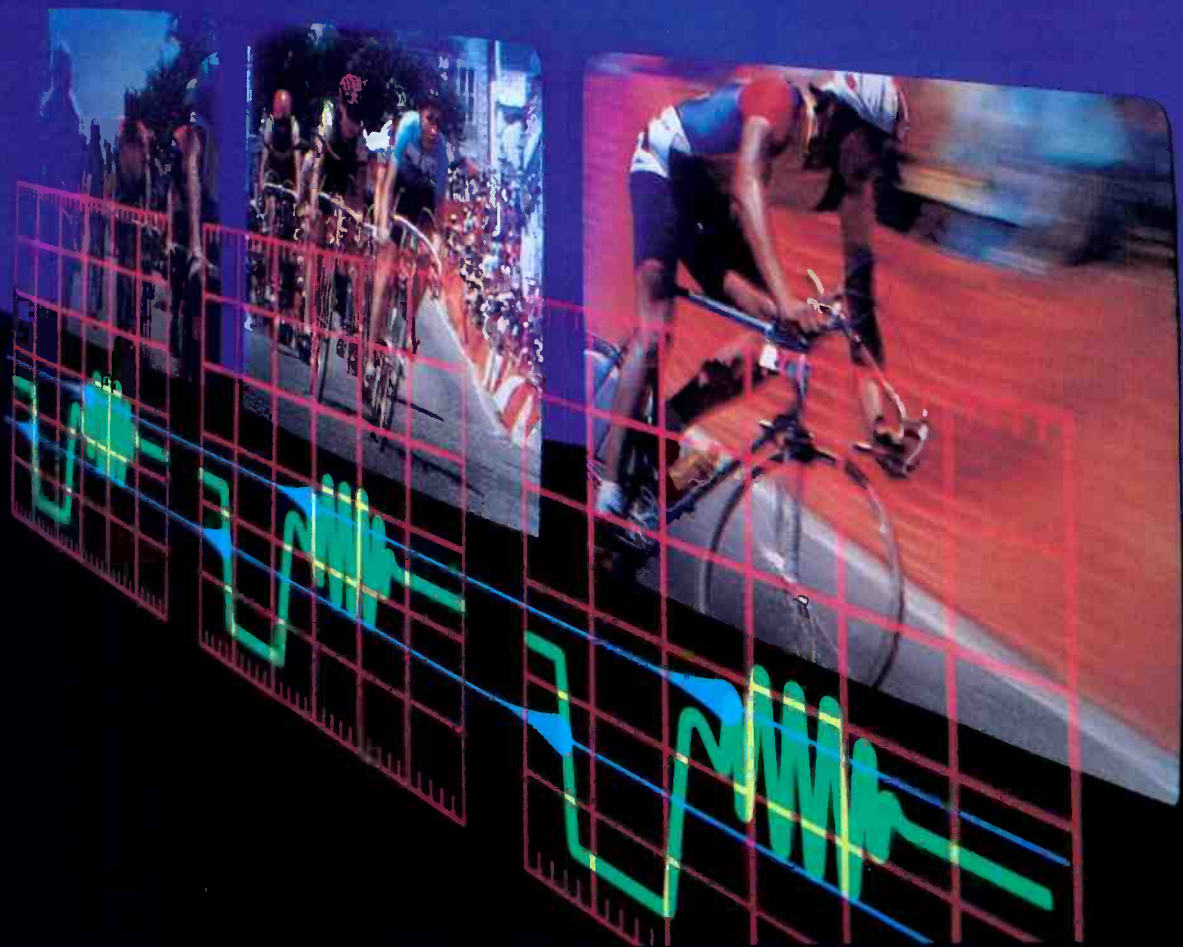
Tek instruments give you broad test and measurement capabilities. They are accurate, easy to operate, and compatible with other broadcast equipment. Above all, Tektronix television products continue to meet the broadcast industry's needs. Take it from us: no one watches television closer than Tektronix.

494/494P Spectrum Analyzer (Above) An unprecedented value! Counter frequency accuracy, baseband through microwave coverage and unique HELP mode to guide

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Our new 1750 signal monitor gives you a unique, dynamic display of SCH phase relationships.

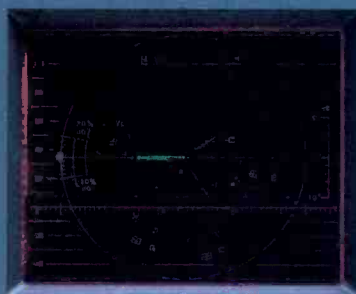
You can see at a glance if a video signal is properly SCH phased... or just as easily, compare two signals for color frame matching.

Hit-or-miss SCH phasing may have been tolerated in the past—but now it's costing you time and money every day.

The Tektronix 1750 can help you regain control. By maintaining consistent SCH phase... or by seeing potential problems *before* a glitch occurs, you'll avoid the frustration of multiple passes and enjoy getting it right the first time. Saving time saves you money and makes the best use of your valuable resources.

SCH phase, of course, isn't the only parameter you need to keep on track, and SCH display is only part of the 1750's comprehensive signal monitoring capabilities. At the push of a button it also displays vector mode... or waveform mode, enhanced by digital line selection through the vertical interval... or R-Y/sweep mode for easy interpretation of differential phase distortions.

Whether used for monitoring video in production and editing



Correct SCH phase relationship is clearly displayed on the 1750 when dot on the calibration circle is aligned with the vector on the -x axis.



Dot placement on the +x axis indicates an error in the color frame matching of two signals.



This 17-degree offset, indicating a 17-degree SCH timing error, would be impossible to perceive on an ordinary waveform monitor display.

environments, or for making fast and accurate measurements during equipment maintenance, the 1750 Series is a new benchmark for comprehensive performance in both NTSC (1750) and PAL (1751) standards.

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New equipment at NAB-'84/Las Vegas

By Carl Bentz, television editor

This Issue of **BE** maintains its traditional roundup of new products at the NAB show. However, because of the late date of this year's convention, we had to produce this issue *before* the convention started. To do that, **BE** mailed special forms to all exhibitors to request data needed for this edition.

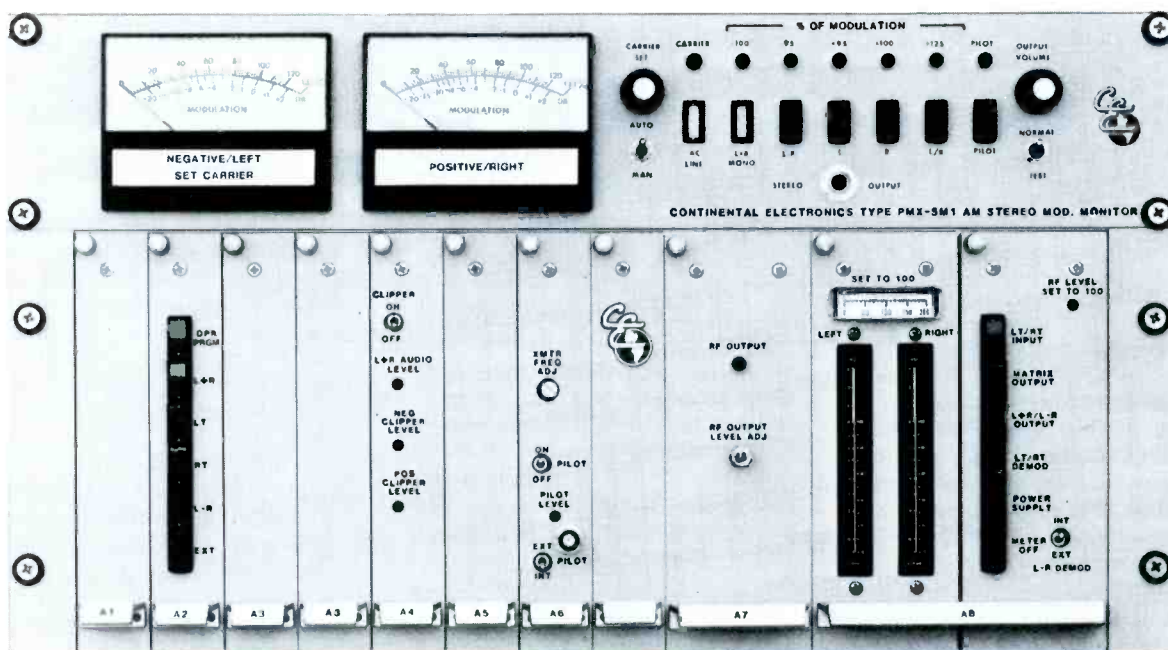
Returns from this mailing are reported here. Departing from tradition, we have elected to report the show in sections—*Television* and *Radio*—according to the layout of the convention floor. Initially, exhibitors could choose the section in which they wished to exhibit. However, late exhibitors had no such choice. Consequently, the organization at the show (according to the broadcast market being served) is not infallible. So, if you do not find a company in the section anticipated, check the other section.

Some exhibitors did not respond to our call for new product data. Others may not have received forms because they were late exhibitors and were not on the NAB listings. Furthermore, many companies may have held off revealing all of their new products. Much of this information will be found as **BE** continues this new product report in our July issue. Also in July, we will cover the engineering sessions at the show and report on major addresses delivered.

YOU'VE
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WHAT IT
TAKES



Your winning combination for AM Stereo



Is AM Stereo ready to move up?

Market-place decisions notwithstanding, the recent introduction of receivers able to decode signals from any of the four systems in use today makes it easier for broadcasters to move ahead with AM Stereo plans.

Which system is #1?

The PMX (Magnavox) System was first selected by the FCC to be the Industry Standard for AM Stereo.

We established the system's viability during the 1979 NAB Show.

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Our Type 302A Exciter, developed for the PMX System, and our new Type PMX-SM1 AM Stereo Modulation Monitor give you a superior package for AM Stereo broadcasting.

We've built a world-wide reputation for high-quality AM transmitters that offer unmatched

on-air reliability with complete transparency.

Ultimately, the day-to-day operation of your AM Stereo System will depend upon equipment and service.

We stand on our track record of providing the best of both.

If you're considering AM Stereo, or if you just want more facts, give us a call. You can't lose.

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Radio exhibitors

ANT TELECOMMUNICATIONS LTD.

Model 232: Telcom c4 noise reduction equipment designed for operation with Type C VTRs, packaged in a 19-inch rack panel; switching remotely controlled to follow VTR record/play functions.

Model 122: Two-channel Telcom c4 noise reduction for broadcasting and mastering studios where playback is primary function, includes transformer-balanced input/output and optional recording encoder.

Model 112S: Two-channel c4 system in rack-mount configuration for satellite audio applications, designed with electronically balanced input/output connections and 1:2.5 slopes, instead of usual 1:1.5.

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ATI/AUDIO TECHNOLOGIES INC.

DA416/DA208: Low cost quad and dual 1x4 audio distribution amplifier systems.

DA10000: Modular distribution amplifier system, providing 10 1x6 modules in 5¼-inch rack with dual redundant power supplies, interchangeable DA modules, active- or transformer-balanced outputs and metering/compressor options.

VU1000: Audio metering and monitoring system with LED 3-color bargraph display offering VU, average and PPM ballistics; eight balanced inputs selected by touch switch; input selected shown by 7-segment device.

P100: Encore series turntable amplifier offering R and C cartridge loading adjustment, subsonic warp filter and 80dB unweighted S/N rating, in mono and stereo versions.

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AVC SYSTEMS

Studio furnishings: Custom-built architectural-grade furnishings in wood or plastic laminated finishes.

Audio consoles: Harrison PRO-7 and AIR-7.

Digital audio: dbx - 700 processor.

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ALLIED BROADCAST EQUIPMENT

Telemix IX: Gentner's 15-line microprocessor-based telephone system for improved telephone audio on talk shows or other broadcast use.

On-Air lights: Architectural, strobe series, standard and Fidelipac on-air

lights for 115Vac and strobe or micro series units for dcV operation.

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ALPHA VIDEO & ELECTRONICS

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ALTRAN/McGRAW EDISON

Broadcast interface: Oscillator/modulator with uninterruptible power supply and modem to phase modulate AM carrier for low data-rate signaling; non-interfering with AM stereo programming.

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AMBER ELECTRO DESIGN

5500: Programmable audio measurement system for virtually every parameter of audio components and systems includes gain, response, noise, distortion, wow-and-flutter and cross-talk. Multiple control possibilities for 10-instrument setups include built-in spectrum analyzer.

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APHEX SYSTEMS LTD.

Compellor: Compressor, peak limiter and leveler uses constant sensing of signal characteristics to provide intelligent gain riding, increased loudness and undetectable compression.

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ATLAS TOWER

G60S: Specially designed 5-foot face TV tower, for installations from 800-to 1000-foot applications. Designed to keep 1000-foot tower costs below \$250,000.

International series: Radio and TV towers, designed to ship in 25% of normal cubic space, for heights to 1000 feet.

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ABG dubbing center: Complete,

self-contained system, equipped with turntable, record/play cart deck, noise reduction, digital timer and audio limiters.

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AUDI-CORD

TDS series: Twin-deck playback cart decks, featuring removable lower deck and a double-ended motor shaft from ac hysteresis synchronous motor to avoid problems of long shaft/capstan assemblies.

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AUDIO + DESIGN/CALREC

M series: Minimixer for applications requiring 8-16 inputs, two outputs and mono sum. Operational configurations include in-channel EQ, auxiliary sends, input sensitivity adjustment and pan controls, with optional limiter/compressor module.

Soundfield mic: Coincident stereo/Surround-Sound mic, offering versatility for even difficult situations. Four capsules, mounted in a tetrahedral array, drive low noise amplifiers, which provide balanced outputs through a common connector to supporting control electronics.

SCAMP processor: Four-band modular audio processing system may be tailored to particular situations.

TCR-1: Portable SMPTE/EBU time code reader includes output through which processed time code may be returned to the source; battery-operated.

Ambisonic mastering system: Four units used to enable multitrack studios to mix and release materials in Ambisonic Surround-Sound formats. Units include pan-rotate system; B Format converter; UHJ transcoder/encoder; and decoder.

Circle (261) on Reply Card

AUTOGRAM

MICROGRAM: Microprocessor-based audio console for manual, live-assist or full automation, with 64 stereo inputs, three stereo outputs and selectable mono outputs, plus time, stop watch and full logging.

Circle (262) on Reply Card

B & B SYSTEMS

AM-1: Monitor for stereo audio and time code signals with CRT, VU meter and LED peak metering of audio and CRT display of stereo audio and time code phase and/or gen-lock condition.

Circle (263) on Reply Card →

World's most accommodating camera.

You'd expect the Ikegami HK-322 to make beautiful, crisp, color-true pictures. It does. You'd also expect it to offer the latest in computer set-up convenience with its third generation microprocessor control plus comprehensive operational automatics and 8 scene files and 8 lens files. It does that too. But what you might not expect, is just how incredibly flexible the HK-322 is.

Consider that you can specify 30mm or 25mm Plumbicons,* and for each size select standard, Anti Comet Tail or diode gun operation. The same holds true for cabling. You choose from triax, multicore or, if you'd like, specify an HK-322 version that's compatible with your existing TV 81 cable. You also have a choice of optional camera control configurations.

There are also some unique features such as trim files that compensate for differences between the internal pattern projector and the external scene caused by chromatic aberrations in the lens.

Finally, compare its performance to any other camera. An honest resolution of 800 lines at center, a practically noiseless S/N ratio of up to -58 dB and a virtually unmeasurable .05% registration error over the entire raster.

Best of all, the HK-322 is ready right now to fit into your idea of an ideal studio/field camera. Without compromise, but with plenty of accommodation.

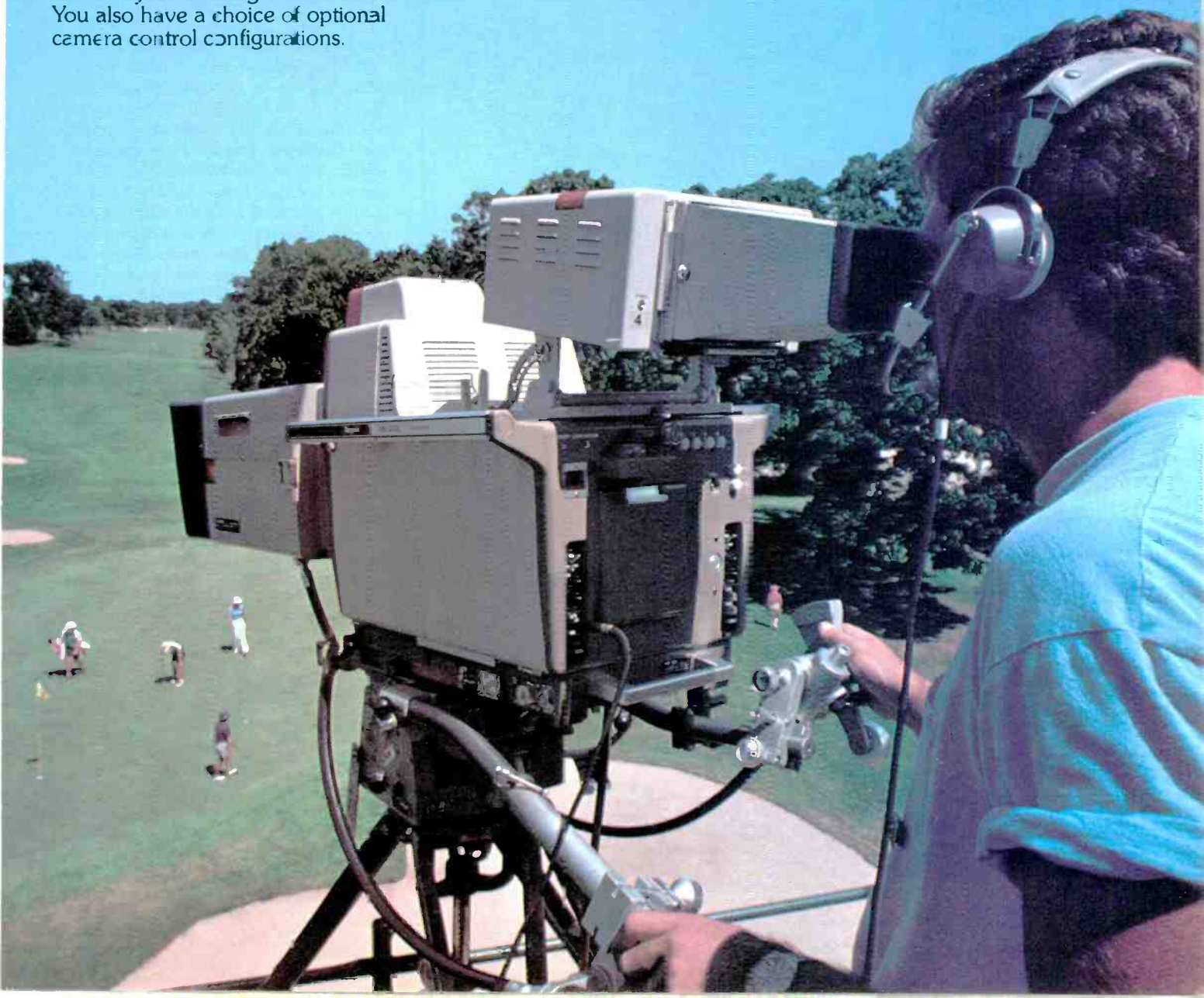
Contact Ikegami. See for yourself. Ikegami Electronics (USA) Inc. 37 Brook Avenue, Maywood, NJ 07607

*T.M. of N.V. Philips

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Midwest: (314) 878-6290
West Coast: (213) 534-0050
Southwest: (713) 445-0100
Southeast: (813) 884-2046

Ikegami HK-322

Circle (18) on Reply Card



BSM BROADCAST SYSTEMS

Series 5000: AFV routing switcher, based on 10x10 matrix, expandable to 150x150 by stacking mainframe. Additional time code or audio levels possible, controlled by computer from multiple stations.

Video DA: Each plug-in card contains dual 1x6 distribution circuits for any video requirement.

10x1 switcher: Series 200 video routing switcher, self-contained with optional remote-control panel, using TTL control logic.

Circle (264) on Reply Card

BARRETT ASSOCIATES

Davbar #DB-8: Space Saver broadcast automation system using eight modified TASCAM 234 cassette decks with random access capability for 6½-hour unattended operation. Add-on increase time to 24 hours.

Reconditioned equipment: Rebuilding services to factory specifications.

Circle (265) on Reply Card

BAYLY ENGINEERING LTD. (AEG-Telefunken)

S-3161C: 100W solid-state FM

transmitter including comprehensive metering, instantaneous frequency change, remote-control facilities and FCC/DOC approval.

CCS-100: Coaxial changeover system for switching any two or more transmitters, and associated antennas, while monitoring forward and reflected RF power and VSWR, as well as modulation. VOX activation includes delay control for legitimate pauses in program audio.

Circle (266) on Reply Card

BEYER DYNAMICS

MC-734: Vocal condenser mic with cardioid pattern, flat frequency response, 3-step filter and shock-mount pickup element.

MC-736: Short shotgun mic for outside newsgathering, featuring cardioid/lobe pickup and switchable low frequency filter.

MC-737: Long shotgun mic for newsgathering, with tailored low frequency response and high output signal level.

Circle (267) on Reply Card

See ad on page 79

BOONTON ELECTRONICS

82AD: AM/FM modulation meter, providing 2% accuracy to 300kHz FM deviation and for 10% to 90% modulation, automatically tuned and leveled, with IEEE-488 bus interface option.

92E: RF millivoltmeter covers frequency range from 10kHz-1.2GHz, voltage range of 200µV to 300V (with optional divider), true rms response.

1030 signal generator: Programmable RF generator uses wide baseband modulation for testing, paging and data FM subchannels; external modulation to 200kHz available; GPIB programming.

1100: Programmable AF oscillator with full talk, listen GPIB interface; covers 20Hz-50kHz, fixed 1V output, 10mV-8V variable output.

Circle (268) on Reply Card

BRETFORD MANUFACTURING

CA26-42 stand: Mobile equipment stand includes locking lower cabinet and allows adjustment of top shelf from 28- to 42-inch height.

Circle (269) on Reply Card

BROADCAST ELECTRONICS

5500B: Multideck cartridge machine in 5-deck design, featuring plug-in decks, Phase Lock IV head assembly for mono or stereo, with or without cue tones, and optional 5310 recording electronics.

5400: Audiotape cartridge machine.

4R50: Remote audio mixer.

AX-10: AM stereo exciter.

ALXANDER
If You and Your Equipment Depend on Battery Power...
**LET ALEXANDER HELP YOU
BE FAST**

Attach up to three 12-14.4 volt battery packs to the Alexander Triplex Charger. The Triplex will bring them all to full charge in less than two hours — automatically... without monitoring.

SMART, AND

With the Alexander Smart Sequential Charger you can charge up to six packs without buttons to push or lights to monitor. The consistent 2-amp charge means you'll get fresh packs with no worry about over-charging.

RELIABLE!

We're so proud of the reliability of our batteries that we urge our users to analyze them on a regular basis... with the TRI-ANALYZER. The Tri-Analyzer displays remaining capacity (in MAH) in a fully automatic operation that also dememorizes the cells.

ASK FOR THE NAME OF YOUR ALEXANDER BATTERY DISTRIBUTOR

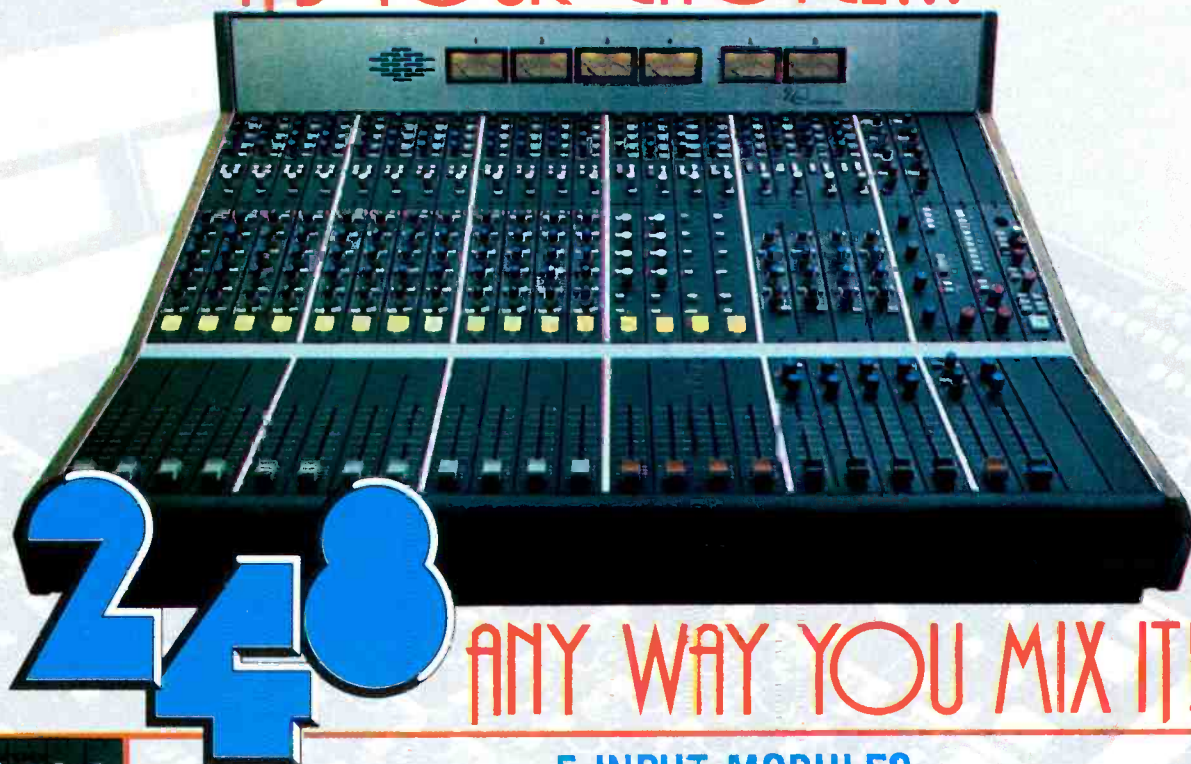


ALEXANDER

1511 S. Garfield Pl/Box 1645/Mason City, IA 50401
515-423-8955

Circle (146) on Reply Card

IT'S YOUR CHOICE...



ANY WAY YOU MIX IT!

Your choice of: **5 INPUT MODULES**

Mic/Line Equalized Mono Input — Transformerless, or Microphone Input Transformer; 4 to 1 Stereo Mix, or 1 of 4 Stereo Select Line Input, and a 4 Input Mic Mixer (not shown).

8 CHANNEL ASSIGNMENT MODULES

2 Channel, Mono or Stereo Source; Stereo PGM/AUD Channels, 4 Channel, Mono or Stereo Source, and 8 Channel Mono or Stereo Source. These Modules can also be used for re-assignment of Sub-master Outputs.

9 FADER MODULES

VCA Mono Fader, VCA Stereo Fader, VCA Dual Group Master Fader, Top Position Mono or Stereo Faders, Mono or Stereo Faders, and Mono or Stereo Faders with Start-Stop Switch.

7 OUTPUT GROUP MODULES

Echo Fader with Mono Output, Mono Output, Stereo Output, Cue/Reverb Output and Output Equalizer, 4 Channel Program/Tape Monitor Mixer, and 4 Channel Bus/Film Composite Mixer.

Whatever your need or application — Film, Recording, Live Sound, Fixed Installation, Broadcast Production or Post Production, the **248 Component Series** from **QUAD EIGHT/WESTREX** can be configured to suit your exact requirements.



Circle (19) on Reply Card

quad eight/ Westrex

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11929 Vose Street, North Hollywood, CA 91605 U.S.A.
Telephone: 818-764-1516 Telex: 662446

QUAD EIGHT/WESTREX LTD.

Unit 1, Fairway Drive, Greenford, MIDDX UB6 8PW U.K.
Telephone: (01) 578-0957 Telex: 923003

COMREX[®]

2X

2X + 2 = PROGRAM LINE



With two dial telephone lines and the Comrex 2X, you can have a beautiful, quiet 5 KHz broadcast channel, instantly, easily and wherever you want.

For more information, call or write
P.O. Box 269, 60 Union Ave., Sudbury, MA 01776 617-443-8811

Circle (20) on Reply Card

Sign on with NEC UHF Transmitters.

NEC is the world leader in UHF-TV transmitter technology. Reason enough to sign on with NEC...but not the only reason.

Other reasons include more than 55 years of proven reliability. Excellent color performance. High efficiency klystron power amplifiers for low power consumption. Not to mention ready availability, competitive pricing and unsurpassed service capabilities.

To sign on with NEC UHF-TV Transmitters, call 1-800-323-6656. You'll get a commitment to performance that begins with our bid.

NEC

IMAGINE WHAT WE'LL DO NEXT.

NEC America, Inc.
Broadcast Equipment Division
130 Martin Lane
Elk Grove Village, Illinois 60007
In Illinois: (312) 640-3792

Circle (21) on Reply Card

Broadcast Electronics Continued

91: Microprocessor video diagnostics system for FM transmitters.

Circle (270) on Reply Card

BROADCAST SUPPLY WEST

ProRax: All wood table or wall cartridge racks (#100) or carousel cart racks (C80 and C120).

ProBase: Turntable base for SP15, SP25 or SP10MkIIA units.

ProAmp PP220: Stereo phono preamplifier.

ProTech tonearms.

Circle (271) on Reply Card

BRÜEL & KJÆR INSTRUMENTS

4000 series: Studio microphones providing line-level outputs, follow precision design of B&K instrumentation equipment.

Circle (272) on Reply Card

BRYSTON LTD.

2B-LP: 50W audio amplifier for two 8Ω loads requires only one rack unit of space, with THD/IMD less than 0.01% and noise at 95dB below full output.

Circle (273) on Reply Card

CRL AUDIO

56800: Stereo generator for FM transmission.

Circle (274) on Reply Card

See ad on page 37

CSP

PR-250: Power reduction unit for daytime AM stations.

Circle (275) on Reply Card

CAPITOL MAGNETIC PRODUCTS

Audiopak AA-4: Audio cartridge loaded with SGS-4 broadcast mastering tape, for insignificant degradation of the original material, with improved life and sound, less maintenance.

Circle (276) on Reply Card

DWIGHT CAVENDISH LTD.

TD-05: Modular design videocassette duplicating system accommodating up to 50 VCRs of mixed formats in slave racks, with all routing, switching, video and audio DAs, remote machine control and quality control system.

TDII-20: Larger videocassette duplicator system with capabilities of 50 or more VCRs of various formats.

Circle (277) on Reply Card

Centro does it all...

**your best "turnkey" source for
video editing, production and broadcast
facilities...fixed or mobile.**



A 35,000-square-foot plant . . . a staff of electronic engineers that know all the complex aspects of systems technology . . . a fully integrated architectural, design, construction and installation team . . . a demonstrated history of providing clients with telecommunications systems . . . and advancing the state of the art . . . that's what we're all about.

Centro "softens" the impact of high technology by designing and providing the comfort and special needs that make the difference for your operational staff.

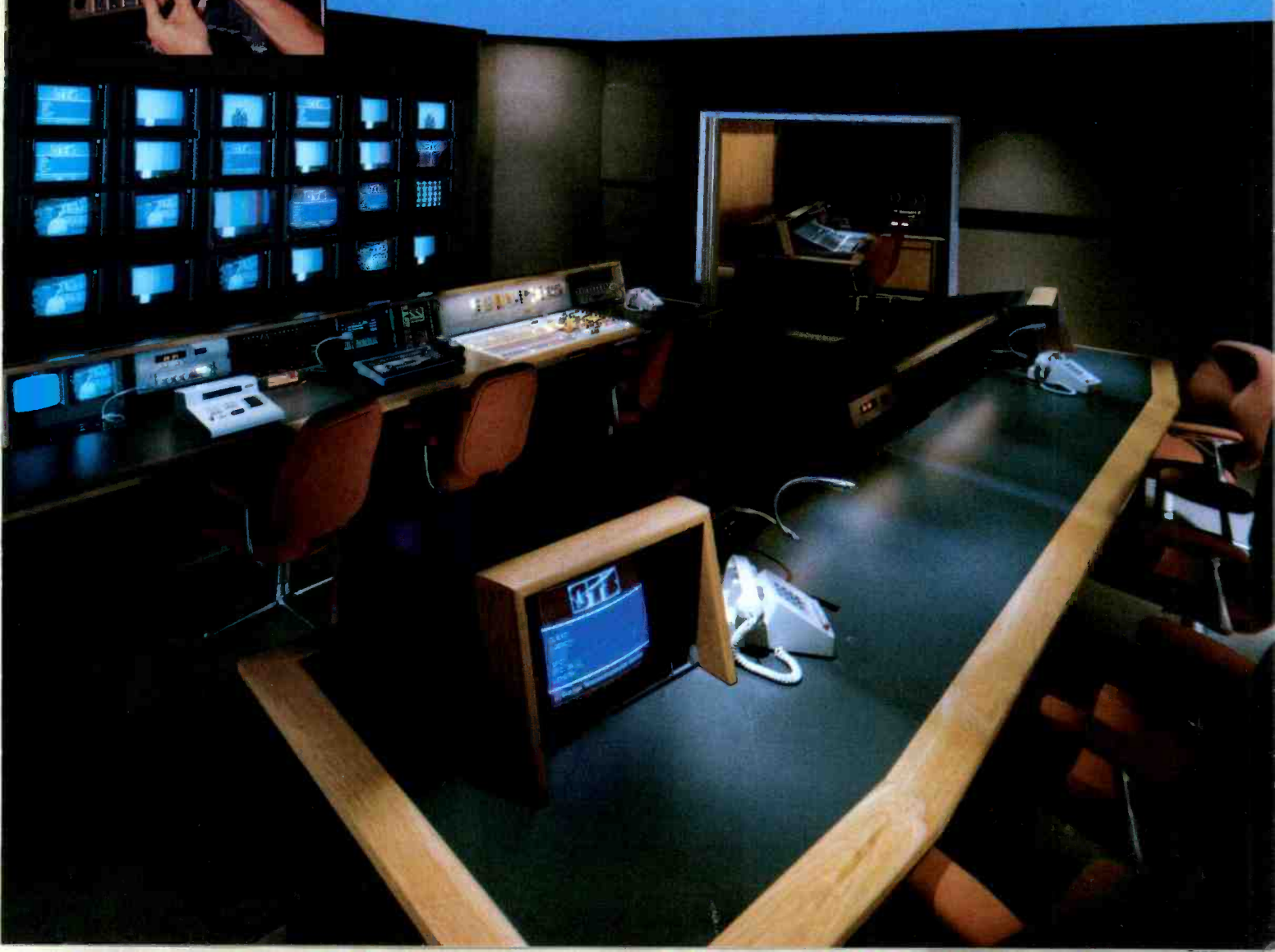
We can deliver you a system that integrates today's highly sophisticated equipment into a productive and profitable telecommunications tool.

Call or write today:

Centro Corporation
9516 Chesapeake Drive
San Diego, California 92123
Telephone: (619) 560-1578
TWX: 910-335-1734 CENTRO SDG

 **Centro**

a subsidiary of SKAGGS TELECOMMUNICATIONS SERVICE
Circle (22) on Reply Card



CHANNELMATIC

Broadcaster I: Automatic 15-videocassette changer system, random-access capability for U Format, unmodified Sony Type 5 VCR players.

Patchmaster: Routing switcher system, 10x1, stackable for input and output expansion; with local/remote push-button, time clock or computer control, with interface to decimal, RS-232 or parallel BCD control formats.

UAA-6A: Universal audio amplifier, six separate transformerless units in 1 1/4-inch rack panel.

Handimod I: Plug-in accessory for Type 5 VCRs, allowing inexpensive sync-lock, vertical interval switching and audio output adjustments.

Circle (278) on Reply Card

COMPUTER CONCEPTS

Co-op copy management: Allows multiple co-op orders with separate invoicing, copy rotation plays, special dealer billing and other utilities, for adding to current computer systems, integral to all new systems.

Micro-Bridge 80: Allows users of Wang hardware to run programs written for personal computers on existing equipment.

Sales graphics presentations: Graphs for presentations of CRT and

printed displays of sales performance vs. goal and other sales information.

Circle (279) on Reply Card

COMTECH ANTENNA

OFFSAT antenna: One-piece, offset feed-mount system attaches to R/T earth station antenna for E1/Az, polar and transportable versions. Reflector (5.5m) in plane of orbital arc stands eight feet tall and exceeds C-Band and Ku-Band 2° spacing specifications.

Circle (280) on Reply Card

See ad on page 105

CONNECTRONICS

Seck Producer B: Production mixing system.

XLR connectors: Low cost line of audio connectors.

Studiflex 16: Multipair cable for broadcast and production studio use.

Circle (281) on Reply Card

CREATIVE TRADE

(CTAB)/MILAB

VIP-50 microphone: Condenser design with rectangular capsule, variable patterns, transformerless and switchable between mic/line level with an SPL capability of 145dB, even at low frequencies.

Circle (282) on Reply Card

CROWN INT'L.

12SP microphone: Studio-quality unit for recording, sound reinforcement, broadcast and ENG, phantom-powered, transformer-balanced, low Z output and hemispherical pickup pattern.

PZM mics: Pressure zone mics for semipro and sound reinforcement needs.

Circle (283) on Reply Card

dbx

Demonstrations: Multichannel TV sound, including stereo audio and second audio program.

ICs: Integrated circuitry for multichannel sound equipment.

700: Digital audio processor based on companded predictive delta modulation (CPDM) technology. Products include 710 2-channel mic preamp module, 700P playback-only digital processor and D700 disc-mastering delay unit.

Circle (284) on Reply Card

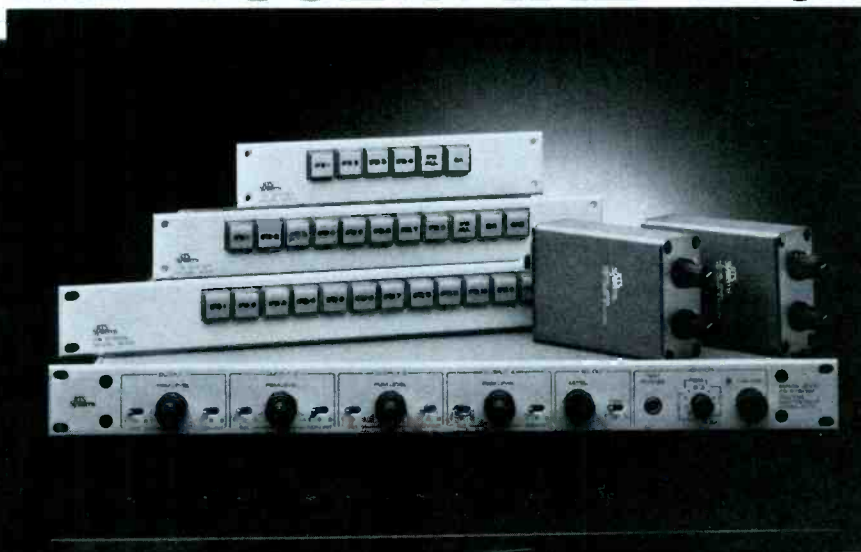
DELTA ELECTRONICS

ASE-1/ASM-1: AM stereo exciter and modulation meter equipment for the C-QUAM Motorola transmission format.

RCS-IV remote control: digitally

Between you and on-air talent:

THE ESSENTIAL INGREDIENT



News, sports, and other "live" broadcasts require accurate, dependable communication between production staff and the talent on-air. That's where our Series 4000 IFB "program-interrupt" system comes in, crisp and clear. With a modular format for easy custom configuration and expansion, our 'total-system' approach meets the most demanding and complex broadcast situations. We set the standard for IFB systems. Call or write RTS for detailed information.

RTS SYSTEMS, INC. • PROFESSIONAL INTERCOMMUNICATIONS • PROFESSIONAL AUDIO PRODUCTS
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RTS
systems
A COMPACT VIDEO COMPANY

Circle (17) on Reply Card

MASTERING THE MIND'S EYE

BROADCAST PLUS

U-MATIC VIDEOCASSETTES

AGFA BP — the promise...delivered.

**AGFA
VIDEO**

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275 NORTH STREET, TETERBORO, N.J. 07608 (201) 288-4100

Circle (23) on Reply Card



SAW devices with mass appeal.

Now you can enjoy all the benefits of acoustic wave technology at the lowest possible price, thanks to the mass production capabilities of Signal Technology Ltd., our sister company in Swindon, England. Their fully automated production facility includes 100% computer testing and special assembly equipment that can produce up to 2,000 finished devices per hour (that's one device every two seconds).

Available from Andersen

These devices are distributed in the U.S. and Canada by Andersen Laboratories. We have SAW devices for all international broadcasting standards at common IF frequencies, as well as low band VHF filters. Many devices are available from stock. Just call Don Lowcavage at (203) 242-0761.

**ANDERSEN
LABORATORIES**

Andersen Laboratories, Inc. 1280 Blue Hills Avenue, Bloomfield, CT 06002. Telephone (203) 242-0761/ TWX 710-425-2390.
Andersen SAW products are available in the United Kingdom and Europe through our sister company, Signal Technology Ltd., Swindon, Wiltshire, UK.

Circle (24) on Reply Card

Delta Electronics

Continued

determined readings and equipment status with highlighted out-of-tolerance and alarm flags on user-designated CRT format.

Circle (285) on Reply Card

See ad on page 113

DIELECTRIC COMMUNICATIONS

DCP-B: FM panel antenna features low cost, low wind load and a 1.2:1 VSWR over a 20MHz bandwidth for multistation operation. Four dipoles per panel offer improved gain over 2-dipole types.

Circle (286) on Reply Card

DORROUGH ELECTRONICS

ST-80: Stereo generator to complement the digital DAP model 610 processor on FM, eliminating variables common to many audio chains.

Circle (287) on Reply Card

ECD INDUSTRIES INT'L.

Camera pickup tubes: Distributor for Saticon, Vistacon, sulfide vidicon, Leddicon and Plumbicon products for all major cameras.

Transmitting/special purpose tubes: Distributor for products from Amperex, Cetron, EEV, Eimac, GE, ITT, Machlett, National, Omni-wave, Penta-L, Raytheon, RCA, Siemens, Telefunken, Varian, Victoreen and Westinghouse.

Circle (557) on Reply Card

EDCOR

GLA 10 amplifier: 10W continuous-commercial audio amp with 4Ω, 8Ω and 16Ω voice coil and 25V or 70V line outputs, operating from 12Vdc or ac power.

Circle (288) on Reply Card

ELECTRO IMPULSE

Various FM dummy loads; calorimeters and wattmeters; RF attenuators.

Circle (289) on Reply Card

ELICON

IPS 2000: Intelligent keyboard.

SARA: Speech activated robotic arm.

25C: Microprocessor-based servo controller.

Circle (290) on Reply Card

EMERGENCY ALERT RECEIVER

SCA model 3 subcarrier receiver: For reception of FM SCA transmis-

sions, uses a new phase-locked loop detection circuit for noise-free signal recovery at all standard injection levels.

EBS Model III receiver: For reception of emergency broadcasts over the EBS system.

Circle (291) on Reply Card

JOHN FLUKE MFG.

9000 series: Microprocessor troubleshooting system, based on unguided failure analysis methods, aids technician in locating component failures, but speeds the process by avoiding unnecessary steps of logical sequence.

Circle (292) on Reply Card

GENTNER ENGINEERING

SPH-4: Single-line telephone interfaced with "Caller Control" user-adjustable caller/talent balance for full 2-way or full gain reduction of caller when talent talks.

Telemix-IX: Fifteen-line microprocessor-based telephone interface, software driven, programmable, RS-232 remote-control port.

MicroTel: Battery-operated mixing console with mic and recorder inputs, headphone and recorder outputs, telephone interface and highly portable.

Flexiblock: Punch-block interconnection/termination unit for stranded wire cables.

Versapatch: Prewired patch panel in a chassis, with hinged rear panel for easy access to jacks, uses 22-gauge stranded wire and RF shielding.

Circle (293) on Reply Card

GIESE ELECTRONIC

Lock-3, Lock 3/2: Synchronizers for SMPTE/EBU LTC- and VITC-compatible tape equipment.

The Taker A/B.

Time code equipment: SMPTE/EBU VITC- and LTC-based systems.

Circle (294) on Reply Card

GOTHAM AUDIO

Systex: Digitally recorded audio, stored on 330Mbyte Winchester-type SMD hard disks for high speed random access; based on 16-/32-bit Motorola 68000 microprocessor; disk capacity is 60 minutes mono, 30 minutes stereo.

Circle (295) on Reply Card

HALLIKAINEN & FRIENDS

DRC190: Digital remote-control system operates manually or under station's BASIC program and RS-232 interface, with IEEE-488 port for automated test equipment, for 10 meter inputs, 10 raise, 10 lower and 10

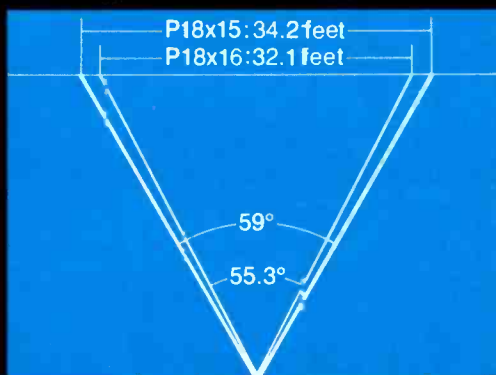
New Standards

The Widest Angle, The Highest Performance

Canon engineers have done it again, advancing the optical state-of-the-art so far forward that new standards must be considered.

The Canon P18 x 15 BIE offers the widest angle of any broadcast television zoom lens: 59° plus incredible edge-to-edge sharpness, fidelity and sensitivity throughout its 18X range.

Every one of these superb lenses will be supplied with both 1.5X and 2X built-in extenders and a pattern projector. Options include manual, semi-servo or full servo operation.



The Canon P18 x 15 is the most versatile studio lens ever made, setting new standards for years to come.

P18 x 15 BIE F2.1 for 30mm Cameras* KEY SPECIFICATIONS

- Focal length: 15-270mm
- Max. Relative Aperture: 1:2.1 (15-218mm)
Aperture: 1:2.7 at 270mm
- Angular Field of View: 59° x 45.8° at 15mm
3.6° x 2.7° at 270mm
- Minimum Object Distance: 0.6 meter (2 feet)

* Also available: PV18 x 11 BIE F1.6 for 25mm Cameras



**OVER
500 CANON
18X LENSES NOW
IN SERVICE IN
THE U.S.A.!**

Canon Studio Standards



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© 1983 Canon U.S.A., Inc.

Circle (25) on Reply Card

NOW HITACHI HAS A 1" VTR TO MATCH THE ACHIEVEMENT OF OUR COMPUTERCAMTM CAMERAS.

After presenting video producers a camera good enough to shoot studio-quality pictures outdoors, what can you possibly do for an encore?

Present production houses with a 1" VTR better than anything they're now using to edit these pictures with.

That's the high-performance Hitachi HR-230.

It'll open the slightly jaded eyes of engineers and editors at even the biggest production houses wedded to our two major competitors.

Because this VTR gives you *more* than today's production house competitive machines. A recue in 3.5 seconds. With no pops and clicks. An excellent acceleration and deceleration profile. A fast/slow motion, real time



reverse and field/frame still motion. Up to 3 hours of operation. And a unique fold-out full-feature editing panel.

In fact it is a true third-generation 1" in just about every respect, except for its lower price.

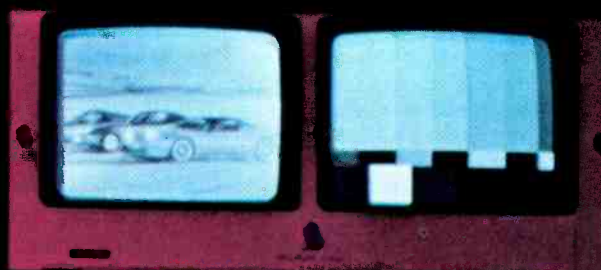
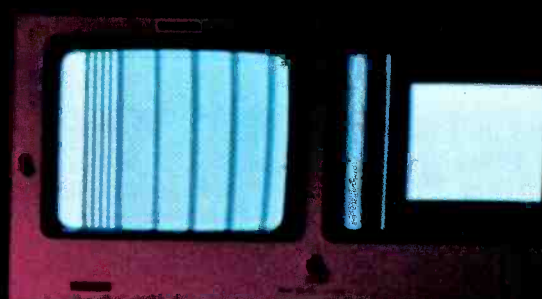
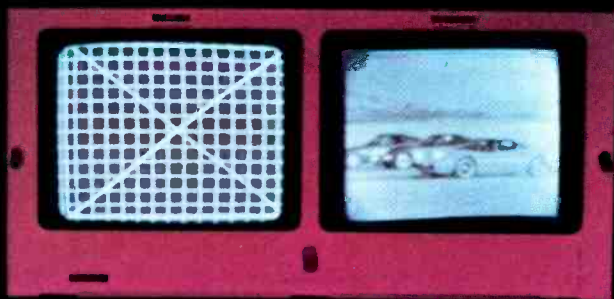
And you get something from Hitachi that is the hallmark of our design and manufacturing philosophy: unmatched reliability. Reliability that has given some editors up to 90 hours of high-speed editing per week for months on end from Hitachi 1" VTRs with *no* downtime.

For more information, contact Hitachi Denshi America, Ltd., Broadcast and Professional Division, 175 Crossways Park West, Woodbury, NY 11797. (516) 921-7200.



HITACHI

Circle (26) on Reply Card



Hallikainen & Friends

Continued

selected channel outputs.

Circle (296) on Reply Card

HARRIS BROADCAST GROUP

TVE-60S: Ultrahigh efficiency 60kW UHF TV transmitter with Varian VKP-7550 S-series klystron, consuming 130kW (60kW visual/10% aural).

TV-30H: Highband VHF TV transmitter, using Quadrature Corrector for $\pm 1.5^\circ$ ICPM, video saw filter for visual sideband attenuation of -15dB at 4.5MHz.

Wavestar antenna: Omnidirectional UHF TV slotted waveguide antenna, rated greater than 240kW.

C-series camera: Horizontal level-dependent contour adjustment, allowing predetermined threshold of contours generated from red and green; enhanced diagnostics; advanced viewfinder with electronic safe-title area and variable grease pencil window.

MW-50C: 50kW medium wave transmitter with overshoot correction for increased average modulation level and up-front accessibility of frequently used controls.

FMX series antennas: Circularly polarized FM antennas including 120kW FMXH class B and C; FMXL model for 12kW Class A operation.

Medalist-12: Twelve-channel dual stereo audio console for AM and FM on-air and production installations.

NEWFOR: High speed titling system by VG Electronics Ltd. relieves editors of routine and tedious tasks without restricting editorial freedom.

Circle (297) on Reply Card

See ad on page 67

HOLADAY INDUSTRIES

HI-3113: Fiber-optic link provides interface to isotropic broadband field-strength meter.

HI-3006: Isotropic broadband magnetic field strength meter.

Circle (298) on Reply Card

HOWE AUDIO PRODUCTIONS

Audio console: VCA-designed audio mixer, modular expandability from 6-24 channels, each allows three inputs per channel with mix-minus; digital logic machine controls; spill-proof membrane panel switches; and LED indicators for channel functions.

Circle (299) on Reply Card

See ad on page 61

IGM COMMUNICATIONS

Custom controller: Control product makes Instacart systems valuable in TV production.

Instacart: Instant access system for audio cartridge automation is completely redesigned and updated for 12, 24, 36 and 48 cart/tray configurations.

Circle (300) on Reply Card

ITC/3M

Omega stereo reproducer: An economical stereo audiotape cartridge machine featuring rugged mechanical construction and simple, clean electronics.

Circle (303) on Reply Card

See ad on page 91

INDUSTRIAL ACOUSTICS

GEMINI noise-lock: Double-wall, steel-component structures to construct a low weight acoustic facility with high noise-reduction properties.

Circle (301) on Reply Card

INTERACTIVE MOTION CONTROL

IMC3565: Motion control computer, quickly configured to handle various types of studio effects systems, such as model stages, video animation stands and high speed video stands; interfaces to editing controller.

IMC VAC-4: Video animation compound offering 4-foot travel of table in north/south or east/west directions on 5'x6' base and 1r/s rotation of table simultaneously.

IMC R/T: Motion control computer for use in film or video production, live action effects and model stages.

Circle (302) on Reply Card

KAY INDUSTRIES

Phasemaster T-Series: Rotary phase converter, accepts single-phase power and provides 3-phase outputs with regulation within a range of 2% to 5% of the single-phase primary supply.

Circle (304) on Reply Card

KINEMATICS/TRUE TIME INSTRUMENTS

Simplex interface: Option for users of model 60-DC and 468-DC NBS synchronized clocks, providing capability for driving remote analog clock units, can be ordered new or will retrofit to already-installed systems.

Circle (305) on Reply Card

LIGHTING METHODS

Designer: Lighting control console with 24, 36 and 48 control channels having a 999 dimmer capacity, 48-hour battery backup of scene memory, electronic patching, micro-cassette setup/cue archiving and pro-

portional dimmer to channel patching.

CH-200: Lighting control system in 12, 18, 24, 36 and 48 control channel configurations with 2-scene or memory master, programmable features and compatibility to LMI digital dimming systems.

Concept: Two CRT displays show channel status, cue sheet and other pertinent data in a computerized lighting control console. Subroutines allow multipart cues to be performed with one key. Interfaces available for popular dimmer products.

Idea: Lighting control system.

Circle (306) on Reply Card

LOGITEK ELECTRONICS SYSTEMS

Perfectionist: Audio console featuring eight sidebar slider or rotary mixers with four inputs/channel, Hall effect switching, remote punch block connections and maximum THD rating less than 0.1%.

PWR amplifiers: PWR-80 (40W/channel rms) and PWR-30 (15W/channel rms) feature XLR-balanced inputs, integral muting, overload protection and front-panel headphone connections with mono or stereo modes.

PAI-4: Pro Audio Interface, providing balanced/unbalanced conversion for two incoming record lines and two outboard playback lines, optimizing impedance and levels.

MAS/ADJ DA: Distribution equipment featuring 1-in/6-out and individual output level controls.

Circle (307) on Reply Card

MEI/MICROPROBE ELECTRONICS

Autonet: Recording system to pick up network feeds for cartridge on reel formats and prepare them for playback without operator intervention; starts recorder, fades audio in and out, applies end of message cue and recues tape.

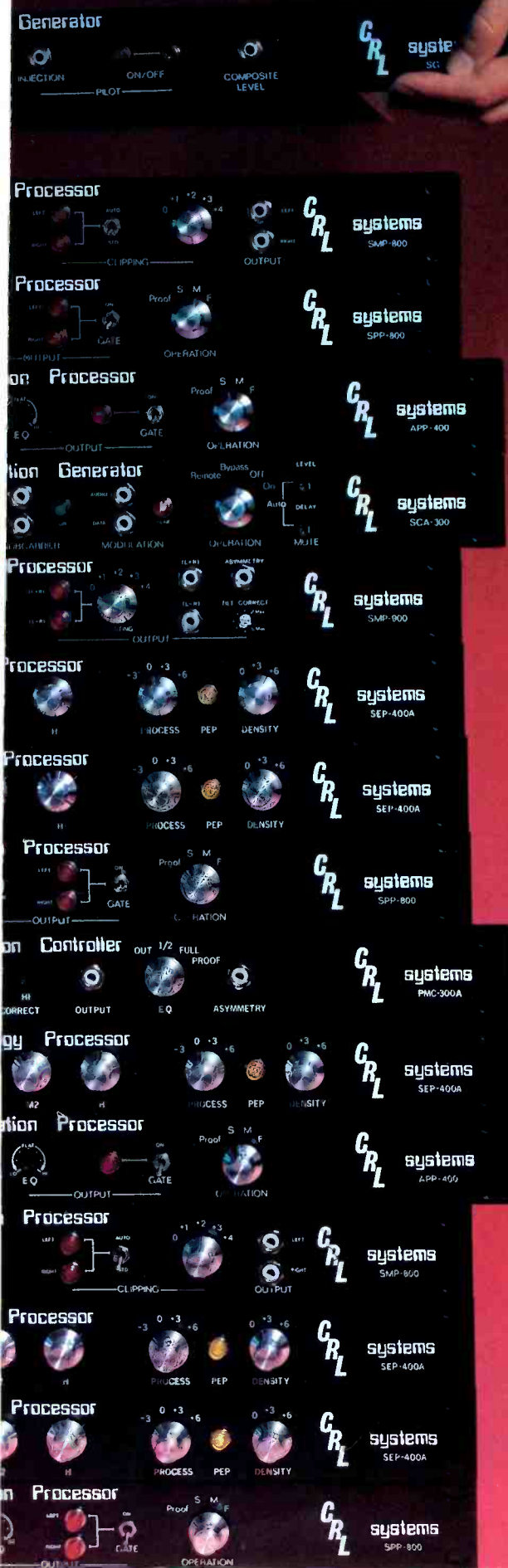
Satmaster: Commercial insertion system combines local spots from tape with satellite-link audio programming, based on carousel, Go-Cart, Instacart or 3-deck cartridge machines; 1000-event memory with real time controls.

Circle (308) on Reply Card

McMARTIN INDUSTRIES

BTL-10 translator: 10W FM broadcast translator equipment causes no deterioration to stereo or SCA information, with integral signal strength metering for receiver antenna adjustment and 65dB S/N.

PS-1K/PS-5K: Power reducers for AM daytime stations, compatible with all standard remote-control systems



SEE HOW OUR NEW STEREO GENERATOR STACKS UP!

Now the finest stereo processor in the country has a stereo generator to match. This latest addition to our product line offers outstanding performance at a modest price. It is the first stereo generator **designed** to handle highly processed audio.

The SG 800 has outstanding specs. One of the reasons is CRL's exclusive Balanced Modulator design. This allows ultra-linear modulation of the 38kHz subcarrier, while maintaining a precision digital phase lock with the pilot to prevent any frequency drift.

Other specifications include a signal to noise ratio in excess of 80db. The separation is in excess of 60db. Distortion is so low that it is difficult to measure; typically less than .01%.

Now the best news of all. The special introductory price: \$1450. The SG 800 is available now for use with the SMP 800 limiter or the FM 2 or FM4 systems. Call **Bob Richards** now at **800-535-7648** for complete information and your free two week trial.

DON'T JUST OPTIMIZE . . . MAXIMIZE YOUR SIGNAL WITH CRL.

CRL AUDIO
THE PROCESSING SPECIALISTS

Circuit Research Labs, Inc.

(602) 438-0888 or
(800) 535-7648

2522 W. Geneva Drive
Tempe, Arizona 85282

Circle (27) on Reply Card

McMartin Industries
Continued

and all makes of transmitters; no coils or capacitors; third power for pre-sunrise option.

BFM-S-500: Super S FM/SCA sub-carrier generator, places up to five independent subcarriers on FM base-band between 53kHz and 100kHz through use of efficient AM single-sideband technique.

TR-S-500: Modular Super S tuner for FM/SCA signals with various choices of subcarrier channel decoders.

Circle (309) on Reply Card

THE MANAGEMENT

SuperLog-TV: Multiuser TV traffic system, applicable to CATV, LPTV and smaller stations for traffic, billing and sales aids.

Super Log: Multiuser traffic system supports six users at separated points doing individual tasks. System delivery within 10 days of order acceptance for large volume AM and FM stations.

Sky Log: Traffic, billing and affidavits system for stations connected with satellite-linked music services, including Load 'n Go pre-formatting and setup.

Circle (310) on Reply Card

MARCOM

Marcom 516M: Multi-input line monitor, with switching to select one of 16 audio inputs to VU or peak responding metering and 10W internal amplifier.

CN Rood BAX-114: Bandwidth extension modulator, in portable format for ENG and outside broadcasting use.

Circle (311) on Reply Card

MEDIA SOFTWARE SYSTEMS

MediaMaster: Computerized log and billing system for AM and FM radio stations in association with database software ClientMaster.

Circle (312) on Reply Card

MICMIX AUDIO PRODUCTS

Dynafex DX-2: Stereo Dynafex system with exciter circuits.

Dynafex DP-1: Mono Dynafex with studio-type controls.

Circle (313) on Reply Card

MICRO CONTROLS

PTS-10CD AM stereo STL system with two program channels and third remote-control channel; Signal Capture Control (SCC) built into the receiver; transmitter rated 7-10W RF output.

Uniphase exciter: Combines STL and exciter functions for FM.

PTS-10CR: FM repeater STL system to increase link coverage distance of a studio-transmitter radio relay.

Lil' Pager: SCA paging subcarrier generator, operating on frequencies between 41-185kHz, using direct FM modulation and special RF shielding.

TSL-10: Telemetry data transmission system linking the transmitter site to the studio.

Circle (314) on Reply Card

MITCHELL CAMERA

Geared head: Lightweight geared pan/tilt head, features three speeds for pan and tilt with integral lift plate to aid in extra depression angle needs.

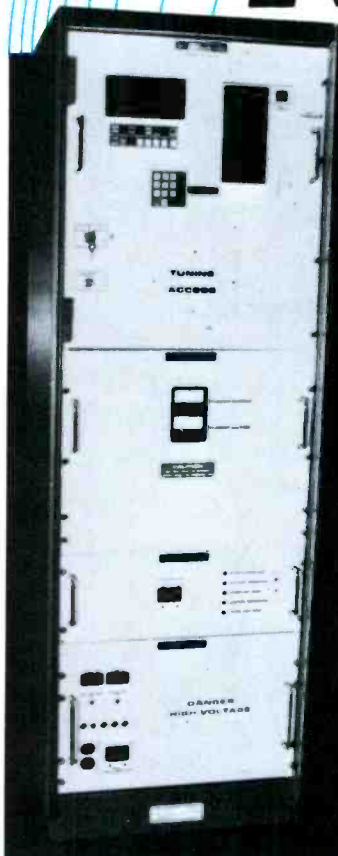
Universal fluid heads: Series of fluid-damped pan/tilt heads featuring Autoslip auto breakaway for quick pans, positive tilt lock; many with bubble level, dual handle capability; for a wide range of cameras.

Circle (315) on Reply Card

MODULATION ASSOCIATES

SU-10 uplink: Designed for ENG and data collection, portable system includes dual 10W solid-state HPAs, frequency-agile modulators, dual-channel upconverters, audio/data processors and audio monitor.

DEMAND MCL



MICROPROCESSOR CONTROLLED KLYSTRON High Power AMPLIFIERS

SATCOM C-Band Ku BAND
For High Power MICROWAVE transmission. Reliable MCL SERIES 10000 is field-proven throughout the world for quality, performance and long life.

Illustrated is M/N 10667-3.35KW C-Band high gain with microprocessor interface, the latest in the continuously evolving line of MCL's State-of-the-Art Satcom transmitters. A host of options are available to meet your most discriminating requirements, or, we'll engineer and design for your customized needs.

MCL assures you of 24 hour maximum parts replacement; provides 24 hour-7 day access to MCL personnel for assistance in installation or servicing.

WRITE for complete NEW illustrated, technical reference brochure # 1001. DEMAND "MCL" MICROPROCESSOR CONTROLLED KLYSTRON High Power AMPLIFIERS.

MCL, INC. Ten North Beach
LaGrange, Illinois 60525
(312) 354-4350 TWX 910-683-1899



Circle (28) on Reply Card

THE SYNCHRONIZER THAT WILL FINALLY SYNCHRONIZE THE INDUSTRY.

With a total system capability far beyond the grasp of most synchronizers and a price that's thousands less, the new Sony "Sync Master" synchronizer easily offers you the greatest price and performance in the industry.

It also offers you a much greater range of features than the vast majority of synchronizers. Including an edit list capability of up to 200 edit points.

And it's the only synchronizer developed by both a professional audio/professional video manufacturer.

But the real reason for buying it is that it is upwardly compatible to the proposed SMPTE "Recommended



Practices for Digitally Controlled Equipment." Which means the interfacing problems between video, audio and film equipment will be problems of the past. This Sony "Sync Master" synchronizer has a built-in distributed intelligence network that makes it able to talk to an entire universe of diverse machines developed by diverse manufacturers.

So before you invest in a synchronizer that just solves today's problems, perhaps you should first examine the one that will also solve tomorrow's.

SONY
Professional Audio.



Welcome to the Ampex

Care-free Creative Control

Anyone who has ever integrated a complete post-production editing system knows that it's a complex, difficult and often confusing job. Products from different manufacturers don't always interface easily.

Ampex stands above the confusion by offering all the key elements of a sophisticated post-production system from one manufacturer, complete with fully integrated hardware and software. We call this the *Ampex Creative Command Center*.

This system consists of an Ampex ACE edit controller, Ampex switcher and VTRs and our Emmy-award-winning ADO digital special effects system. Since all these use SMPTE RS-422 serial communications, they are easily interfaced with each other and the peripheral equipment you need to fill out your system. No hidden costs for interface devices. Ampex products are designed from the ground up to work with each other in a fully compatible system.

This isn't exactly a new idea. Post-production facilities all over the world are discovering the business advantages of Ampex Creative Command Centers. A few of them are pictured above, and more are being installed every day.

More creative power and control is the name of the game with an Ampex Creative Command Center. With a system based on a sound technical groundwork, editors are free to put their full creative energy into every job, confident that they are free of technical constraints.

At the heart of the Center is the remarkable ACE editing system, fast enough and smart enough to satisfy the most creative editors in the business. Depending on individual preferences, you may choose the Touchscreen option, or either the dedicated or ASCII-style keyboards. Using the ACE joystick control, you're in command of all the other products in the system. With the optional General Purpose Interface (GPI) you can command any product activated by an electronic "trigger."

And there's more flexibility. ACE disks are interchangeable with any other ACE system of any configuration. ACE can even read and write CMX-format disks. You can schedule system time much more effectively and conveniently.

That's only part of the story. There's more creative power, control and flexibility inherent in all the Ampex products.

System Flexibility

Product quality and reliability have long been associated with the Ampex name. In our Creative Command Center, you have a wide choice of Ampex products, each unsurpassed in its price/performance category. Complementing ACE, with its various options, you have a choice of Ampex production switchers, either 4100 Series, or the microprocessor-based AVC Series. AVC switchers offer awesome creative power, yet are simple and logical to operate.

You also can choose any of the Ampex VTRs: the VPR-2B, the VPR-80, or the VPR-3 (the mainstay of Olympic Games broadcasts) with unequalled speed and tape handling ability, or our ARC-40 M-format VTRs.

The very popular ADO has become the standard in the world of creative image manipulation, with over 250 in use around the world. Its abilities are constantly being expanded by the imaginations of its many users.

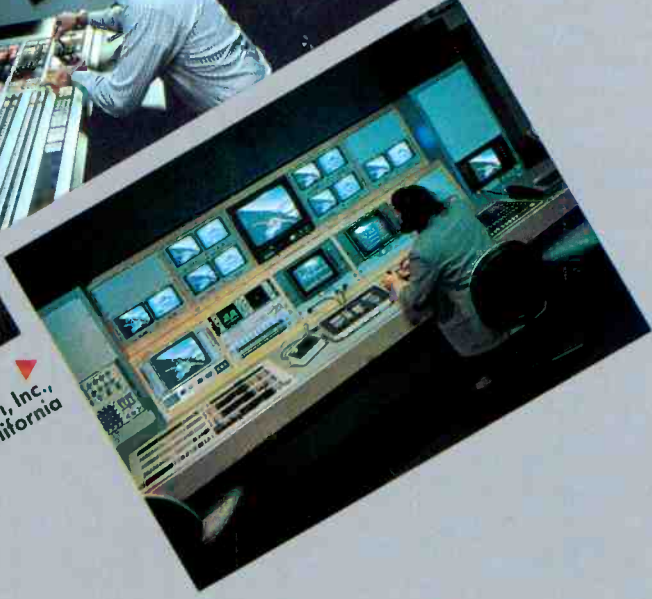
Your needs and budget determine the configuration of your own Ampex Creative Command Center. No matter what shape it takes, Ampex products will perform to support your business goals.



Ultimate Video International B.V.,
Hilversum, Holland



Crawford Communications,
Atlanta, Georgia



Atari, Inc.,
Milpitas, California

Creative Command Center

Can Management Love a Creative Command Center?

Editors who use these systems every day find that their solid technical foundation allows more efficient use of time for creative experimentation, or to meet tight client budgets and deadlines.

All this helps keep clients happy. Not only is the Creative Command Center an impressive system to see, but its performance can help you build the kind of good will that pays off on the bottom line.

Captive facilities find that Creative Command Centers can be equally effective for their needs, turning out a variety of software. One interesting application can be found at the coin-operated games division of Atari, where a complete Center has been installed to produce the very latest in laser video arcade games.

So don't be intimidated by the sophistication of these systems. They're practical first and foremost, and designed to make management smile, even the controller.

Support That Keeps You Going

Xceptional dedication to the smooth working of your Ampex Creative Command Center is a characteristic of our service and support force.

It starts with the Ampex Sales Engineer you may call to explain how a Creative Command Center can fill your individual needs. He and your Ampex Service Engineer will work with you as your system is installed and checked out. They and all the other support people at Ampex will be there when you need them, wherever you are.

Obviously, there's much more that you need to know about an Ampex Creative Command Center than we can tell you here. Your Ampex Sales Engineer is just the person to give you that information. Ask him to tell you everything you want to know.

AMPEX

Ampex Corporation • One of The Signal Companies

Circle (30) on Reply Card

What Our Customers Are Saying About Us and the Creative Command Center.

- "With ACE, I can put more creative energy in my work with peace of mind. I don't have to worry about technical problems."
- "ACE is really an awesome editor. And the system is even more awesome than ACE alone."
- "The thing I'm most impressed with is the Ampex software and how user-friendly it is."
- "We purchased the Ampex equipment as a system, rather than stand-alone products, because we believed Ampex's innovative power can be most effectively demonstrated in the total system."
- "Interface on all equipment was a key factor in our decision to purchase a full ACE system. We wanted a single source."
- "In 20 working hours, we went from an empty room to an ACE system in full operation. That's due to the basic quality of the Ampex equipment and the use of the RS-422 buss."
- "We've gotten good support from both Ampex sales and service. They seem to be interested in what we're doing and what we think."
- "We've been with Ampex for 11 years. We're a small company; we need the support of a large manufacturer."

San Francisco 415/367-2296 • Los Angeles 818/240-5000 • Atlanta 404/491-7112 • Chicago 312/593-6000 • Louisville, KY 502/239-6111 • Washington, D.C. 301/530-8800 • New York/New Jersey 201/825-9600, 212/947-8633 • Dayton, OH 513/254-6101 • Dallas 214/960-1162 • Salt Lake City 801/487-8181 • Seattle 206/575-0156

Modulation Associates
Continued

DATA-SAT: Satellite receiver, for reception of 56kbit/s data.

SSTS-SAT: Agile 24-channel video receiver, including agile subcarrier selector for any of 12 frequencies.

Circle (316) on Reply Card

MOSELEY ASSOCIATES

PCL-606/C: Studio transmitter link operating at 1.7GHz.

MRC-1600 options: Remote-control CRT and logger for the micro-

processor-based transmitter control equipment.

Circle (317) on Reply Card

THE MUSICWORKS

Ralph Emery Show: Weekly country interview show, five hours/week, barter.

Jim Reeves Radio Special: Five-hour radio music special program, available for cash only.

Circle (318) on Reply Card

NAUTEL

AMPTE 20: AM transmitter, pro-

viding 20kW standard output, with two preset power levels between 21.2kW and 2kW, consisting of two AMPFET 10 systems coupled with a quarter-wave hybrid combiner, featuring main/standby circuitry.

AMPFET P400: AM transmitter for 400W output with preset power levels between 10W and 400W.

Circle (319) on Reply Card

ORBAN ASSOCIATES

P-009 equalizer: Frequency, bandwidth, boost/cut, high-/low-pass filter and input gain are fully adjustable and programmable through IEEE-488 or serial interface.

412A/414A: Single- and dual-channel compressor/limiter systems for general purpose audio level control, providing the essentials without the frills.

Circle (321) on Reply Card

See ad on page 121

PRC OF AMERICA

Anti-static reels: Plio-Magic 1-piece videotape reels for 1-inch and 2-inch tape, 5-inch to 8-inch diameter, manufactured from resin that reduces static buildup, repels dust.

Circle (322) on Reply Card

PACIFIC RECORDERS & ENGINEERING

ABX consoles: Consoles for 2-, 4- and 8-track production studios, with multitrack mix-down, slate/oscillator, multiple studio talkback, foldbacks, dimming and telephone mix-minuses.

Circle (323) on Reply Card

See ad on page 89

PENNY & GILES

Rotary fader: Conductive plastic rotary-format faders in mono and stereo formats with audio or linear output tapers, detents and cue contacts.

Circle (324) on Reply Card

PHOENIX SYSTEMS

System 100: Broadcast management system running on IBM PC and compatible PCs for event logging, handling complete traffic and billing functions.

Circle (325) on Reply Card

PRISMAGRAPHICS

Media kit: Includes holder for your audiocassette tape presentation.

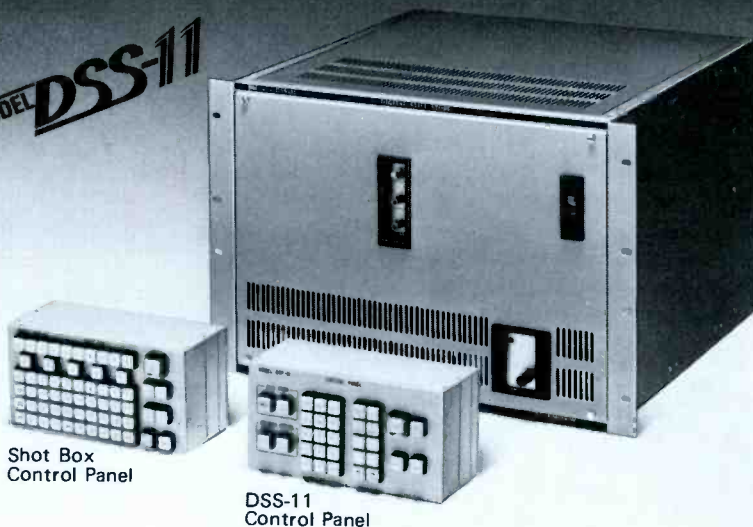
Circle (326) on Reply Card

QEI

695 exciter: Less than 0.025% distortion in synthesized design with 5-20W output, includes modulation

The Only Digital Still Store for Less than \$40,000

MODEL **DSS-11**



The DSS-11 is the world's only digital still store with the quality and resolution required for broadcasting applications priced under \$40,000. Although the DSS-11's compact modular design is ideal for OB vans, an on-board Winchester disk drive provides 160 megabytes of storage for up to 1,000 fields. It can also be simultaneously interfaced with up to seven additional disk drives. Superb stills reproduction is guaranteed by the CC-SPF system. And the fast access time of 0.35 sec even for frames makes the DSS-11 perfect for either studio or OB applications. Call NTI America for a free demonstration. The DSS-11: the most cost-effective digital still storage on the market.



NTI America, Inc.

1680 North Vine Street, Los Angeles, California 90028
® Phone: (213) 462-8945 Telex: 215468

Inquiries from sales representative are invited.

Circle (31) on Reply Card

40 to 1

Canon PV40 x 13.5B IE: THE OLYMPIAN

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

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



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
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West Coast Office: 123 Paulina 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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Circle 32 on Reply Card

QEI

Continued

monitoring and built-in peak counter.

695T30kWA: 30kW PA using grounded grid 3CX15000 for maximum stability and reliability, with solid-state drive, diagnostics and remote control.

Circle (327) on Reply Card

See ad on page 166

RADIO SYSTEMS

ESA-10: Stereo broadcast console in Metrics series, includes 10 channels, linear faders and total dc control, handles 30 inputs with 0.03% THD/IMD and mic/noise at 80dB below -50dBV.

Circle (328) on Reply Card

See ad on page 168

RAMKO RESEARCH

PM-42 Sidekick: Four-channel audio mixer for portable applications, including individual mix-level controls, detented cue positions, master gain control, integral VU meter, oscillator and headphone gain.

EARS-1616: AF routing switcher, providing basic 16x16 matrix, expandable, with optional serial remote-

control configuration.

P-4M/4S: Compact audio mixer, offering four input mono or stereo channels, continuously variable switchable EQ, solid-state meter and headphone output.

P-5MX: Mixer-extender unit for P-4M, adding five additional mixing input channels.

Circle (329) on Reply Card

RAMSA/PANASONIC AUDIO

WX-8050 system: Wireless mic/receiver system based on space diversity for reception stability includes WX-8350 receiver control section to automatically select only the stronger transmission, for 400MHz spectrum operation.

Portable mixers: WR-500 and WR-130, for remote broadcasting or reinforcement applications, include premix outputs for effects and flexible powering.

WR-8616 console: For 8-track and 16-track recording or post-production, assorted modules accommodate mic and line, mono and stereo inputs. The 10 mixing bus system includes four group, two master, two send and two echo lines.

Circle (330) on Reply Card

REACH/SPANTEL

TVC-1: tone and voice pager unit.

Spantel digital pager/display unit.

Spantel Cellular Controller (CC MK VII): SCA paging terminal control system.

Circle (331) on Reply Card

SAKI MAGNETICS

Saki line of long-life ferrite replacement heads: For professional audio recorders such as Ampex, MCI, Mincom, Otari, Revox, Scully, Studer and Technics.

Circle (332) on Reply Card

SAMSON MUSIC PRODUCTS

Phase Reflex: highband true diversity digital wireless microphone system.

49MHz microphone: Wireless system.

Microphone stands: All-metal construction.

Circle (333) on Reply Card

SCRIBE NEWSORDER

RENG cassette recorder system with mic/line inputs, line output and talk-over play feature.

Circle (334) on Reply Card

This Modulation & Power Controller will keep your AM Transmitter right on the money. 24 hours a day, seven days a week. We guarantee it.

With the MPC-11 controlling your transmitter you can be sure your station is operating at optimum levels without exceeding FCC license limits. Your station "sound" will always be just right regardless of program format or level of audio processing. We can guarantee this because our MPC-11 lets you select all of the parameters. From threshold levels to adjustment increments to time intervals. For power, positive and negative modulation peaks, and "do nothing" low level modulation limits. For primary and alternate transmitters with up to three different antenna patterns.

Once the parameters are set the MPC-11 will take over. It will continuously monitor the rf signal and auto-

matically provide raise/lower power commands. It will provide precise digital gain control over two separate audio feeds to the modulator. The MPC-11 is compatible with AM stereo applications and existing remote control systems. It also provides a continuous indication of the exact amount of correction supplied. Both through the front panel meters and through auto-logging outputs.

You may truly "set and forget" the MPC-11. It will provide alert alarms before compensation limits are reached. Plus LED status and alarm outputs for all parameters. It even contains self diagnostic circuits to provide fail safe operation in the event of a malfunction. The operational status of all alarm, indicator, and diagnostic circuits may be verified with a front panel switch.

Price: \$2,750.00 (rf sample is required).



POTOMAC INSTRUMENTS

932 PHILADELPHIA AVE. SILVER SPRING, MD 20910
(301) 589-2662

Circle (33) on Reply Card

5050 MARK III-2 Two Channel Recorder

IN 1994, YOUR STATION IS SURE TO HAVE ONE FAMILIAR FACE.

The compact console version of the legendary OTARI 5050 "B" is built to be around for many years. It's the 1/4" two-channel professional machine that has been designed with the performance, features and flexibility a broadcaster needs—today and well into tomorrow.

The rugged MARK III-2 has three-speed capability (field-selectable in pairs of 7.5/15 or 3.75/7.5 ips) with $\pm 7\%$ vari-speed, dynamic braking for gentle tape handling, and it's the only machine in its price category that's available with a full-func-

tion autolocator. The MARK III-2 also features an external machine control interface connector for use with SMPTE time code-based synchronizers or the autolocator. Front panel record calibration adjustments, two-frequency oscillator and an extra 1/4-track playback head are just a few of the helpful production features we've built in.

After you compare features, performance and price, you can feel comfortable making an investment in the machine that's built for the real world.

We're confident of our new MARK III-2. And you can be too.

Contact your nearest dealer who represents The Technology You Can Trust.

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

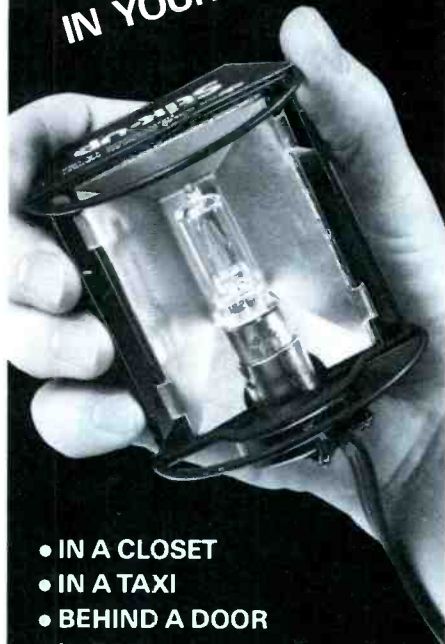
OTARI®

Circle (34) on Reply Card



Technology you can Trust.

THERE'S A
Stik·upTM
IN YOUR FUTURE...



- IN A CLOSET
- IN A TAXI
- BEHIND A DOOR
- IN BED
- HAND HELD
- UNDER A DIVING BOARD
- IN JAIL
- AT A ROCK CONCERT
- ON A STAGECOACH
- AT A FASHION SHOW
- UNDER A LUNCH COUNTER

It will make your lighting more effective wherever you need to conceal a small compact light source.

Stik-up, ideal for film, TV, stills. Up to 200W. Also 12V for battery operation. Weighs only 8 ozs. with cord. Stick it anywhere. Kit available.

Write or call for info.

Stik·upTM

THE GREAT AMERICAN MARKET

826 N. COLE AVENUE HOLLYWOOD CA 90038
TELEPHONE 213/461-0200 • TWX 910 494 1233

© 1984

Circle (35) on Reply Card

SHIVELY LABORATORIES

4420 reflectometer display unit: An active monitor that calculates the true VWSR, incident power and reflected power; provides warning and transmitter trip outputs.

2120 and 2320 TV/AM isocoupler unit: Permits the mounting of low power TV transmitting antennas on AM broadcast towers. Models are available for the VHF and UHF bands.

Circle (335) on Reply Card

SOUNDCRAFT ELECTRONICS

SAC-2: Stereo on-air console.

Series 20 recorder: Two-track master recording equipment, including computerized alignment for five different types of tape and three EQ standards at any of three tape speeds; center track time code; noise-reduction switching outputs; 14-inch reel capability in ¼-inch and ½-inch versions.

Circle (336) on Reply Card

SOUND TECHNOLOGY

710: Precision audio filter set, used with 1700 series distortion measurement system with filter for A weight; IEEE/IHF receiver; 20Hz and 200Hz high-pass; 15kHz, 20kHz and 30kHz low-pass.

Circle (337) on Reply Card

SOUND WORKSHOP PRO AUDIO PRODUCTS

Serial console interface: Allows slave unit to be controlled from a RS-232 port, driven by video editor or other computer.

30-TV: Compact 8-bus production console series geared for video editing applications.

Circle (570) on Reply Card

SPRAGUE MAGNETICS

Audio stacks: Replacement audio heads now are available for several popular recorders, including the 3M M-79 24-track, MCI JH-110A and JH-110B ¼-inch and ½-inch, and MCI 16- and 24-track recorders.

Circle (338) on Reply Card

STANTON MAGNETICS

ARC-5: Carbon fiber brush cleans records and removes static buildup.

PBR series: Announcer earphones, constructed of high impact plastic in fleshtone color, available in three different impedance values.

60A Dynaphase: Stereo headphones for accurate sound reproduction and user comfort.

Microwafer series: Lightweight, high performance headphones.

Stereowafer 45: Lightweight headphones.

P-mount series: Turntable cartridge, featuring advanced design and plug-in mounting.

Circle (339) on Reply Card

STUDER REVOX AMERICA

TLS4000: Modular synchronizer operates stand-alone, with optional control panel or in large systems under SMPTE/EBU bus and RS-432 serial systems.

FM monitor: A726 microprocessor-controlled digital synthesized FM tuner for critical broadcast monitoring.

PR99 MKII: Enhancements to audio recorder include varispeed option, redesigned erase oscillators and expanded setup facilities for reproduce channels.

Circle (340) on Reply Card

See ad on page 125

SWITCHCRAFT

Phone jacks: Four new right-angle low profile phone jacks—SN37A-14B, SN70B-12A, SN49B-14B and SN70C-14B—in 2- and 3-circuit forms, designed for snap-in mounting on circuit boards.

Circle (341) on Reply Card

See ad on page 71

SYMETRIX

DCS-16: Remote-control system for machine supervision, allowing control and status of equipment through a 2-wire or radio link.

522: Audio processing unit, providing multifunction dynamic audio signal control, for 2-channel or stereo-interconnected modes.

Circle (342) on Reply Card

TABER MFG. & ENG.

1500 model automatic bulk tape degausser: For any size videotape or audiotape from two inches to compact audiocassettes, includes thermal overload protection.

Circle (344) on Reply Card

TAFT TV AND RADIO

Transponder time: Satellite transmission services, available 24 hours/day.

Circle (343) on Reply Card

JAMES THOMAS ENGR./ALUMIFAX

Aluminum truss: Has pre-rigged lighting fixtures.

Circle (345) on Reply Card

TOTAL SPECTRUM MFG.

HS-100P: Microprocessor-con-



Boost transmitter efficiency with EIMAC TV tubes. VHF, UHF, MDS, ITFS.

EIMAC, a leader in communications tube design, introduces its new tubes for TV translators (transposers), low-power TV (LPTV), and TV transmitting service worldwide (VHF Bands I, II and III; UHF Bands IV and V).

In addition to concentrating on VHF and UHF applications, EIMAC has developed tubes specifically for Multipoint Distribution Systems (MDS) and Instructional TV Fixed Service (ITFS).

EIMAC tubes available cover power ranges from 100W to

1,000W peak sync/visual in the UHF range which can be used in combined aural and visual transmitting applications as well as separate diplexed transmitters. EIMAC tubes meet or exceed stringent IMD and gain requirements. Tubes used in MDS or ITFS service are capable of providing up to 50W peak sync/visual.

During the design phase, special attention was paid to efficient cooling and heater cathode operation for improved overall transmitter operation.

Varian EIMAC
1678 S. Pioneer Road
Salt Lake City, Utah 84104
Telephone: 801 • 972-5000, ext. 334

Varian AG
Steinhauserstrasse
CH-6300 Zug, Switzerland
Telephone: (042) 23 25 75
Telex: 78-841



Total Spectrum Mfg.
Continued

trolled preset pan/tilt/zoom/focus system.

Uni-II-Snd: Uniplexer-TV slide projection system with servo neutral density wheel.

SportFocuser: Automatic focusing system for sports camera applications.

VS-200M: Motorized pan/tilt system with variable speed.

Circle (346) on Reply Card

TRIDENT USA

Trimix audio mixing console.

T.I.L.: In-line audio mixer system offering 36-way mainframe (standard), eight auxiliary sends, six echo returns, 360-way patchbay, separate mic and line inputs (both balanced) and a choice of equalization modes.

Circle (347) on Reply Card

UMC ELECTRONICS

B.S.8-100 Systems 8: Automatic news recording system, providing air-

ready cartridge from information transmitted by networks via satellite or land-line.

Circle (348) on Reply Card

URSA MAJOR

StarGate 323: Digital reverb system with full 15kHz bandwidth in all eight room simulations and for all decay times.

Circle (349) on Reply Card

VALLEY PEOPLE

Advantage 310: Audio noise and level meter, using Trans-Amp isolated, balanced differential inputs to eliminate unwanted noise, RF and hum pickup; covers -100dB to +30dB measurements with average, peak and rms detector response on dual-scale meter.

HH2x2B: Level-matching interface simplifies level and impedance matching between consumer and broadcast audio equipment, while reducing RF and hum pickup with balanced circuitry.

Circle (350) on Reply Card

VECTRIX

Midas Color Card: Hardware module for IBM PC and XT computers, for simplified color graphic production.

Midas PAINT: Software for Color Card.

PAINT program: Software for IBM PC and XT computers.

Circle (351) on Reply Card

Stop using bad tape. Reduce tape dropouts. Improve video quality.

The RTI Videotape Evaluator/Cleaner finds control track and other physical damage that make a tape useless. It can even print out exact damage locations. You'll know instantly which tapes shouldn't be used.

It eliminates up to 70% of temporary tape dropouts. Good tapes will look even better.

It also eliminates frequent head clogging by reducing tape-borne dirt and loose oxide.

Protect your tapes, your recorders and your reputation.

This machine will pay for itself in tape costs alone. For detailed information, write or call us toll free at 800/323-7520.*

Models available for U-Matic, VHS or Beta.



RTI
VIDEO
PRODUCTS
COMPANY
A Subsidiary of Research Technology International

4700 Chase Ave., Lincolnwood, IL 60466
*Illinois, Alaska, Hawaii or outside the U.S.A.,
call 312/677-3000

Circle (37) on Reply Card

NAB-'84 TV wrap-up

Our NAB-'84/Las Vegas coverage continues on page 53. TV manufacturers that provided pre-show information are listed in that section. For the remaining companies that attended NAB, please check our July issue coverage.

These new ADC distributors are ready to take your next order as fast as you can turn the next two pages

They're fully stocked with everything from state-of-the-art pre-wired audio and video patch panels, and related accessories including the new ADC Humbucker. And they're ready to

deliver. Fast.

Turn the next two pages. Then give your nearest ADC distributor a call and see how fast you can get connected.

ALABAMA

Gray Communications Consultants
209 Oxmoor Circle, Suite 708
Birmingham, AL 35209
205/942-2824

ARKANSAS

Gray Communications Consultants
5105 McClanahan Drive, Suite J-1
North Little Rock, AR 72116
501/758-3234
(AR WATS only 800/482-1185)

CALIFORNIA

American Video Products
615 South State College Blvd.
Fullerton, CA 92631
714/525-5772

West Coast Audio
1951 Gardena Avenue
Glendale, CA 91204
213/502-1980

Yale Electronics
6616 Sunset Blvd.
Hollywood, CA 90028
213/465-3186

Hoffman Video
800 West Pico Blvd.
Los Angeles, CA 90015
213/749-3311

Pacific Radio
1351 Cahuenga Blvd.
Los Angeles, CA 90028
213/462-1392

Broadcast Marketing Associates
2211-C Fortune Drive
San Jose, CA 95131
408/946-2236

FLORIDA

Gray Communications Consultants
1031 N.W. 91st Terrace
Gainesville, FL 32601
904/378-2896

Gray Communications Consultants
1657 N.W. 79th Avenue
Miami, FL 33126
305/591-3637

Midwest Corp.
3331 N.W. 82nd Avenue
Miami, FL 33122
305/592-5355

Pro Audio General Store
2480 S.E. 52nd Street
Ocala, FL 32671
904/622-9058
(FL WATS only 800/342-0186)

Gray Communications Consultants
1605 South Bumby Avenue
Orlando, FL 32806
305/896-7414

Gray Communications Consultants
5401 Southern Comfort Blvd.
Tampa, FL 34336
813/885-1411

Midwest Corp.
6302 Benjamin Road, Suite 403
Tampa, FL 33614
813/885-9308

GEORGIA

Gray Communications Consultants
404 Sands Drive
Albany, GA 31705
912/883-2158

Midwest Corp.
P.O. Box 888759
Atlanta, GA 30356
404/457-4300

Gray Communications Consultants
3684 Clearview Avenue
Doraville, GA 30340
404/455-3121

Pro Audio General Store
1805 Kimberly Drive
Marietta, GA 30060
404/425-0630

Allied Broadcast Equipment
4405 Mall Blvd., Suite 314
Union City, GA 30291
404/964-1464

ILLINOIS

Pro Audio General Store
746 Cyprus Lane
Carroll Stream, IL 60188
312/231-7120

Allied Broadcast Equipment
5095 N. Elston
Chicago, IL 60630
312/794-0224

AVC
747 Church Street, Suite A6
Elmhurst, IL 60126
312/279-6580

INDIANA

Midwest Corp.
8455 Keystone Crossing, Suite 101
Indianapolis, IN 46140
317/251-5750

Allied Broadcast Equipment
635 South "E" Street
Richmond, IN 47374
800/428-6954

KENTUCKY

Midwest Corp.
1 Spert Drive
Edgewood, KY 41017
606/331-8990

Midwest Corp.
2035 Regency Road
Lexington, KY 40503
606/277-4994

Midwest Corp.
1804 Cargo Court
Louisville, KY 40299
502/491-2888

LOUISIANA

Gray Communications Consultants
5441 Pepsi Street
New Orleans, LA 70123
504/733-7265

MARYLAND

Midwest Corp.
4720 B Boston Way
Lanham, MD 20801
301/577-4903

Peirce Phelps
12288 Wilkins Avenue
Rockville, MD 20852
301/984-7979

MASSACHUSETTS

Professional Recording & Sound
1616 Soldiers Field Road
Boston, MA 02135
617/254-2110

Lake Systems
55 Chapel Street
Newton, MA 02160
617/244-6881

Midwest Corp.
1328 Wheaton Avenue
Detroit, MI 48084
313/689-9730

MINNESOTA

AVC
2709 East 25th Street
Minneapolis, MN 55406
612/729-8305

MISSOURI

Antech Labs
11118 Olive Street Road
St. Louis, MO 63141
314/962-5656

NEW MEXICO

Dyma Engineering, Inc.
367 Main Street S.E.
Los Lunas, NM 87031
505/865-6700

NEW YORK

Martin Audio-Video Corp.
423 West 55th Street
New York, NY 10019
212/541-5900

Univisions
2011 Teall Avenue
Syracuse, NY 13206
315/437-0301

NORTH CAROLINA

Midwest Corp.
2848 Interstate 85 S.
Charlotte, NC 28208
704/399-6336

OHIO

Midwest Corp.
7500 Wall Street
Cleveland, OH 44125
216/447-9745

Midwest Corp.
4410 Westerville Road
Columbus, OH 43229
614/476-2800

PENNSYLVANIA

Peirce Phelps
490 S. St. John Church Road
Camp Hill, PA 17011
717/761-0240

KASS Electronics Distributors
2502 Township Line Road
Drexel Hill, PA 19026
215/449-2300

Lerro Electric Corp.
3125 North Broad Street
Philadelphia, PA 19132
215/223-8200

Peirce Phelps
2000 North 59th Street
Philadelphia, PA 19131
215/879-7171

Midwest Corp.
535 Rochester Road
Pittsburgh, PA 15237
412/364-6780

TENNESSEE

Gray Communications Consultants
115 Spence Lane
Nashville, TN 37210
615/883-9175

Midwest Corp.
A7-156 Space Park South
Nashville, TN 37211
615/331-5791

TEXAS

Television Systems
2419 Rutland Drive
Austin, TX 78758
512/837-1769

Allied Broadcast Equipment
1201 East 15th Street, Suite 309
Plano, TX 75074
214/423-8667

VIRGINIA

Alpha Audio
2049 West Broad Street
Richmond, VA 23220
804/358-3852

Midwest Corp.
1395 Air Rail Avenue
Virginia Beach, VA 23455
804/464-6256

WASHINGTON

Allied Broadcast Equipment
1112 South 344 Street, Suite 312
Federalway, WA 98003
206/927-4337

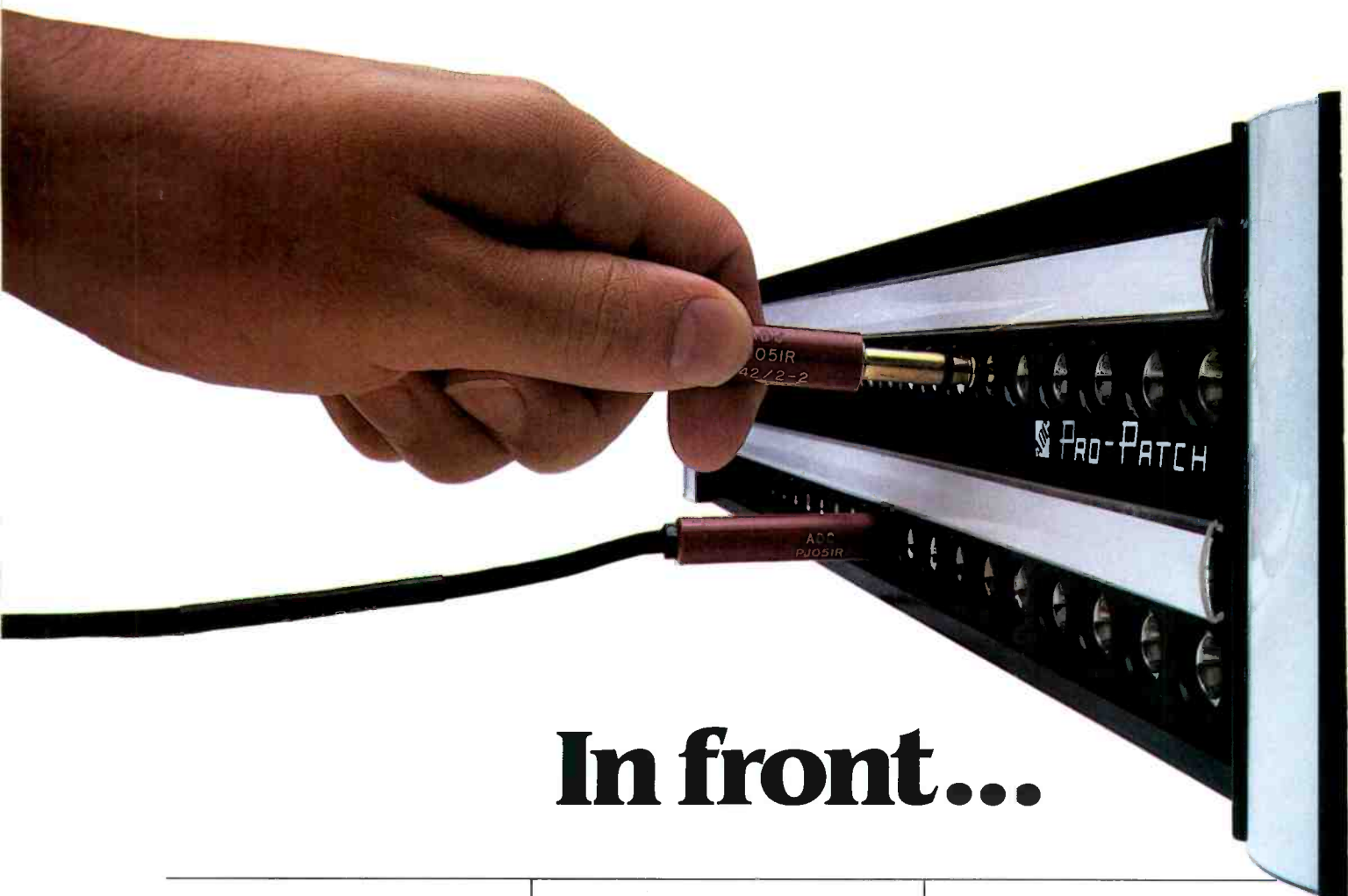
WEST VIRGINIA

Midwest Corp.
300 First Avenue
Nitro, WV 25143
304/722-2921



ADC/Magnetic Controls Co.

PRE-WIRED JACKFIELDS



In front...

Your engineering staff has more important things to do than soldering patch panels. That's why you'll find a big advantage in ADC's 100% pre-wired Pro-Patch™ jackfields and Ultra-Patch™ panels. Featuring ADC's new split cylinder contacts, these units allow for fast, reliable, hassle-free installation.

Fully assembled, computer tested and ready to hook up, Pro-Patch and Ultra-Patch completely eliminate labor intensive soldering or crimping operations.

In fact, hooking up to the back of a Pro-Patch unit is

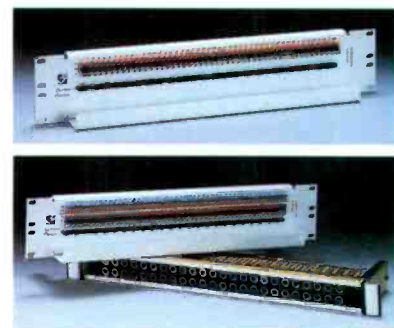


Pro-Patch jackfields and Ultra-Patch panels cut installation time from hours to minutes and allow circuit or normalizing configuration changes in seconds.

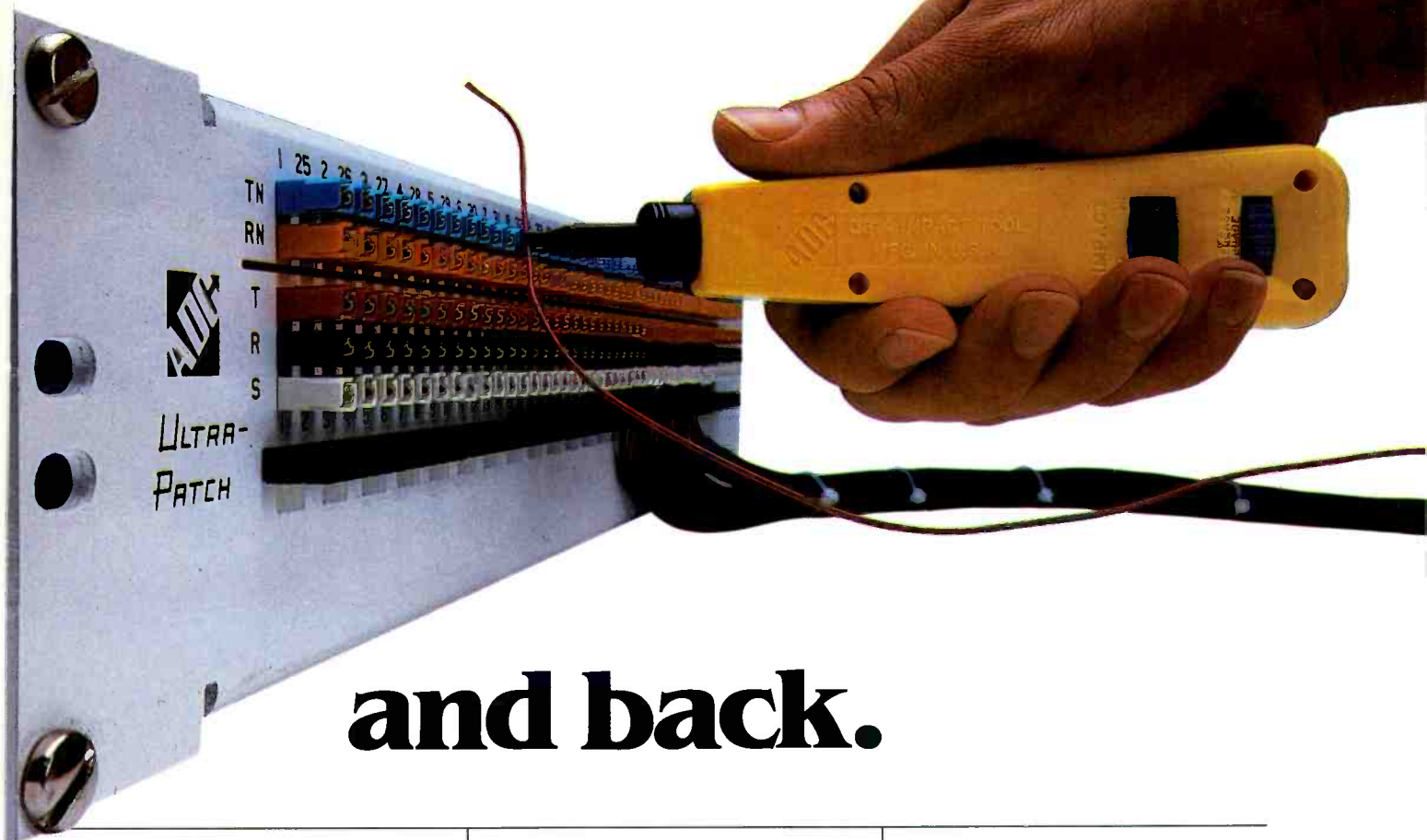
almost as easy as plugging into the front. Just a push on a special hand tool bares a wire, locks it into a split-cylinder contact inside an insulated

housing and trims off excess length.

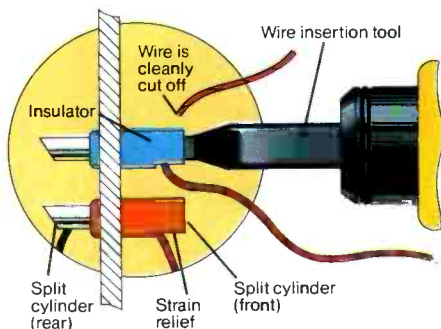
Since their introduction last April at NAB, Pro-Patch jackfields and Ultra-Patch panels have appeared in virtually every segment of the Broadcast industry.



READY TO PLUG IN.



and back.

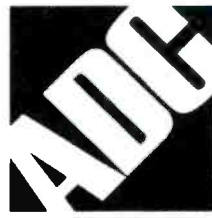


ADC's unique split-cylinder system features contacts that will accept 22, 24 or 26 AWG solid or stranded wires. The cylinders are housed in plastic insulating modules and are recessed to virtually eliminate shorting at the contacts. Both sides of the contact have two-wire capability providing for four gas-tight terminations per contact. The cylinders are also rated for a minimum 100 cycles and are easily replaceable. Triple strain relieving is provided on all units.

Pro-Patch and Ultra-Patch — as well as many custom configurations incorporating the split-cylinder contacts — are fast setting the stage for a new industry standard of wire termination.

For more information on these truly state-of-the-art audio patching systems — or our over 300 other standard audio and video patching systems — write or call ADC Magnetic Controls Co., 4900 West 78th Street, Minneapolis, Minnesota 55435, (612) 893-3000.

Custom orders welcome.



ADC Magnetic Controls Co.
4900 W. 78th St., Minneapolis, MN 55435

Circle (38) on Reply Card

ADC's NEW SELF-NORMALLING COAX JACK:

Delivered faster for less without leaving performance behind



In the past, many engineers felt that a 12-plus week wait was the price one paid for a reliable coax jack.

But the self-normalizing, multi-purpose ADC SJ2000 has changed all that. SJ2000 gives superior performance without the delays. Or the expense.

The SJ2000 has the features you want: nickel or gold plating, terminating or non-terminating versions, and you can purchase it individually or loaded in panels.

What the SJ2000 doesn't have is a high price tag. That's because ADC



manufactures most of its own parts, employing the latest CAD/CAM technology.

Our high volume manufacturing capabilities also let us deliver from stock, either from our distributors or Minneapolis order center.

Check our claims yourself. **To order, just call**

(612) 893-3010.

Custom orders are welcome.

ADC's New Humbucker only \$95.00 list

It will reduce up to 60dB of ground induced hum. Plus the price is less and the delivery fast. Call (612) 893-3010 for details.



**ADC/Magnetic
Controls Co.**

4900 W. 78th St.
Minneapolis, MN 55435

Circle (39) on Reply Card

Television exhibitors

ABP SYSTEMS

**Modular video camera.
Truck.**

Circle (352) on Reply Card

ADM TECHNOLOGY

9000 series: Microprocessor-based stereo console; architecture provides mix of any source to submaster or direct assignment to master output; all control delegated from central keypad unit.

VP series: Console designed for video post-production, interlinks to video editing facilities or production switcher.

BCS2443: Stereo TV audio console, specifically designed for those interested in stereo audio for television, based on the 2442 series console with all features redesigned for 2-channel audio.

ST 164: Stereo radio production console, for any AM or FM stereo application.

Circle (353) on Reply Card

See ad on inside front cover

AF ASSOCIATES

Protel LMS/SA-01: Library management system for tape and film.

Protel CCS/SA-01: Commercial compiler.

Protel FMS/SA-01: Facilities management system.

Circle (354) on Reply Card

See ad on page 155

ABEKAS VIDEO SYSTEMS

A52: Special effects system for on-air or production, based on digital techniques including variable axis compression, infinite expansion, posterization, flips, splits and tumbles in single- or dual-channel systems.

Circle (355) on Reply Card

ACCU-WEATHER

Expanded ready-for-air graphics service: Includes daily almanacs, national/regional maps and The Week Ahead forecast displays.

Circle (356) on Reply Card

ADDA

ESP II still processor: Modular design of dual still processor permits digital effects transitions between two output channels. Interchangeable with ESP-C systems, using 8-bit, 4x_{SC} sampling and compatible disk drive data format.

AC-21 PAL: Dual-channel video signal processing system, now available for PAL applications.

Circle (357) on Reply Card

ADVANCED DESIGNS

DOPRAD I and II systems: Doppler weather radar equipment, based on the DWR-200C radar unit, interprets and displays Doppler-effect detected weather information in easily understood format.

Circle (358) on Reply Card

ALDEN ELECTRONICS

C2000 systems: Three versions allow color weather displays based on information from government-

The New Garner 1400

The revolutionary coil design of the Garner 1400 makes it the superior high-energy 1-inch tape eraser on the market. Independent tests prove it:

Depth of Erasure:

No eraser can match the Garner 1400's minus 90 db. erasure of a heavily saturated 14-inch reel of 1-inch high coercivity tape.

Speed:

It is no contest. The 1400 erases high-energy tapes completely in less than 16 seconds. Other erasers take four times as long.

Ease of Operation:

No one beats Garner 1400's ease of operation. Just touch the "on" switch and place the tape on the conveyor. There are no drawers, no spindles, and no height adjustments.

Dependability, Guaranteed

For over 12 years, Garner has set the standard for tape erasers. Just one look at the rugged construction of the Garner 1400 shows you why. Garner is so confident of the 1400's quality that it's backed with a 2-year warranty.

The Garner 1400...designed to meet the highest standards of the industry...yours.

garner industries

4200 North 48th Street, Lincoln, NE 68504
(402) 464-5911/TELEX 438068

The high-energy tape eraser that outperforms every other eraser on the market.

Circle (40) on Reply Card

Alden Electronics

Continued

operated remote radar weather display systems (RRWSD), from various private databases and from both weather data sources.

Circle (359) on Reply Card

ALEXANDER MFG.

Sequential charger: Safely charges up to six nicad batteries in sequence for 12-14.4V units.

Triplex charger: For three battery packs, the safe 2A charge rate continues until unit senses battery is at full charge, then switches to trickle charge state.

Tri-Analyzer: Charger/evaluator system analyzes and charges up to three nicad packs simultaneously.

Circle (360) on Reply Card

See ad on page 26

ALLSOP

Ultraline VHS cleaner: Wet VHS player cleaning system operates on entire tape path with a non-abrasive cleaning ribbon.

U-matic cleaner: Wet cleaner and refill kit.

10088: Maintenance kit for computers.

Circle (361) on Reply Card

AMEK CONSOLES

M2500 TV: 56x48 live-to-tape console.

M1000 TV: 8-bus production console.

Matchless: 26x25x8x2 production audio mixing desk.

Opt-1: Optical transfer desk.

Circle (362) on Reply Card

See ad on page 80

AMPEREX ELECTRONIC

XQ4087: 1/2-inch high stability DG Plumbicon.

83XQ: 30mm DG Plumbicon tube.

XQ4187/85XQ: 3/8-inch high stability DG Plumbicon.

XQ3457/87XQ: 3/8-inch magnetic static DG Plumbicon.

XQ3467: 3/8-inch Plumbicon tube for low cost, high performance cameras.

YK1263: Klystron.

Circle (363) on Reply Card

AMPEX

AVA-III: Complete graphics system, software-based; drawing pad with stylus; image storage on disc.

ESS-3 still-store: Enhancements include new repackaged operator interface hardware and improved software.

ADO enhancements: Added effects nearly double the creative possibilities

of the system, with Digi-Matte general purpose keyer and concentrator unit for up to four multiple-channel effects.

Broadcast ADO: System designed more in line with the small- or mid-sized station's needs; different software; specified set of effects; keyboard image manipulations and greater on-line storage on floppy disk.

ACE editor: See "Update on Editing" on page 128.

Spectra Image demonstration: Interface of videodisc technology to Ampex video production products.

Circle (364) on Reply Card

See ads on pages 11, 40, and 41

AMTEL SYSTEMS

8800 series: Video DAs, offering fixed unity gain, feedback clamp or clamp with equalization versions for high density systems to 48 outputs within two rack units.

4900: Evertz LTC reader, character generator, source ID and code phase corrector with optional VITC reader/translator cards.

4500: Evertz VITC portable time code generator and LTC generator/reader operating on 9V batteries, for PAL or NTSC.

3600D: SMPTE/EBU LTC generator/reader with switch selection of NTSC/PAL, includes high speed reader (1/20X to 70X play speed), high resolution video character generator with two sizes and continuous or momentary jam sync.

Circle (365) on Reply Card

ANCHOR SYSTEMS

RM-1: Rack-mounting equipment for the Anchor AN100 25W sound system.

Snakes: Multi-input microphone cables.

Porta-Com: Cabled intercommunications system.

Circle (366) on Reply Card

ANTENNA TECHNOLOGY

Simulsat-7: For TV broadcast applications, a multibeam earth station antenna system equivalent in performance to a 7m dish.

Circle (367) on Reply Card

See ad on page 13

ANTON/BAUER

UltraLight: Modular, portable lighting system; universal bulb selection from 12-120V; versatile mounting; accepts up to three filters or diffusers; base options for dual light from single power source or from separate power sources.

Trim Pac 13 & 14: Nicad batteries with 2.2Ah rating at 13.2Vdc and 14.4Vdc for full run-time under all operating conditions, compatible with

advanced logic monitoring of Lifesaver chargers.

SpyCam: Black-and-white Newvicon camera with pinhole lens, for surveillance, responds to lighting conditions from 0.2fc to full sunlight, combined with wireless mic receiver, VTR, Pro Pac 90 battery and integral monitor.

LightLink: Fiber-optic link sends gen-lock, intercom, camera control and video on 1km optical fiber to MicroControl decoder unit.

MicroPhase: Gen-lock for any MicroControl unit through an adjustable blackburst video signal.

HL79E MicroControl: Camera control unit for Ikegami ENG camera, allows communications over standard mic cable to more than 1000 feet.

Monitor bracket: Snap-On bracket for Panasonic color monitor BTS 700N, accepts Pro Pac 13 battery.

Circle (368) on Reply Card

See ad on page 159

APIS

Graph Pac: High resolution custom graphics system, allows color, positioning, marquee effects and compression of the image factory programmed into Memory Pods from customer-supplied artwork.

Circle (369) on Reply Card

ARRIFLEX

ATC: ARRI time code equipment for film cameras.

ARRILITES: Portable tungsten lighting in 650W, 1kW and 2kW ratings.

Circle (370) on Reply Card

ARTEL COMMUNICATIONS

CV103 system: Fiber-optic interconnection between CPU and Computer-vision's Instaview C color work stations, for separations up to two miles.

LS100 system: Developed for CAD/CAM communications on IBM 3250 graphics display system and compatible with IBM 5080 color raster systems.

Circle (371) on Reply Card

ASACA/SHIBASOKU

AEV-300: A multi-image viewer, interfaces to any editing control unit, provides simultaneous views of 16 frames from each of four video sources. Each source has individual motion controls, enabling the editor complete supervision.

ACL-3000: Broadcast cartridge system, for commercial insertion or automated program presentations.

TG-52A: Digital signal generator.

VS13AO: 150MHz sweep generator.



Freedom to Choose your Digital Video Processor or Transmit by Satellite Without Affecting your Audio

*That's what is designed into
Lexicon's Model 1300 audio-to-video
delay compensator.*

20-kHz bandwidth

< 0.025% harmonic
distortion

Transformer balanced inputs
and outputs

Delay from 0 to 340, 680, 1365,
or 2048 ms – 1300s (stereo)
0 to 680, 1365, 2731,
or 4096 ms – 1300 (mono)

+24-dBm input/output level

lexicon

Your video devices should communicate with an audio delay unit that precisely* compensates for video delay, holding lip sync.

The Model 1300 does just that – with any video device you own or expect to own. The Model 1300's advanced engineering provides transparent audio processing and conforms to the 16-bit standard, offering the highest quality broadcast audio even when your signal is passing through a series of delay processors.

The Lexicon Model 1300 has been evaluated and approved by ABC, CBS, and NBC network laboratories and is in use at all three facilities. For more information call or write Lexicon.

*Hysteresis prevents video sampling alone from doing the job – for more technical information call or write for our Delay Synchronizer Applications Note.

Circle (41) on Reply Card

Lexicon-designed and
manufactured converter
subassembly with 16-bit
linear PCM encoding and
48-kHz sample rate

Software-based input
control module that measures
video timing differences or
recognizes pulse widths,
RS422, or a variety of other
sync protocols

Lexicon, Inc.
60 Turner Street
Waltham, MA 02154 USA
(617) 891-6790
Telex 923468
Export: Gotham Export Corporation
New York, NY 10014

SONY TRINITRONS HAVE BEEN YOUR PICTURES CAN LOOK

1 An Aperture Grille, which doesn't warp, instead of a shadow mask, which does—for high color purity.

2 Nine-hundred TV lines for the highest resolution of any master control CRT—so details are sharper, and noise is never hidden.

3 Advanced comb filter—to achieve excellent luminance/chrominance separation with minimum artifacts.

4 ± 5 mm convergence within center circle—to prevent outlines from appearing around images.

5 One-percent linearity in center lines—to ensure perfectly proportional images.

6 Current feedback circuitry—to reduce color temperature drift to 1% over 500 hours.



DRAMATICALLY IMPROVED SO THEIR ABSOLUTE WORST.



If this were live, and you were critically evaluating your video signal, you would be looking blissfully at one of the most revolting pictures you ever saw.

You would, that is, if you were viewing a new Sony BVM-1900 or BVM-1201 Broadcast Trinitron®.

The new BVM Master Control Monitors have been completely re-engineered to reproduce your signal precisely the way it was fed into them.

If Tiny Tim's hair was covered with snow, or his ukulele was making too much noise, you'd know it. Because these Trinitrons offer the highest resolution available—900 TV lines.

This degree of resolution has been made possible through Sony's extensive research and development in high-definition TV.

However, the real reason they're the state of the art in broadcast CRTs is that they give you the highest resolution without ever compromising color purity or brightness.

That's because instead of using a shadow mask, which suffers from the disadvantage of being spherical (therefore causing it to warp

from heat), Sony uses an exclusive Aperture Grille. It's cylindrical, and is rigidly held straight at the top and bottom, enabling it to resist thermal or mechanical bending and ensuring white uniformity.

And thanks to another exclusive Sony feature, Automatic Beam Control, when Mr. Tim goes tiptoeing through the tulips, they won't turn into pansies right before your eyes. Because the monitor reads its own signal and instantly corrects for color drift.

Plus, all phosphors used in BVM Broadcast Trinitrons now match the industry's U.S. standards.

For more information on the one piece of test equipment you shouldn't be without, the one with mixed video capability, that's ready to accept computer graphics, and you don't have to be Tiny Tim to afford, contact Sony Broadcast today.

In New York/New Jersey call Sony at (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; in the West (213) **SONY**®
Broadcast 841-8711.

Sony Broadcast Products Company, 1600 Queen Anne Rd., Teaneck, NJ 07666. © 1984 Sony Corporation of America. Sony and Trinitron are registered trademarks of Sony Corporation.

CM65A/CM22A: High definition color monitors in 26-inch and 20-inch CRT sizes, displaying 1125-line images from RGB or Y/C_w/C_N inputs.

CM99A1: Small 9-inch monitor for NTSC signals, has optional dc power supply for the mobile operation, with two video signal inputs, comb filter and audio input.

Circle (372) on Reply Card

See ad on page 93

ATHENA/L-W INT'L.

Telecine multiplexers: Three-port pre-aligned prism multiplexer includes 8:1 electronic iris neutral density wheel controlled by TV camera electronics. Addition of diplexer allows two sources per port, for mixing media, with programmable frame rates, instant direction change and still-frame capacity.

4500 telecine projector: Phase-locking dc-servo drive and reel motors for NTSC, PAL or SECAM with slow/stop motion uses CMOS control circuitry.

Circle (373) on Reply Card

AUBURN INSTRUMENTS

MC/1: Machine control system, based on 2-wire connections for VTRs, film chains or other broadcast equipment, includes all control and tally signals on a single audio pair.

Circle (374) on Reply Card

AUDICO

619-R: Videocassette rewriter, used in conjunction with other equipment for unloading and reloading cassette housings; for VHS, Beta and U Format.

Circle (375) on Reply Card

AUDIO DEVELOPMENTS

AD 14S: Four-, 6- or 8-input portable stereo mixers, PICO.

AD 062: Eight-, 10-, 12-, 14-, and 16-input portable mixer systems, multmixers.

Circle (376) on Reply Card

AUDIO KINETICS

Q.Lock enhancements: Additional software for 3.10 synchronizer system allows use with digital audio editing.

Mastermix: Console automation equipment with floppy disk memory, adapts to various consoles through retrofit packages, allowing non-automation systems to be used.

Circle (377) on Reply Card

AUDIO VIDEO CONSULTANTS

AVC-1310-5-17: Interface system

for videotape transfers, based on Panasonic NV-1310 with five functions and 17 transports. Functions and number of transports are customer-selectable.

Circle (378) on Reply Card

AURORA SYSTEMS

Aurora/100 enhancements: Expanded weather and sports data display options, including pictorial and textual weather data from Weather Services Int'l; preview channel with instant swap to on-air.

Circle (379) on Reply Card

AVANTEK

AR-2000: Simulchannel earth station receiving system for TV broadcast including two AVA-4220B LNCs, dual-polarized antenna feed, separate H and V feedlines for up to six program channels. Up to four systems may be driven from the same feedlines for a total of 24 channels.

Circle (380) on Reply Card

B-W LIGHTING SYSTEMS

VTR cable assemblies: Type F field-reparable connector style and Type M factory-molded connector style cable assemblies for all popular ENG system combinations.

Armored assemblies: Option A lightweight flexible armored cables with Type F or Type M connectors.

Breakaway assemblies: Option B quick disconnect ENG cable assemblies.

Circle (381) on Reply Card

B-W LIGHTING SYSTEMS

20-201/T light: Tall cyclorama lights, rated 2kW per mixture for cycs for 14-foot heights and more. One-, 2- and 4-circuit versions give flat illumination at 8-12 feet from curtain.

Circle (382) on Reply Card

WILLIAM BAL CORPORATION

Silverline cases: Equipment transport cases that are dent-resistant, thermally stable, handsomely styled and lightweight.

Circle (383) on Reply Card

BESTON/McINNIS-SKINNER

Marquee 1000: Low cost production titler, offering high resolution, proportional spacing, 16 character sizes with upper and lower cases and internal clock; word processing capability.

NewsCan Datagraphics: Graphics generator system with two steps of resolution, 640Hx484V pixels (4096 colors) and 1920Hx484V pixels (16

million plus colors).

Circle (384) on Reply Card

BOGEN PHOTO

M-100: Bogen minilight, weighing only 1.25 pounds, operating from any 12Vdc source, uses 100W quartz lamp with a multimirror faceted dichroic finish.

TSE video cases: LC series cases (9.25"x14", available in 4-, 5- and 6-inch depths) and LF series cases (14"x21", available in 4-, 5- and 6-inch depths) include your choice of foam padding for protection of equipment during transport.

Bowens Hi-Glide: A complete system for suspending studio lighting equipment, including rails, single and double carriages, universal mounting brackets and pantographic suspension units.

Tripod spreader: Designed for Bogen lightweight tripod.

Circle (385) on Reply Card

BROADCAST MICROWAVE SERVICES

BMT-2K: Frequency-agile transmitter for 2GHz, ac/dc powering, modular and field serviceable, with two independent subcarriers.

TBR-2K: Ac/dc powered, frequency-agile receivers for studio quality from remote locations, designed with dual conversion and available in 2GHz, 2.5GHz, 7GHz and 13GHz models.

Circle (386) on Reply Card

BROADCAST SYSTEMS

DC-8: Eight U Format VCRs (expandable to 14), for automated video programming on CATV or LPTV, programmable to 98 events from sequential playback or randomly accessed material.

ProPak 20: Editing console with spaces for two Sony Type 5 or BVU machines, TBC, audio mixing and video switching equipment, retractable desk surface.

ProPak 80: Production console equipment racks.

BJ-200/BJ-240A: Audio jack panels provide 52 or 48 tip-ring-sleeve jacks (respectively), prewired to terminal strip at rear.

MC-series: Machine control equipment.

Circle (387) on Reply Card

BROADCAST TECHNOLOGY

Vector 4000: Multisignal audio monitor system allows 24 kHz audio signals on a single audio pair, a dry telephone pair or a video coaxial cable.

MI 2112: Prioritized local and

EVEN THE HAIRIEST SITUATION CAN'T SHAKE UP THE FIRST 3-CHIP CAMERA.



Some gripping news from NEC: the ENG camera has come of age. Our new SP3 packs so many features into 5.9 lbs. it's a small wonder.

With three CCD chips instead of tubes, the SP3 can take all the abuse your crew dishes out, and never needs registering. It produces broadcast quality pictures with over 500 lines of resolution. And better still, you can use it with any format—M, Beta,™ 1/4" or 3/4".

To find out more about the SP3, the most newsworthy camera around, call NEC at 1-800-323-6356. In Illinois, call 312-640-3792.

NEC

IMAGINE WHAT WE'LL DO NEXT

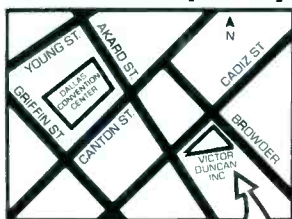
NEC America, Inc., Broadcast Equipment Division
130 Martin Lane, Elk Grove Village, Illinois 60007



VICTOR DUNCAN, INC. WILL BE THERE

At the 1984 GOP National Convention...

With a completely equipped field office to serve your production/post-production needs.



VICTOR DUNCAN, INC. FIELD OFFICE

- ★ Convenient location just two blocks from the Dallas Convention Center.
- ★ Over 11,000 sq. ft. of parking and facilities, providing round-the-clock ENG/EFP rental, sales, and service.
- ★ 3/4" editing suites with 24-hour access.
- ★ Full stocks of 1" & 3/4" tape and supplies.

If you plan to cover the GOP, Victor Duncan has you covered!

DALLAS — (214) 869-0200
Four Dallas Communications Complex • Irving, TX 75039-3510

CHICAGO — 661 N. LaSalle St.
Chicago, IL 60610-3770
(312) 943-7300

DETROIT — 32380 Howard St.
Madison Hgts., MI 48071-1429
(313) 589-1900



VICTOR DUNCAN, INC.

Circle (43) on Reply Card

Squeezer

The Video Compression System With One Feature All Others Lack: Affordability.

Everyone today is facing the budget squeeze one way or another. Networks, affiliates and independents. Cable companies. Production and post production houses. One curious thing about budget squeezes is that they have a way of making equipment purchase decisions both easier and harder. Easier when it's clear that a particular item costs too much for the times. But harder when you are looking at equipment you know you need, but can't find the bucks for.

The Squeezer: Meeting Your Needs With A Unique Set of Special Effects Features.

The Squeezer, from Precision Echo, is a programmable video compression and positioning system that compresses an image down to four selectable sizes, places that image anywhere within the

screen on command, crops any part of it to any size, and puts a variable-sized border of any color around it on request. It can even flip the image horizontally or freeze the action. Exclusive dual joy stick controls make image manipulation simple. And the utility of its design makes The Squeezer a versatile tool whether rack mounted in a production facility or used in mobile applications.

The Squeezer: An Affordable Alternative.

There's very little that you'll find on The Squeezer that you couldn't find on an ADDA, Vital, or a Quantel system. Except the price tag. Those other systems cost anywhere from \$40,000 to \$200,000. The Squeezer costs under \$20,000. For broadcast programming, news and

sports production, cable TV, educational and industrial applications, nothing comes close to the cost efficiency of The Squeezer.

The Squeezer from Precision Echo. High on quality and cost efficiency.



PRECISION ECHO

3105 Patrick Henry Drive • Santa Clara, CA 95054
(408) 988-0516 • TWX 910/338-2328

Circle (44) on Reply Card

Broadcast Technology

Continued

remote program interrupt (IFB) features allowing 10x10 expansion console to be added to M2121 mix-minus console with 10 program interrupt buses and 5-level priority assignment logic.

TI 5000: Telephone interface system.

MI 2016: 6x6 mix-minus/program interrupt system.

Circle (388) on Reply Card

BROADCAST VIDEO SYSTEMS

CVP-100: Michael Cox video processor, accepts RGB from a computer, regardless of scanning rates, to produce NTSC RS-170A video signal.

BVS D-1000: Decoder for NTSC video signals.

Cox component systems: Color correction equipment and video switcher for component video applications.

Circle (389) on Reply Card

See ad on page 152

CMC TECHNOLOGY

Dynamic parallel tracking autotracking record/reproduce video head system.

Circle (390) on Reply Card

CMX/ORROX

See "Update on Editing" on page 128.

Circle (558) on Reply Card

CALZONE CASE

Escort: ATA-approved equipment transport cases for various types of equipment, with combination cases, double-angle construction, plywood and heavy grade formica laminate, high density foam linings and rust resistant Sessions hardware.

Proline II series: Less expensive case series, particularly for the musician or club performer, follows Escort design.

Convoy series: Charcoal polyether foam lining inside 1/8-inch ABS plastic protects equipment inside lightweight equipment transport cases.

Circle (391) on Reply Card

THE CAMERA MART

Source of almost every video or film need.

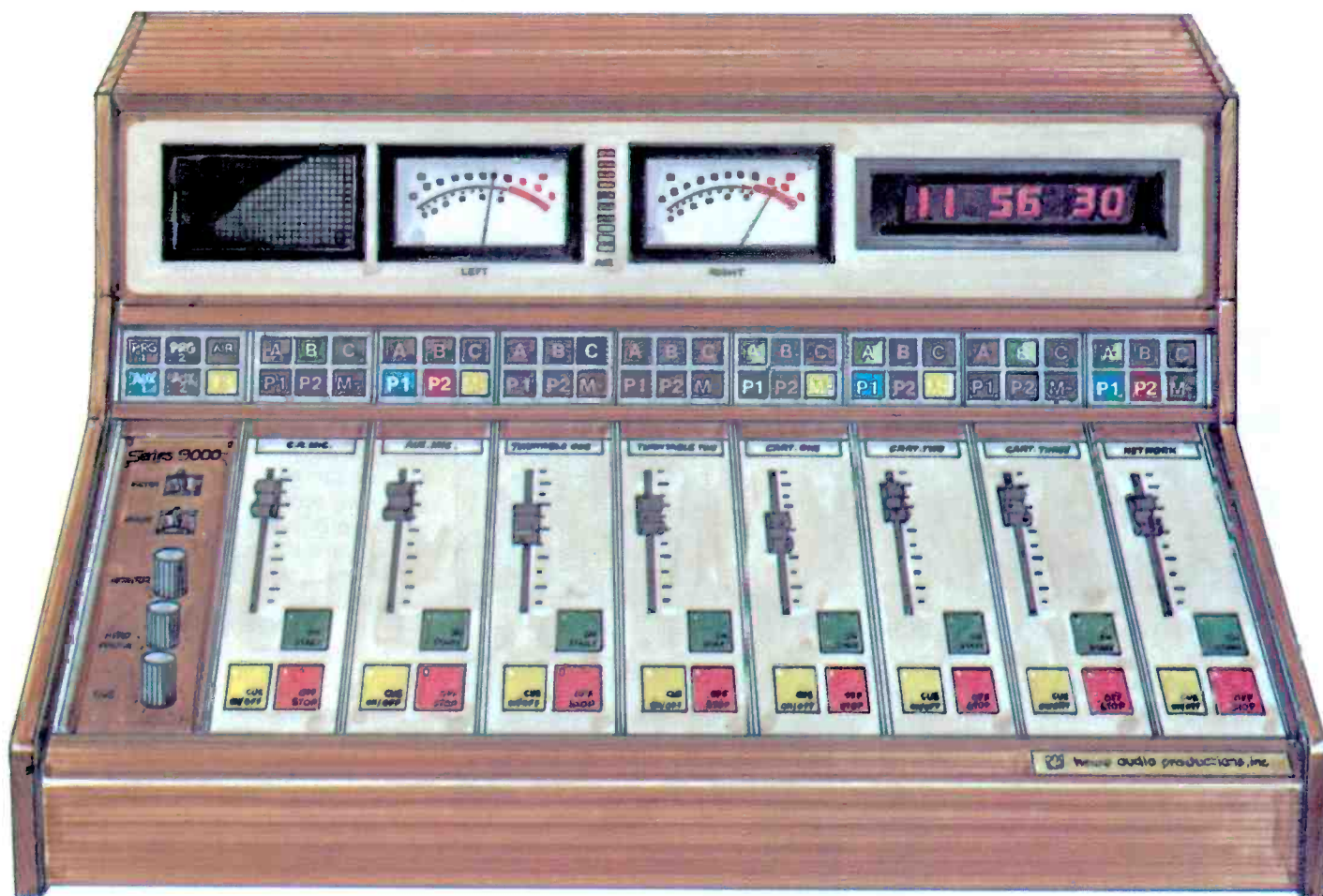
Circle (392) on Reply Card

CANON USA

J18x9BIE zoom: The 9-162mm focal length is expandable to 18-324mm with an integral tele-extender, yet weighs only 1.8kg for 2/3-inch cameras.

J40x9BIE lens: A 2/3-inch camera

Series 9000... the expandable solution!



There isn't another audio console that compares with the Series 9000 by Howe Audio!

- ✓ **Sealed membrane switches** and the best quality faders available. TTL Digital Logic for machine controls that is assignable to the input you have selected on each fader.
- ✓ **Monitor Control Section.** Volume controls for monitors, headphones, and cue. Stereo/Mono monitor select and meter select switch.
- ✓ **Input and output selects.** 3 inputs and 3 outputs for each channel, including mix-minus.
- ✓ **Cue Speakers.** Built in on the front of the console. Smaller units have 1, larger units have 2.
- ✓ **Metering through regular Analog V.U. Meters.** Optional Vacuum Fluorescent meters also available.
- ✓ **Your Choice of a Clock or Timer** standard in smaller units, both standard in larger units.



...the only Modular Audio Console without a Main Frame!



The Series 9000 consoles are available in sizes from 8 to 22 channels.

Howe Audio Series 9000... a new concept in consoles. The only modular consoles that do not require the broadcaster to purchase an expensive mainframe. This means a substantial savings to you, yet still affords you the ability to add on channels and features at a later time.

The Series 9000 consoles are expandable at any time by adding more channel modules, adding to the metering section, and adding options such as another clock or timer, another cue speaker, etc.

Circle (45) on Reply Card



howe audio productions, inc.

3085 A Bluff Street
Boulder, Colorado 80301

303/444-4693

For more information: 800/525-7520

Canon USA
Continued

optical system with 2X extender, providing focal length of 9-360mm (18-720mm) with f/1.4 at 9mm and f/1.9 at 360mm (f/2.8 at 18, f/3.8 at 720).

Circle (393) on Reply Card
See ads on pages 33 and 43

CAT SYSTEMS

4200: Facility monitoring system shows system parameters and RF switching network schematic in high resolution color, with preview mode for training.

3200: Security system with floor

plan and alarm points in high resolution color; alarms announced and printed; guard response time monitoring; auto telephone calls performed.

System enhancement: All systems may be controlled with a lightpen instead of a keyboard.

5250 enhancement: Expanded earth station remote-control system, shown actively controlling an earth station in Minneapolis from the show floor.

Circle (394) on Reply Card

CECO COMMUNICATIONS

Electron tubes: For transmitting, re-

ceiving, camera and CRT applications.

Semiconductor products and video equipment.

Circle (395) on Reply Card

CENTRO

One Pass trailer: 45' van production system custom-designed for One Pass Video productions of San Francisco.

Edit console: Custom video production facility furniture.

Portable teleconferencing system: Includes freeze-frame capability.

Circle (396) on Reply Card

See ad on page 29

CENTURY PRECISION OPTICS

Periscope: For table-top, motion control, miniature and special effects, featuring f/2.8 multicoated optics, 1:1 relay lens, various adapters.

0.7X wide-angle adapter: Increases coverage of zoom lens by 30%, for 3/8-inch optics, scratch-resistant glass.

Duplikin III: Duplicating device for transfer of 35mm slides to videotape, for 3/8-inch and 1-inch portable cameras.

Circle (397) on Reply Card

CETEC VEGA

67-A DII: Portable diversity receiver with Dymex II noise-reduction system.

66 DII: Portable receiver with Dymex II noise reduction.

T-80 series: Hand-held wireless microphone transmitters with Dymex II noise reduction.

ZC-177: Impedance converter for musical instrument pickups.

Circle (398) on Reply Card

See ad on page 127

CHRISTIE ELECTRIC

SMT1/2/3: Less expensive ReFLEX-20 "burping" 20-minute battery charger systems.

Circle (399) on Reply Card

CHROMA DIGITAL SYSTEMS

Chromafex 766: Combines special effects, time base correction, frame synchronization and frame storage with compressions, even/odd field freeze, positioning, inversion and mosaic tiling.

Circle (400) Reply Card

CHYRON

VP-2 graphics generator: Now in production, a stand-alone generator for low cost, high resolution graphics combines any eight of 512 colors, any six of 45 fonts with disk memory, palette animation and keying.

Circle (401) on Reply Card

See ad on page 115

Turn On A New Source of Equipment Financing.

ARMCO FINANCIAL CORPORATION

When you need capital for major new equipment purchases, turn on the Armco Financial Corporation. Our unique blend of affordable, asset-based financing and prompt, knowledgeable service can help you when others can't. Write or call Dave Walker, Armco Financial Corporation, Industrial Finance Division, 12720 Hillcrest Road, Suite 700, Dallas, Texas 75230 (214/233-1070). Offices also in Denver, Houston, Kansas City, New Orleans and Oklahoma City.



Circle (46) on Reply Card

When accuracy Counts...Count on Belar for AM/FM/TV MONITORS

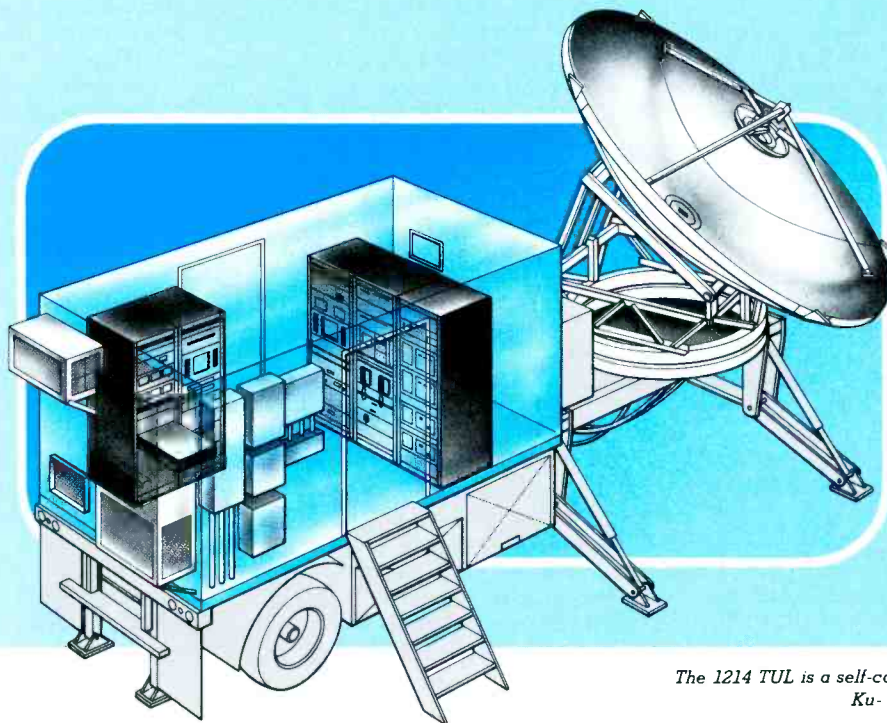


BELAR
AM MODULATION MONITOR



BELAR CALL ARNO MEYER (215) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 826 • (215) 687-5550

Circle (47) on Reply Card



The 1214 TUL is a self-contained TV broadcast studio for Ku- or C-band satellite transmission.

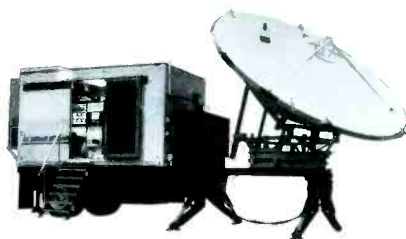
The simplest way to put your special event on the air is with a Microdyne transportable uplink

Direct to satellite, no delays

Since the essentially interference-free Ku-band requires no frequency coordination, you can slice hours off your broadcast response time.

And since you link directly to a satellite, you rely less on expensive, troublesome backhauls.

The whole thing couldn't be simpler: from site to satellite to studio. With no interference. No loss of signal quality. No delays.



The 1214 TUL can be towed at highway speeds and is only one of many transportable uplinks available from Microdyne.

Not just for ENG

Electronic news gathering is only one of the many uses of a Microdyne transportable uplink. As a completely self-contained broadcast studio, it is ideal for sports events, political conventions, outdoor concerts or

other special event.

In fact, one of our transportables is already booked for the '84 Summer Olympics and both national political conventions.

Ku- or C-band, audio or video

Of course, not everyone wants or needs all of the capabilities of our full-blown Ku-band uplink. So we give you a choice of either Ku-or C-band, with as much or as little production equipment as you need.

We even have a smaller, audio-only transportable uplink that uses the economical Single Channel Per Carrier (SCPC) radio system. State and regional radio networks have found this system ideal for local sports broadcasts.

And the hourly transponder lease rates for satellite distribution are very economical. A full Ku-band transponder for video (43 MHz) costs about \$600 an hour. Monthly rates can cut that in half.

The cost of an audio-only C-band channel is even less: just \$75 per hour. That's for a single 7.5 kHz (10 dBw)

channel. Bulk use rates can reduce that even more.

Custom uplinks and downlinks

Our engineering staff is skilled at custom-tailoring our equipment to suit your needs. We offer a full range of components and services for both uplinks and downlinks, and all our products are backed by one of the most responsive service policies in the industry.



Our 3.66-meter audio-only uplink. The electronics are housed in rugged carrying cases that are easily transported and quickly set up.

If you would like more information about our transportable satellite uplinks, call our Marketing Department at (904) 687-4633 and tell us what you need. You'll be amazed at just how simple it can be to put your special event on the air.



Microdyne Corporation

P.O. Box 7213 • Ocala, FL 32672 • (904) 687-4633 • TWX: 810-858-0307

Circle (48) on Reply Card

CINEMA PRODUCTS

Mini-Mote: Remotely controlled pan/tilt head designed for all popular 16mm/35mm film cameras as well as all EFP video cameras, including the Ikegami EC-35.

J-6 zoom control: Using the same motor as in J-4 and J-5 products, J-6 includes an integral 12Vdc rechargeable battery with solid-state circuitry in a single-cast aluminum housing.

Mini-Worrall head: Rugged, compact and lightweight precision geared head with low center of gravity designed to accommodate today's cameras, from an ARRI 35BL to an Ikegami EC-35.

Skymount 8081: A product of Cogans & Wilson (United Kingdom), for use with various helicopters to stabilize various TV and film cameras, provides countersprung mounting stability and maximum maneuverability.

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

CLEAR-COM INTERCOM SYSTEMS

TW-12: Universal 2-wire interface,

connecting Clear-Com systems to 2-wire systems, such as RTS, translating line levels, power supply voltage and signaling.

CP-300: Belt-pack remote station is switchable between Clear-Com and RTS-type intercom systems, for single-/2-channel operation, dynamic or carbon mic/headset, mic limiter and optional visual signaling.

Circle (403) on Reply Card

See ad on page 74

COLLINS DIVISIONS, ROCKWELL INT'L.

Doppler Radar: Complete weather radar system using Doppler effect pulse-pair processing, showing precipitation only, turbulence only or precipitation and turbulence, provides easily understood colorized displays of weather conditions.

Circle (404) on Reply Card

COLORADO VIDEO

290CT: Slow-scan TV transmitter for analog NTSC color signals, requiring 8kHz bandwidth, sends a single-

field picture in 74 seconds. System allows audio channel transmission of TV signals.

250 receiver: Complement to 290CT transmitter, the receiver accepts the 8kHz bandwidth slow-scan TV signal and reproduces the image in color. Gen-lock to other system equipment is possible.

Circle (405) on Reply Card

COLORGRAPHICS SYSTEMS

LiveLine IV: Digital paint system provides 256 simultaneous colors, anti-aliasing, fully interactive weather interfaces and multiple work stations.

Prompter: High resolution font-selectable prompter, automatic script input, speed control, flexible show order.

DiskPak: Archive system for NewStar, adds 50Mbyte storage with 25Mbyte disc cartridges. Cartridges are removable for on-shelf storage while directory remains on-line.

Networking: Interlinking with other NewStar systems for instant national and international information exchange, based on public data network packet switching. →

the VC-2000P...Engineers Love its Ability! Owners Love its Price! A Complete Video Processor For \$695

The VC-2000P is perfect for videotape editing, duplicating and for use as a camera control unit. It automatically regenerates all sync, blanking, and color burst signals which will correct most instabilities (such as jitter, bending, and rolling.)

As a camera control unit the video, color, and hue adjustments

allow camera matching and correct levels. In tape editing these controls provide scene to scene matching and fade to black.

Enhancement and noise reduction controls provide dramatic picture improvement and reduce tape duplicate generation loss. Additional

features include four video and four audio outputs, and optional plug in RF modulator.

The rack mountable VC-2000P is only \$695.00. Call or write for literature. Dealer inquiries invited.

ICM VIDEO

10 North Lee • P.O. Box 26330
Oklahoma City, OK 73126
(405) 232-5808



Circle (49) on Reply Card

The only big thing about Neve's video editing console is the quality.



Neve's 5455 4 bus console

That's why more facilities demand Neve.

More and more video editing suites are being equipped with Neve's 5455 4 bus consoles, part of the highly successful 542 range of 6, 8, 12 and 16 input 2 bus consoles that have become an industry standard in all facets of production: Complete Post Production, Vidtronics, Telemation Productions, Windsor Total Video, Teletronics, and Reeves Teletape to name a few. It's no wonder.

The 5455, engineered and designed to offer the exceptional Neve quality you've come to expect of the larger units, is uniquely suited for video editing.

Features include two types of interface to video editing systems: Post-fade balanced line level direct outputs from each channel for those switchers/editors requiring independent audio sources; or a VCA interface that provides DC voltages to control the input channels gain. Cross-fades and cuts on the 5455 may now become part of the EDL.

The 5455 4 bus with 12, 16 or 24 inputs is available in a "drop-through" mounting configuration, providing excellent control access in minimum space.

For further information, please call (203) 744-6230 or write.

Demand Neve

RUPERT NEVE INCORPORATED: Berkshire Industrial Park, Bethel, CT 06801 (203) 744-6230 Telex 969638 • 7533 Sunset Blvd., Hollywood, CA 90046 (213) 874-8124 Telex 194942 • RUPERT NEVE OF CANADA, LTD. represented by: Sonotechnique, 2585 Bates, Suite 304, Montreal, P.Q. H3S 1A9 Canada (514) 739-3368 Telex 055-62171 • NEVE ELECTRONICS INTERNATIONAL, LTD.: Cambridge House, Melbourn, Royston, Hertfordshire, SG86AU England Phone (0763) 60776 • RUPERT NEVE GmbH: 6100 Darmstadt Bismarckstrasse 114, West Germany Phone (06151) 81764.
Circle (50) on Reply Card

Colorgraphics Systems
Continued

RRWDS dial-up radar: Color radar displays of 4096 colors, an option to LiveLine, gives time sequence storm tracking, labeling and special base map construction.

Circle (406) on Reply Card

COMEX CORPORATION

SB010-MRC/MD-100: 10W solid-state transformer and 100W amplifier from Comwave for ITFS operation.

B16S series: Bogner MDS/ITFS antennas for omnidirectional or car-

dioid coverage patterns.

PT2518: Conifer MDS receiving antennas.

MCD-4: Conifer MDS receivers.

Circle (407) on Reply Card

COMPUCON

FM services: Translator/booster application; coverage analysis; existing/potential market area analysis; proposed/pending application modification analysis.

LPTV services: Analysis of returned/dismissed applications for possible reacceptance.

MDS services: Market area

analysis; actual terrain interference studies; new/modified application preparations; listing of existing station operators, applicants and permittees on ITFS/OFS band in requested area of interest.

Circle (408) on Reply Card

COMPU-PROMPT

CP series: Teleprompting system based on microcomputers, providing color coded text, forward/reverse scroll, text editing, hard copy printout and floppy disk script storage.

Circle (409) on Reply Card

COM-TEK COMMUNICATIONS TECHNOLOGY

RC-72 Receive-a-Cue: Director wears M-72 wireless microphone transmitter, while talent uses PR-72b companion receiver and neck-loop transducer and miniature wireless inductor receiver concealed in the ear.

Circle (410) on Reply Card

CONRAC DIVISION/ CONRAC CORPORATION

6200: Class 1 master color video monitor with 13-inch and 19-inch PIL CRTs, NTSC-RGB switchable inputs, Colormatch CRT phosphors, comb-filtering standard and excellent white field and brightness uniformity.

2600: Monochrome video monitors in 9-, 15- and 19-inch CRT sizes, capable of 800TVL resolution, with pulse-cross display and separate H and V drive options.

7300: RGB monitor for ultrahigh resolution exhibits 1000-line non-interlaced capability at 64kHz scan rate with 60Hz refresh rate and 1280x1024-pixel resolution format for flicker-free computer graphics.

Circle (411) on Reply Card

CONTROL VIDEO

See "Update on Editing" on page 128.

Circle (559) on Reply Card

CONVERGENCE

EditDroid: See "Update on Editing" on page 128.

Super 90+: See "Update on Editing" on page 128.

CI-90: Character inserter places time code digits into video being recorded, creates window dubs.

Circle (412) on Reply Card

CROSSPOINT LATCH

6139CHK: Video production switcher, controlled by 7239 auto drive, 6403 editor switcher or 7203

SAFE AND SOUND



With McCurdy's Extended Range Meter

- Accurate, self-contained unit in only 3.5 inches of standard rack mount space.
 - Input sensitivity from -50 dBm to +30 dBm in 2 dB steps.
 - Bridging and matching balanced inputs.
 - Balanced monitor and line outputs.
 - Optional PPM Meter for simultaneous measurements.
- Get performance and peace of mind in the McCurdy tradition with the SA-14023 Extended Range meter.

McCurdy Radio Industries

108 Carnforth Rd., Toronto, Ontario, Canada M4A 2L4
Tel: (416)751-6262 Telex: 06-963533
1051 Clinton Street, Buffalo, New York 14206
Tel: (212)772-0719

Circle (51) on Reply Card

antonbauer Pro Pac 90™

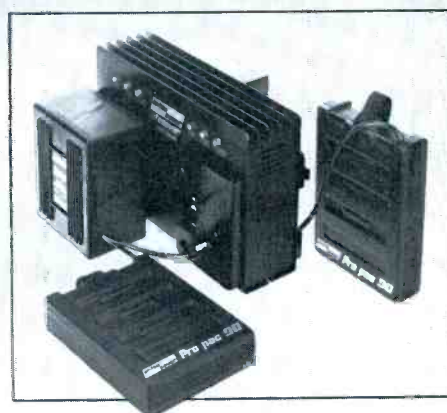
The *professional*
VTR battery.



Exclusive Features:

- **New printed circuit design...**greatly improves reliability compared to conventionally wired batteries.
- **New technology NiCad cell...**provides greater capacity, improved voltage plateau, more reliable fast charging, and virtually eliminates "memory" problems.
- **100% overcharge protection...**every cell is individually monitored during the Anton/Bauer Lifesaver charging routine.
- **Triconn™ connector...**includes cell monitor output for safe and dependable charging. (Patent Pending)
- **New cold temperature protection circuit...**eliminates danger of destroying a cold battery during charging.
- **100% computer tested...**a printout of test results is delivered with each battery.
- **Rugged design features...**new steel reinforced molded cable strain relief and high impact molded case.
- **Direct replacement for Sony BP-90 VTR battery.**

Call or write for our illustrated system brochure, price list and the name of your local dealer.



Lifesaver 8 Hour Quad, LSQ4, can charge any combination of up to 4 Pro Pac 90 VTR batteries or Snap-On™ batteries. The Pro Pac 90 can also be safely charged in one hour with the Lifesaver Fast Charger, LSFC. The Lifesaver chargers prolong battery life and keep batteries fully topped indefinitely.



*The quality standard
of the video industry.*

Anton/Bauer, Inc. □ One Controls Drive, Shelton, CT 06484 □ 203-929-1100

Circle (52) on Reply Card

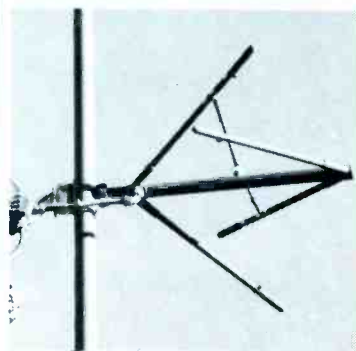


Cetec Antennas

**WHY BUY JUST
AN ANTENNA?
WITH A CETEC
ANTENNA YOU GET:**



★ HIGH QUALITY ★
TWO YEAR WARRANTY
PERFORMANCE THAT'S
UNEQUALLED
RECOGNIZED SUPERIORITY



In today's competitive FM market, you have no reason to consider an antenna that's not the very best. That means a tried and proven Cetec antenna. Over one thousand JSCP Penetrators have built this reputation, and other Cetec models support higher or lower power requirements.

**NOW, DON'T YOU WISH
YOU HAD A CETEC?
THE EDGE IN PERFORMANCE!**

**CALL THE FACTORY
OR YOUR CETEC DEALER**

Cetec Antennas
6939 Power Inn Rd.
Sacramento, CA 95828
Tel: (916) 383-1177
Telex: 377 321

Circle (53) on Reply Card

Crosspoint Latch Continued

editor switcher for elaborate computer-controlled effects; interfaces also to 6800 audio mixer for post-production.

6150BK: Master control switcher, offering 16-input switching, optional second audio channel, serial port for computerized control and programming for two transitions in real time.

6124A: Rack-mount version of 6124, with LED-lighted push-buttons, can be controlled from edit controller by 6403 editor switcher interface. The 4-bus, 12-input system includes two independent mix/effects amps.

6116: A 3-channel video switcher, handling encoded video or component video signals including Y-688 or RGB formats, with four inputs dedicated to component, three to encoded. Mix or transitions between the two modes are not allowed.

Circle (413) on Reply Card
See ad on page 174

dbx

Demonstrations: Multichannel TV sound, including stereo audio and second audio program.

ICs: Integrated circuitry for multichannel sound equipment.

700: Digital audio processor based on companded predictive delta modulation (CPDM) technology. Products include 710 2-channel mic preamp module, 700P playback-only digital processor and D700 disc-mastering delay unit.

Circle (414) on Reply Card

DALSAT

DSA-TVRO: Receive-only earth station for television.

DSA-ST: C-Band uplink for fixed earth station applications.

DSA-DR: D-Band dual redundant uplink system for fixed earth stations.

DSA-K-Band: Ku-band uplink system for fixed earth stations.

Circle (415) on Reply Card

DATA COMMUNICATIONS

BUYLINE: A variety of automated products and services for broadcast stations, representatives and agencies, allowing shared information through a common link, including BIAS for the station, REPLINE and SESAMI for reps, and SPOTLINE and COMM-LINE for ad agencies or buyers.

IBM PC software: Spreadsheet, Database, Newsroom, Word processing and other financial software designed for the broadcast station with an IBM PC.

Circle (416) on Reply Card

DIGITAL ENTERTAINMENT

X-80 and X-80A: Digital audiotape

recorders, using a fixed-head design with wide dynamic range, flat frequency response, low distortion and freedom from wow and flutter; operationally similar to analog machines.

XE-1: Digital electronic editor for the X-80/X-800 recorders, a powerful addition to cut-and-splice editing facilities of the X-80 series of digital recorders.

SAM 82/SAM 42: Portable broadcast audio mixers. SAM 82 is an 8x2 mixer, featuring linear faders, input sensitivity adjustments, on-channel EQ, full monitoring and test oscillator. SAM 42 is a 4x2 version.

Circle (418) on Reply Card

DIGITAL SERVICES CORPORATION/DSC

Illusion: Digital effects system includes slides, squeeze, flips, spins, compression and mirror image, with perspective and aspect control, from programmed and pre-programmed integral bubble memory storage system.

Flexikey: Digital effects unit for key images.

Conductor: Master control automation system.

Statistician: Sports/election statistical software package.

Circle (419) on Reply Card

DOLBY LABS

380: Circuitry providing Dolby noise reduction for the Ampex VPR-3 and VPR-80 VTRs.

362: System for applications requiring 2-channel noise reduction simultaneously.

Circle (420) on Reply Card

See ad on page 97

DUBNER COMPUTER SYSTEMS

Automatic scene change detector: Locates and identifies film frames or video fields where cut type scene changes occur; camera movement changes are ignored.

Circle (421) on Reply Card

See ad on page 77

DYNAIR ELECTRONICS

Control systems: New control system for Series 25 and System 21 distribution switchers with increased flexibility.

Circle (422) on Reply Card

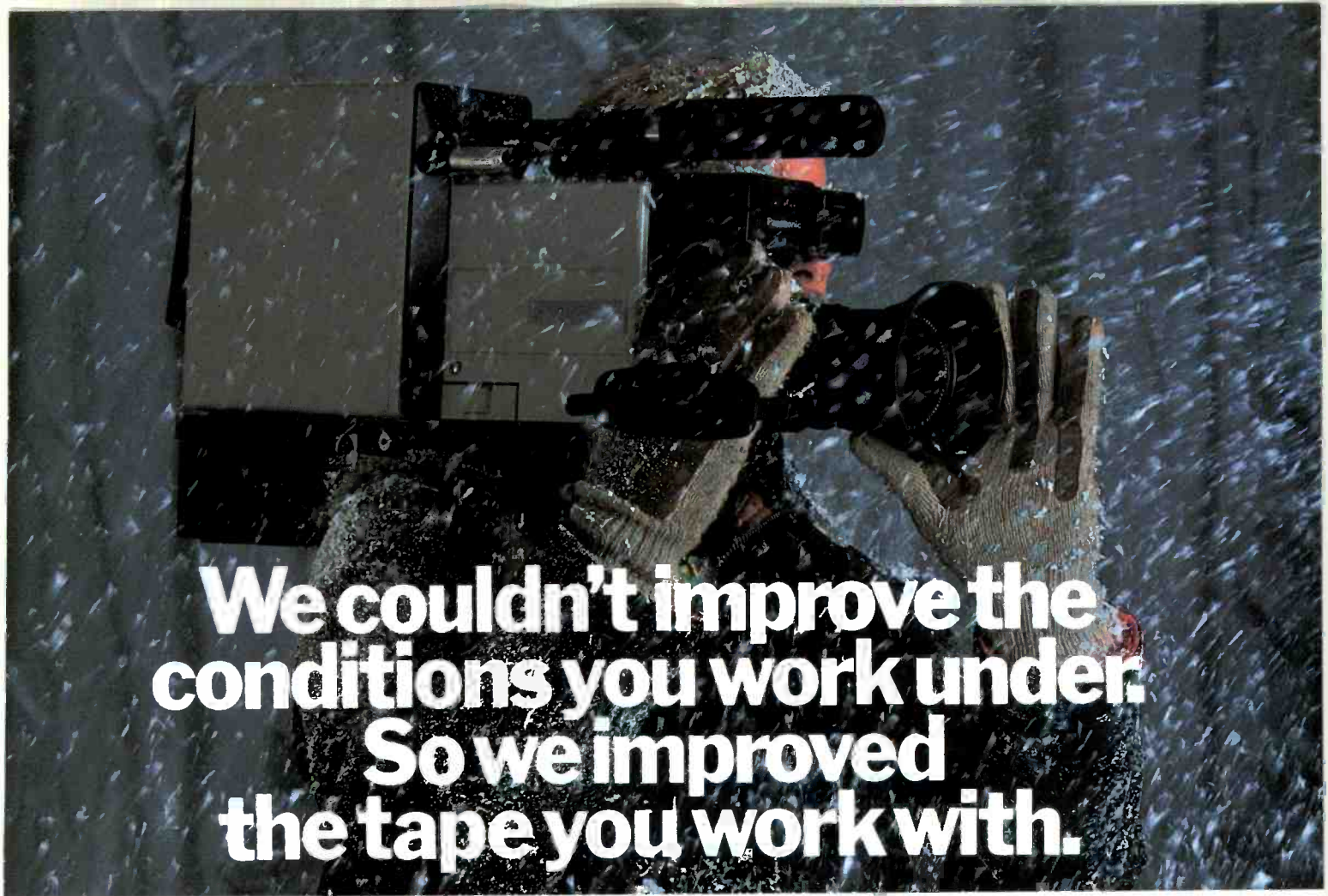
See ad on page 107

DYNAMIC TECHNOLOGY LTD.

Library system: Computer software package simplifies management, archive and search facilities in a videotape library.

VPA-2646: Video equalizing DA, based on 6-output modules, each with integral power supply. Nine modules fit in a 2-unit-high, 19-inch rack panel.

SDA-2656: Audio DA module, pro-

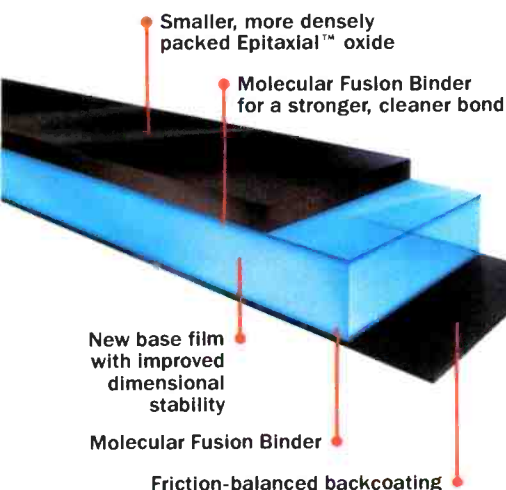


**We couldn't improve the
conditions you work under.
So we improved
the tape you work with.**

HGX Pro 1/2" Videocassettes.

Differences you can see, hear. And retain.

At last, tape performance impervious to the whims of weather and the rigors of editing. Harnessing new tape technology, Maxell brings ENG dramatic improvements you can see, hear and retain.



The Epitaxial™ contribution: higher video, brighter chroma.

A new, smaller oxide achieves unprecedented packing density. Expect enhanced signal-to-noise. Better definition. And extended replays without signal loss.

Molecular Fusion Binder: longer life bonding for truer-to-life performance.

A bond immune to time, temperature or mechanical stress. With no need of plasticizers, so none can creep to the surface. Anticipate far fewer dropouts, less clogging and extended tape and head life.

New base, binder, backcoating. Better support for the signal.

No static. No noise. No dust. The molecular-fused backcoating assures diminished mechanical and magnetic noise. And optimum running smoothness, even in high heat.

A shell made to the industry's toughest standards.

Ours. The transport is quiet, jam-proof. The housing immune to temperature extremes.

From open reel tapes to a complete line of KCS/KCA U-Matics, audio and VHS/Beta cassettes, we're getting quality down to a science. And in your hands, our science turns to art.

**HGX Pro 1/2" Videocassettes
in Beta and VHS.**



maxell®

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020

Circle (54) on Reply Card

Dynamic Technology

Continued

viding 10 balanced outputs per module with integral power supply and compatible with VPA-2646 system.

Circle (423) on Reply Card

EECO

Still-frame audio: Interactive videodisc system, stores up to 10 seconds of audio information within the space required for one video frame, for a variety of applications in broadcasting.

ECONOLINE: Entry level post-production and editing time code products, including MTG-55 LTC generator, TCR-65 reader and VCG-75 character generator for SMPTE format.

IVES enhancements: See "Update on Editing" on page 128.

EMME: See "Update on Editing" on page 128.

Circle (424) on Reply Card

See ad on page 135

EEV

K3372 klystron: 55kW rated, broadband, external cavity klystron, designed for 40% or greater efficiency, includes beam control system for higher efficiency.

K4351W assembly: Continuously tunable from 470-860MHz, with numeric readout indicators.

P8490/P8496 Leddicon: One-inch camera tube with barium aluminate cathode for longer life in diode-gun design. P8442 designates a LOC variant.

P8450/P8452 Leddicon: 30mm camera tube with LOC target and diode-gun design. P8452 includes barium aluminate cathode.

P4320 CCD camera: P8602 series frame-transfer CCD device provides freeze-frame operation from 1/50-1/1000s for motion analysis, sports action or production line control.

Circle (425) on Reply Card

EG&G

SS124: Photocell sensor, reacts to ambient light condition for control of tower lighting units.

SS125: Strobe-type lighting flasher heads, for tower beacons or other hazard lighting requirements.

Circle (426) on Reply Card

EASTMAN KODAK

Videotape products: EVT-1000 1-inch tape for B and C Formats, standard or mini 3/4-inch U Format and 1/2-inch Beta and VHS Format packaging.

Circle (427) on Reply Card

See ads on pages 94 and 95

ECHOLAB

AFS: Eleven-input audio-follow-video switcher system, providing 2-bus audio system capable of audio cuts and fades with manual or remote-controlled operation.

Circle (428) on Reply Card

ELECTOR USA

Barco CTVM4: Master control color monitor, in 14-inch and 20-inch CRTs for RGB, NTSC/notch, NTSC/comb, PAL/notch and SECAM standards.

Barco DCD: Super version video monitors for all standards, as well as RGB and IBM-PC signals, in 16-, 22- and 27-inch CRTs.

Barco MCD: Modular video monitors for NTSC, PAL, SECAM and RGB includes speaker and optional tuners, in 22-inch and 27-inch CRTs.

PAD series: Barco public address display monitors for attractive and colorful cycling messages and graphics, with storage capabilities of 12-, 32- and optional 64-frame messages of 12-line, 40-character format.

Circle (429) on Reply Card

ELECTRO IMPULSE

Various FM dummy loads; calorimeters and wattmeters; RF attenuators.

Circle (430) on Reply Card

ENVIRONMENTAL SATELLITE DATA

PMT-100 update: Storage of 250 images, capability for creating loops of nine images or more and included graphics pad form basic weather-graphics package. Interfaces for Zephyr broadcast transmission, Collins Doppler radar and RRWDS radar.

Weather data products: Visible data satellite pictures, composite surface and satellite pictures, upper-air analysis pictures.

Circle (431) on Reply Card

EURO EQUIPMENT SERVICES

Magstand: Computer-assisted animation stand for film or video, driven by stepping or dc motors; north/south movement—400mm, east/west movement—70mm at 500mm/s with dc motors or 200mm/s with stepping motors.

Mag Lens: Zoom lens for optical printer system.

Maglight: Additive lamphouse for optical printer.

Circle (432) on Reply Card

EXCALIBUR INDUSTRIES:

Shock absorber case: Features

2-inch foam lining, floating inner sleeve and standard rack-mount rails. Access doors can be custom-designed.

Circle (433) on Reply Card

FILM/VIDEO EQUIPMENT

SLA12125: PEP battery pack, rated 12Vdc, 12.5aH, for video cameras, recorders and dc-powered monitors.

Circle (434) on Reply Card

FOR-A CORPORATION OF AMERICA

FA-430: TBC system, includes digital image enhancement and color correction functions.

FA-600/690: TBC system with frame-store or synchronizer modes.

FA-410: TBC equipment provides dynamic tracking control for use with Sony BVU-820 or Panasonic NV-series U Format VCRs.

VTW-400: Video character generator/titler equipment.

CS-4300: Video color corrector system.

DEC-100: Color video decoder, converts NTSC composite video to RGB components.

VTG-12: Video generator, creates time, date and timer characters.

Circle (435) on Reply Card

See ad on page 165

FOROX

VMP "800"S: Multitrack audio display system shows each track in a different colored bar on the video monitor, allowing the operator to see when tracks will be audible seven seconds in advance.

Circle (436) on Reply Card

FREZZOLINI ELECTRONICS

MF12: Lightweight minifill light head for 12Vdc operation.

VB12V: High technology line of 12V battery packs.

BDC2: Two-channel battery conditioner and charger system.

FPC1: New line of Frezzi power charger systems.

Circle (437) on Reply Card

FUJI PHOTO FILM USA

H521 BR: 3/4-inch U Format broadcast videotape cassettes, Beridox formulation.

3/4" F.R.S.: Flame-retardant shipper for U Format KCA/KCS cassettes.

H451: 1/2-inch VHS Super XG cassettes.

H351: 1/2-inch Beta Super XG cassettes.

Circle (438) on Reply Card

GEC-McMICHAEL LTD.

Satellite terminals: For Ku-Band

ANNOUNCING FORTY YEARS OF BROADCASTING EXCELLENCE... SWITCHCRAFT.

That statement should come as no surprise to anyone in broadcasting. For over forty years, we have been supplying broadcast engineers and technicians, studios and stations with efficient, durable audio components of every shape, size and design. As a broadcast professional you already know, and probably use, our products.

Just look around your studio for a moment. From the simplest audio connectors and patch cords to more sophisticated jack field and impedance matching transformers, Switchcraft products are an integral and basic part of the broadcasting and recording industries.



As you have grown, so have we. Our commitment to quality and excellence has led us to technological advances such as the "QG" Quick Ground connectors, a product innovation that has yet to be surpassed. All of our components are designed for convenience, durability and perfect sound transmission to insure broadcast and recording excellence.

Today, our product line encompasses thousands of standard and miniaturized components serving the full spectrum of audio requirements. Call us or your Switchcraft Representative today for complete details on all of our components and plug into forty years of experience.

SWITCHCRAFT INC.

A Raytheon Company

5555 N. Elston Avenue • Chicago, IL 60630 • (312) 792-2700

Circle (55) on Reply Card

YOUR WORLD

The whole show builds to a series of quick cuts. But building those cuts isn't a quick process. So you take it back and forth...frame by frame...over and over. Through endless passes—and endless points of view. But in the end, what you really have to trust are your own eyes. And your instincts. And your tape.

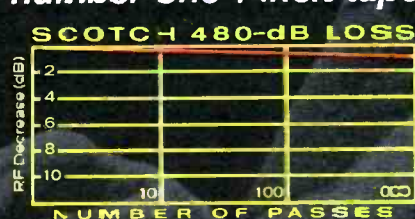


Photographed at VCA Teletronics, New York City.
© 1984 3M Co. "Scotch" is a registered trademark of 3M.

OUR TAPE



We know you need a videotape that can take the punishment of relentless editing. So we've taken the number one 1-inch tape in the world—our own Scotch® 479—and topped it. With



Scotch 480. With the same excellent electromagnetics as 479. The same superior dropout performance. And the same laser-tested consistency. But with 480, we've made a tape that's still more rugged—capable of retaining original picture quality even after 1000 edit passes from the same pre-roll point. With less than 1½

dB loss. Without stiction. And with the backing of Scotch engineers just a call away. Scotch 479 and 480. Two of the tapes that make us...number one in the world of the pro.

Scotch®
AUDIO & VIDEO TAPES

NUMBER ONE IN THE WORLD OF THE PRO

3M

Circle (56) on Reply Card

GEC-McMichael
Continued

applications, a receive-only system and an elliptical-design transmit/receive system.

GM9015/A: LNA/LNC, GASFET design; for Ku-Band, rated 150°K.

GM9060: Satellite receiver for Ku-Band systems.

GM4001: Precision NTSC decoder unit, incorporates comb-filter techniques.

GM7151/GM7137: NTSC color monitors, using 20-inch and 14-inch CRTs, respectively.

GM8000 series: Monochrome monitors include CRT sizes from 5½-inch to 20-inch.

Circle (439) on Reply Card

GTE SPACENET

Satellite services: Promotion of services scheduled for 1984 and 1985 on Spacenet and GSTAR satellites; C-Band and Ku-Band; 36MHz, 54MHz and 62MHz bandwidths; 8.5W, 16W, 20W and 30W satellite transmitters; various coverage footprints.

Circle (440) on Reply Card

GENERAL ELECTRIC LIGHTING DIVISION

FWM Watt-Miser: Quartzline lamps, for use in quartz-halogen fixtures, with optical coating, for 40% energy savings; 650W lamp replaces a 1kW lamp, for 90% of the light, but 35% less heat.

Circle (441) on Reply Card

GRAHAM-PATTEN SYSTEMS

612: Post-production audio mixer, featuring 12-input, dual-channel output, with microprocessor control and plug-in hardware and software modules.

1238 keyer: Stand-alone keyer in a single rack unit, allows selectable self-key or external key and provides keying from colored sources; optional matte generator for colorizing.

1231 DSK: Downstream keying system for up to six simultaneous keys, masking, mix in/out, program fade to black, edit controller interface.

1235: Simplified downstream keyer system.

Circle (442) on Reply Card

See ad on page 128

GRASS VALLEY GROUP

100: Small format video switcher, low cost, for applications in which fewer inputs are required, but flexibility is desired.

3291: Wavelink fiber-optics, the laser long distance system, provides link distances to 25km; single audio, dual audio and data options.

Demonstrations: Component video research and development products.

Circle (320) on Reply Card

See ad on page 7

GRAY COMMUNICATIONS CONSULTANTS

Mobile production vehicles.

Circle (443) on Reply Card

GRAY ENGINEERING LABORATORIES

FDG-241: Film counter/data generator equipment for video-assisted film editing provides display of time code, film edge numbers, scene/take and reel numbers on video monitor for edit decisions.

Circle (444) on Reply Card

GREAT AMERICAN MARKET

LZR/Lighthesizer: Modular lighting control system with full manual board and two memories, including 2-scene preset with 120 cues and memory chase for up to 2368 continuous steps.

Blackwrap: Flexible matte black aluminum in 12"x50' rolls. Thickness of 0.002" allows easy forming to mask light leaks and shape beams.

MicroChase: Battery-powered low

Clear-Com Gives You...



...a Choice!

For more information, call or write:



1111 17th St. / San Francisco, CA 94107
415-861-6666 / TWX: 910-372-1087
EXPORT DIV.: Box 302
Walnut Creek, CA 94596 / 415-932-8134
Telex: 176340 CLEAR-COM WNCK

In this demanding industry so abundant with incompatible formats, Clear-Com presents TWO barrier-breakers: a 2-channel belt-pack that works on standard mic cable and a Clear-Com-to-RTS System Interface!

Our CP-300 Two-Channel Belt-Pack is not only a high-intelligibility Clear-Com Remote Station, but it also provides the same pin-to-pin connections as RTS-type intercoms with *better performance*.

Ergonomically, the tough, lightweight CP-300 has been designed for camera operators and production people. Dynamic or carbon headset-compatible, it features rocker switches that place Clear-Com's popular features at your fingertips. Three-pin XLR input and output connectors allow simple, quick set-up.

The CP-300 works with any Clear-Com or RTS System. You decide: do you want one channel or two? Finally, you can enjoy two channels of communication in an RTS-type OR Clear-Com-type* intercom system.

The choice is yours!

*two channels when used with Clear-Com TW-12 two-wire interface

Circle (57) on Reply Card

There's a Microtime Time Base Corrector for every application. And budget.

T-100. One of the lowest priced digital TBCs in the world. But you'd never know it when you see what it does. Designed with many of the features that made our T-120 the industry leader, the T-100 offers unparalleled performance for a wide range of broadcast, industrial, cable and low power television applications. The most TBC for the money. **\$6,950.**



T-120. The T-120 does everything but cost a lot. Engineered to bring out the best in non-segmented 1/2" and 3/4" VTRs. Designed and built to outperform anything in its class. The price: **\$8,450.**



T-120D. A dynamic breakthrough in TBC technology. The T-120D features two major improvements: DYNAMIC TRACKING (DT)* and digital effects capabilities. DT operation allows for "on air" slow motion and freeze frame when used

with a SONY* BVU-820 U-MATIC* VTR. Connect two T-120Ds to our optional E-120 effects processor, and the result is an inexpensive effects system that provides A/B roll editing, digital effects and DYNAMIC TRACKING.* Only **\$9,950.**



*DYNAMIC TRACKING, SONY and U-MATIC are registered trademarks of Sony Corp.®

MICROTIME

A Subsidiary of ANDERSEN GROUP

1280 Blue Hills Ave., Bloomfield, CT 06002. (203) 242-4242. TWX 710-425-1165.

Circle (58) on Reply Card

All in good time.



Great American Market

Continued

voltage light sequencer system, concealable in costume or decor, handles 20 lamps per circuit with adjustable speed.

Mini Scene Machine: A modular lighting projection system designed to handle 4"x5" glass or steel effects or transparencies, 35mm transparencies and standard Great American patterns.

Circle (445) on Reply Card

See ads on pages 46, 146 and 152

GRUMMAN AEROSPACE

Rainbow Sound: Encoding of audio into the video format allows a cost-effective method of obtaining a full bandwidth audio path, operates with present transmitter configurations.

Circle (446) on Reply Card

HM ELECTRONICS

SYS-82: Studio wireless microphone system with Dynamic Expansion II, featuring a compact transmitter with detachable belt clip option, advanced receiver design and wide dynamic range.

SYS-58: Hand-held wireless system with Dynamic Expansion II, using a Shure SM58 microphone element.

RX752: Low profile, Flat-Pac battery-operated wireless microphone system receiver, designed for ENG, EFP and film applications.

WH710: Flush-mount 2-channel headset station, featuring the same circuitry as the WL742, but without the speaker. The unit mounts in a standard electrical box.

BH730: Low cost wireless intercom system. The half-duplex wireless communications Belt Pac interfaces with an unlimited number of remote Belt Pac stations.

BH740: Low cost wireless intercom system. The full-duplex wireless interface Belt Pac functions as a standard Belt Pac with radio system operation built in to connect a wireless system to a cable system.

BH750: Low cost wireless intercom system. The full-duplex wireless Remote Belt Pac with headset transmits to a BH740 intercom system.

Circle (447) on Reply Card

HARRISON SYSTEMS

Raven: Forty-position console mainframe, expandable, follows many design concepts of MR-4 systems, supplied with 28 input modules and 28 SIFAM VU meter movements; allows expansion kit.

TV-4 teleproduction console: For a variety of configurations with 52 mono mic/line or stereo line inputs,

simplified operation and modular construction for various applications.

PRO-7: A family of consoles, patterned after the TV-4 systems without the complexity, for broadcast, live sound, cine and teleproduction industries.

AIR-7: Console design aimed at broadcasting, using proprietary balanced, differential signal function blocks, high RF immunity and human-engineered precepts.

Circle (448) on Reply Card

KARL HEITZ

Fluid heads: Models 580 and 680 incorporate 100% fluid damping of pan and tilt action for 50- and 100-pound cameras, respectively.

566M: Gitzo extra short mic fishpole, reaching from 15- to 54-inches in six sections, 3/8-inch and 1/2-inch bushing fits various microphones.

Leveling balls: 621BC and 621BCL, for fluid heads with headlock; optional gearlift for height adjustment.

Circle (449) on Reply Card

HOTRONIC

AD51 enhancements: Freeze-frame/field, remote-control and dropout compensation capabilities added to the TBC system.

Circle (450) on Reply Card

HUGHES ELECTRONIC DEVICES

IRS-24X48: Intermediate routing switcher system, for audio and video, with 24-in/48-out matrix.

ISC-480: Serial control option, based on RS-232, allows remote control of IRS series routing switchers.

SAS-401/SVS-401: Self-powered audio or video routing switchers with 4x1 format.

SRU-RGB: 8x1 component video routing switcher, featuring 45MHz bandwidth, is usable for RGB of YIQ component formats.

Circle (451) on Reply Card

ICM VIDEO

VC-2000P: Video processing system, regenerating sync blanking and burst with enhancement and noise reduction, for editing and duplication facilities or camera control.

SR-4600P: Commercial C-Band satellite receiver, featuring return to channel after loss of power; compatible with Chaparral and M/A-COM Omni Spectra polarization systems.

Circle (452) on Reply Card

See ad on page 64

IKEGAMI ELECTRONICS (USA)

HL-95 Unicam: Camera/recorder

system with configurations for Bosch 1/4-inch Lineplex and 1/4-inch M Formats, as well as typical ENG and EFP applications.

ITC-730A: Less expensive ENG/EFP color TV camera system with 300M CCU.

HDTV equipment: High definition studio and field TV camera with TM-751H 30-inch TV color monitor in 5:3 aspect ratio for 1125TVL resolution.

EC-35HD cinematography camera: Electronic film-style camera with latest lenses and accessories.

ML-83/79: ENG microwave link equipment for use between HL-79E and HL-83 portable cameras and a central production location.

Series 9 monitors: 9V precision in-line and delta-gun 19V and 13V high resolution color monitors.

TKC-990: Autoset telecine TV camera system, using computer control and diascopes with digital geometric correction for less than 0.05% registration error in a 3-tube prism optical configuration.

Circle (456) on Reply Card

See ads on pages 25 and 111

INDUSTRIAL SCIENCES

AFE: Automated production effects unit, adds flexible effects control in conjunction with 904 switcher.

9016: Auto transition unit.

Series 5000/7000: Distribution amplifiers for video, audio, pulse delay and subcarrier requirements.

Circle (453) on Reply Card

INTERACTIVE SYSTEMS

See "Update on Editing" on page 128.

Circle (560) on Reply Card

See ad on page 88

INTERAND

Discon 1000: Teleconferencing system coupling freeze-frame video with interactive audio and computer-aided graphics, for applications in which conference participants do not need to see each other, but do want to see documents, charts, etc.

Circle (454) on Reply Card

INTERFACE ELECTRONICS

550: Modular audio mixer for radio and TV production.

200: Portable audio mixer, featuring talkback, cue send, balanced outputs, P&G faders and ac/dc operation.

Circle (455) on Reply Card

JVC COMPANY OF AMERICA

BY-110U camera: Three 1/2-inch Saticons and f/1.4 prism-optics offer 600TVL resolution, automatics, 54dB

The more you see, the more we hear



Look who's talking about Dubner now.

While we claim no responsibility for the famous line, "Build a better mousetrap and they'll beat a path to your door," we'd like to think it might have been said about the Dubner CBG-2 video graphics/animation system. In any case, we thought you might like to hear what your colleagues are saying about us:

"The CBG-2 is undeniably the most novel and flexible state-of-the-art real-time animation graphics device currently available."

— Mark Bernardo, Chief Graphics Design Engineer, Olympics ABC Television

"We needed a machine that would allow us to compete effectively in an already competitive market. The CBG-2 gave us the capability to create weather maps and news graphics quickly, it could be operated by department personnel, and it was the best buy on the market."

— Bob Plummer, Director of Engineering, Fisher Broadcasting KOMO (Radio & Television, Seattle)

"It's a digital computer and animation tool that allows artists to create quality animations independently. The CBG-2 is relatively inexpensive, it works fast and enhances the creative process with real-time imagery."

— Elaine Schwartz, Computer Animator Atlantic Image (New York animation house)

"The CBG-2 is much faster and less expensive than standard film animation. The real-time animation, clean key capability, expandability and great software support make it one of the best computers around."

— Corinne Sousoulas, Art Director Motion Picture Laboratories (Memphis post production house)

"The CBG-2 is a valuable tool due to its ability to create effective graphics quickly. It offers three dimensional animation, graphic enhancement, and character generation all in one unit. And these features are difficult to find in any one machine."

— Victoria Henigman, Electronic Graphic Designer WPBT-TV (Miami PBS Affiliate)

"The Dubner was purchased for its advanced animation capabilities, its ability to be upgraded via software, and its cost effectiveness. We love it!"

— Dan Sokol, Vice President, Engineering Video Post & Transfer (Dallas post production house)

With all the nice things being said about Dubner, all we can say is thank you. We plan to keep up the good work. You'll keep seeing it and we'll keep hearing about it.

For a free demonstration of the Dubner CBG-2, call (201) 592-6500, or write.



Dubner Computer Systems, Inc. 158 Linwood Plaza Fort Lee, New Jersey 07024

Circle (59) on Reply Card



JVC Company of America
Continued

S/N, hot shoe viewfinder and 8.2-pound weight, without viewfinder or lens.

KY-320U ProCam: Autoshift registration, matrix masking, $\frac{2}{3}$ -inch industrial grade Plumbicons and f/1.4 prism combine in portable or studio configuration TV camera.

KY-210U camera: A resolution to 650TVL at 57dB S/N is possible, along with low light performance in 40 lux at +18dB gain, from prism-optics, RS-170A output, 2H vertical enhance-

ment with level dependency.

Digital audio mastering system: Videocassette VHS recorder is basis for a biparity recording format with 16-bit linear quantization in PCM processor.

See "Update on Editing" on page 128.

Circle (457) on Reply Card

JENSEN TOOLS

Foam-filled personal computer case: Zipper-style enclosure filled with high density 2-inch polyfoam for conveniently and safely transporting a personal computer and peripherals or

other sensitive electronic equipment.

Zipper-style telecommunications kit: For inside plant repair work, combines a comprehensive selection of tools and test equipment with a zipper-style attache case.

Circle (458) on Reply Card

KAVCO

Kavcart: Random-access video cartridge player system, controlling up to 96 decks, interfacing to master control via RS-232 and providing printed logs and positive tape identification.

Circle (459) on Reply Card

KAVOURAS

Triton XL: Graphics and animation system for television, planned for the weather, but useful for all graphics.

Satellite services: High speed data communications provided via satellite links.

Triton Radac display: Doppler radar information processed and displayed by the TRITON X system.

Circle (460) on Reply Card

KNOX VIDEO PRODUCTS

K100 Chromafont: One uppercase and one lowercase font in two sizes, combined with 512 color palette, four italic choices, superscripts, subscripts, edgings, underline; NTSC/PAL-B compatible, etc.

Knox K701: Color corrector for independent RGB corrections in-line or prerecorded NTSC video, featuring individual controls for red, green and blue pedestal and gain.

7640 colorizer.

Circle (461) on Reply Card

KUDELSKI/NAGRA

IV-S recorder: SMPTE/EBU time code recorder for double recording in conventional film or video, in preparation for mixing and editing on T-audio recorder systems. Standard IV-S units are upgradable.

Circle (462) on Reply Card

LAKE SYSTEMS

La-Kart Matrix 6M: Multievent system for commercial insertion or automated programming allows random access videocart playback, computer controller, floppy disk storage, six Type M VCRs, YIQ with audio-follow switcher, component TBC, Asaca monitor and Tektronix waveform/vector monitors.

Circle (463) on Reply Card

LAIRD TELEMEDIA

4320: 35mm dual-drum dissolve projector.

*"Our
Litepak®
is the best
equipment
investment
we've made.
It's never let
us down."*

Marc Raymond,
Westsun Media Ltd.



For years, the Litepak® 1224 high density dimming system has been the choice of discriminating users of permanent and touring equipment. Now it's available in a competitive twelve-pack for the portable rental market. All models have plug in control and dimmer modules, a separately breakered hot pocket and pin, TLG or PBG receptacles. Main power is fed from the rear by cable or optional G4100 connector. Packs can be stacked in any combination and still allow access to all parts and controls.

The DMD 324 three phase dimmer module has output voltage regulation, a full-sized pregrounding pin, digital continuous self trimming and short circuit protection.

The new 1200 series expandable manual control console has direct or cross face submaster selection, split dipless crossfader and bump/solo buttons.

For the full story on our complete range of equipment contact us at:



DILOR INDUSTRIES LTD.

"Leading Edge Technology For The Arts"

Box 2169, 37749 2nd Ave., Squamish, B.C. V0N 3G0
Telephone: (604) 892-9301 Telex: 04-53383

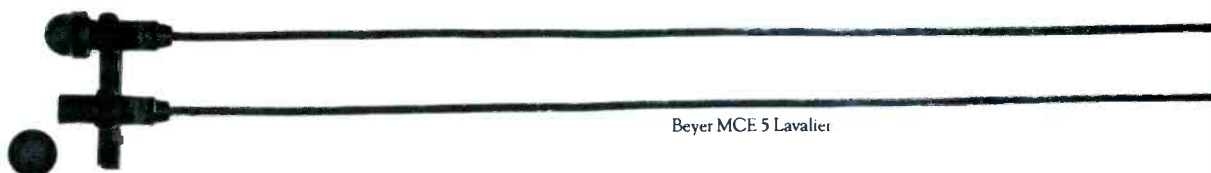
**Dealer Inquiries
Invited**

Circle (60) on Reply Card

Why Beyer mics represent a viable alternative to the usual choices in Broadcast.



Beyer MCM Condenser System



Beyer MCE 5 Lavalier



Beyer M 260

Now there's another high-tech German condenser system.

Until recently, film and broadcast engineers thought only Sennheiser and Neumann made high-quality condenser microphone systems. Now the Beyer MCM Series offers the same German excellence in design and construction, the same kinds of accessories (windscreens, pistol grips, shock mounts) and facilities for 12V and 48V "phantom" powering.

And since the MCM Series studio condenser mic is part of a system which combines power modules and different mic capsules (long shotgun, short shotgun, unidirectional, omnidirectional and figure eight), you get more microphone potential for dollar output.

Like all Beyer microphones, the MCM Series is a truly professional instrument system suited to the widest range of applications in Broadcast/Film and Video post-production.

With lavalier mics, small is not enough.



Electret condenser lavalier mics like SONY's ECM-50 have proven useful for on-camera miking situations because of their reduced size. And while many of these mics offer good performance in a compact size, the Beyer MCE5 also provides extended frequency response (20 to 20,000 Hz) and durability in an even smaller format (diameter: 7 mm / length: 23 mm).

To optimize its compatibility with a variety of broadcast and film applications, the tiny black MCE5 is available in different configurations for powering interface and includes a system with accessories like windscreens, expansion mounts etc.

At Beyer Dynamic's ultra-modern manufacturing facility in West Germany, we hand-build virtually all of our microphones in the most evolved state of fine German engineering.

There's more than one way to bring out the warmth in an announcer's voice.



Broadcast engineers choose the E-V RE20 for many vocal announcing situations because of its wide frequency response (45-18,000 Hz)* and smooth sound. Beyer Dynamic's M 260 also provides the extended frequency response (50-18,000 Hz) and warmth required for critical vocal applications with one distinct advantage: its reduced size. Its compact and efficient ribbon element captures the warmth traditionally provided by this type of mic. And because it is considerably smaller than a mic with a large moving-coil diaphragm, the M 260 provides a natural, balanced sound image in a portable format that won't obscure copy or take up valuable space in the studio.

The Beyer M 260 has its own custom-designed ribbon element to optimize the mic's performance based on its Broadcast applications.

The Dynamic Decision

beyerdynamic))))

*Extracted from competitive promotional literature or advertising.

*Documentation supporting specific comparative claims available upon request.

Beyer Dynamic, Inc. 5-05 Burns Avenue, Hicksville, New York 11801 (516) 935-8000

Circle (61) on Reply Card

Laird Telemedia

Continued

7204: Dual-channel option for 7200B character generator.

7212: Control keyboard option for model 7200B character generator.

Circle (464) on Reply Card

LANDY ASSOCIATES

CB-1: Slate/border generator, showing safe-title area, selectable digit sizes, audio tone output, hard/soft internal key, relay closure on count zero.

Interphase S-202: Remote-controlled switching system for one video and two audio signals, selecting one of 10; gang units for one or 19; control option via SMPTE digital machine control RP-113 available.

S-20: Passive switching system for selecting one of 10 video and associated audio signals in audio-follow mode; audio switching is balanced.

Circle (465) on Reply Card

LAUMIC

Distributor products: Include CMX Edge, Crosspoint Latch 6112BH switcher interfaced with the Edge, and Micro Video EditCalc film/tape editing translator system.

Circle (466) on Reply Card

LEADER INSTRUMENTS

LSG-215A: Programmable, synthesized AM/FM RF signal generator, capable of preprogramming for up to 100 different test conditions.

LPM-8000: Laser power meter, measuring output from laser devices used in compact audio disc and videodisc player systems.

LBO-5860L: Half-rack waveform monitor, displaying baseband-encoded video, including line selection for 1H display of VBI Lines 7-21 of Fields 1 and 2.

LBO-525L: Two-channel oscilloscope with 50MHz bandwidth in vertical amplifier, true calibrated delay timebase with run-after-A and trigger-after A modes.

Circle (467) on Reply Card

See ad on page 5

LEMO USA

Series 01 Minax: Connectors for 50Ω 0.1-inch OD coaxial cable, with quick connect/disconnect design, including cable plugs and receptacles, panel-mount receptacles and straight or right-angle board-mount jacks.

Series 00 NIM-CAMAC: Connectors for 50Ω cables such as RG-174A/U, RG-58C/U and other similar sizes.

Circle (468) on Reply Card

See ad on page 157

LENCO

PSG-412: RS-170A sync pulse generator, SC/H-phased, with blackburst output, remotable gen-lock, VBI line selection; provides blackburst if input fails or unprocessed video if unlocked to input.

PFM-600: Frame and power supply for audio DA system, consisting of PAA-650 DAs, PAA-651 DA with metering and PAM-626 metering and monitoring module.

Circle (469) on Reply Card

LEXICON

1300S: Audio delay synchronizer compensates for audio-to-video and lip sync discrepancies associated with satellite transmission and frame-storage techniques.

1200C: High resolution audio time compressor offering 1s/h time accuracy and RS-232/RS-422 bus interfacing.

Circle (470) on Reply Card

See ad on page 55

LIPSNER-SMITH

CF190: Micro-Perfect film cleaning system, high speed cleaning of 16mm and 35mm film, using ultrasonic cavitation and submerged rotary buffers in solvent-miser process.

SR1200: Automatic solvent recovery methods, self-contained, with 12-gallon batch capacity, distills more than one gallon of solvent per hour.

Reelwind: Constant tension with variable speed forward and reverse film rewinder for 16mm and 35mm, using reels or cores; optional digital counter.

Vedette II: Professional film viewer for 16mm and 35mm, featuring microprocessor control, Quik-Trac speech processing, 80-square-inch view screen and 2400-feet (optional 3000-feet) capability.

Circle (471) on Reply Card

LISTEC TV EQUIPMENT

A-2100 ScriptWriter: Provides clean copy to talent, even with last minute changes; includes word processing features, smooth scrolls, storage in 5¼-inch floppy disks.

2000 series display: On-camera prompting display includes lightweight hood and trapezoidal mirror, featuring fast disconnect from any pan/tilt head.

Circle (472) on Reply Card

See ad on page 154

LOWEL-LIGHT MFG.

Frame-Up: Portable folding flag frames in two sizes handle gels from 21"x24" or 24"x34", use Lobo clamp for quick installation on lighting stands.

Circle (473) on Reply Card

MCI/QUANTEL

Paint Box enhancements: TACK, allows a portion of an image to be moved around until the proper placement is determined; weather satellite interfacing and software for WSI, ESD, R-Scan, Accu-Weather; interface to Central Lending Library still-storage.

Mirage enhancements: Picture Expansion, zoom expansion, reduction effects for Mirage; floating viewpoint, allows operator to move the viewpoint and explore 3-dimensional space.

Mirage Macro: Mirage system allowing shapes and transitions to be entered via disc cartridge, eliminating individual composing stations.

Cypher: Numerous typefaces, infinitely variable font sizes, color, animation, effects and 3-D manipulation for captions and other visual objects.

Encore: The Penultimate Picture Illusion system with zoom, compression, positioning, rotation, perspective and more in a multichannel digital video effects systems.

Circle (474) on Reply Card

MZB & ASSOCIATES

MZB-14: Mobile production vehicle, based on Grumman coach, with 6'x7' roof-top camera platform and other custom features.

Four-wheel mobile ENG vehicle.

Cube-type mobile ENG vehicle.

Circle (475) on Reply Card

MAGNASYNC/MOVIOLA

Edgewriter: Simplifies film editing by adding film edge numbers and SMPTE code while transferring film to videotape.

Circle (476) on Reply Card

MARCONI INSTRUMENTS

6960 power meter: GPIB-based RF power measuring system covers range from 10MHz-20GHz, for true rms power in a 50dB span from 1μW-100mW.

Circle (477) on Reply Card

MARK ELECTRONICS

Modular rack equipment.

Circle (478) on Reply Card

MICRODYNE

TUL 1214: Ku-Band transmit station with fully redundant equipment, tows easily at highway speeds, yet the 5m antenna system is easily set up within an hour. (C-Band version optional.)

OS-4 antenna: Offset-fed parabolic antenna, reflector dimensions of 8.3'x20.83', meets FCC 29-25log0 re-

quirements, for 4GHz/6GHz and 12GHz/14GHz.

TUL 64: C-Band transportable uplink system for SCPC operation.

1100 PCDR(3): SCPC demodulator, tuning in 10kHz steps, for 50Hz-7.5kHz and 50Hz-15kHz bandwidths.

Circle (479) on Reply Card

See ad on page 63

MICRON AUDIO PRODUCTS

TX-203: Hand-held wireless microphone for high VHF frequencies, rated 50mW RF output, includes Type C electret cardioid condenser or Type O omnidirectional condenser elements.

MDR-3 receiver: Diversity receiving system for high VHF frequencies may be set for Channel A, Channel B or diversity operation.

MDS-2 receiver: Modular space diversity receiving system may contain up to eight receivers, antenna distribution, audio output and universal power modules in a single frame.

Circle (480) on Reply Card

MICROWAVE

COMMUNICATIONS LTD.

MLV-1 series: Transportable microwave link, allows transmission of video with four sound program channels, designed for ENG, OB or emergency link restoration.

Circle (481) on Reply Card

MIDWEST

M40 production vehicles: Forty-four-foot production vans, custom-designed and furnished; on display units for Turner Broadcasting System and TCS Video Voyager 2.

Circle (482) on Reply Card

See ads on pages 1, 8 and 9

MINOLTA

TV Color Analyzer II: Analyzer for standard red, blue and green primary intensities, as well as a chroma mode, to show chromaticity coordinates and luminance in candelas or foot-lamberts.

Circle (483) on Reply Card

MITOMO COMPANY LTD.

MDC-50/50R: Random-access auto changer system for laser disc reproduction.

MDS-5R: Random-access control and electronics package for laser disc system.

MAX-30: ENG microphone mixer, weighing 0.9 pounds, includes three dynamic mic inputs, with switching to allow two condenser mics with integral phantom power and a line-level input.

MAX-31D: ENG microphone with three mic inputs and one line input;

optional wireless receiver connects to line input.

MRC-45: Portable rapid battery charger handles up to three BP-90 batteries simultaneously, charging a flat battery to 90% capacity in 45 minutes.

MVW-20E: VHS cassette winder/eraser requires four minutes for fast-wind or rewind of T-120 cassette, with magnetic head-type erasure and operation from 12Vdc or ac adapter.

Circle (484) on Reply Card

MOLE-RICHARDSON

Molelectronic dimmer: 12kW dc system with ac/dc converter for ac in, dc out.

Mole Solar-Arc Solarspot: 12kW and 6kW Fresnel HMI spotlights.

Molepar lights: HMI lighting rated at 200W, 575W and 1.2kW.

Molepole Jr: 2kW pole-operated 8-inch light.

Junior Solarspot: Eight-inch light featuring wireless remote control, 2kW.

Circle (485) on Reply Card

MONTAGE COMPUTER SYSTEMS

See "Update on Editing" on page 128.

Circle (486) on Reply Card

NEC AMERICA/BROADCAST

EQUIPMENT DIVISION

AS-18: Audio synchronizer corrects for delays caused by satellite relay or extensive video processing systems.

FS-18: Frame synchronizer, providing direct or heterodyne TBC function, freeze, interface to AS-18 audio synchronizer, 4-field memory and simplified diagnosis through data rotation scheme.

FBN-9000 transmitters: FM transmitter series covering range from 150W-20kW, with only units from 5kW and up using a single tube. Direct carrier frequency modulation is used.

Circle (487) on Reply Card

See ads on pages 28 and 59

NTI AMERICA

DSS-11: Digital still-store system featuring color-compensated SPF system, access times of 0.35s, internal disc storage to 1000 stills, optional shot box; compactly packaged for remote vehicle use.

DAS-2: Digital audio store, converts audio to digital signals, stores them on large capacity disk system using DPCM-AQ-AS method, allows editing and random access.

516 B 5 S: Digital color bar generator system.

Circle (488) on Reply Card

See ad on page 42

NALPAK VIDEO SALES

Tripak: Molded tripod case.

Travel-Kart: Heavy-duty folding cart.

Ear-Mike: Combination phone and earpiece.

Bel-Air cases: Molded equipment transportation cases carrying ATA approval.

Circle (489) on Reply Card

RUPERT NEVE

Necam for Post: Necam production computer system fitted on 51 and 81 series consoles for production and/or multitrack.

81-series console: Unique central assignment capability, incorporating four memories on multitrack post-production consoles for 2-, 4-, 6- and 24-track systems.

Circle (490) on Reply Card

See ad on page 65

NOVA SYSTEMS

Nova 500 TBC: Digital design offers 32 lines of memory, 8-bit/4x_{fs} sampling and slim packaging in a 1-rack unit height for exceptional picture transparency.

Circle (491) on Reply Card

NURAD

130PTI: 13GHz portable transmitter, capable of 1W output.

130RXI: Companion receiver to 13GHz 130PTI, portable.

23AR2: Dual-band central ENG microwave receiver system.

45AR2: Dual-band central receiver ENG microwave system.

65SQII: 6.5GHz central receiving ENG antenna system.

65OR2: 6.5GHz transmitting antenna.

SuperPod: Helicopter ENG system using Loran-aided control.

Circle (492) on Reply Card

O'CONNOR ENGINEERING LABS

53: Tripod dolly fitted with 6-inch urethane wheels includes tripod tie-downs, for camera loads to 350 pounds.

55M-B: Claw ball tripod features quick, positive single-point leveling for ENG, EFP and location film shooting, constructed of high strength aluminum alloy.

Circle (493) on Reply Card

OMICRON VIDEO

2300 DA: A 1-in/10-out video and stereo audio distribution system integrated into a 1 1/4-inch rack-mount package with ± 3 dB adjustment of luminance and chroma and independent 0-6dB adjustable audio channels.

EM-7100: See "Update on Editing" on page 128.

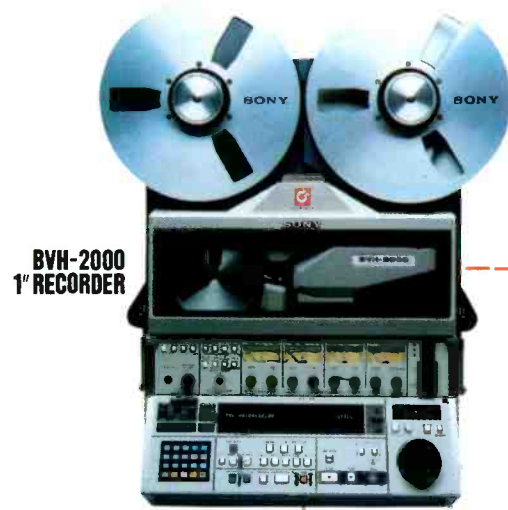
Circle (494) on Reply Card

PALTEX (DATATRON)

Gemini: Digital video effects
Continued on page 87

**THE REASON
YOUR EDITING
COMPONENTS
DON'T WORK
TOGETHER IS
BECAUSE
THE PEOPLE
WHO CREATED
THEM DIDN'T.**

INTRODUCING THE FIRST TOTAL SYSTEM DEVELOPED BY ONE MANUFACTURER.



**BVH-2000
1" RECORDER**



**BVT-2000
1" TBC**



**BVU-820
3/4" RECORDER**



**BVT-800
3/4" DIGITAL TBC**



**BVW-40
1/2" RECORDER**



**SONY/MCI JH-24
24-TRACK
AUDIO RECORDER**

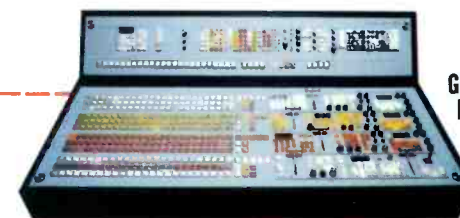


**BVM-1201
BROADCAST
MONITOR**

**SONY/MCI
JH-600 SERIES
AUDIO CONSOLE**



**GVG 300 SERIES
PRODUCTION
SWITCHER**



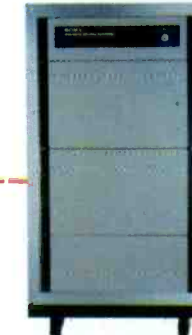
**CPD-5001
DISPLAY
TERMINAL**



**BVE-5000
CONTROL PANEL**



**BVE-5000
COMPUTERIZED
EDITOR**



**BVH-2000
1" RECORDER**



**BVT-2000
1" TBC**

You're looking at the utopian editing suite. A system that takes you straight to productivity without passing through chaos.

One that truly breaks Murphy's Law. Because Sony mastered the seemingly impossible feat of asking a series of machines to work in perfect harmony with one another.

No longer must you take the hodgepodge approach to editing systems, which is purchasing one component from one company and another from a second. Through the Sony total system approach you're assured that all the interfaces will work perfectly. Because they're worked out in our labs, not your editing suite. So downtime is virtually eliminated.

Only Sony offers it. But then, only Sony developed each and every product on these pages. (Even the Grass Valley software interfaces for the 300 Series Switcher were co-developed by Sony.)

So if you want to spend more time counting profits and less time counting losses, contact Sony. And discover the joys of building an editing system that does what nobody else's can consistently do: Work.

SONY
Broadcast

A SYSTEM IS ONLY AS GOOD AS THE SUM OF ITS COMPONENTS.

1" EDITING



BVH-2000 IN CONSOLE

- Multiple machine configurations, changeable and upgradable.
- Wide DT range: from -1 to +3 X standard speed
- Video/Audio confidence replay
- Self-diagnostics with visual and audible malfunction alarms

- Plug-in Time Code Generator/Reader (optional)
- Plug-in Timebase Corrector (optional)
- 2 hours record/play time

BKH-2015 OPTIONAL PLUG-IN TIMECODE FOR BVH-2000

- Generator/Reader with VITC/LTC capability
- Character Generator
- User Bit Display



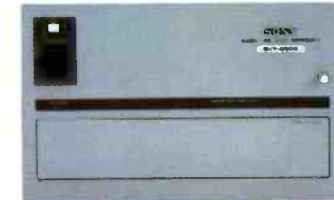
BVH-2500 RECORDER

- All features of BVH-2000 plus:
- Full C Format compatibility
- Real time, variable and frame-by-frame recording, using DT head
- Full-color framing
- Instantaneous and repeatable re-writing by erasable DT head



BVT-2000 TBC

- 9-bit, 4 Fsc sampling
- Drop-out compensation with Y/C separation
- Built-in Velocity Compensation, Sync Pulse Generator, Video Processor and automatic Advanced Sync Generator
- Full remote-control function
- DT playback with BVH-1100/1100A/1180/2000 and BVU-820 VTRs



BKH-2100 OPTIONAL PLUG-IN TBC FOR BVH-2000

- Plug-in, 4-circuit board Digital TBC
- 8-bit 4x Fsc samplings
- Remote-control capability



3/4" EDITING



BVU-820 RECORDER

- Built-in, full-scale editing functions
- Dynamic Tracking
- Playback from -1 to +3 X standard speed
- Simultaneous video playback in record mode (Video Confidence)



BVT-800 DIGITAL TBC

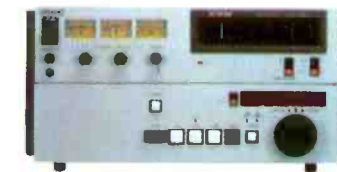
- 15 H correction range
- DT operation with BVU-820 from -1 to +3 X standard speed
- Built-in digital DOC
- Single cable interconnect with BVU-800/820
- Remote-control facilities
- Recognizable monochrome pictures up to ± 40 X standard speed

1/2" EDITING



BVW-40 BETACAM™ RECORDER

- Compressed Time Division Multiplex video recording system
- Built-in Timebase Corrector with Digital DOC
- Full Video/Audio insert and assemble editing, with preview/review, forward/reverse trim, selectable pre-roll and auto edit in/out functions
- 9-pin RS-422 serial and 36-pin parallel remote ports
- 7-pin Dub-in/Dub-out connection for BVU series U-matics™
- 12-pin Y/R-Y/B-Y component input/output
- Component and composite outputs



BVW-10 BETACAM™ PLAYER

- Full Shuttle and Jog functions
- Built-in TBC with Digital DOC
- Built-in Time Code Reader and LED display
- Selectable Dolby™ noise reduction
- Plug compatible with wide range of external systems
- Only front access required
- Component and composite outputs

At Sony, we do more than guarantee the best total system. We guarantee the best individual components.

The machines you see on these pages, which comprise the three established formats of the broadcast industry, represent only a small sampling of the Sony universe of post-production products.

Each component, while different in price and scope of features, shares five things in common. Unsurpassed quality, reliability, durability, ease of maintenance, and excellence of value that Sony is famous for.

So whether you buy the Sony system piece by piece, or an entire system at a time, you can be assured peace of mind.

For all the details contact Sony in New York/New Jersey at (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; in the West (213) 841-8711.

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SONY
Broadcast

system, editing system controllable.

See "Update on Editing" on page 128.

Circle (495) on Reply Card

PANASONIC INDUSTRIAL

TQ-2024: Audio/video disc file player, for full-motion or frame-by-frame video with near digital quality audio, allows access times of 0.5s on concentric or spiral disc formats to 15,000 or 24,000 still frames respectively, and eight or 13.3 minutes of full-motion play.

WV-888: ENG/EFP camera, designed around prism-optics and three $\frac{2}{3}$ -inch ST-MG Saticons, offers 200fc sensitivity at f/4 with S/N of 57dB, full automatics, optional remote-control unit and low price.

AU-300B: M Format studio editor/recorder/playback machine, with integral TBC, Dolby C noise reduction, bidirectional search to 20X play speed and vertical design for rack-mounted, front-access.

TQ-2023: Full-motion or frame-by-frame optical disc record playback system, based on semiconductor laser technology and 8-inch discs, for dual

audio channels, 24,000 frame capacity or 13.3 minute full-motion play time.

Teletext decoder: Prototype for use with any receiver or monitor includes composite video, RGB and RF (Channels 3 or 4) outputs; integral tuner; and wireless remote control, for NABTS system.

TU-2000X: Broadcast teletext decoder, for NABTS standards, includes NTSC encoder for composite video or direct RGB outputs and RS-232C connector for data analysis, cable-wired for 23-function remote control.

Prototype videotext decoder: For NAPLPS/SRM standards, includes a wired remote control with full QWERTY programmable keypad, for 256x210 dot displays on receiver or monitors from RF, composite or RGB outputs.

AU-TB30: TBC for internal installation in AU-300 M Format VCR/editor, offering 32-line memory, Y/I/Q baseband processing, adjustable vertical blanking and integral RS-170A sync generator.

AK-30 camera: Three $\frac{2}{3}$ -inch Plumbicon tubes for 650TVL resolution, 62dB S/N and Y/I/Q, NTSC and RGB outputs. Other features include digital zone registration, color negative reverse function and optional triax adapter.

Playback adapter: RECAM AU-S220 adapter, connects to VCR with single cable, allowing Y/I/Q signals to be translated to broadcast format. TBC interface includes SC and ADV SYNC inputs. Waveform monitor outputs and two audio channel outputs are included.

AU-220 VCR: RECAM M Format recorder/player includes color playback capability, Dolby C noise reduction, integral SMPTE time code generator and 2-channel audio system.

MVP-100 M-Vision: Multifunction video player, for 24 computer-controlled M Format transports, with two TBCs, computer, program sequencing, auto random spot insertion and multisource editor capabilities.

RECAM enhancement: Dolby C noise reduction for audio channels of VCR units.

See "Update on Editing" on page 128.

Circle (496) on Reply Card

PERROTT ENGINEERING LABS

PE8204U: Universal fast charger for ENG batteries.

PE138D: Cellmate battery discharger and battery condition analyzer.

Circle (497) on Reply Card

See ad on page 108

SOUND REPUTATION.

AKG has been providing television and radio broadcast engineers with the right microphones to meet their demanding requirements.

Now AKG has developed three new professional microphones all built with AKG reliability and studio quality sound.

These three low-noise condenser microphones meet very specific needs: the C-535 cardioid for hand-held vocals or speech pick-up, the C-567 miniature lavalier for uncanny "live" intelligibility and the C-568 short shotgun for that "extended reach" with switchable roll-off to eliminate rumble and wind noise.

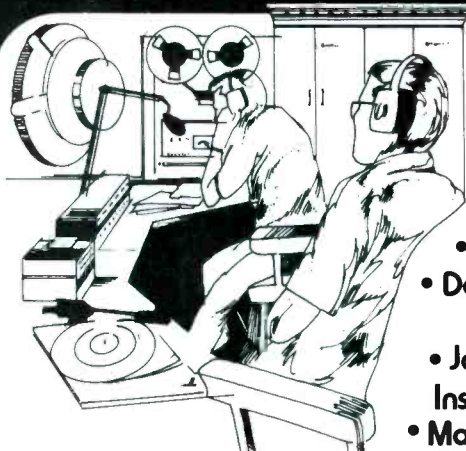
For a sound reputation... choose AKG.



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- Atlas • Audiopak
- AudioTechnica • Belden
- Broadcast Electronics
- CRL • CSI • Crown
- Cablewave Systems • DBX
- Deltalab • Electro-Voice • EXR
- Fidelipac • Inovonics
- Jampro-Cetec • JBL • Leader
- Instruments • Lexicon • 3-M
- Marti • Micro-Trak • Nortronics

Orban Associates • Otari • Phelps Dodge • Revox • Russco

- Shure • Sola • Staco • Stanton • Surcom • Tapco
- Technics • Telex • Urei • VIF and many more.

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Telex 51-4733 ELECTREX MIA



ELECTREX COMPANY © 1983

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Circle (62) on Reply Card

WHO LEADS IN NEW EDITING SYSTEM FEATURES?

LOOK AT WHAT ISC INTRODUCED AT NAB!



- New System 51 with 10 M Byte Hard Disk
- New Rack Mount System Packaging
- 10 New Hardware Features
- 21 New Software Features
- 5 New RS422 VTR Interfaces
- 10 New RS232 VTR/ATR Interfaces
- 10 New Switcher Interfaces
- 4 New Audio Mixer Interfaces
- 5 New Special Interfaces

The result? The most advanced video tape editing systems in the world. Deliverable now, not next year. And because of our commitment to support, last year's customers have received many of the new features free or at modest cost. That's why we're called ISC — the strong, quiet company... setting the pace.

INTERACTIVE SYSTEMS COMPANY

5601 N. Broadway, Mesa Reservoir Rd.
Boulder, CO 80302 (303) 447-2013

Sold exclusively in Canada by:
GLETRONIX, Toronto, Ontario (416) 444-8497



Circle (63) on Reply Card

PHILIPS SYSTEMS

LDK-26: Midstudio LDK-6 compatible ⅓-inch camera, with computer control and triaxial cable operation.

LDK-614: Portable member of LDK-6 family, weighing less than 17 pounds with viewfinder, using ⅓-inch LOC DG Plumbicon and operates from battery or through triax.

LDK-54: VRC camera, designed around ⅓-inch HS Plumbicons, combines with LDL-2000 ¼-inch Lineplex recorder for independent ENG use and backed by LDL-2020 portable production unit, LDL2010 studio VTR and LDL2009 playback VTR.

LDH-6220 monitor: A 20-inch version of LDH-6200, offering two composite video inputs, RGB inputs, pulse-cross/split-screen displays and NTSC comb filter.

LHH-0502: Professional CD-reproduction system with two remotely controlled compact disc drives, offering random access, pre-programmed sequencing, drive control unit and video display of data from both drives.

LDM series transmitters: FM transmitters ranging from 15W-30kW use a common modular drive unit and include comprehensive monitoring and logic control.

Circle (498) on Reply Card

PICTURE ELEMENT LTD.

Video sequence processor: Digital video record and playback system with digital editing and effects features.

Circle (499) on Reply Card

PIHER ELECTRONICA SA

CG4721: Multifont character generator system providing 45ns horizontal resolution, includes integral 140-page disk and 256-row RAM memories, proportional spacing, character overlap and RS-232 interface.

TV transmission: UHF and VHF transmitter and translator systems for LPTV applications.

Color monitors: PM and IM series color monitors in 14-inch and 20-inch CRT sizes for PAL or NTSC standards with RGB.

Video switching, distribution and associated equipment.

Black and white monitors: PM-3600 monitors in 10-inch and 17-inch CRTs for 625-line or 525-line systems.

Circle (500) on Reply Card

POLAROID

Instant slides: 35mm photographic materials in 40-ISO and black-and-white continuous tone or high contrast, with AutoProcessor, for slides within three minutes.

Circle (501) on Reply Card



the trendsetters

Unquestionably the industry's standard of excellence
in broadcast equipment

Our TOMCAT cartridge recorders/reproducers
and BMX series of broadcast consoles
deliver trendsetting on-line performance
in broadcasting systems world-
wide, from Boston to L.A.,
Australia to Great Britain.

TOMCAT: simply the world's finest. Innovative
design assures superb sound quality, reliability, and
low noise operation.

BMX, Series II: the ultimate in high performance
mixing consoles.

Call or write today for free information on our
complete line of equipment.



PACIFIC RECORDERS & ENGINEERING CORPORATION

2070 Las Palmas Drive - Carlsbad, CA 92008 - 619-438-3911 - Telex: 181777

Circle (64) on Reply Card

PORTA-PATTERN

Zone plate charts: Test charts based on the BBC zone plate for 525-line (001-30) and 625-line (001-31) TV systems.

001-45: Revised depth of modulation chart.

Zone plate slides: Transparency forms of the BBC zone plate for 525-line (006-30P) and 625-line (006-31P) TV systems.

006-56P: Transparency form of revised depth of modulation chart.

030 series: Large studio size charts.

Circle (502) on Reply Card

QSI SYSTEMS

AF-1000: Autophasing blackburst generator adjusts each of three outputs automatically for phased chroma and sync signals arriving at switcher from generator-driven equipment.

FPS-590: Field production slate.

DM-171: All-channel off-air TV demodulator.

SW-402: 4x2 minifield production switcher includes dissolve capability.

Circle (503) on Reply Card

Q-TV

VPS-500: Electronic computer-based prompter system.

VIV: Virtual image videoprompter magnifies images for easier use.

Circle (504) on Reply Card

QUANTE

1000 series: Fiber-optics systems, featuring digital transmission of multistandard composite or component video, wavelength division multiplexing for multiple channels and digital audio via digital subchannel on video codecs.

Circle (505) on Reply Card

RCA

TK-48: A studio camera with programmable dynamic lens connection, using memory files to store extra levels of correction, and enhanced viewfinder display for an array of monitoring and controls.

TKS-100 telecine: CCD film chain, based on a multiplexed microprocessor-controlled system, featuring switchable 16mm/35mm operation of each film transport and a wide range of options.

TH-900 VTR: Type C recorder with autoscanning tracking, fast acceleration and deceleration for quick cue location, gentle tape handling and a versatile control panel.

CCD-1 camera: Total solid-state camera using three CCD sensors for reduced image retention, greater resolution, less noise, greater sensitivity and no image burn-in.

TTG-100U: G-line UHF TV transmitter, using a single klystron PA for

100kW rating, with economical expansion to 200kW, recycling for improved reliability and increased efficiency.

TCP antenna: Circularly polarized panel antenna for FM and TV Channels 2-13, available in directional or omnidirectional patterns with wide impedance bandwidth for multichannel multiplexing.

See "Update on Editing" on page 128.

Circle (506) on Reply Card

See ad on page 3

R-SCAN

LPATS: Lightning position and tracking system plots position of lightning strike within one mile accuracy and displays the weather information in full color animation.

NVG 500k/12: Northern Video Graphics video facsimile display system creates animated satellite weather displays from GOES/WEFAX, METEOSTAT, GMS, GOES-TAP and APT data sources.

VideoSlide 35: For 35mm color slides of videographics on standard photographic films or Polachrome 35mm autoprocess film.

Circle (507) on Reply Card

RTS SYSTEMS

2500 series: Plug-in amplifier system for a variety of distribution and signal control functions.

17 series: Intercom system for portable or permanent operations using single-channel conference line interconnection.

Circle (508) on Reply Card

See ad on page 30

RANK CINTEL LTD.

ADS 1: 16mm/35mm solid-state telecine, including dirt/scratch concealment, multiplexing of three dual-gauge transports with one electronic control unit, variable speed and negative/positive operation.

Circle (509) on Reply Card

REAL WORLD TECHNOLOGIES GROUP

MonSter: Mono-stereo coherency evaluator, for applications where left-right energy coherency is essential for correct mono-mix. Bridged across the left and right channels of audio source, a bargraph displays continuous readout of average phase energy.

uniMonSter converter: Places audio bargraph information from the MonSter mono-stereo coherency evaluator on an active video display, an optional configuration of the established uniVuer.

uniCUE: Dialog studio talent cue system.

Circle (510) on Reply Card

REES ASSOCIATES

Facilities construction, design, consultation.

Circle (511) on Reply Card

RESEARCH TECHNOLOGY INT'L.

Videotape storage: Sturdy modular rack designed for videocassette storage for U-matic, VHS and Beta Formats, compatible with previous film storage equipment.

VT6500: One-inch videotape cleaner system, providing sapphire burnishing edges, wiping tissue and vacuum techniques.

Circle (512) on Reply Card

See ad on page 48

RIVIERA BROADCAST LEASING

Financial services: Equipment leasing, term loans, acquisition funds and receivables financing plans geared to broadcaster's needs.

Circle (513) on Reply Card

ROHDE & SCHWARZ

DZF meter: Objective and repeatable measurements of eye-height, half eye-height and amplitude of videotex data signals show TV data signal distortions.

UPSf2 noise meter: Weighted or unweighted luminance video noise measurements are made on transmitter, camera, VTR, signal generator and distribution equipment. Plug-ins add video level and chroma noise capability. Option includes IEEE-488 bus use.

LFM 2 measuring set: Split-frequency method group-delay measurements on active and passive 2-port networks are displayed on digital readout or external oscilloscope. Accessories increase range to 1GHz and IEC-bus use.

SPF 2 signal generators: Video and noise signal generators combine with VITS insertion to check out switching equipment and to allow automated measurement of VTR, VCR and TV receiver production lines.

SKF VITS equipment: CCIR test signals in the vertical interval allow fully automatic monitoring of video transmissions at all times. Versions provide options to handle special videotex transmission needs.

MUF 2 transcope: A single test system includes all measurement devices to check TV transmitter and translator alignments for Band I, II, III and IV/V equipment.

Circle (514) on Reply Card

ROHN

DBS mounts: Adaptable mounting equipment for any antenna style, with 360° circular and 180° vertical adjustment. Easy field installation possible.

Circle (515) on Reply Card →

Sound Advice

ITC announces a revolutionary departure from the traditional triple deck cartridge machine. The Delta III's advanced modular design gives you three independently removable decks. This means that you can remove a deck for easy maintenance and still stay on the air.

That's great news for you and your listeners because the Delta III's superior sound will spoil everyone who hears it. You won't want to settle for less, and neither will they.

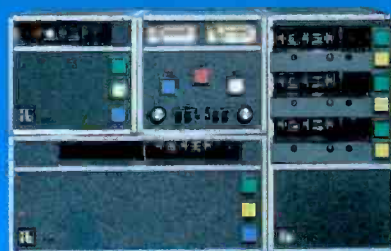
The Delta III is part of the Delta series, ITC's new generation of cartridge machines. Mechanically, electronically and physically superior to previous models, the Delta Series is fast becoming the new standard of the industry.

That's something you need to know. Because you wouldn't want to miss the revolution.



The Delta III offers:

- three independently removable decks
- rugged modular design
- crystal-referenced servo motor
- toroidal power transformer
- non-magnetic stainless steel shaft
- now more affordable!



Don't Miss The Delta Revolution

INTERNATIONAL TAPETRONICS CORPORATION

2425 South Main Street / P.O. Box 241 / Bloomington, Illinois 61701

Call Toll-Free: 800-447-0414

From Alaska, Hawaii and Illinois call collect: 309/828-1381

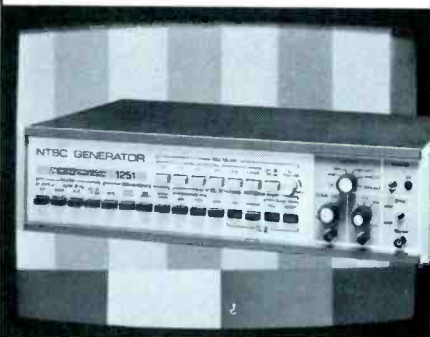
3M hears you...

Circle (65) on Reply Card

3M

from
B & K-PRECISION

NTSC STANDARDS plus MULTIBURST for under \$1,000



Model 1251 \$995

- Generates standard NTSC color bars with or without -IWQ signal; five step linear staircase (with high or low chroma); dot, cross-hatch, dot-hatch, center cross and 8 raster patterns
- Multiburst—stepped, full field and variable
- External video input modulates rf or i-f carrier outputs
- Crystal controlled rf, i-f, NTSC sync
- 4.5MHz audio intercarrier modulation; selectable 1kHz, 3kHz or external

The B&K-PRECISION 1251 is a true NTSC standard generator designed for color broadcast, CATV and industrial applications. Its simple operation makes it a time-saving tool for aligning and trouble-shooting video tape recorders as well.

The quality, capability, dependability and precision of the Model 1251 equal or exceed that of much more costly generators.

**Prove it for yourself.
See your local B&K-PRECISION
Distributor for immediate delivery.**

BK PRECISION

**DYNASCAN
CORPORATION**

6460 West Cortland Street
Chicago, Illinois 60635 • 312/889-9087
International Sales: 6460 W. Cortland St., Chicago, IL 60635
Canadian Sales: Atlas Electronics, Ontario
South and Central American Sales:
Empire Exporters, Plainview, NY 11803

Circle (66) on Reply Card

ROSCOR VIDEO SYSTEMS ENGINEERING

Equipment source: Engineering, sales, rental, installation and post-production services.

Circle (516) on Reply Card

ROSS VIDEO LTD.

Encore: Microprocessor-based memory system for storing and recalling video production switcher setups; total storage of 100 setups and five 32-scene sequences.

Circle (517) on Reply Card

SACHTLER CORPORATION OF AMERICA

Video 14 system: Fluid head with three dial-in steps of drag, combined with a pedestal-tripod, for lightweight camera use in the studio or ENG/EFP applications.

HOT POD: Tripod system for ENG, extra long with center column.

Circle (518) on Reply Card

SESCOM

SAT-1: Audio level controller for satellite receivers or other sources, maintaining constant output level with widely varying input levels.

MLD-5: Mic to line-level amplifier with front-panel gain control from 41-75dB. Two units fit into one 1¼-inch rack frame.

TST-1: Field testing oscillator with -60dB to +4dB output and 0.25W headphone amplifier, operating from internal battery.

Circle (519) on Reply Card

SHARP ELECTRONICS

XM-1300: High resolution color video monitor for EFP or studio use with 0.31mm dot pitch, 600TVL 13-inch CRT, comb filtering, H and V sync delays, composite and RGB video inputs and two time constants for AFC.

XC-900D: Three-tube prism ENG/EFP camera, based on DG Plumbicons, offering 600TVL resolution at center screen with 57dB S/N luminance rating and a weight (without lens) of 13.51 pounds.

XC-803TX: Triax remote-control system for camera multiplexes video, audio and camera control information with dc power onto triaxial cable for interface between the camera head and base station.

Circle (520) on Reply Card

SHOOK ELECTRONIC ENTERPRISES

#14-22/E production vehicle: New concept in design with improved access to director, engineering and tape

areas, as well as more space for additional equipment.

#18-27 production vehicle: Three-camera-plus production system with a full complement of audio-video equipment supplied by Magnetic Media for Craddock-Surls Telecommunications.

#45-60 production van: Custom-designed 45-foot van for John Crowe Productions, includes Philips and Ikegami cameras, Sony VTRs, GVG switching, Audiotronics audio and two Chyron graphics units.

Circle (521) on Reply Card

SHURE BROTHERS

FP31: Compact microphone mixer for ENG/EFP, with three mic or line inputs, two mic or line-level outputs, internal or external Vdc, VU metering, integral limiter and phantom mic powering on all inputs.

SM83-CN: Condenser-type lavalier microphone with dip at 730Hz and high frequency boost above 3kHz for natural sound and controlled low frequency roll-off to reduce external noise.

Circle (522) on Reply Card

See ad on page 119

SIGMA ELECTRONICS

GLC-100: Gen-locking computer system, based on Commodore 64, interfaced to video for titling, graphics, etc.; storage on 5¼-inch floppy disk drive; Graphics One software package.

VPA-380: Video processing amplifier, including gen-lock circuitry, locks to VTR or stable video for editing and duplication or camera control unit applications.

VDA-115: Video equalizing amplifier and video DA handles compensation of cables up to 1100 feet.

Circle (523) on Reply Card

WARREN R. SMITH

Real time graphics stand: Controlled, repeatable video camera moves with synchronized and precise pan, tilt, zoom and rotation.

Aerial image positioner: Positioner allows 35mm and 2¼x2¼ slides to be used with the graphics stand.

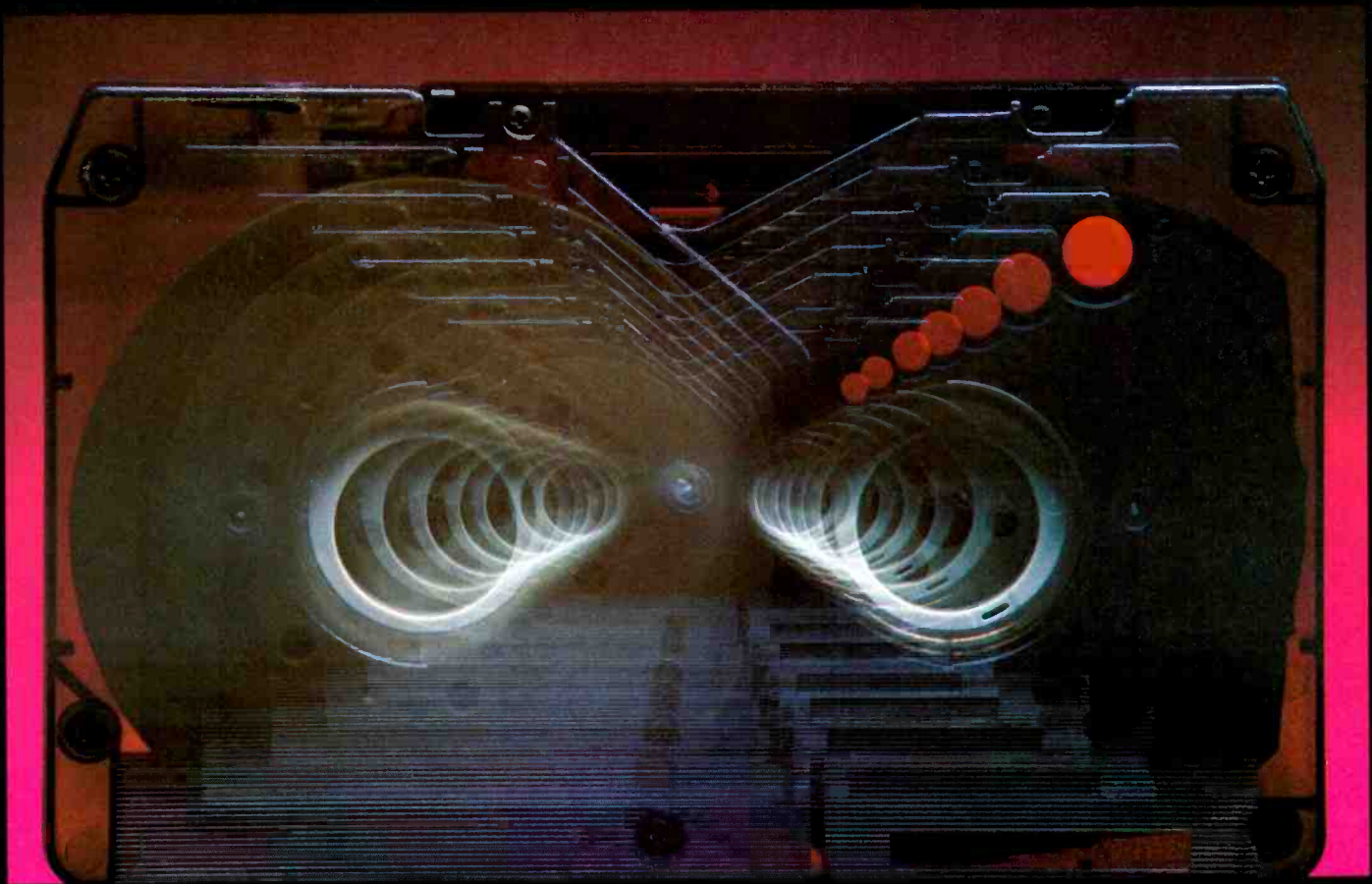
Servo pan/tilt head: Precision pan/tilt and zoom moves, used with graphics stand.

Periscope: 1623 and 3535 snorkel-type cine lenses, usable with 16mm/35mm film or ⅜-inch and 1-inch video cameras.

Cine lens adapter: 16-66N adapts 16mm cine lens to 3-tube ENG/EFP cameras, featuring focus and iris controls.

Telecine lens: TC-300 has 55mm f/2.8 optics for any 3-tube ENG/EFP camera used on a telecine system.

Circle (524) on Reply Card



LOAD 300 CARTS AT ONE TIME

No other automatic cart loading system can hold 300 carts at one time. And also give you random access and continuous reproduction. Cassettes can be searched, loaded, played, and rewound with the push of a single button.

Utilizing any 1/2" tape format, the ACL-3000 is economical, fast, efficient, and accurate. And best of all most stations will only have to load carts once a day.

Write us for complete details on the ACL-3000 automatic random access cart system. The world's most efficient cart system.

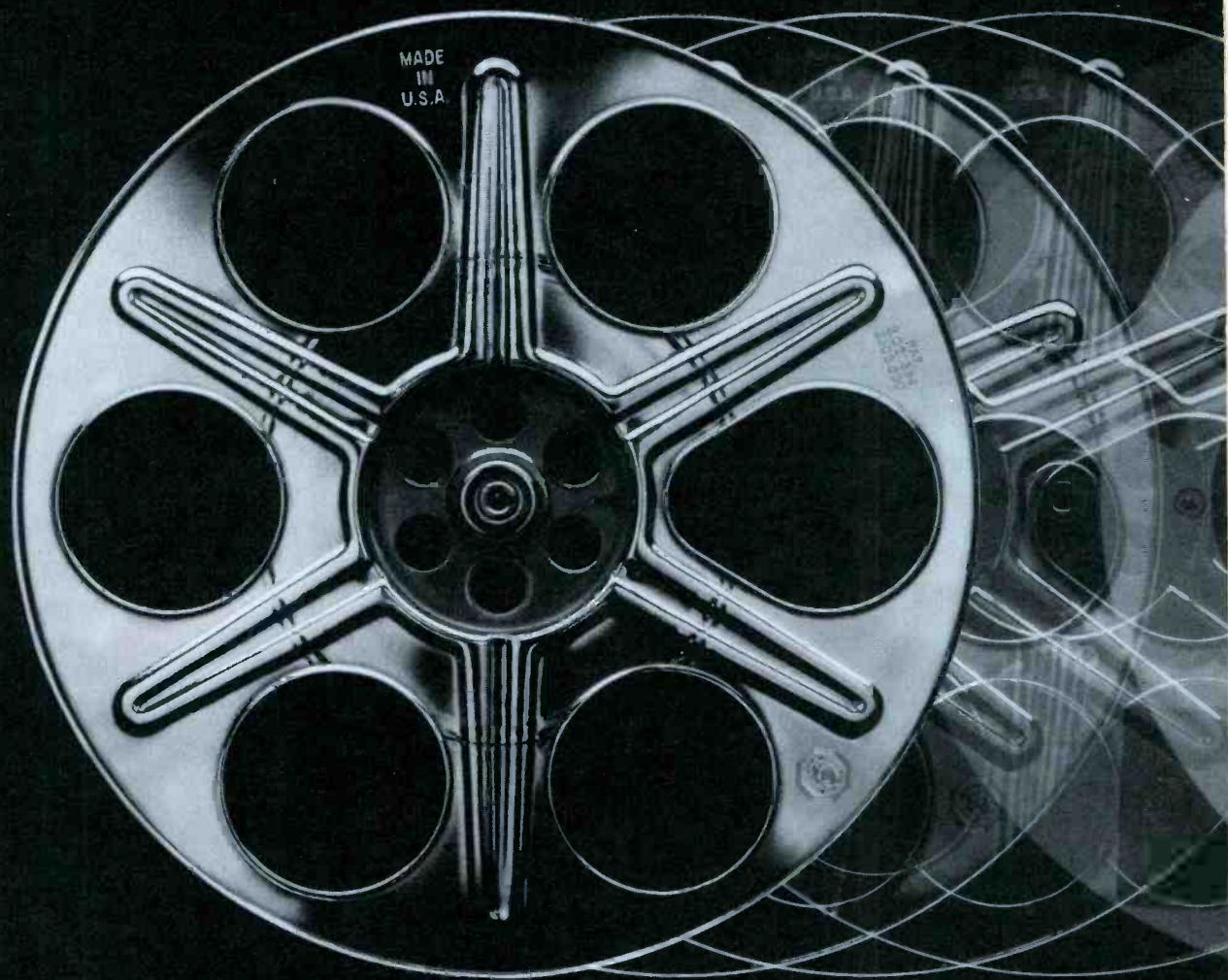
THE TRUE MEASURE OF PERFORMANCE.

ASACA[®]

Asaca/Shibasoku Corp. of America
12509 Beatrice Street, Los Angeles, CA 90066
(213) 827-7144, For sales and service 1-800-423-6347
Circle (67) on Reply Card



THE FIRST NAME IN FILM



Introducing video tape with the quality, dependability, consistency, and backup service you expect from Kodak.

The virtues that have made Eastman Kodak Company the first name in film are now yours in new Eastman professional video tape.

A world leader in imaging technology for more than a century brings you a brand of video tape so good that we stake our reputation on it.

So can you. Because Eastman professional video tape offers you a unique combination of benefits.

Quality. Try our video tape and experience its quality. You'll see that Eastman professional video tape meets the same stringent performance standards that characterize all Eastman products.

Dependability. Establishing a reputation for reliability takes time and commitment. Our record speaks for itself. To satisfy your need for dependability, our products are made to our own demanding specifications.

Consistency. As the world's leading manufacturer of photographic film, Kodak appreciates the critical impor-

ance of video tape product consistency. Therefore, Eastman video tape is manufactured according to our strict uniformity requirements.

Technical service. You can count on our field force of skilled sales and engineering representatives to help you get the most from Eastman video tape products.

Availability. You don't have to wait for Kodak to set up shop. We already operate a worldwide marketing network. And a dealer organization also will soon be ready to supply you with Eastman pro-

IS THE NEW NAME IN VIDEO TAPE



professional video tape...when and where you need it.

You have the option of professional-quality and broadcast-quality Eastman professional video cassettes in both 1/2-inch (VHS and Beta) and 3/4-inch (U-Matic, standard and mini) cassette sizes. Broadcast-quality 1-inch tape (helical "B" and "C" format) is scheduled to be available in mid-1984. We offer an excellent selection of video cassettes and video tapes for use with NTSC as well as PAL/SECAM TV systems.

Now is the time for you to discover what the new name in professional video tape can do for you. To learn more, contact your Kodak sales and engineering representative.

ATLANTA (404) 351-6510	NEW YORK (212) 930-7500
CHICAGO (312) 654-5300	SAN FRANCISCO (415) 928-1300
DALLAS (214) 351-3221	TORONTO (416) 766-8233
HOLLYWOOD (213) 464-6131	VANCOUVER (604) 926-7411
HONOLULU (808) 833-1661	WASHINGTON, DC (703) 558-9220
MONTREAL (514) 761-3481	

Overseas, call the local Kodak company.
Motion Picture and Audiovisual Markets
Division, Eastman Kodak Company,
343 State Street, Rochester, NY 14650

Circle (68) on Reply Card



EASTMAN Professional Video Tapes



SOLID STATE LOGIC

E54 software package: Improved SSL console automation with Cycle Drop In, Set Up Menu, Master Transport Selection, Synchronizer Controller and Diagnostic Programme, increasing efficiency and flexibility of SSL Series E.

Synchronizer: Direct interfacing to ATRs and VTRs with transparent control of entire machine system from operator's Primary Studio Computer keyboard.

SL 688V matrix: Stereo mixing matrix, for use with SL 6000E console, adds flexibility for stereo and mono post-production.

Programmable equalizer: With two independent 3-band parametric sections, linkable for stereo, with variable Q, retrofits to Series E systems.

Circle (525) on Reply Card

SONY COMMUNICATIONS

19-inch monitors: PVM-1910 and PVM-1911 color video monitors for office and studio; PVM-1911 includes touch-screen capability for intelligent video applications.

KTX-8300/VDX-1000 videotex: Terminal and frame-creation systems for Prestel software (KTX) and NAPLPS format (VDX), merging intelligent video with computer technology.

Training system: Combines LDP-1000A videodisc player, SMC-70G microcomputer and SFA-1000 still-frame audio adapter for training material presentations.

IF-500: Multiple interface box links broadcast-type equipment with institutional VTRs and controllers.

See "Update on Editing" on page 128.

Circle (526) on Reply Card

See ads on pages 39, 56, 57, 82-86

SOUNDOLIER

1044: Slope-front equipment console for standard 19-inch equipment, available in royal blue and satin beige.

2061: Heavy-duty vertical equipment racks, in blue and beige, offering 61 $\frac{1}{2}$ -inch equipment space.

700-14: Slope-front turret for 19-inch widths, providing 14-inch vertical space for equipment.

Circle (527) on Reply Card

STAGE LIGHTING DISTRIBUTORS

D2108: Lighting controller system, with eight control channels for 2-scene system, based on digital techniques.

2400UG: Digital dimmer system, including eight channels, each capable of 2400W.

Autocolor: Automatic color changer, computer-controlled system selects one of six colors within three seconds.

Circle (528) on Reply Card

STEENBECK

ST 941V: Editing system for video/sound post-production, based on U Format (VHS optional) and two 16mm magnetic sound films.

Circle (529) on Reply Card

STOREEL

Modular tape transport: Setup for pre-play schedule.

Hi-density storage: Prototype modular storage systems for VHS, 1-inch and MTV applications.

Circle (530) on Reply Card

SWINTEK ENTERPRISES

Mark 200D: Radio headset system.

Mark QDC: Video camera wireless microphone system.

Mark Q/6R: Road production radio microphone system.

Circle (531) on Reply Card

TASCAM

122B: Cassette deck, designed for broadcast applications, includes balanced inputs and outputs, for stereo; nominal output +4dBm.

133B: Three-channel cassette machine, with balanced inputs and outputs, provides stereo with a third channel for internal 25Hz cue/control or external data/FSK control information; nominal output +4dBm.

234 Syncaset: Four-channel cassette recorder, includes synchronous playback of some tracks, while others record, for overdubs, punch-in inserts; mic and line inputs with stereo pan control.

Series 40: Audio recorders, 2-, 4- and 8-track with +4dBm nominal levels, interface to SMPTE control and automation equipment; autolocator with return-to-zero and search-to-cue.

Series 50: Two- and 8-track audio recorders, featuring +4dB balanced nominal level capabilities.

M-520: Modular audio mixing console, 20x8x16, featuring clean feed, four side-chain systems, prefade listen, stereo solo in place.

Audio transport: Two-piece recording system in floor standing console features $\frac{1}{4}$ -track, $\frac{1}{2}$ -channel configuration with optional broadcast/monitor editing system.

Audio patchbays.

Circle (532) on Reply Card

See ad on page 103

TEATRONICS

Concept: Computerized lighting controller, interfacing to most popular dimming equipment, from Electronic Theatre Controls.

Idea: ETC lighting controller, with 200-cue memory for 125 channels, handling 1000-dimmer softpatch.

Executive Director: Manual lighting control console with 15x24 low voltage matrix patch, 12 assign-

able submasters and effects channel assignments.

Genesis T-MUX options: Encodes, decodes multiplexed lighting control data between controller and dimmer (Strand Century compatible).

Circle (533) on Reply Card

TEKTRONIX

1740 series: Waveform/vector monitors, incorporating optional battery pack for portable operation, for NTSC, PAL and PAL-M standards with unique SC/H-phase metering monitoring capability.

AS-118: Audio synchronizer, compensating for audio-to-video timing differences resulting from cascaded and/or extended memory (4-field) video synchronizers.

494 spectrum analyzer: Measurement capability from 10kHz-325GHz with HELP mode display of controls and functions on CRT, in manual or programmable versions.

2445: Portable oscilloscope with TV option, allowing performance as waveform monitor or wideband (150MHz) oscilloscope.

AA501: Audio analyzer equipment for complete audio signal analysis with programmable bus capability.

Circle (534) on Reply Card

See ads on pages 17, 18, 19, 20 and 21

TELEMET DIVISION/GEOTEL

Passive transmitter: System providing 10dB of equalization for 16PEVL 124Q balanced coaxial cable. 110Vac source not required.

Circle (535) on Reply Card

TELEVISION EQUIPMENT ASSOCIATES

Matthey delay line/filters: Reduced in size with response ripples of less than 0.1dB peak-to-peak, K-ratings less than 0.5% and stopband rejection flat to 100MHz.

Matthey VA.255 attenuator: Switchable video attenuator with 0.1dB steps to 25.5dB for padding or simplified measurements.

RACAL Suregard: Headset for noise exclusion with noise-canceling mic.

RACAL emergency field phone: For party-line operation.

Circle (536) on Reply Card

TENNAPLEX SYSTEMS LTD.

Kathrein antennas: Broadband dipole panels for arrays of 3-panels/bays by triangular masts.

Catalogs.

Circle (537) on Reply Card

TENTEL

T2-H18-CBD: SMPTE Type C tension gauge, measuring in-line tape tension of Ampex VPR and Sony BVH recorders.

T2-H7-UMS: Betacam tension

DOLBY® NOISE REDUCTION FOR THE 1980'S



SP multi-track unit



360 single-track units



CN 221B for
Sony BVH
1000/1100

CN 234 for
Sony BVH 2000



CN 226 for
Ampex
VPR-2

Dolby noise reduction is keeping pace with today's demand for high-quality sound — everywhere. With the introduction of such products as plug-in modules for VTRs and the SP multi-track unit, it is easier than ever before to protect *all* your irreplaceable audio tracks from hiss, hum, and print-through. From broadcasting to music recording, from video sweetening to motion picture dubbing, Dolby A-type NR reliably continues to fulfill its original promise: effective noise reduction combined with complete signal integrity.

Dolby Laboratories Inc., 731 Sansome St., San Francisco, CA 94111.
Telephone 415-392-0300. Telex 34409. 346 Clapham Road, London SW9.
Telephone 01-720-1111. Telex 919109. "Dolby" and the double-D symbol
are trademarks of Dolby Laboratories Licensing Corp. S83/5050

Dolby®

Tentel Continued

gauge.

HPG-C: Head protrusion gauge measures tip projection and drum eccentricity for SMPTE Type C VTRs.

HPG-1: Head protrusion gauge, applicable for Beta, VHS and U Format recorders.

Circle (538) on Reply Card
See ad on page 146

THOMSON-CSF COMPONENTS

TH2400 series: C-Band uplink klystrons, from 750W-3.35kW, featuring 6-, 12- and 24-position channel tuner, 45MHz bandwidth/channel and fully interchangeable with VA 936 units.

TH2425/TH2426: Ku-Band uplink klystrons for 1.5kW and 2kW output ratings, fully interchangeable with VKU 7791 units, feature an 85MHz bandwidth and quick preset to six or eight channels.

TH-547: 1kW UHF tetrode, designed for LPTV applications.

TH-582: 20kW UHF tetrode, designed with Pyrobloc grid structure for greater efficiency.

TH-371: 20kW VHF tetrode, features Pyrobloc grid structure.

Circle (539) on Reply Card
See ad on page 145

THOMSON-LGT

Satellite receiver: C-Band receiver capable of four programs.

TV transmitters: VHF and UHF transmitters/translators, 200W-20kW.

FM transmitters: LPFM systems.

Circle (540) on Reply Card

3M/OPTICAL RECORDING PROJECT

Laser videodisc services: Improved disc mastering and replication service, 25 1-sided discs in 24 hours, 100 1-sided discs in 72 hours from qualified premaster tape.

Tandem program encoding: Videodiscs with Sony and Pioneer digital programs on the same disc side.

Mastering from U Format premaster tapes: Discs prepared from original source ¾-inch tape avoiding dupes to 1-inch C Format.

Circle (541) on Reply Card

TOTAL COMMUNICATION SYSTEMS

Video Voyager 2: Forty-five-foot mobile production vehicle, featuring expandable side to create 132 square feet of work space, compartmentalized HVAC and full complement of video/audio/production/post-production equipment.

Transportable uplink: C-Band uplink in fully-redundant, simultaneous dual-feed system with auto power

changeover, using Andrews antenna, MCL HPAs, SA exciters.

Circle (542) on Reply Card

TOWLE-FREE TECHNICAL PRODUCTS

Videocassette automation: Combines 20-cassette elevator, Sony 800 or 5000 U Format VCRs, control and monitoring equipment for pneumatically operated video automation.

Circle (543) on Reply Card

TOWNSEND ASSOCIATES

TA-25NTH: 25kW highband VHF TV transmitter.

TA-1000HTU: 1kW UHF LPTV transmitter.

TA55NE(U): Universal UHF amplifier, adapts to klystrons from any manufacturer.

Circle (544) on Reply Card

TRANSIMAGE INT'L LTD.

TS-102 TBC time sharer: TBC system provides all interconnections needed for four different VTR/VCR machines to use a single corrector. Priority switching places machine A as preferred; vertical interval switching produces clean video cuts; audio switching allows proper sound to follow the video.

MUSA jack fields: Series of jackfield products offering 14-, 18-, 20- and 22-way connections.

Circle (545) on Reply Card

ULTIMATTE

Ultimatte 5: Video compositing device, accepting Y, R-Y and B-Y component signals, as well as RGB and YRGB inputs with background inputs also allowing NTSC composite video.

Circle (546) on Reply Card

UNION CONNECTOR

Wireless light control: The DIGI-I control unit plugs into any outlet of the electrical system and addresses up to 256 SU-I dimmers plugged into the same system. Loads to 20A, plugged into SU-I units, are controlled by RF digital data.

Circle (547) on Reply Card

See ad on page 149

UNI-SET

Uni-Set staging system: Additional modular elements, providing any studio with a variety of studio sets.

Circle (548) on Reply Card

UNITED MEDIA

See "Update on Editing" on page 128.

Circle (561) on Reply Card

UNIVERSAL SATELLITE

VideoMate III: High resolution monochrome video projector accepts

baseband video with separate H and V syncs, digital inputs, separate composite sync or sync on green, for images to 12-foot widths.

Circle (549) on Reply Card

VARIAN ASSOCIATES

2CX1200A7: Small ceramic triode for AM, amateur and other services.

4-500B: Economical version of the 4-500A.

KVP-7553S: Super high efficiency UHF-TV klystron.

KVP-7853: 100kW UHF klystron

VKC-7980B12: 3kW C-Band broadband klystron.

4CX3500A: 3.5kW power tetrode.

4CX7500: 7.5kW power tetrode.

4CM25,000G: Multiphase power tetrode, rated 25kW.

4CM100,000G: Multiphase power tetrode for 110kW rating.

4CM400,000A: Multiphase power tetrode for 400kW power rating.

4CM40,000G: 400kW power tetrode.

Klystrode: VHF power amplifier, combines grid cathode configuration of the tetrode with grid-controlled, density-modulated beam, focusing and output cavity/collector more similar to the klystron, for high power with high efficiency.

Cavity amplifiers.

Circle (550) on Reply Card

See ads on inside back cover and page 47

VIDEO INT'L.

STC 1003: Standards conversion equipment includes PAL, NTSC and SECAM interconversion, as well as freeze-frame synchronizer, TBC and test pattern generator; digital technology.

Circle (551) on Reply Card

WSI

Custom graphics: Access to custom-prepared graphics via menu selection adds to weather presentations; custom graphics available on request/reply basis as other WSI services.

Meteosat data: Real time satellite imaging via the Meteosat system gives access to weather conditions in Europe, Africa and the Middle East.

DiFax maps for weather graphics.

Circle (552) on Reply Card

WEATHER BANK

WeatherCheck: Satellite-delivered weather data, displayed on CRT designed for radio weather announcers or as a backup to the graphics system in television.

Circle (553) on Reply Card

WHITE INSTRUMENTS

4100A: Two-channel octave-band L-C active graphic equalizer featuring

Continued on page 160

CONRAC



High Definition Audio *For the complete picture*

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Station profile: Radio Hoyer

By Ekke J. Huisman,
managing director, marketing,
Industrial Electronics (antilles) NV,
Curacao, Netherlands Antilles

Industrial Electronics (antilles) NV is an engineering/consulting company. Under the guidance of technical director Fred M. Chumaceiro, the company is involved in a major construction project involving an innovative use of solar technology for Radio Hoyer in Curacao.

Curacao is one of a string of small islands that make up the West Indies nation of the Netherlands Antilles. These Caribbean islands are an autonomous part of the Kingdom of the Netherlands. The Dutch government provides for their defense and foreign affairs representation, but all other matters of daily life are left to the people of the islands themselves.

In this setting 30 years ago, Horacio Hoyer established a pioneering AM radio station on Curacao and named it Radio Hoyer. Since that time a second AM station, designated Radio Hoyer-2, has been put into operation. Now Radio Hoyer has embarked on a state-of-the-art expansion program. Two new FM stations are being constructed by Radio Hoyer to complement the present AM outlets on the island. What makes the Radio Hoyer-FM project unique is the power source for the transmission system—100% solar energy.

The site chosen for the transmitting facility is on the highest ridge of Curacao's eastern-most mountain, the Tafelberg. Phosphate was mined from the area on a large scale until 1979, and miners still remove limestone from the mountain. The site is perfect for an FM transmitting complex, except for the lack of electricity and other utilities. From the many options available to obtain electricity, the need for a high degree of reliability sparked the decision to go with solar power.

Because of island geography, the Tafelberg location lends itself to the use of a highly directional transmitting antenna system. The main benefit of a directional antenna in this ap-



Shown is an aerial view of the Radio Hoyer-FM transmitting site, located on the mountain of Tafelberg.

This view of the mounting pad for the solar power array used in the Radio Hoyer-FM project is taken from the adjacent transmitting tower, and shows the preliminary wiring for the solar modules. Only the right-hand portion of the pad is used at present, leaving space for future expansion of the solar energy collector system, if needed.



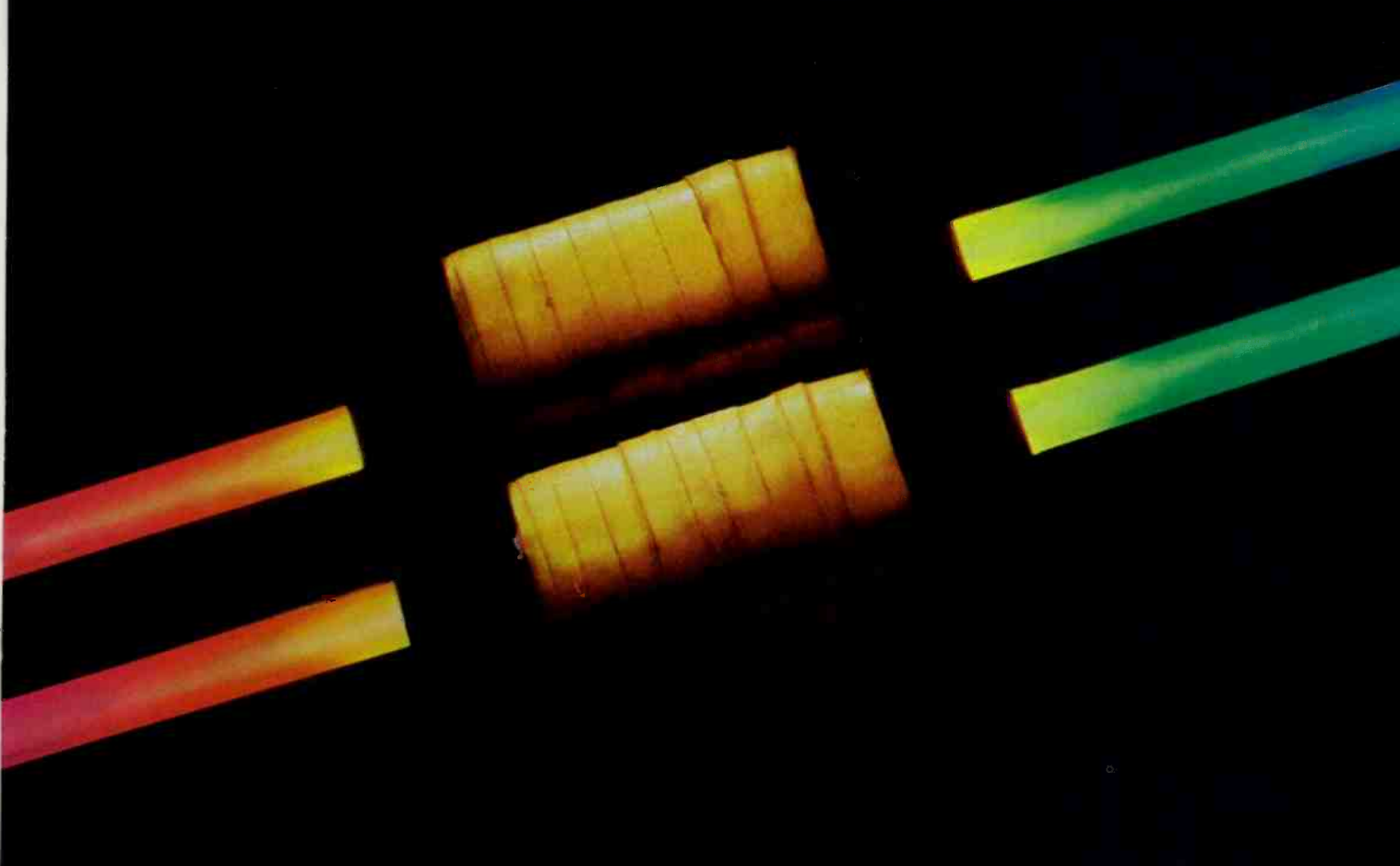
plication is reduced power consumption. An antenna system consisting of 16 Scala CA5-150 Yagis is used to obtain the desired coverage pattern and keep the transmitter power consumption to a level that can be supported by the solar energy system. The effective radiated power of each of the two FM stations is 5kW (horizontal and vertical). With the highly directional antenna system providing a gain of greater than 13dB, a transmitter power output of just 300W is required for each station. The transmission

chains consist of QEI exciters and Acrian power amplifiers. The units have been modified to operate directly from a battery bank, bypassing the ac-to-dc power supply.

The solar collector system consists of 128 Arco M53 photovoltaic modules mounted on an elongated octagon-shaped base. The solar

The transmitting antenna is assembled on the ground before placement on top of the support tower. The battery and transmitter equipment building is shown in the background.





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Part of the solar collector system is shown in this photo, with the transmitting tower in the background. Below the Yagi array used for the two transmitters are an STL receive antenna and a telemetry antenna.



Shown is the interior view of part of the Radio Hoyer-FM transmitter building. The equipment rack holds transmission equipment for both stations. One of the power amplifiers can be seen behind the rack, and the diplexer assembly is to the right of the rack.



modules charge a 24V battery bank, which makes operation possible at night and during periods of insufficient sunlight. The power system is controlled by a microprocessor system designed by Industrial Electronics.

The dc supply feeds the two 300W FM transmitters and associated hardware. Instead of conventional air conditioning for the equipment room at the transmitting site, special heatsink construction has been used to conduct heat produced by the power amplifiers out of the room. The two power amplifiers' outputs are combined in a Shively Labs FM diplexer and fed to the directional antenna, which is supported by a 120-foot-high ROHN tower. Preliminary tests indicate excellent stereo coverage of the island.

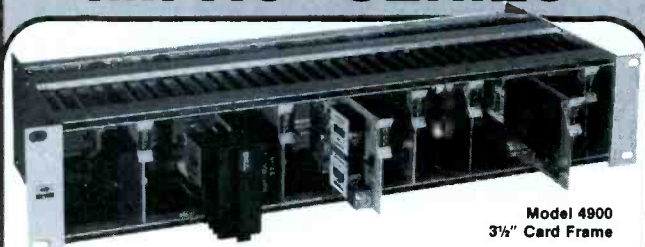
The Radio Hoyer-FM project matches new technology with the special needs of the end user. This effort may point the way for other similar projects in the United States and elsewhere.

Editor's note:

The use of solar power at broadcast facilities has been covered several times by **BE** in recent years. Interested readers are referred to the October 1979 and November 1979 issues for other perspectives on solar energy generation.

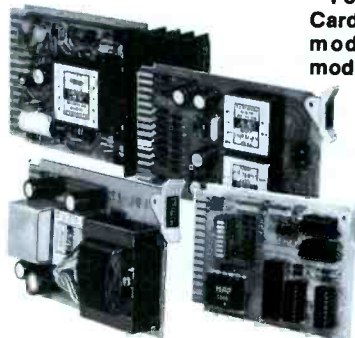
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Technical deregulation:

How radio engineers have been affected

By Rick Garofalo, staff engineer, WGN-TV, Chicago, IL

The FCC's decision to drop the First Class Radio Telephone License in July 1981 has been a subject of continuing criticism and controversy. The commission received many harsh letters of protest from engineers who thought the professional status of broadcast engineering had been downgraded, and from industry groups such as the Society of Broadcast Engineers, which predicted "possible deadly hazards for untrained personnel."

The FCC's reasoning behind eliminating the First Class License stemmed from a Georgia Institute of Technology study in which the commission could find no significant relationship between operator licensing and signal quality. In the 15-page discussion section of the July 8, 1981, *Federal Register*, the FCC said that

nearly all those making comments (both for and against keeping the license) agreed that the current licensing examination was insufficient to test technical competence. The commenters also agreed that any effective examination would have to include hands-on performance tests on broadcast equipment. The FCC thought that such tests would be impractical and prohibitively expensive to administer.

Accordingly, the commission decided to place responsibility for ensuring technical competence of engineering personnel with individual station licensees. The commission reasoned that licensees would be kept in check by "market forces and economic self-interest." Although the FCC still required adherence by all stations to applicable rules, elimination of the First

was viewed by many as a retreat by the commission in technical regulation.

Since the elimination of the First Class License more than two years ago, the commission also has sharply reduced transmitter logging requirements for broadcast stations. These two actions have caused many engineers, particularly radio engineers, to worry about their future in the industry.

To gain insight into the effect that technical deregulation has had on radio broadcast engineers, I conducted a survey as part of a master's thesis in management and the development of human resources at the National College of Education in Evanston, IL. With the help of **Broadcast Engineering**, 1480 questionnaires were mailed to radio engineers across the country. Nearly 50% of the questionnaires were returned by the cutoff date, an impressive return for any survey.

Survey results

The three main thrusts of the survey concerned working conditions, hiring qualifications and compensation benefits. Questions about working conditions included staffing levels, equipment automation, and the use of full-time, part-time and consulting engineers. The radio station personnel questioned in the survey also were asked about employer preferences in job qualifications and about compensation and educational benefits. The primary goal of the project was to show the effects that technical deregulation had on the employment of radio engineers. The survey expanded on some areas covered in a recent **BE** research report on the state of the industry. (See **BE** December 1983, page 96.) The survey results are summarized in Table I and Table II.

The questionnaire shows that a significant number of engineers (22%) noted a decrease in the number of

Table I.
Summary of staffing level data gained in the radio engineering survey.

Category	Result
Staffing level changes within the last two years:	
Increase	7%
Decrease	22%
No change	71%
Stations that have a full-time chief engineer	23%
Stations that have at least one full-time maintenance engineer	69%
Number of maintenance engineers on staff:	
1	60%
2	23%
3	9%
4	4%
Stations that use consulting engineers	62%
Stations that have installed automation equipment	41%
Stations that reported a layoff of engineering personnel due to automation	8%

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Table II.
Questionnaire results on station hiring preferences and employee compensation.

Category	Result
Station preference for replacing the First Class License as a means of ensuring technical competence:	
SBE Certification Program	42%
General Class FCC License	31%
No licensing	8%
Statewide professional licensing	7%
Other	12%
Qualifications used by stations for hiring decisions:	
Vocational or military school	76%
High school	16%
College degree	8%
Engineers that rate their pay as "good" or "fair"	74%
Engineers that think their pay and benefits have not changed since elimination of the First Class License	82%
Stations that offer merit pay incentives	62%
Stations that offer tuition reimbursement as a method of encouraging additional employee education	33%
Stations that offer in-house or out-of-house educational programs	27%

technical persons employed at their stations since the First Class License was eliminated. Most respondents said the slack caused by this decrease has been filled by part-time or contract engineers.

The results on automation equipment also are interesting. Although 41% of engineers responding to the survey said that their stations had installed full or partial automation systems, only 8% reported that the automation had resulted in fewer engineering jobs. Several engineers said that program automation equipment had been tried, but later was removed by management because of poor audience ratings results.

The figures on employment of chief engineers, maintenance engineers and consulting engineers provide insight into the current employment situation at radio stations across the country. Sixty-nine percent of respondents said their stations employed one or more full-time maintenance engineers, and 83% reported that the maintenance staff was composed of one or two persons. Although 77% of the engineers questioned indicated that their stations did not have a full-time chief

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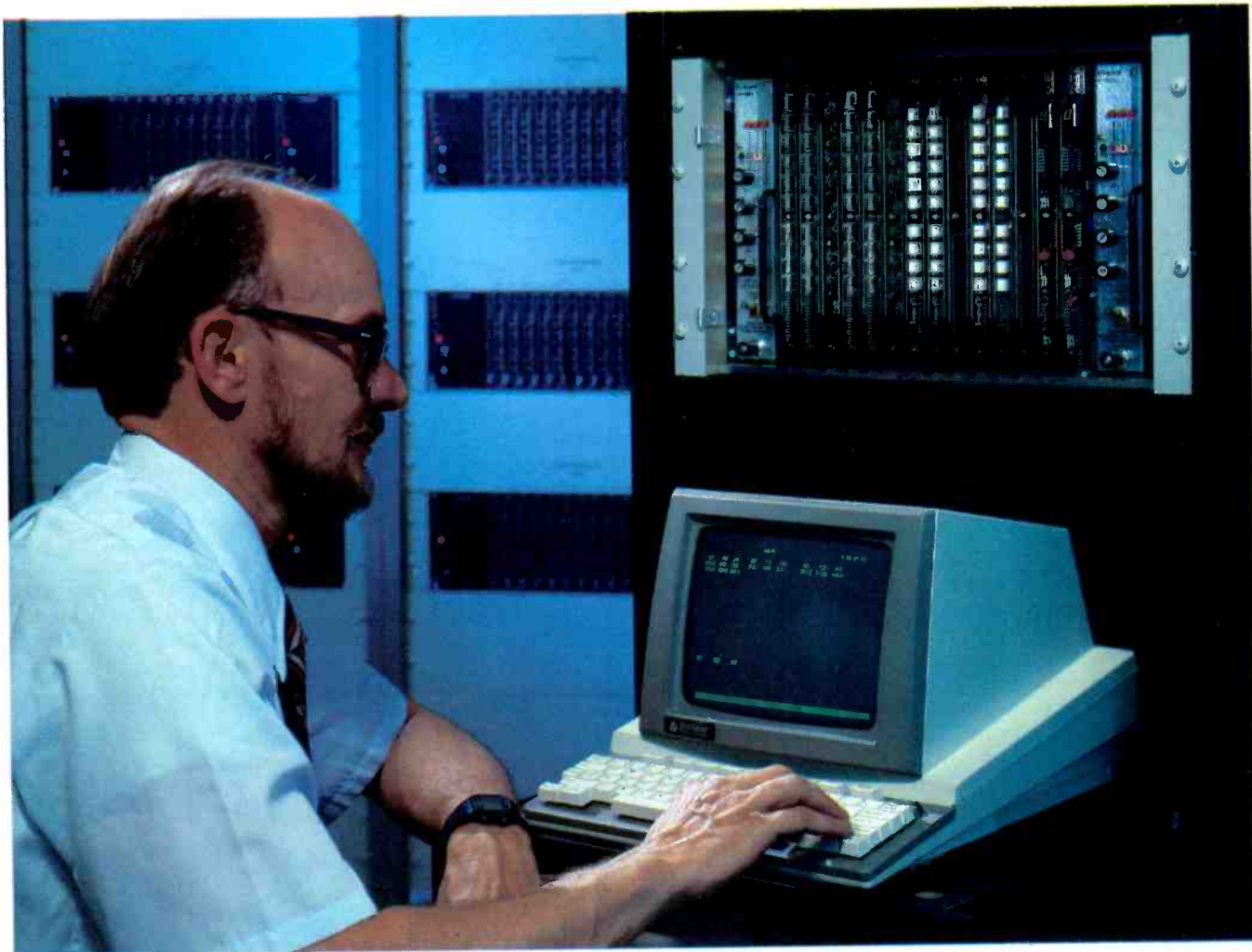
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A major goal of this study of engineering trends was to determine if stations offering comprehensive wage and benefit packages also offered educational opportunities to keep their engineers abreast of current technology. Although only 27% of the stations provide educational opportunities (both in-house and out-of-

Perhaps the most interesting statistic concerning employee compensation is that 82% of the engineers said that pay scales had not changed since the elimination of the First Class License more than two years ago. Some critics of the FCC action had feared a general decrease in salary levels for broadcast engineers.

The position of the radio engineer in the broadcast industry is slowly changing. Equipment reliability has improved dramatically within the last two decades, and greater profit margins have allowed stations to purchase backup gear as protection against off-air problems. These changes and improved test equipment make it possible for engineering personnel to maintain a greater volume of equipment in less time than ever

If radio engineering is to remain a vital and challenging part of the broadcast engineering profession, technicians will need to assert themselves into positions of greater visibility than ever before. Radio engineers, particularly chief engineers, must communicate with station management on a continuing basis. Too often in the past, engineering has tended to be equipment-oriented, rather than people-oriented. Although the engineer's primary goal is equipment installation and maintenance, technicians need to know how their department contributes to overall station goals and objectives. Radio engineers can make themselves an important part of the management team.

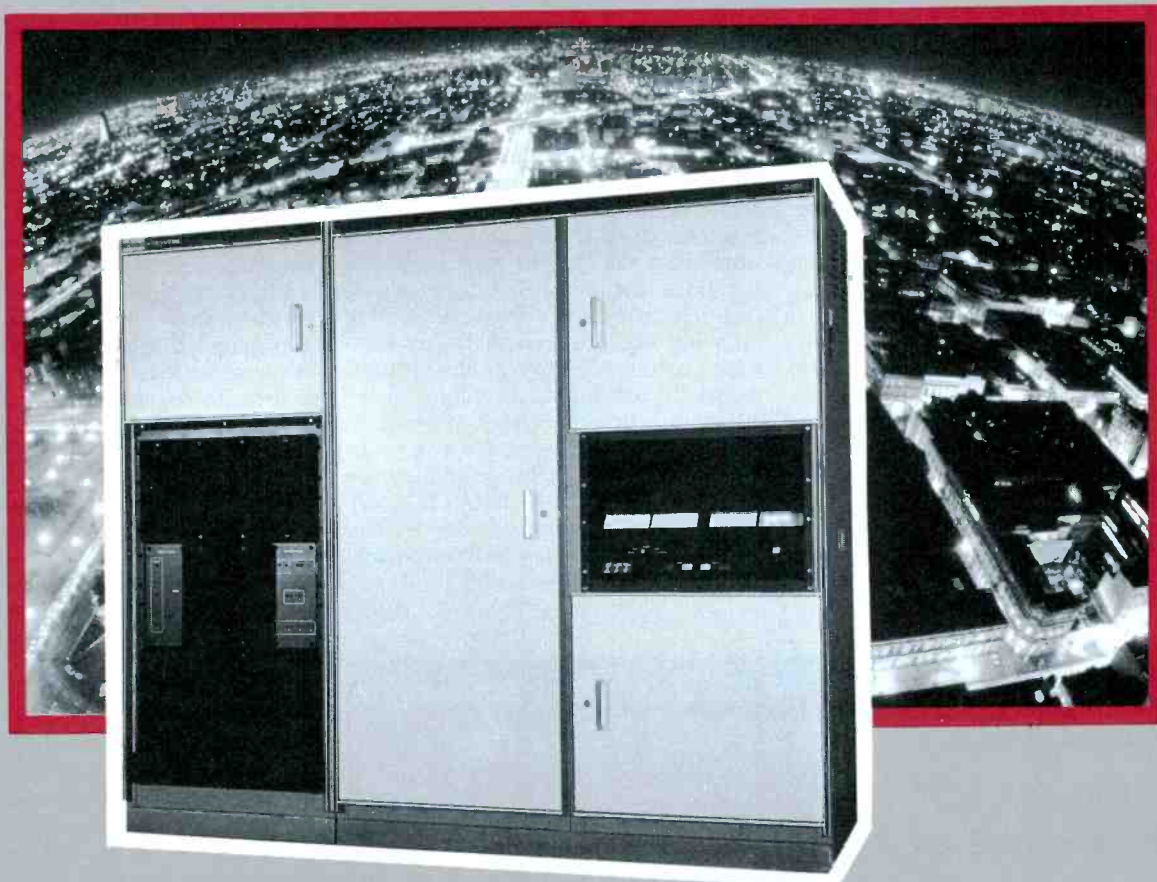
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**The Signal
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Field report: IGM BASIC-A

By Jerry Whitaker, radio editor*

The IGM Communications BASIC-A automation system, using the version 3.0 software package, is a full-function program controller that can execute complex music formats. The version 3.0 software cleans up a number of bugs in system operation found in earlier versions, and can be installed in any BASIC-A unit.

When KPJD-FM purchased BASIC from IGM several years ago, version 2.0 software was used in the system. After a few months of operation, several problems became apparent. The most pronounced of these was the system's possibility for mistakenly putting two audio sources on the air at the same time.

Several other problems were found with the system during the first six months of operation that probably could be attributed to power line transients or static discharges. For example, the system locked up three or four times in a disallowed state in which the video display became inoperative. Another trouble involved the system ignoring end-of-message tones, leaving a particular source on the air until manually advanced. In all of these cases, resetting the system cleared up the problem. However, resetting also can erase the entire program memory (depending on which chassis is reset).

Once the software bugs were identified, IGM sent a new software pack-

age (version 2.6) to correct the double audio problem and several other minor troubles. The service KPJD has received from IGM has been good. The company has done all possible to help the station with any problems found with BASIC-A.

Most troubles encountered initially resulted from programming and format errors that we created ourselves while generating KPJD's program. The automation system does exactly what you tell it to do, so a small oversight in the programming sequence can have a serious impact on system operation. Most such problems centered on real time commands that caused the system to jump ahead when we did not want it to or delayed an advance longer than we had intended. These problems were not the machine's fault. The old saying about garbage in, garbage out, is true.

System configuration

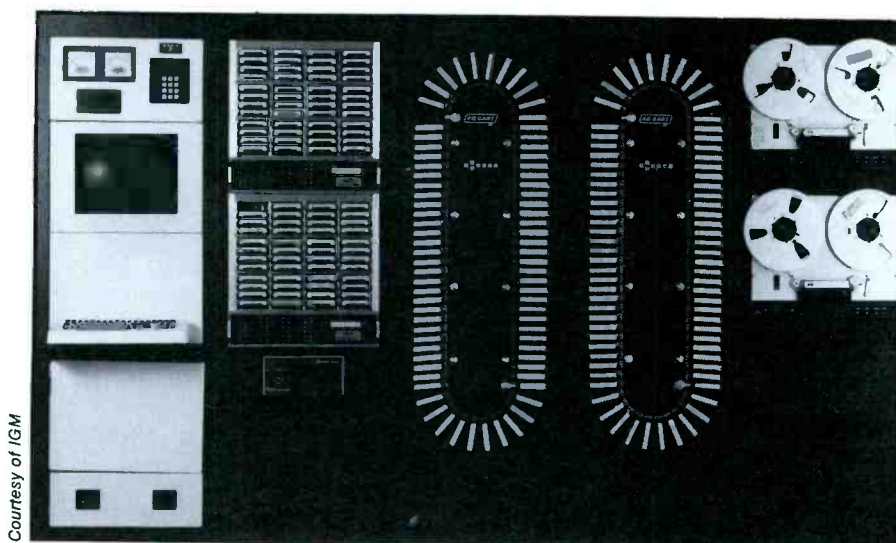
The BASIC-A is built to be expandable to the needs of the most complex formats and programs. The usual memory size accommodates up to 3000 events and 1000 different labels for those events. An extended memory is available by simply adding memory cards to the system. With a full set of memory boards, BASIC will accept as many as 6000 events and 2000 labels.

We have found that the standard memory of 3k events is more than adequate for KPJD-FM's format, and we have not come close to using up the 1k of label space in memory. If increased memory space is required by a station, expansion is made in increments of 1500 events, plus 500 labels per card.

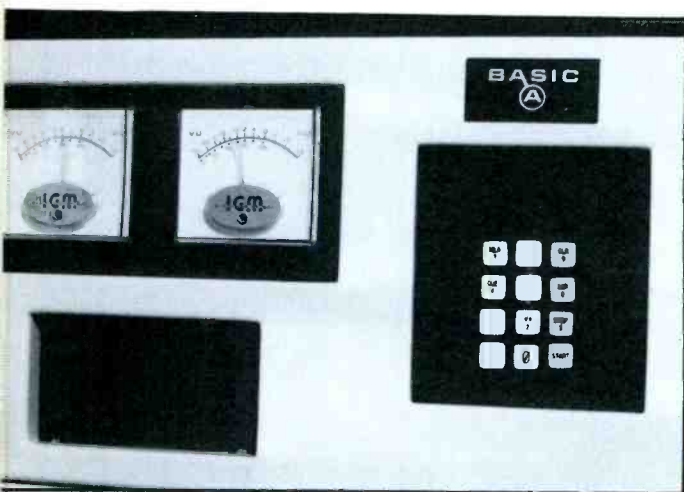
Communication with the system is through a CRT and keyboard mounted at the control racks. An optional remote monitor and keyboard are available, if desired.

Programming is through three modes of operation: the *Utility Mode*, *Programming Mode* and *On-air Mode*. The *Utility Mode* is used by engineering and programming to set the time, date, station identification, voice track, log descriptions, log printing, source assignments, special deletions and memory diagnostics.

*This report was prepared while Whitaker was chief engineer at KPJD-FM/KRED-AM in Eureka, CA.



Courtesy of IGM



Shown is a typical cartridge-based automation system using the BASIC-A controller. The system hardware is contained in the rack on the far left. The other equipment racks contain source machines.

The BASIC-A monitor control panel is shown. This assembly contains a monitor amplifier, right- and left-channel VU meters, and a microcomputer-controlled keypad that can be used to operate the system manually if necessary.

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The Programming Mode is used by traffic and programming to schedule commercials and, through special formats, create the sequence of events each hour. Nearly all data entry to the system is done in this mode. With the music rotation and voice-track functions set aside in format files, traffic can call up each hour of the broadcast day and enter the commercial schedule without seeing, or disturbing, the music sections or special programs. Use of the Programming Mode in no way disturbs the on-air schedule of events.

Several special functions are available to the programmer, including



Shown is the data entry keyboard of the BASIC-A system. The system's CRT and keyboard usually are located at the equipment racks, but can be remotely located by special request.

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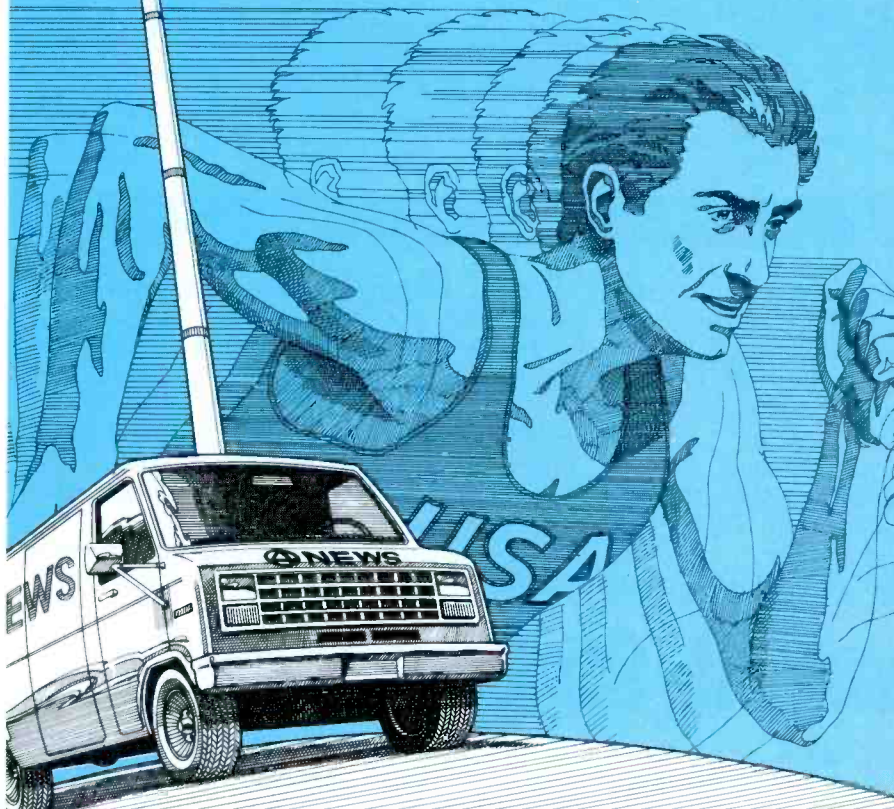
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jumps to other sections of memory, memory search routines and a variety of real time conditions. Audio controls allow slow, medium or fast audio fades in or out of a source, voice tracking with double audio, a special preset fade level and source dead-roll.

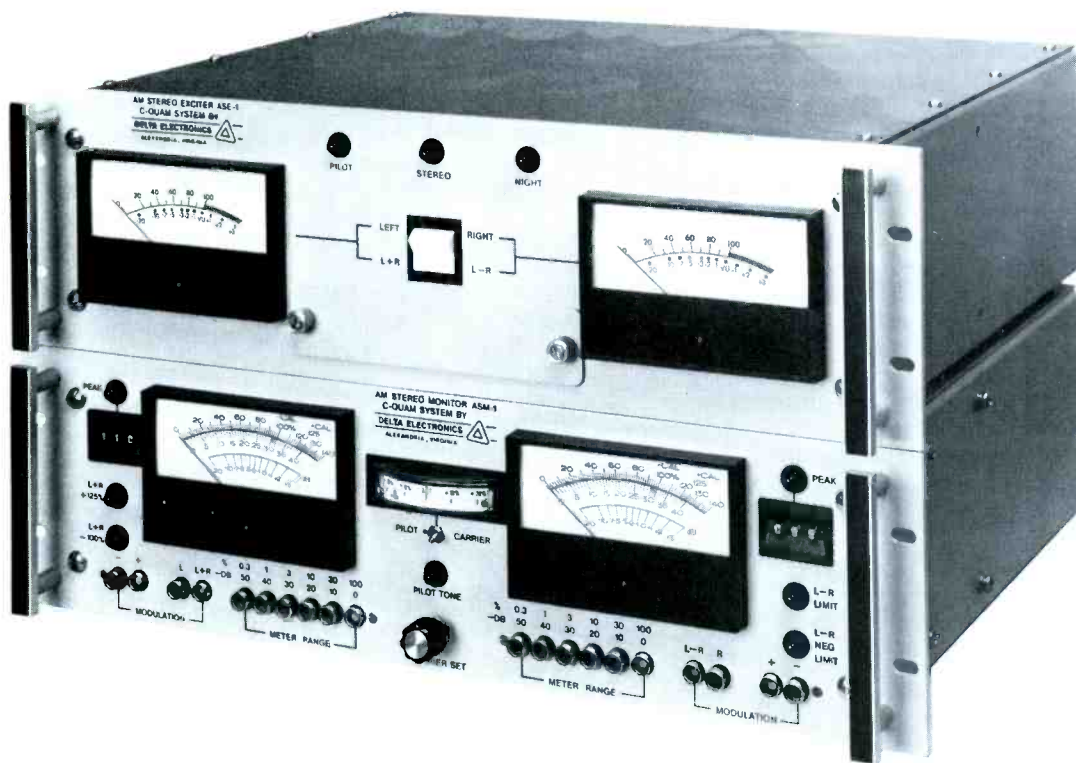
The On-air Mode is the operational mode of BASIC-A. The source on the air and the next page of programming are displayed on the CRT, as are the real time and running time of the current source. Events can be added or deleted at the control position, or from an optional remote station, when the system is in this mode.

The control keyboard includes several single-function buttons used when BASIC-A is in the On-air Mode, such as System Start, System Stop, Source Override (which manually advances the program one step) and Now. The Now button is a programmable spot in memory that makes the next event in the on-air program a pre-selected source, such as a live studio microphone for insertion of a news bulletin.

An Emergency Channel is included in the memory as an escape to a programming problem. For example, if the program calls for several tape selections to play before a commercial cluster at 15 minutes after the hour, and one or more of the decks runs out, the program would have nowhere to go until the internal clock reached 15. The Emergency Channel is designed to give the system a pre-programmed spot in memory to which it can go for instructions. Typically, this channel would tell the system to play a reserve tape deck until the real time block was removed.

The final method of controlling the operation of BASIC-A involves the monitor panel, which allows manual

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Delta Electronics, Inc. introduces the ASE-1 AM Stereo Exciter and ASM-1 AM Stereo Modulation Monitor: FCC type-accepted C-Quam System transmission equipment for the AM Stereo broadcast market. C-Quam is the *Compatible* Quadrature Amplitude Modulation system developed by Motorola, Inc. C-Quam is the system of choice for more than 70 U.S. stations plus additional Canadian stations. Users range from kilowatt day-timers to full-time network flagships. These stations report enthusiastic response from listeners using multimode and full C-Quam stereo receivers as well as typical monophonic receivers. The key is compatibility without compromise. All listeners, stereo and mono, receive a clear signal with low distortion. Delta's twenty-year leader-

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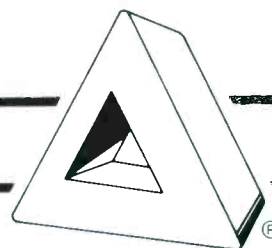
For additional information, contact Bob Bousman at (703) 354-3350.

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control of all audio sources. If needed, the system can be run from this keyboard until the main program is restored. The monitor panel also manages the program and cue monitor amplifier, VU meters and the Silence Sense function. The amount of dead air allowed before the system will advance automatically to the next event is programmable to the delay desired, generally 6-10 seconds.

A thorough description of BASIC-A's programming and operation is beyond the scope of this report. However, it will do just about anything a program director can dream up. The system communicates in English and is easy to "talk to," once the operator learns the proper code words.

A solid-state electronic receive-only logging printer is used to give a hard-copy readout of events aired. Figure 1 shows a typical section of the log with the time, source number, commercial or program description and spot length.

A separate stand-alone AFSK (audio frequency shift keying) encoder is used in the station's production room to encode the desired print-out of commercials or special program descriptions. If no information is encoded onto the cartridge, the automation system will print a description from its memory, such as "commercial" or "public service announcement." Various status reports and program memory dump routines also can be printed by the system if desired.

System hardware

BASIC-A is programmed, controlled and maintained from a single, 6-foot rack that contains the monitor panel, video display, data entry keyboard, audio chassis, central processing unit (CPU) chassis and power supply. (See Figure 2.)

Three microprocessors are used to control the system. The main CPU board manages the memory and most of the operating software, the audio CPU manages the audio source operations and the monitor CPU manages the Silence Sense functions and manual control circuits.

The main CPU chassis consists of a microprocessor card, a CRT and keyboard interface, several program-mable read only memory (PROM) software cards, a serial communication board, a terminator card and up to five program event memory cards. Other boards can be added for various options, such as a full remote terminal or simple remote-control station.

The audio CPU chassis consists of a microprocessor card, a terminator board and up to 16 source cards. Each audio source used in the system requires an input printed circuit board (PCB), which controls start and stop

functions, audio switching, AFSK decoding and end-of-message tone detection (depending on the type of source). Each type of source requires a particular card. Reel-to-reel units use one type of board, single-play cart machines use another, and so on. A special function relay source card is available that provides any one of 12 different contact closures under control of the program. These typically would be inserted to perform coffee pot-type functions based on real time commands.

The monitor panel chassis consists of the monitor CPU, an input keyboard, a 6-digit LED readout, two VU meters and a monitor speaker. The power supply chassis provides +5Vdc, ± 15 Vdc and +24Vdc to the system. A battery backup carries the memory through power outages to

09:08:43AM	0100	OPEN-UT-MUSIC	
09:08:44AM	0200	MUSIC	
09:11:44AM	0100	30TH-UT-MUSIC	
09:11:45AM	0400	MUSIC	
09:14:06AM	0503		
09:14:16AM	0504	EUREKA HALL 11-25	30 CM
09:14:46AM	0519	HICKORY FARMS 11/22/82	30 CM
09:15:16AM	0100	OPEN-UT-MUSIC	
09:15:17AM	0200	MUSIC	
09:18:38AM	0100	OPEN-UT-MUSIC	
09:18:39AM	0400	MUSIC	
09:21:12AM	0300	MUSIC	
09:24:21AM	0505	JINGLE	
09:24:35AM	0300	MUSIC	
09:27:32AM	0509	WELSON FLOOR TIME 20 MIN. 7 CM	
09:27:44AM	0300	MUSIC	
09:30:25AM	0804	RELAY	
09:30:25AM	0900	LIFESTYLES CARNIVAL RIDES	2:32 PM
09:33:03AM	0100	OPEN-UT-MUSIC	
09:33:04AM	0200	MUSIC	
09:37:00AM	0547	UNIQUE BOUTIQUE WAIT ROOM	30 PSR/CM
09:37:32AM	0100	OPEN-UT-MUSIC	
09:37:33AM	0200	MUSIC	
09:41:28AM	0100	OPEN-UT-MUSIC	
09:41:29AM	0400	MUSIC	
09:44:19AM	0510	WELSON FLOOR TIME 45 MIN. 7 CM	
09:44:29AM	0300	MUSIC	
09:47:58AM	0804	RELAY	
09:47:59AM	0503		
09:48:00AM	0516	REDWOOD BOOTEK	30 CM
09:48:42AM	0504	EUREKA HALL 11-25	30 CM
09:49:12AM	0100	OPEN-UT-MUSIC	
09:49:15AM	0200	MUSIC	
09:51:24AM	0100	OPEN-UT-MUSIC	
09:51:30AM	0400	MUSIC	
09:54:31AM	0300	MUSIC	
09:57:26AM	0505	JINGLE	
09:57:42AM	0300	MUSIC	
10:01:01AM	0804	RELAY	
10:01:01AM	0501	STATION-10	
10:01:05AM	0540	SHERWOOD FOREST	30 CM

Figure 1. A typical program log print-out from the BASIC-A system. Information supplied to the station from the system's computer includes the time each event aired, source identification number, description (including commercial label) and running length of commercial announcements.

prevent loss of programming. The power fail and return times also are printed on the log for later reference.

A floppy disk is standard on all BASIC-A systems. It allows the entire program memory to be dumped onto a disk for a variety of uses. The system memory likewise can be loaded from a disk when needed.

Audio specifications for BASIC-A are good. The standard output level is +8dB, with another 10dB of headroom before clipping. Frequency response is flat to within 1dB from 50Hz-15kHz. Maximum harmonic distortion is 0.5% per channel up to the clipping point. Noise is at least 60dB below the standard operating level. Figure 3 shows the measured performance of the system installed at KPDJ-FM.

Audio routing is performed by CMOS analog switches for quiet and reliable operation. Audio fades are executed by a voltage-controlled amplifier and driven by a digital-to-analog converter, which receives its instructions from the system memory.

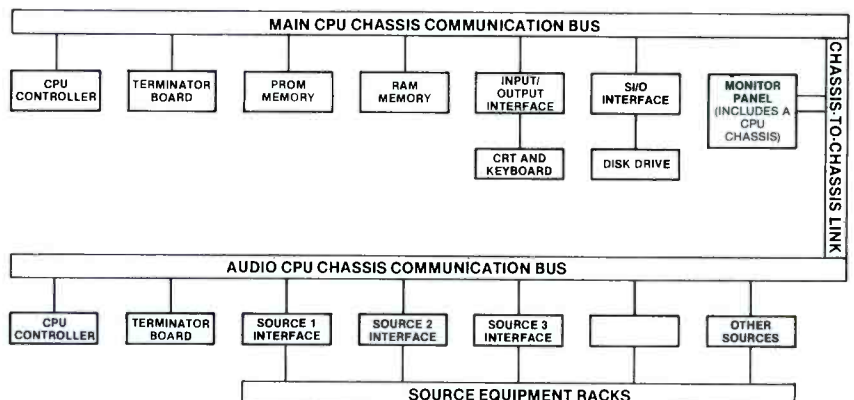
BASIC-A is well-documented with technical descriptions of each printed circuit board used in the unit. Schematics are complete and detailed. No component layout sheets are included for individual PC boards. However, parts are easy to locate with silk-screened designations on the component side of each card.

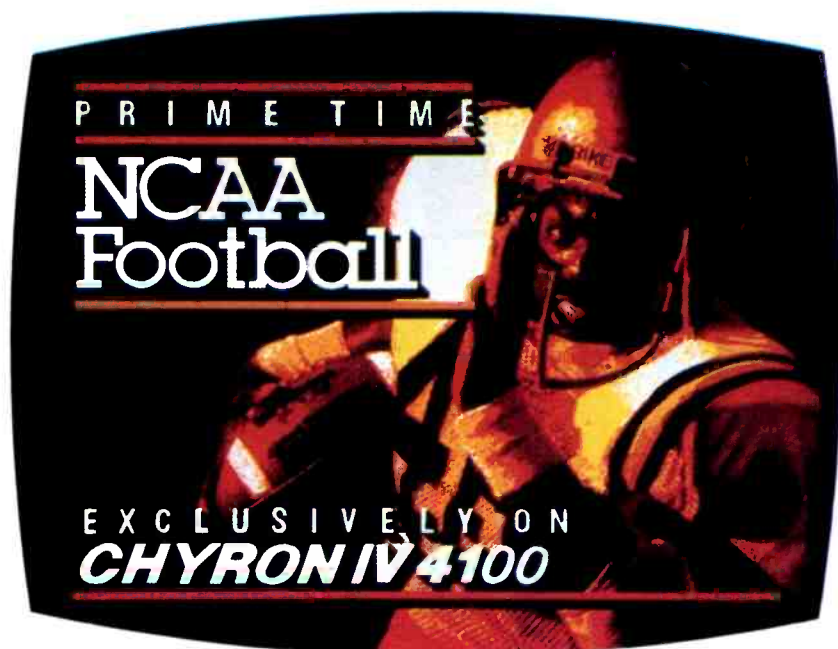
Much craftsmanship has gone into constructing BASIC-A. The circuit cards are well-done, and most are removed easily from their mother board chassis. An extender card allows troubleshooting of a particular board with the system up and running. The unit is easy to service, with access to all sub-assemblies from the rear cabinet door.

Version 3.0 software

The software conversion process

Figure 2. The operational configuration of the BASIC-A automation system. Three microcomputers are used in the system to manage various sections of operation.





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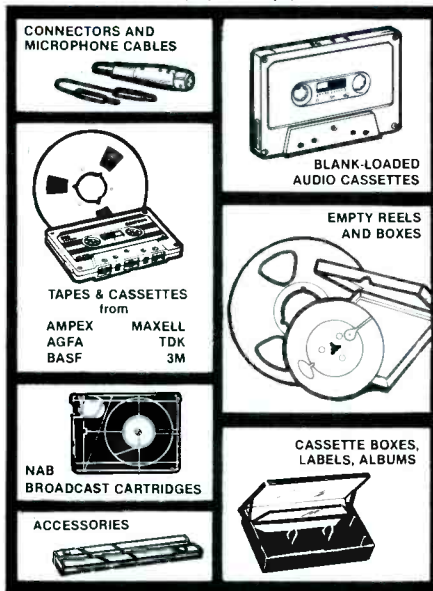
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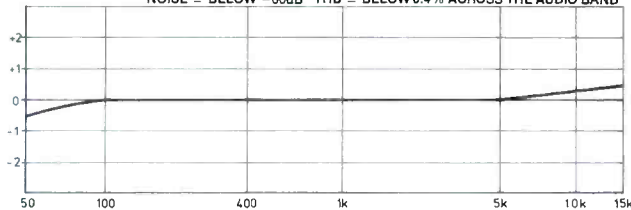
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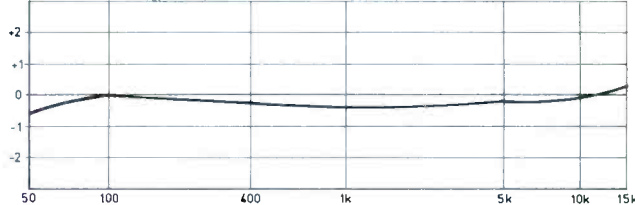
CHANNEL 1 RESPONSE

NOISE = BELOW -60dB THD = BELOW 0.4% ACROSS THE AUDIO BAND



CHANNEL 2 RESPONSE

NOISE = BELOW -60dB THD = BELOW 0.4% ACROSS THE AUDIO BAND



COMPOSITE RESPONSE

SOLID LINE IS CHANNEL 1 RESPONSE, BROKEN LINE IS CHANNEL 2 RESPONSE

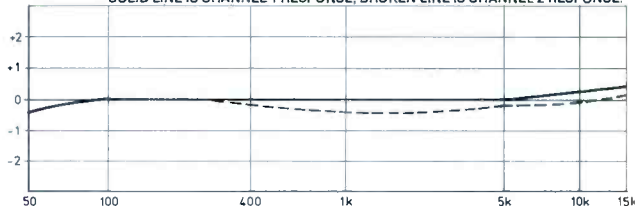


Figure 3. Performance measurements on the BASIC-A automation system. Frequency response, noise and total harmonic distortion (THD) tests were made at the system operating level of +8dB line output.

(for stations with earlier-version software packages) is simple and straightforward. Two new PROMS are installed in place of existing devices. One PROM is on the monitor panel PCB and the other is located on the audio CPU board. Three new cards then are inserted into the main chassis and the old boards are returned, along with the removed PROM, to IGM. The new boards are the main CPU, serial input/output (SI/O) and main PROM cards.

This conversion process takes about 30 minutes to complete. Before installing the new SI/O and PROM boards, check the DIP switch banks located on the cards. They should be set to the positions described in the modification instructions sheet.

KPDJ encountered a problem when changing the software on its unit, because the instructions (that have since been changed) did not specify the positions of two of the four DIP switches. A call to the factory quickly solved the problem.

In addition to clearing away some software bugs, version 3.0 provides several new features. Before the change, whenever the CPU chassis was reset, all program memory was lost. With the new software, however, a reset command reinitializes the system, but will not automatically clear the program memory. Instead, BASIC gives the operator the option of resetting the memory or leaving it alone. This allows the station to correct most of the disallowed states that can occur because of power line transients and static discharges, without losing memory.

Another feature of software version 3.0 is the capability for dumping the program memory to disk while the system is on the air. It was possible to load the entire program onto a disk before, but only while the system was in the Stop mode. With this new feature, copies of memory can be made routinely for security or business computer applications.

The new software also allows improved remote control of BASIC-A, making it more useful in a live-assist operation. The accuracy of the system's real time clock is improved, as well. Typically, BASIC-A drifts less than one second per week.

KPDJ is pleased with the new BASIC-A version 3.0 software package. It makes a good system even better.

Editor's note:

The field report is an exclusive BE feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

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

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

For more information on the BASIC-A automation system reviewed in this report (now designated BASIC-III), contact IGM Communications, 4041 Home Road, Bellingham, WA 98225.

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Selecting an analog video fiber-optic system

By Pete Mountanos, fiber-optic business manager, Grass Valley Group, Grass Valley, CA

Each fiber-optic manufacturer makes various claims regarding performance, distance, quality, etc. Because each one uses different approaches and specifications, direct comparisons are difficult to make. As a result, buyers must understand their particular application, as well as how various types of systems operate, to ensure that they make the best purchase. This information explains various types of equipment and suggests some simple tests to use in system evaluation.

All video fiber-optic systems fall into two categories—digital or analog. Based on today's technology, digital systems typically cost much more and do not achieve the performance of analog systems. However, they are appropriate for long-distance transmission needs (more than 50km or 31 miles), in which repeaters are required. Where applicable, such systems generally do not compete with analog systems. The performance typically depends on the sampling bit rate (in other words, 3X or 4X color subcarrier), as well as whether the A-D conversion is based on 8- or 10-bit architecture devices. These systems usually require 90-140Mbit or greater capabilities, and cost up to twice as much as their analog counterparts. Thus, with economics in mind, the

thrust of this discussion is limited to choosing an analog optical fiber system.

There are two basic approaches to designing an analog video fiber-optic system. These are commonly referred to as intensity modulation (IM) or pulse frequency modulation (PFM). Each has inherent strengths and weaknesses. Understanding the differences is important in choosing a system.

Intensity modulation

IM systems usually are the easiest to manufacture, and, hence, the least expensive types of systems. They operate on the concept of using an input video signal in the 0-1V range to directly drive a light emitting device (LED). They may use various input stages, clamps, linearizing circuits, etc., but all operate on the same principle. The output intensity of the optical device is correlated directly to the input signal. More input volts equal more light output.

The IM simplicity has advantages and disadvantages. IM systems inherently handle large incoming signal bandwidths. 25MHz is common, and systems for up to 50MHz are available. On the negative side, performance of such systems is directly related to the turn-on characteristics of the LED and the amount of light output power. To understand why,

remember that because the optical signal is a linear representation of the input signal, the receiving device must perform the exact inverse function in turning the optical signal back into an electrical one. This usually dictates using a PIN diode as opposed to an avalanche photo diode (APD).

APD devices often are used in digital systems because of an inherent gain capability. Because of the APD's non-linearity, however, it cannot be used in an IM system. The PIN diode works on a conversion basis of one photon to one electron, at best. Conversion ratios typically are in the 60% to 70% range. Thus, the manufacturer must provide a gain amplifier that has literally no noise and can operate at extremely low current levels. The PIN diode must be the mirror image of the optical transmitting device and stay that way for the life of the system. Otherwise, linearity is degraded and system performance is unacceptable.

Another major consideration is what system signal-to-noise (S/N) ratio parameter will be needed. Because an IM system has no inherent signal improvement over the link noise level, the S/N ratio will be a direct function of the optical carrier-to-noise (C/N) ratio at the receiver. Thus, the greater the distance or the more attenuation introduced into the link, the lower the S/N ratio.

Each of the drawbacks can be addressed by changing the drive of the optical device, but always one at the expense of the other. To gain understanding, look at a typical turn-on graph of an optical emitter device. Figure 1 shows light output vs. current for such a typical device. If a manufacturer drives the device from the knee to peak output, he can obtain good S/N ratio performance because of the depth of modulation. Unfortunately, this hurts linearity. Because light output is not absolutely a linear function, the greater the depth of modulation, the worse the linearity. Conversely, using less depth of modulation degrades the S/N ratio.

These factors may or may not be a problem, depending on performance requirements. Keeping these considerations in mind, purchasers must decide precisely how much non-linearity or degraded S/N ratio they can tolerate. They must evaluate these

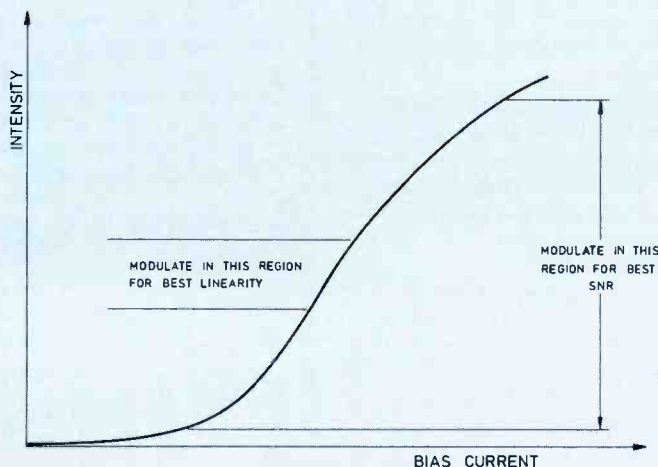
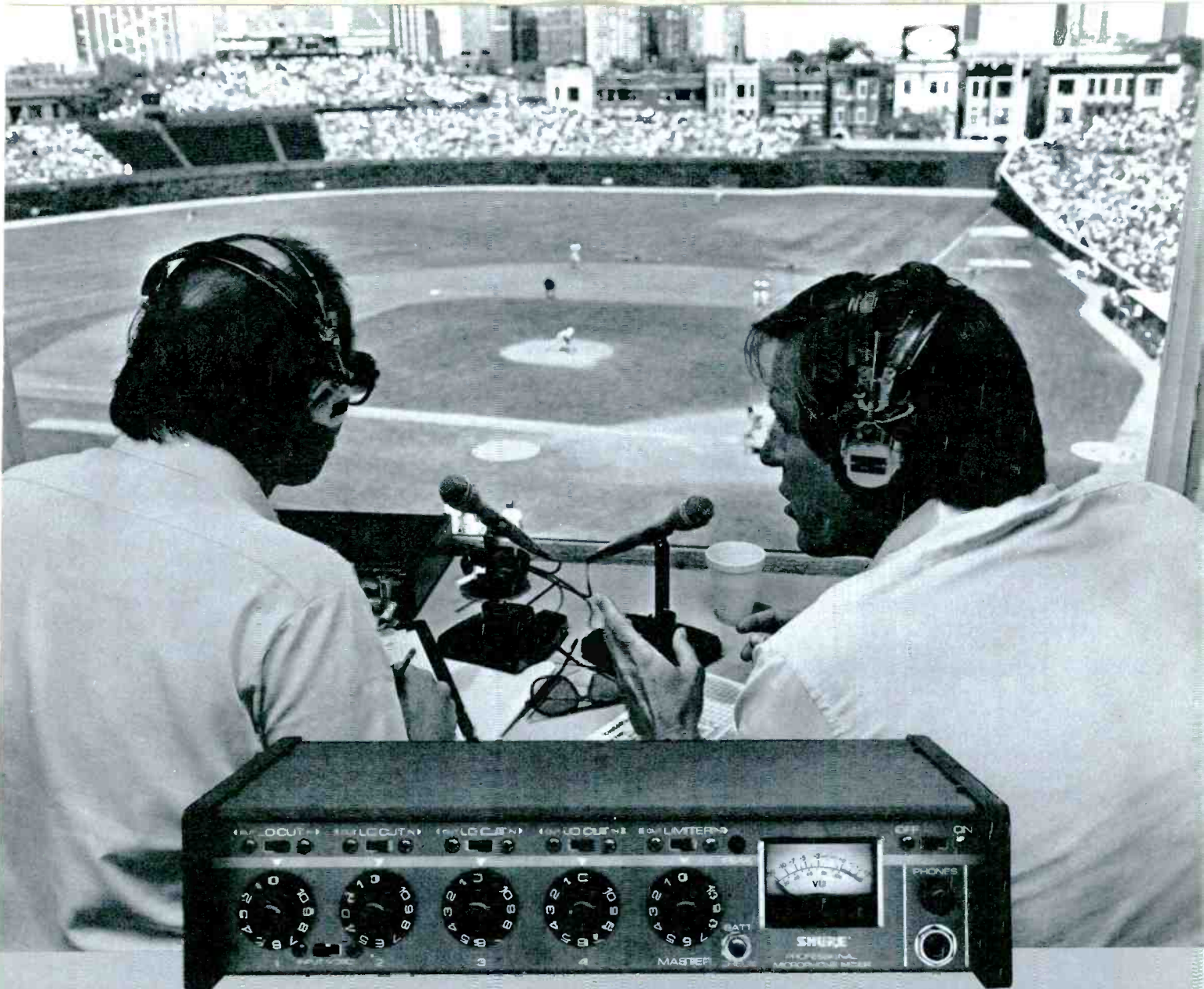


Figure 1. Typical IM LED characteristics.



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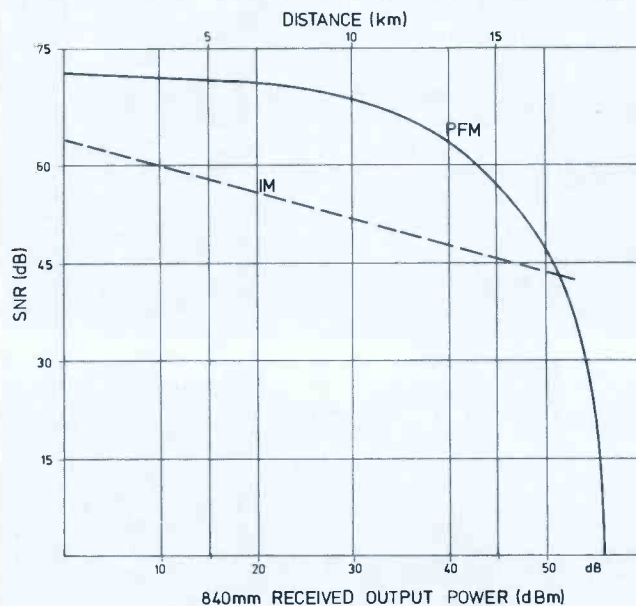


Figure 2. S/N ratio vs. modulation scheme as a function of received power.

trade-offs against the system being considered.

Pulse frequency modulation

Although they use what is still considered an analog approach, PFM systems drive the optical device in a different manner. Such systems are designed to eliminate the problems of non-linear optical devices. In fact, al-

most every major telecommunications manufacturer in the world manufactures or uses systems based on this approach. Companies such as NEC, Thomson-CSF and Western Electric, as well as Grass Valley Group, have chosen the PFM approach.

The heart of the system is the modulator, which, in concept, is simple. The input signal voltage drives a

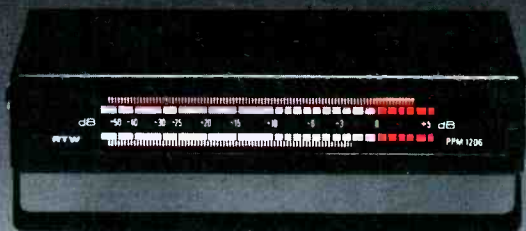
square-wave modulator. The higher the voltage level, the higher is the frequency of modulation. The major difference between IM and PFM systems is what is being modulated. In IM systems, the light intensity is altered. In PFM systems, the duration or time the optical device is on is changed. The PFM system advantage is that the optical device is on or off, resulting in references to the PFM method as "quasi-digital."

Although the PFM approach solves some problems, it can cause some as well. First, such systems bear the added cost of a modulator. Second, the input bandwidth generally is limited to 10-15MHz, compared to 25-30MHz of the IM system. Third, LED systems operating in the 830nm spectrum are more susceptible to material dispersion, because of the higher carrier frequency.

On the plus side, however, S/N ratio and linearity are more a function of the modulator than of the optical device. These two degradation factors can be solved by using proven FM modulation techniques. As a result, high performance NTSC video systems, which must meet the shorthaul requirements of RS-250B, are built using PFM techniques.

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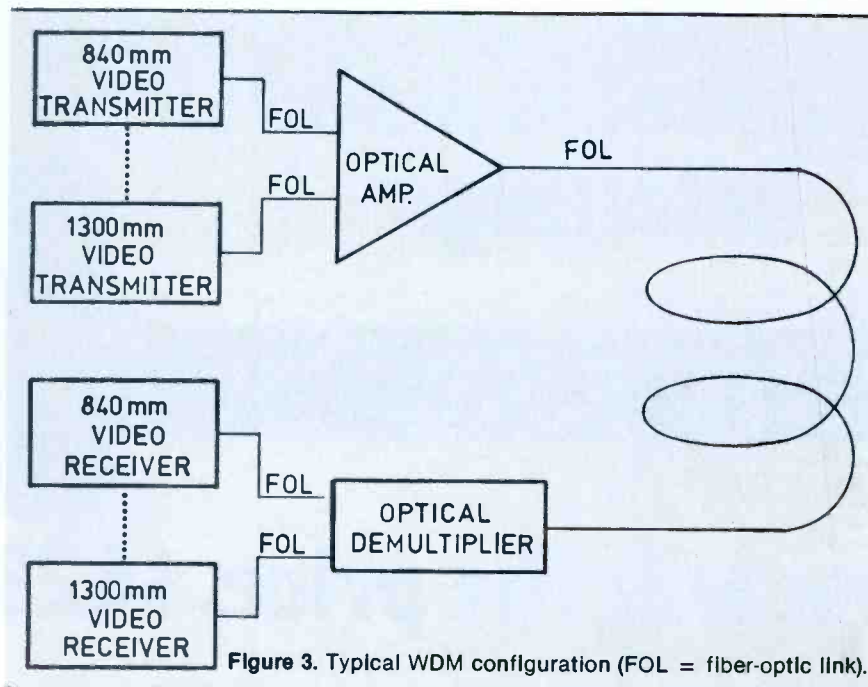
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complete transmission link. Wavelength division multiplexing (WDM), as a solution to this cost, is increasingly evaluated as a means to increase the fiber's capacity.

WDM involves placing multiple signals on different light wavelengths down the same fiber. Thus, placing two video channels on a single fiber requires half as many fibers in the cable. WDM also allows future services to be added to an existing fiber system. An existing 840nm data system can be expanded to a video system by adding 1300nm equipment. Assuming loss budget requirements for each individual system are not exceeded, each channel operates virtually independently of the other on the same fiber. Although most new fiber installations are more cost-effective, based on today's prices, systems capable of expansion help ensure the suitability of a system in the long term. GVC's WAVELINK systems demonstrate this capability with two broadcast video channels being transmitted over the same fiber simultaneously.

Broadcast video

Today, almost every manufacturer that transmits a TV picture claims "broadcast-quality" video. Rather than

systems is the easy incorporation of various optical devices operating at different wavelengths. Because S/N ratio is only indirectly dependent upon C/N ratio, the systems can be wavelength division multiplexed to put multiple video channels on a single fiber.

Wavelength division multiplexing

Analog video fiber-optic systems can transmit over distances of 25km or more without a repeater, depending on the optical wavelength and type of fiber being used. At such distances, fiber costs become a substantial contribution to the cost of the

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VIDEO					
Crosstalk Video to Video	-65/4.43	-60/4.43	-60/5	-60/5.5	-60/4.4
Hum & Noise (0-4.2 MHz)	-75	-75	-65	-75	
(IRE WEIGHTING)	82				-75
Frequency Response (dB to mHz)	± 1/5.5	± 1/5.5	± 1/5	± 1/5	± 1/5
Diff Gain (10-90°)	3.58	1°	25°	1°	1°
Diff Phase	1°	1°	25°	1°	12°
AUDIO					
Crosstalk (dB/kHz) Audio to Audio	-88/20	-85/15	-80/15	-80/15	-75/20
Hum & Noise (dB below out)/ FILTER	-122/15k	-109/	-92/15k	-104/15k	-109/15k
Freq Resp (a) Max Out (dB/dBm)	± 1/30	± 2/24	± 1/24	± 1/24	± 2/24
Over Freq Range	20-20k	30-15k	20-20k	30-15k	30-15k
Com Mode Rej Ratio (dB)	-80	-75	-80	-65	-70

*Data not available

Data based on manufacturers specification as of 4/83.

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using such a loosely defined term in a procurement document, attempts are made to place specifications on various signal parameters.

The picture received at the home is not of the same signal quality as that produced in a studio. In fact, the farther a picture gets from its point of origin, the more it is degraded. Multiple tape generations, electronics limitations and other factors degrade a video image. The performance we have come to expect of a distribution amplifier cannot be duplicated in a 50,000-mile satellite link. As a result, we must define performance requirements for various links of the possible distribution system.

The most thorough document that attempts to define the requisite performance specifications of optical fiber equipment is the EIA standard RS-250B. This document defines almost every aspect of the TV picture and the required performance of equipment operating in any portion of the transmission system. Some key parts of this document are worth noting.*

Aspects of transmission are defined and broken into various categories. These include the following:

- shorthaul, point-to-point (for example, studio transmitter link);
- mediumhaul, for up to 10 repeaters;
- longhaul, transcontinental, for up to 150 repeaters;
- satellite; and
- end-to-end considerations.

The area of interest for this discussion is shorthaul specifications, because that is what fiber-optic systems should meet to qualify for broadcast video. This is not saying that every fiber system must meet this specification. Meeting RS-250B would be substantially more than is required for a security or surveillance system. Rather, the shorthaul specification defines what we should expect of a broadcast-quality video link.

Of the key performance requirements, a major area of consideration is S/N ratio. Equipment should demonstrate 67dB S/N ratio, measured with a weighting filter. Differential phase should be 0.5° with differential gain at less than 2%. Although the document lists many more requirements, these provide a sample of the performance required. Operation below these standards can result in the ultimate picture quality not meeting the required performance. Fortunately, fiber-optic systems that meet these requirements are available, yet users need to verify that a par-

ticular system being considered is capable of meeting the requirements.

Measurements

Measuring the previously mentioned parameters is relatively simple and also is specifically described in the EIA document. Most of the tests can be performed with a waveform monitor, a vectorscope and an rms voltmeter. Some additional tests also are appropriate for a fiber-optic system.

If it meets specs, what then? One of the first things a user should look at is immunity to electromagnetic interference (EMI). We know that fiber itself is a dielectric and is immune to magnetic and RF fields. But what good is this if the transmit and receive electronics are not equally immune?

A relatively easy check starts by looking at package construction. First, are the electronics surrounded on all sides by conductive surfaces, such as metal? Second, looking at the design, are long, exposed wires likely to pick up stray signals? Third, does it demonstrate immunity? A simple check involves putting a test signal through the electronics and simultaneously operating a hand-held CB radio in close proximity to the frame. If there is any evidence of interference on the waveform monitor, then the electronics may be susceptible. Another good test is operating the equipment under a transmitting tower.

Next, check the equipment for immunity to microphonics or people bumping into cables or racks during equipment operation. This seems obvious, but it is possible for some systems to change performance if someone bends a cable. Set the equipment up for a typical S/N ratio test using an rms voltmeter on the output. Disconnect the incoming signal and read the system noise in millivolts. The reading should be 1mV or less without a weighting filter. Then twist the fiber-optic connector. There should be little or no change in the noise level. Next, wrap several turns of fiber cable around your finger, making certain not to exceed manufacturers' bending radii limitations. Watch for any changes in noise level. If changes are evident during either test, the link will be susceptible to people working in equipment racks.

Final notes

Although many manufacturers' equipment meets EIA document limitations, and most meets the previously mentioned tests, not all will do so. If you are introducing fiber-optic materials into your system, satisfy yourself that the equipment you are about to select will meet all of your requirements.

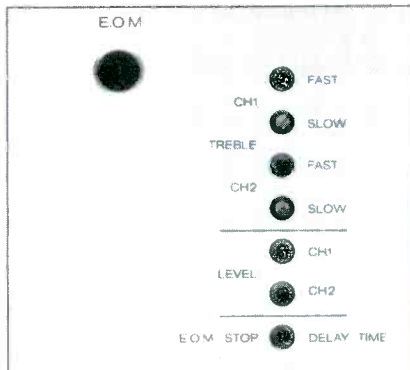
! :-)))

*Copies of EIA RS-250B may be obtained from the Electronic Industries Association, Standards Sales Office, 2001 Eye St., NW, Washington, DC 20006. When a payment of \$15 is enclosed with the order, EIA pays the return postage.

The Revox Automation Advantage

The new Revox PR99 Playback Only presents a ten point program for more cost-effective broadcast automation.

1. Compatible with Existing Systems—The PR99 Playback Only is fully compatible with practically every existing broadcast automation system. In many cases it can be swapped for existing decks in a matter of minutes.



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The and BROADCAST engineering

By Brad Dick, director of engineering, KANU/KFKU Radio,
University of Kansas, Lawrence, KS, and secretary of the SBE

The Society of Broadcast Engineers organization of today can trace its origins to a **Broadcast Engineering** editorial written many years ago. In December 1961, John Battison, then editor of **BE**, wrote a column suggesting the need for an organization devoted exclusively to radio and TV engineering personnel:

"Perhaps a new organization is needed for broadcast engineers, one started in the same way as the Institute of Radio Engineers (IRE). Perhaps it should be called the Institute of Broadcast Engineers (IBE) and presided over by one of the great broadcasters of a few years ago. How many years has it been since a broadcast engineer was president of the IRE?

"We leave you with that thought for this month. Your comments addressed to the editor will be welcome."

With this, Battison had issued the first public suggestion that a national organization was needed for broadcast engineers. However, his call for response was only mildly successful. Over the next few months, he received some 32 responses to his invitation, not all of which were positive. According to Battison's editorial in the February 1962 issue of **BE**, only three-fourths of the letters he received were in favor of his suggestion to form a new broadcast organization.

At that time, the IRE was a large international society that included a number of technical disciplines. The group later merged with another engineering organization to form the Institute of Electrical and Electronics Engineers (IEEE).

Among those suggesting the development of a new organization was Fred Hervey, who later would become a strong supporter of IBE (later changed to SBE). Hervey wrote, "I too believe that the time is ripe for the formation of an association of, by and for

the broadcast engineer." He went on to suggest specific guidelines for the IBE:

- "All members should be actively employed in the broadcast industry or immediately related industries.
- "Voting membership should be restricted to those members holding a First Phone ticket.
- "Honorary membership should be conferred on FCC field engineers. They are our allies—only incompetents fear them."

Not everyone agreed with Hervey's point of view, however. Harry Dennis wrote, "I am forced to take exception with your (Battison's) lead editorial in the December issue of your magazine." Dennis then listed what he viewed as the many accomplishments of the IRE. He also suggested that there was no one who could administer the new organization, and that Battison might not realize the work that forming a new organization would require.

Despite the minority viewpoint, a new organization soon was started. The April 1963 issue of **BE** included a membership application blank and an invitation for readers to join the Institute of Broadcast Engineers. To drum up additional support, letters of invitation were sent to almost 5000 radio and TV engineers in the United States and Canada.

The response was encouraging to Battison, and within a few months people actually began to join the IBE. An informal meeting was held in late 1963 in the Binghamton, NY, area. Deciding that there was sufficient interest, Battison scheduled the first official meeting of the IBE for the 1964 NAB Convention in Chicago.

On April 5, 1964, the first meeting of the IBE was held in the Williford Room of the Conrad Hilton Hotel. With some 100 participants present, the fledgling organization's first action

was to change its name. There was strong membership opposition to the name, Institute of Broadcast Engineers (IBE), because of the similarity with the union, International Brotherhood of Electrical Workers (IBEW). Concerned about a possible problem with mistaken identity, the name was changed to the Society of Broadcast Engineers (SBE).

The new organization used **BE** as a disseminator for organizational news and information until the *SBE Journal* was published in June 1964. The *Journal* was the mouthpiece of the SBE for several years, but miscommunication and lack of publication savvy caused the *Journal* to die prematurely. The SBE made attempts to replace the *Journal*, but the organization still has not been able to publish a multipage highly technical publication, as some early members had hoped.

BE has throughout the years maintained a close relationship with the SBE. The similar audiences and close ties with technical personnel have contributed to this relationship. For many years, **Broadcast Engineering** acted as the SBE's magazine, carrying news and information about the society. As the SBE grew, the organization began publishing its own newsletter, the *SBE Signal*. This publication, with a regular distribution of nearly 5000, still is the main communications medium for the society.

BE has played an important role in the genesis and development of the Society of Broadcast Engineers. If history proves anything, **BE** and the SBE will continue to enjoy a mutually beneficial relationship.

Editor's note:

Additional information on the SBE can be obtained by writing to the Society of Broadcast Engineers, P.O. Box 50844, Indianapolis, IN 46250.

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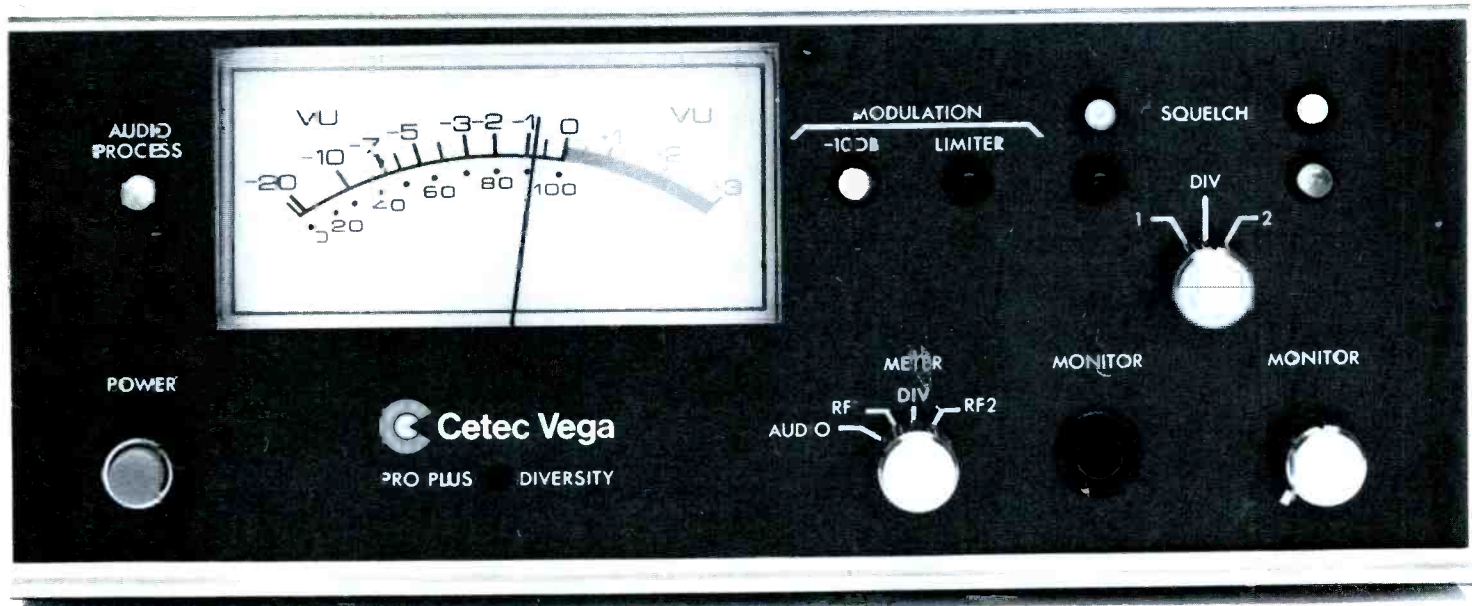
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Update on editing

By Carl Bentz, television editor

Presentation is a major consideration in any form of communications. In video, as in other media, editing is essential for providing the most effective message. The more sophisticated the audience, the more sophisticated the editing requirements may be.

From elementary education to the TV broadcast of a corporate annual report, the type of editing capabilities for the project varies widely. Manufacturers answer marketplace needs with equally varied equipment, from simple 2-machine systems to complex post-production systems. Some systems encompass every piece of equipment usually found in the production studio.

This update concentrates on answers to recent editing needs, from NAB-'83 to the present. Manufacturers were requested in late February to provide data on their newest equipment, including preliminary information on products that would be shown at NAB-'84. Although most complied, a few were reluctant to disclose their new products before the show. Reports on those items from the show will appear in the July issue.

The following material is based on information provided by manufacturers. For complete information on the products, Reader Service Numbers have been provided.

P. ALBRECHT

ESP-M. Interfacing to various products, the ESP-M can communicate with up to 32 machines in a multicontroller configuration. Multiple microprocessors are distributed throughout the system. The system is based on EBU timing with PAL color considered in color framing circuitry.

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ALPHA AUTOMATION

The BOSS. SMPTE time code is the basis of operation for the BOSS edit-

ing controller, which supports a master VTR and four slave machines. The machines, audio or video, must be compatible with the BTX Shadow, although other synchronizer interfaces are predicted for the future. All operator input is through the keyboard in response to extensive data shown on a CRT display, including eight different status conditions for each machine, six scratch-pad memories with user-defined labels, locator registers and a cue menu memory.

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AMPEX

ACE system. The Ampex Computerized Editing system allows a choice of three operator-to-system interaction modes: touch screen, dedicated keyboard and ASCII keyboard. Convenient joystick controls operate up to 16 VTRs through RS-422 serial communication links. Frame-accurate editing is possible with any combination of VTR and ATR machines, video switching with multiple mix/effects banks, special effects systems and various other I/O peripherals.

One of the other peripherals was demonstrated by Spectra Image at the Ampex exhibit at NAB-'84. Interfaced to the ACE system was a laser disc, based on Pioneer technology, as a random-access source.

Circle (577) on Reply Card

BOSCH-FERNSEH

Mach One. The latest version of the Mach One is Series II, combining all features of the standard system with new ones. New capabilities include dual-channel audio control, updated edit listing, cluster event programming and screen highlighting. Series II also adds selection of 16 shuttle-jog speeds in either direction, as well as programmable slow motion.

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Your studio is unique. That's why there's a family of Electro-Voice® Sentry® Studio Monitors. Meet the new addition!

Electro-Voice is proud to announce the addition of a fourth member to the SENTRY family of studio monitors. The new MODEL 100EL combines the superb audio reproduction of the SENTRY 100A with an integral 50 watt power amplifier. The SENTRY family now includes a model to meet the requirements of every professional studio.

SENTRY 100EL—with an integral power amplifier

The SENTRY 100EL adds a 50 watt power amplifier to the SENTRY 100A. The internal amplifier has both balanced and unbalanced line-level inputs, an infrasonic filter to reduce distortion and a torroidal transformer—but nothing to get in the way of the trusted SENTRY performance. The SENTRY 100EL is a solution to problems like limited rack space, equipment transport on remotes, or cramped spaces in video editing booths.

SENTRY 100A—for tight spaces

The compact 8-inch, two-way SENTRY 100A is the ideal choice where space is limited but sonic accuracy cannot be compromised. Flat 45-18kHz frequency response, excellent imaging, true rack-mountability, high efficiency and incredible power handling are some of the features that have made the SENTRY 100A the standard of respected studios everywhere.

SENTRY 500—for wider coverage

The Constant Directivity SENTRY 500 broadens the "sweet spot," allowing more than one person to hear the same accurate sound without "beamy" high frequency problems. The 12-inch, two-way SENTRY 500 will produce 96dB at one meter with only a one



watt signal, yet can handle 100 watts of continuous power with 6dB of headroom—400 watts on peaks.

SENTRY 505—for "quarter-space" environments

The SENTRY 505 is the acoustical equivalent of the SENTRY 500 when mounted in a "quarter-space" environment such as the intersection of a wall and ceiling. The front baffle angles downward at either a 30° or 60° angle making this a large monitor that can be easily used in some of the tightest control room and production environments.

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Each of the four SENTRY monitors is a consistent, dependable audio reference combining high efficiency, high power handling

and low distortion. All deliver the linear response and uniform polar patterns that are mandatory for stringent quality control.

Greg Silsby talks about the SENTRY monitor family:

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"Accept the Sentry challenge. Write to me today for the complete SENTRY family story: Greg Silsby, Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107."



Greg Silsby

Market Development Manager, Professional Markets



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CMX SYSTEMS

3400 series. Introduced at NAB '83, the 3400 and 3400+ featured user-programmable keys for single-stroke call of editing sequences, improved list management, Look Ahead preview for quicker cue preparation and Mark File for rapid marking and replacement of program sequences. The systems also introduced touch screen and voice control as developmental

options. As of NAB '84, the 3400 systems, with new operating software, may be delivered with the voice control and with dual touch screen interaction options. Also, a redefinable keyboard, providing all key labels in various languages or terms of users' preference, has been demonstrated, but is not scheduled for delivery.

CMX also now provides new architecture in its I² intelligent interfaces, with an interface deliverable for the

Ampex VPR3. Serial interfacing systems include self-diagnostics, displaying equipment status in an LED-type display on the I² panel.

CMX promised that the NAB exhibit would include a presentation of a radically new concept for the editing process. As this issue was being prepared, details were not available.

Circle (579) on Reply Card

CEZAR INDUSTRIES

ABR-1A. The ABR-1A is available in a 3-machine A/B roll configuration. The 2-event memory system is compatible with CMX-340X or Paltex decision list formats. SMPTE LTC, Micro-Loc or control track editing options allow split edits and animation.

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CONTROL VIDEO

Sword. New in 1983, the Sword controls one play and one record VTR of most popular types. Up to 20 events may be stored in the memory for the actual edit performance under control track or optional LTC or VITC code modes. Machine control is provided with a "stroker." Edit listing capability is included, but video and audio switching and mixing interfaces are not.

Light Finger enhancements. Touch screen control continues to allow effects control and list management options for Light Finger users. An upgrade to the system, however, is a dedicated keyboard that answers objections voiced to the totally touch-activated system. The keyboard accesses machine control, edit mark in/out, preview edit and replay edit functions.

Circle (581) on Reply Card

CONVERGENCE

EditDroid. The system is a specialized post-production product developed in conjunction with LucasFilms. The system is designed for film-style editing in video with tape and disc applications.

ECS-90 enhancements. Now called the Super 90+, the system is upgraded to include various plug-in options, such as a blade blackburst generator and a time code character inserter that places code digits into the video being recorded for window dubs.

Circle (582) on Reply Card

Survey results/interpretation

By Carl Bentz, television editor

The March 1984 issue of **BE** included a questionnaire regarding editing controllers. As this issue was prepared, approximately 70 responses had been received.

Of the 70 respondees, 26 reported that their systems worked well and they were pleased with the equipment and operation. Forty-four, however, were not happy with the equipment. Of those, approximately half indicated most problems were associated with the controller units, ranging from poor documentation to unreliability and a lack of manufacturer support. Others thought their units were inadequate for their needs.

The other half of the complaints were aimed at associated equipment, with a few naming interfaces, but most listing cassette-type recorders as their primary irritation. Difficulties included tape damage, frame inaccuracy and tape tension in general.

Because nearly all of the respondents use cassette recorders to some extent, and because 26 were pleased with the equipment, the videocassette machine in itself seems not to be inherently bad. The problem is related to the cassettes and to system users, who typically are not engineering-oriented. Unfortunately, the engineer sees the editing system only when there are problems, and then he must make it work again in the shortest possible time.

Cassettes are convenient for unskilled users. The medium is relatively protected from the elements; no physical threading is required; storage is convenient; and

proper handling results in relatively trouble-free operation. Improper handling of cassettes produces nightmares of tape damage, lost material and machine damage.

Tape tension is the single greatest problem with the cassette formats. Several suggestions, although somewhat time consuming, will improve editing system operation and product accuracy. These include the following:

- Make sure the machine tape path is kept clean. Schedule regular maintenance periods.

- Brake bands get dirty even quicker than they become worn. Routine replacement of brake bands will be less expensive than the time lost due to bad brakes.

- Before each editing session, fast-forward all cassettes, then rewind completely, finally approaching the edit point in play or forward search mode. This action improves tape packing and tension within the cassette housing, an area that presents many possible problems.

- If the session has involved a great deal of jogging of the tape, the wind/rewind process is suggested occasionally to prevent internal tension problems.

Recently introduced cassette decks are designed with more attention to tension. Recent cassette designs also account for some improvement. Neither, however, is fail-safe. The previously mentioned suggestions will not solve every problem, but they will help create better products from happier editing sessions with videocassette formats.

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EECO

IVES enhancements. IVES, introduced in 1983, is upgraded to include A/B capabilities in the IVES A/B. All of the original features remain, including an audio mixer with one VTR as an input and a mic/line into a second input. Other enhancements include special effects control and additional interfaces for various popular VTRs.

EMME. EECO's 1984 product is EMME, a multimachine system designed to handle up to nine source machines. Interfaces will be provided for all popular VTRs. LTC and VITC codes in SMPTE and EBU formats combine with control track as possible timing sources for editing decisions. Interfaces will tie EMME to many video switchers as well as audio mixers.

Circle (583) on Reply Card

INTERACTIVE SYSTEMS

Model 41. Introduced in 1983, this controller is based on an 11/23 processor and includes 12 I/O ports.

RS-422 control of various VTRs allows programmed motion functions for variable speed editing. Macro function assigns user-selected sequences to a single key stroke. Real time mode edits and logs multicamera shows on-the-fly.

Model 51. New hardware and software characterize this editing control unit. Additional memory has been added to the product with floppy and rigid disk units as options. Up to 9999 events may be included in the edit decision list for automatic editing control of the 16 machine ports. A wide-form printer, to 132 characters per line, may be included. Other features include a film package remote terminal emulator and print spooling.

Circle (584) on Reply Card

JVC

VE-90A. Editing accuracy is provided with an optional TCR-90 time code reader and the EDL-90 edit decision lister. Assemble and insert modes may be used. One-second fades to and from black are possible, as well as

high speed search, cruise, autotag and recall. A black-and-white monitor provides editing data from the status display generator.

VE-92. A CI-90 character inserter makes work tapes with visual time code inserted into the picture, simplifying and improving accuracy of scene logging. The controller includes a built-in time code generator and readers. A single joystick controls tape motion. Other features include an RS-232 port for printer or floppy disk interface, fade-to-black module and time code character generator.

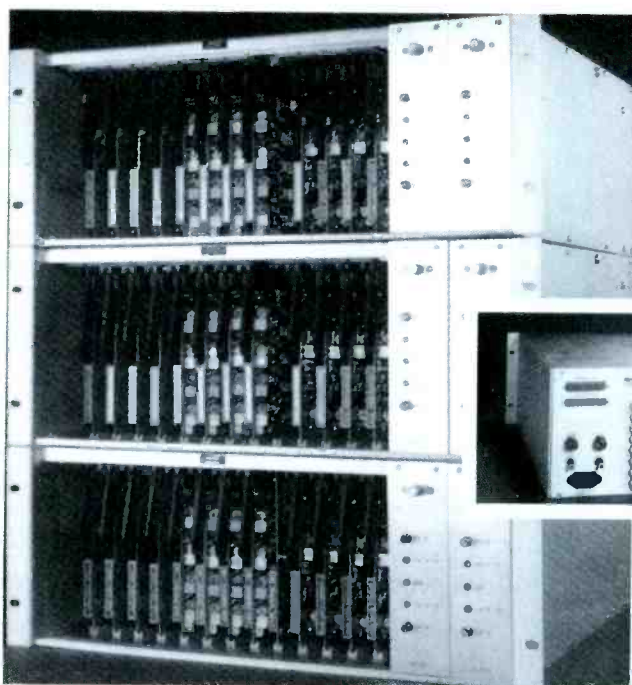
RM-86U. For economical insert and assemble edits, the RM-86U is micro-processor-oriented. Functions include Go-to, Preview, Perform and Review buttons, with record monitor control, Eject button, two search knobs and independent LED indicators to identify tape locations.

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system designed around multiple Beta format VCRs. The operator selects in- and out-edit points for each segment. Once selected, those edit point images are presented on multiple screens and may be scrolled forward and backward, forming a storyboard-type presentation to check the flow of the finished product. The system shown included 14 VCRs, all usable as source machines.

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OMICRON VIDEO

EM-7100 series. A product of Elecon Ltd., Tokyo, the Z80 microprocessor-based EMX-7100 controller operates under SMPTE and EBU time code in on-line or off-line configurations. Interfaces for most popular 1/2-, 3/4- and 1-inch VTRs are available. The standard system includes 128-event capacity, while an optional 192-event memory also handles four VTRs. Edit decision listing uses CMX formats. Various switchers and audio-follow systems may interface, although the unit may have an integral switcher. Peripherals include floppy disk, paper tape and printer.

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PALTEX (DATATRON)

Edit-Star. First shown at SMPTE '83, Edit-Star provides three user-definable soft keys, each accessing a memory register storage to 20 key-strokes. A *Help* key calls out instructions of the functions of any particular key on the controller keyboard. Switcher interfacing enables cuts, fades, keys and effects, along with E-MEM units, if the switcher supports such units. Ten contact closures may be used to control external devices (TTL levels). At the heart of Edit-Star is a 16-bit microprocessor and 300-event memory.

Vanguard enhancements. Level Six software, introduced in 1983, adds various features to the Vanguard controller. *Backtrac* is for film-style editing; *Auto Sync Point* calculates in-points within a source shot; *Match* compares edit list with edited master; *Find It* searches edit list and displays events relevant to a time code number in the edited master; and *Comments Display* shows only events associated with user comments in the edit list. Other features include *Auto Color Frame*, *Rotary Varascan Control* and 500-event memory, with optional 8-inch disk drive interfacing.

SMPTE serial interfacing. These include serial protocol for BVH-2000, VPR-80, Betacam and other VTRs, for Vanguard; ST-3 interfaces for Hawkeye and TR-800; switcher interfaces for GVG 300 with DVE, audio and E-MEM, also Cox T-16 switcher for Vanguard; and ATR interfacing for Otari MX series.

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PANASONIC

AU-A30. Designed specifically for Panasonic RECAM equipment, the AU-A30 controller works with the AU-300A studio editing recorder, handling YIQ or NTSC edits. Insert and assemble edits combine with go-to, preview and review functions. Jogging is provided, along with two bi-directional search dials with up to 8X play speed capability. LEDs display tape counter times in hours/minutes/seconds/frames. Independent edit modes are available for video and audio channels.

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RCA BROADCAST SYSTEMS

AE-800. Time code editing equipment for the TR-800 includes LTC and VITC for complete control in variable speed playback. It is EBU and SMPTE capable and AE-600 compatible.

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SONY

BVE series. BVE-800 editing controllers appeared with the BVU-800 series VTRs and introduced control track or time code references. A/B roll 3-machine operation included BVH and BVU equipment. Event storage grew 128 items, allowing auto edit capability. Interfacing options provided audio and video switching control, as well as hard-copy printer output. All standards are available.

BVE-3000 controls 3-machine operation with BVU and BVH machines intermixed. EBU or control track referencing is used. A built-in switcher and effects generator adds versatility, while the 200-event memory improves editing speed.

The BVE-5000 microprocessor-based system automatically selects the SMPTE/EBU LTC or VITC time code applicable for the speed of the machine to provide the greatest reliability. Auto editing, with a decision

list of 128 events, expandable to 512, may include switching with effects and GVG-300 E-MEM interconnection. *Auto Look Ahead* keeps multiple players cued and ready for the next edit. Printer, paper tape and floppy disk combine to handle the edit decision list.

New software was introduced at NAB '84 that allows all of the systems to interface to GVG component switching equipment.

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UNITED MEDIA

Minicomm. An A/B roll editing system includes control of three VTRs or ATRs. Time code or control track editing are possible. In time code mode, switching interface and list management also are available. For the growing facility, the system expands to a full Commander II.

Commander II enhancements. Two user-definable keys, each capable of sequences to 120 keyboard entries, retain data even with power off. Automatically charged batteries also guard against memory loss with power failures. A go-to mode enables location of an in-edit point by touching two keys. SNS mode ensures proper edits even under less than ideal tape or machine conditions. Up to five ATRs or VTRs are possible, and with optional software, the speed of dynamic tracking VTRs also is controlled. List management software improves understandability and guides the operator through various list manipulations with screen prompts.

Circle (592) on Reply Card

VIDEOMEDIA

Eagle III. Eagle III leads Videomedia's product lineup after its introduction at the 1983 fall SMPTE exhibition. The A/B roll system interfaces to the microprocessor-controlled Echolab SE-3 production switcher. List management, printer output, 250-event memory, GPI contact closures and multilevel transitions are standard in the software and hardware package. From the controller, various effects functions, such as keys, border wipes, pattern limits and E-MEM, may be accessed.

The Eagle series includes the Models I and II controllers. The company's Z-6000 expandable series also is available.

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Computer Controls for Video Production

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Buying the ultimate editor

By Art Schneider, A.C.E., BE post-production consultant, Agoura, CA

Some manufacturers of computer-assisted videotape editing systems have claimed their products to be the ultimate. The author considers the types of editing systems, their options and users' needs to help you decide on your next editing system purchase.

When television is used for any type of communications, videotape and editing are helpful in preparing the material for the best presentation. Once the need for editing is established, other decisions are required before purchasing the necessary equipment. Good planning before making any purchases will result in an effective and efficient system.

When to buy

Of major concern to some broadcasters is when to buy equipment. Many potential buyers are afraid that equipment they buy today will be obsolete by the time it is delivered and installed. Generally speaking, hardware and software of computer-assisted editing systems do not become obsolete. Manufacturers constantly update systems and bring new products into the market arena. These products are designed to entice broadcasters into selling their old systems and replacing them with the latest versions of hardware and software. That does not mean, however, that you must run out and buy these products, especially if your current equipment does the job. If you do not need it, do not buy it. For those who must keep up with the Joneses, the system may be improved, but the bank account probably will not be.

For post-production editing, not directly in the competitive marketplace, it is not necessary to buy new equipment every year. But there will come a time when you must make a decision on what new equipment to get and when.

What to buy

Another major decision regards the application. Is your use for industrial,

in-house training, educational, teleconferencing or commercial TV broadcast? Your use of the editing system ultimately will determine what level of equipment and training you will require for effective results.

Levels of sophistication

There are three types of editing systems currently in use. They are differentiated by their capabilities, as well as their price. The more sophisticated and expensive the system, generally, the higher the level of training required to use the system effectively. Let us consider the three: Type 1—cuts-only; Type 2—basic effects added; and Type 3—top of the line.

Type 1

A basic, cuts-only editing system does just that—picture-to-picture and/or sound-to-sound edits. Limited fades, but no wipes or dissolves, are possible. Generally, the controller deals with one course/play VTR and one recording/editor VTR. Some systems may allow more than one source machine, but the system still operates with only one play machine at a time. The advantage of multiple players is not having to change source tapes as frequently. The convenience costs you for the extra VTR and interfacing equipment.

Most industrial $\frac{3}{4}$ -inch and $\frac{1}{2}$ -inch VTRs capable of remote control will work with cuts-only editing controllers. Most units from popular manufacturers may be integrated into an editing system. However, in the planning stage, check with your suppliers to make sure proper interfaces are in stock before you order the VTRs. It may be wiser to select the editing controller before making a final decision on VTRs.

Most consumer VTRs are not designed with the proper remote-control capabilities to interface to an editing controller. Even though the consumer unit may be far less expensive, it is seldom worth the cost to modify a home VTR for the editing suite. Also, when mechanical or electrical modifications are made, warranties often are void. You would be ahead, then, to

purchase VTRs designed to work with the editing system you plan to buy.

Certain basic functions should be provided by even the simplest cuts-only controller. It should be capable of:

- reading control track pulses off tape;
- marking in/out points;
- setting in/out points;
- trimming in/out points;
- previewing/rehearsing the edit;
- performing the edit;
- replaying/reviewing the edit; and
- recalling the last edit for remake or modification.

Not only are these functions basic, but also they should be defined in simple terms on the key caps of the keyboard. Most technical terms used in editing can be written in simple, easily understood words that do not intimidate the user.

Some options. A number of options are available for most cuts-only systems. Many of them are concerned with one drawback of the edit controller—frame accuracy. Cuts-only systems are unable to preview or record an edit on a repeatable basis, because they are based on control track pulses. These pulses are recorded along one edge of the videotape, and are used by the VTR to maintain constant playback speed. Analogous to sprocket holes on film, there is one pulse per video frame.

When you determine the edit point with a cuts-only system and press the Preview or Record key, the VTRs back up 150 pulses or frames. Once positioned, both VTRs then go into play and, upon reaching the desired point (after counting the pulses), the editor/record VTR is switched to record for the edit. Unfortunately, the frame accuracy of such systems is not good on a repeatable basis. At best the accuracy will be plus/minus one frame, but if several rehearsals of the edit were made, the actual edit then could be 10 or more frames off in either direction, because of mechanical slippage in the VTRs.

The solution for editing accuracy is using a time code reader with the VTRs. With an optional time code

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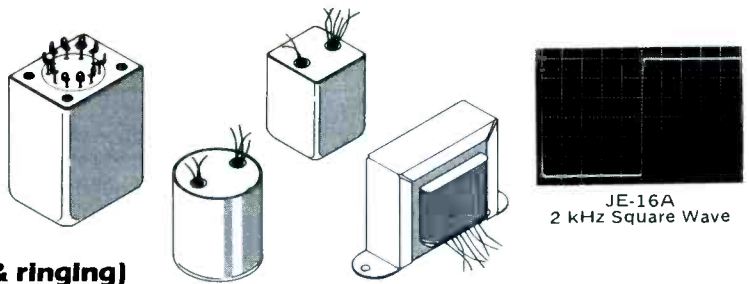
Computer optimized design

100% tested – consistent quality

Low distortion

Wide bandwidth

Minimum transient distortion (overshoot & ringing)



JE-16A
2 kHz Square Wave

INPUT TRANSFORMERS AND SPECIAL TYPES

Model	Application	Impedance Ratio Pri:Sec	Turns Ratio Pri:Sec	20 Hz Max Input Level ¹ (dBu)	Typical THD Below Saturation (%) 20Hz / 1kHz	Frequency Response (dB ref. 1 kHz) 20Hz / 20kHz	Band-Width ² -3dB @ (kHz)	20 kHz Phase Response (degrees)	Over-Shoot (%)	Noise Figure (dB)	Magnetic Shield ⁴ (dB)	Number of Faraday ⁵ Shields	Package ⁵	PRICES		
														1-19	100-249	1000
JE-16-A	Mic in for 990 opamp	150-600	1:2	+8	0.036/0.003	-0.08/-0.05	170	-10	<1.75	1.7	-30	1	A=1 B=2	63.61 68.25	42.49 45.60	29.32 31.46
JE-16-B	Mic in for 990 or I.C.	150-3750	1:5	+8	0.036/0.003	-0.10/-0.22	85	-20	<3	2.3	-30	1	A=1 B=2	63.61 68.25	42.49 45.60	29.32 31.46
JE-115K-E	Mic in for I.C. opamp	150-15K	1:10	-6	0.170/0.010	-0.50/-0.10	115	-5	<7	1.5	-30	1	3	41.48	27.72	21.65

LINE INPUT

JE-11P-9	Line in	15K-15K	1:1	+26	0.025/0.003	-0.03/-0.30	82	-20	<3		-30	1	1	102.86	68.72	47.42
JE-11P-1	Line in	15K-15K	1:1	+17	0.045/0.003	-0.03/-0.25	85	-23	<1		-30	1	3	39.53	26.41	20.62
JE-6110K-B	Line in bridging	30K-1800 (10K-600)	4:1	+24	0.005/0.002	-0.10/-0.30	75	-15	<1		-30	1	B=1 BB=2	62.31 70.95	41.63 47.38	30.56 32.70
JE-6110K-BB	Line in bridging	30K-1800 (10K-600)	4:1	+19	0.033/0.003	-0.11/-0.08	160	-9	<2		-30	1	3	40.98	27.37	18.89
JE-10KB-C	Line in bridging	30K-1800 (10K-600)	4:1	+19	0.033/0.003	-0.11/-0.08	160	-9	<2		-30	1	3	40.98	27.37	18.89
JE-11SSP-8M	Line in/repeat coil	600/150-600/150	1:1 split	+22	0.035/0.003	-0.03/-0.00	120	-9	<3.5		-30	1	4	151.90	101.47	70.01
JE-11SSP-6M	Line in/repeat coil	600/150-600/150	1:1 split	+17	0.035/0.003	-0.25/-0.00	160	-5	<3		-30	1	5	78.62	52.52	36.24

SPECIAL TYPES

JE-MB-C	2-way ³ mic split	150-150	1:1	-2	0.180/0.005	-0.25/-0.20	88	-15	<1		-30	2	3	34.08	22.78	17.78
JE-MB-D	3-way ³ mic split	150-150-150	1:1:1	-2	0.180/0.005	-0.25/-0.16	100	-12	<1		-30	3	3	59.57	39.80	31.08
JE-MB-E	4-way ³ mic split	150-150-150-150	1:1:1:1	+10	0.050/0.002	-0.10/-1.00	40	-18	<1		-30	4	1	96.29	64.32	44.38
JE-DB-E	Direct box for guitar	20K-150	12:1	+19	0.096/0.005	-0.20/-0.20	80	-18	<1		-30	2	6	43.04	28.76	22.46

1. Max input level = 1% THD; dBu = dBv ref. 0.775 V
2. With recommended secondary termination
3. Specifications shown are for max. number of secondaries terminated in 1000 ohm (typical mic preamp)
4. Separate lead supplied for case and for each faraday shield
5. Except as noted, above transformers are cased in 80% nickel mu-metal cans with wire leads.

PACKAGE DIMENSIONS:

W	L	H
1 = 1 1/16" Diam.	1 1/16"	1 1/16"
2 = 1 1/8" x 1 1/8"	1 1/8"	1 1/8"
3 = 1 1/8" Diam.	1 1/8"	1 1/8"
4 = 1 1/2" x 1 1/4"	2 1/2" w/solder terminals	
5 = 1 1/8" Diam.	1 1/8"	1 1/8"
6 = 1 1/8" Diam.	1 1/8"	1 1/8"

NICKEL CORE OUTPUT TRANSFORMERS⁶

Model	Construction	Nominal Impedance Ratio Pri:Sec	Turns Ratio Pri:Sec	20Hz Max Output Level ⁷	600Ω Termination Loss (dB)	DC Resistance per Winding (Ohm)	Typical THD Below Saturation (%) 20Hz / 1kHz	Frequency Response (dB ref. 1kHz) 20Hz / 20kHz	Band-Width – 3dB @ (kHz)	20 kHz Phase Response (degrees)	Over-Shoot ⁴ (%)	Package ⁵	PRICES			
				(dBu)									across (n) windings	1-19	100-249	1000
JE-123-BMCF	Quadfilar 80% nickel	600-600 150-600	1:1 1:2	+ 28	2	– 1.1	20	0.002 / 0.002	– 0.02 / – 0.02	>450 158	– 2.1 – 4.1	<1	7	87.41	44.17	30.47
JE-123-DMCF	Quadfilar 80% nickel	600-600 150-600	1:1 1:2	+ 21	2	– 1.0	19	0.004 / 0.002	– 0.02 / – 0.00	>450 230	– 1.2 – 2.5	<1	8	50.71	33.88	23.38
JE-123-BLCF	Quadfilar	600-600 150-600	1:1 1:2	+ 32	2	– 1.1	20	0.041 / 0.003	– 0.02 / – 0.01	>450 168	– 1.9 – 4.0	<1	7	61.30	35.79	24.70
JE-123-DLCF	Quadfilar	600-600 150-600	1:1 1:2	+ 27	2	– 1.0	19	0.065 / 0.003	– 0.02 / – 0.01	>450 245	– 1.2 – 2.5	<1	8	39.61	26.45	19.42
JE-123-SLCF	Quadfilar	600-600 150-600	1:1 1:2	+ 23.5	2	– 1.1	20	0.088 / 0.003	– 0.03 / – 0.01	>450 245	– 1.2 – 2.8	<1	9	33.48	22.35	15.43
JE-112-LCF	Quadfilar	600-600 150-600	1:1 1:2	+ 20.4	2	– 1.6	29	0.114 / 0.003	– 0.03 / – 0.01	>450 205	– 1.2 – 3.2	<1	10	25.48	17.01	12.49
JE-123-ALCF	Quadfilar	66.7-600	1:3	+ 26.5	3	– 1.3	8	0.125 / 0.003	– 0.04 / + 0.06	190	– 4.6	<6	8	42.14	28.15	19.42
JE-11S-LCF	Bifilar w / split pri	600-600 150-600	1:1 1:2	+ 30	1 (sec)	– 1.7	63	0.058 / 0.002	– 0.02 / + 0.01 – 0.02 / – 0.05	>10MHz 155	+ 1.1 – 4.1	<1	8	42.14	28.15	19.42

6. Multifilar construction has no faraday shield.
- All specifications are for 0Ω source, 600Ω load.
7. Max output level = 1% THD; dBu = dBv ref. 0.775 V
8. Source amplifier -3dB @ 100kHz
9. Output transformers are horizontal channel frame type with wire leads, vertical channel frames available.

PACKAGE DIMENSIONS:

W	L	H	Mounting Centers
7 = 1 1/2" x 2 5/16"	1 15/16"	2 13/16"	2 13/16"
8 = 1 5/8" x 1 15/16"	1 5/8"	2 3/8"	2 3/8"
9 = 1 1/8" x 1 11/16"	1 3/8"	2"	2"
10 = 1 1/8" x 1 7/16"	1 3/16"	1 3/4"	1 3/4"

These charts include the most popular types which are usually available from stock. Many other types are available from stock or custom designs for OEM orders of 100 pieces or more can be made to order. Certified computer testing is available for OEM orders. Call or write for applications assistance and/or detailed data sheets on individual models.

Prices shown are effective 2/1/84 and are subject to change without notice.

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reader, the system should be capable of working with control track pulses or time code information. Even with time code equipment, a solid reference or sync source is advisable. If the system you are considering does not include an integral sync generator, plan on the extra cost of buying one. If you require accuracy you will require a sync generator.

An edit lister option can eliminate hand-written edit decision logs, which are prone to error. Of various devices used with edit listers, a teletype printer/tape punch is the simplest. These may be purchased new or used from computer stores, starting at a few hundred dollars. The advantage is a printed list of all edits with a copy stored in the form of punched paper tape that later may be read back into the system. The printers usually are slow and noisy, however.

Perhaps a more practical storage method for the edit list is a magnetic floppy disk. Although the disk drive and its interface are more expensive than the teletype, the unit is much faster and quieter. A single disk may have a capacity of 2000-3000 edits or more. Floppy disks may be purchased at about 10 for \$40. With care, the disks are reusable.

Two options available with an edit lister are *assign reel numbers* and *assign edit numbers*. Reel assignments are made as each cassette is loaded, and the reel numbers are included in the edit list print-out. Number assignments make it simpler to keep the edit list in sequence.

To visually keep track of time code information, a *data display monitor* option shows time code and other pertinent information on a video display. A *searching time code* option allows you to input a known location's time code and allow the system to find it.

In *A/B roll* editing, cutting from one source VTR to the other in real time or merely synchronizing the two machines is a valuable feature. A/B roll operation is more involved than basic editing, both in system complexity and resulting cost.

Split edits allow staggering of video and/or audio edit points to create a delayed edit. A common use for staggering the edit points is for creating time transitions. *Tape motion control* refers to capability for manipulating the videotape within the cassette. The range should be from still to the maximum search speed of the VTR in forward and reverse directions without damaging the tape. You should be able to view the picture at all times. A joystick, knob, slider or push-button

are common forms of control.

Type 2

More advanced computer-assisted edit controllers include all the features of the cuts-only systems and provide other features for more flexibility. These may include dissolves, several types of wipes, fades and the capability of title keys and mattes over a background. The level of effects available depends on the video switcher connected to the system.

This second level of sophistication generally includes relatively simple audio mixing along with the video switching. Also, time base correction for each of the source VTRs is essential. TBCs are required to stabilize the video signals when more than one signal is used in a special effect.

The cost of a Type 2 system will be considerably more than a Type 1 configuration, because of the addition of the TBCs, video and audio switching, and other peripheral devices needed to achieve the higher level of editing.

Basic list management may be available in Type 2 systems. List management is software in the computer that rearranges edits, updates an edit decision list, adds/deletes edits and performs other bookkeeping chores to generate a clean list for auto-assembly. List management software is useful for those that require re-editing during an off-line or work-print stage of a project. The real aid is with *number crunching* problems that might occur during an editing session.

Type 3

Top-of-the-line systems contain all of the features of Type 2 systems, but more expensive hardware and software are used to generate the results. The full range of VTR formats may be connected to the editing controller. Other items interfaced are complex video switchers, stereo post-production audio consoles, digital video effects generators, character generators, videodisc players and other devices. Highly complicated editing projects easily could use a fully implemented system of multiple source VTRs with all the other equipment normally found in a TV production studio, all under an auto assembly mode. For such systems, $\frac{3}{4}$ -inch and other smaller format VTRs as source machines help offset the enormous equipment cost of the overall system.

Time code is essential to top-of-the-line systems. Two types of time code are available to NTSC TV production. The first, *non-drop-frame*, was developed when time code editing

came into being. The code recorded on tape does not coincide with clock time, as a videotape is played back in real time. Non-drop-frame time turns out to be 3.6 seconds longer per hour than the true program length. TV networks found that in using non-drop-frame code to determine commercial breaks, timings would be off by about a second every 20 minutes. The error caused commercials to be upcut or have pauses at one end or the other.

To avoid such problems, the SMPTE standards committees established the standard called *drop-frame*. By skipping two frames every minute during an hour, except during the 10th minute, the 3.6-second error is eliminated. Drop-frame time equals the real clock program time. There are no other significant differences between the two code formats.

On occasion the time code on the tape may become erratic for one reason or another. In such cases, a time code generator with slaving capabilities is valuable. The unit senses correct code before the erratic section and can replace the missing code. If your editing system cannot read proper time code, it usually will abort the edit.

Along with the two kinds of time code, there are two formats in use. The original format, *longitudinal time code (LTC)*, is recorded along the length of the tape, similar to an audio channel. In fact, on many systems one of the audio channels is used for the LTC data. LTC format is useful from play speeds to fast shuttle speeds, but when the speed drops to near still-frame, LTC format becomes unreliable.

Recent advances resulted in the *vertical interval time code (VITC)*, which picks up where LTC has problems. VITC information is recorded on the tape within the vertical interval of the video signal and is read by the video head. Particularly at slow speeds and still-frame, VITC is highly reliable. At shuttle speeds, however, VITC operation could result in unreliable time information.

Because LTC information is placed on an audio track, or sometimes on a third address track channel, it can be accessed for writing or reading at any time. VITC, being within the video signal, cannot be rewritten without creating another generation of the video. If VITC format is to be used, it should be generated at the time the videotape first is recorded.

User bits, a series of characters (0-9 and A-F), may be used to define miscellaneous information, such as reel



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numbers, dates, scenes or take numbers. The information is integrated within the time code signal and recorded in the LTC or VITC format.

Using an address track for the time code is preferred to using the second audio channel. First, it frees the audio track for stereo, effects or other audio information that may be mixed in the final edited product. Moving the time code from the audio track to the address track eliminates the problems of cross-talk or time code buzz.

Some system considerations

Edit list memory. Advertisements for some systems state 1000-edit capacity. People seem to forget what must be done with a 1000-edit list. Running it through list management software may cause the computer to choke on the amount of data. The larger the edit list, the longer it takes to process the data.

A more practical limit for edit list storage memory would be approximately 600-700 edits. Professional editors generate smaller lists, containing 200-300 edits per list, by breaking up large lists into acts or commercial breaks, or from fade to fade. A group of smaller lists is much easier to manage.

System controls. Various devices are used to communicate with the system computer. The most common device is a keyboard. The size and complexity reflects the complexity of the editing system to some extent. A logical layout of the keyboard leads to more efficient operation. What is logical to one user, however, may not be acceptable to another. The definable keyboard has evolved from disputes over proper keyboard layouts. On some of the newest editing control keyboards, every key can be redefined. One difficulty could be remembering exactly what function has been assigned to what key. For multiple users of a system, the added cost of redefinability may be warranted. For a single editor using the system, it is a luxury, not a necessity.

Some editing functions require the use of more than one key. At the same time, a series of instructions might be used over and over. For both cases, programmable function or soft keys are included on some models. The editor can program a series of keystrokes into a memory and whenever the particular series of operations is required, a single keystroke recalls the entire sequence.

Devices other than keyboards also are available for some systems. One such device is the *light pen* control.

Looking similar to a flashlight with a wire attached, the light pen is pressed lightly against the data monitor to access functions displayed on the monitor screen.

Touch screen control is another of the newer means of accessing commands. By touching your finger lightly on the screen, you may tell the controller which function you desire. On other systems, a touch to the screen, along with a function key on the keyboard, lets the computer know what you want to do. This feature is good for those who are ambidextrous.

The newest means of control was shown at NAB '83. Although the system was introduced only in a preliminary form, the editing controller included voice recognition as a means of communicating with the computer.

Edit list management. Two methods of manipulating the edit list are used. In *active list* systems, the user performs an update, trim or delete of an edit and sees the effect immediately. The active edit list allows the editor to perform list management functions quickly. Although recently introduced software protects the list somewhat, the active edit list must be used with care to avoid making an error that could result in lost editing time.

The *passive edit list* method is more protective of the edit list in the event the editor inadvertently performs a function not called for or desired. Nothing beats experience and skill, however, when editing with time code.

Software. Most system manufacturers are not in the business of offering custom software for your system. They assume the features of the system are what you wanted. Otherwise, you would not have bought the system. But you may find a specific need for a certain feature designed to handle the needs of one of your clients.

If you can afford custom software, it often is worth the expense. First, you must purchase the source listing of your system, if the company is willing to sell it. Then, having a member of the staff skilled at programming, you can develop your own special features. Alternatively, you can contract with someone who offers programming services. There are many good programmers available, many of whom worked for editing controller manufacturers at one time and are familiar with the equipment.

The number of custom software features that can be included is depen-

dent on the memory of the system. For every custom feature added, the number of edits that can be stored in the computer's memory is reduced. The convenience of many custom features may force you to create your edit list in smaller sections. Alternatively, you can expand the memory.

What editors need

Since computer-assisted videotape editing appeared about 16 years ago, most editing system manufacturers have been trying to include all the features they think the end user could ever want. Unfortunately, many editors think the resulting systems are designed by engineers for engineers. The dialogue between editor and computer at times borders on the ridiculous, making many first-time users paranoid when sitting down at the keyboard. Not all systems are like this, but enough exist to be of concern. I have been told that manufacturers do not listen to users before a system is designed. The companies say that is not the case. Perhaps there is something lost in translation, then, because when some systems get to the edit suite, an engineering degree seems necessary for the simplest edit.

In my work as an editor of film and tape, I have consulted with manufacturers on editing systems, designed and tested software, and designed several editing rooms. As a result, I think I have a good insight into what an editing system should do for the user.

I think that manufacturers of TBCs, video switchers, audio mixers and other peripheral equipment should listen more to the users and design tools for videotape editing that are easy to use, reliable, cost-effective and planned against obsolescence. With more efficient and user-friendly editing systems, videotape editing takes on a more professional look. Reduced editing costs allow an editor to think more about the creative aspects of editing, rather than the hardware and mechanics.

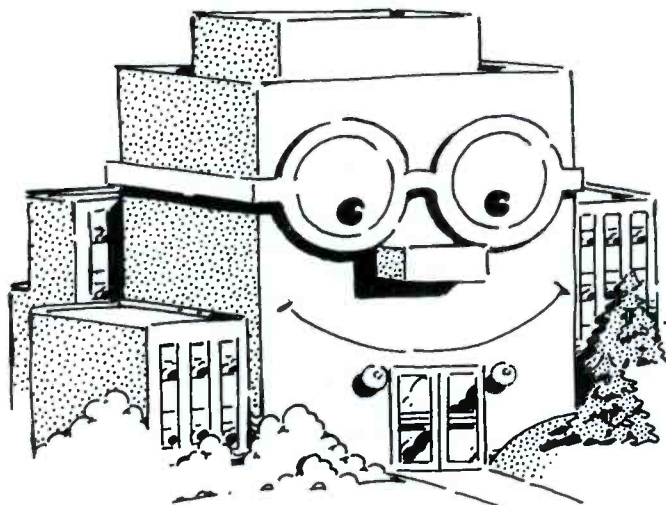
Too many systems require the user to press multiple keys during the edit session to accomplish what has to be done with better software and hardware. This finger exercise, which I call "keyboard calisthenics," usually makes a difficult task out of a normally simple one. The concept of the soft keys is a good beginning.

Requests for consideration

There are many items that I would like to see considered by more manufacturers. They are found in

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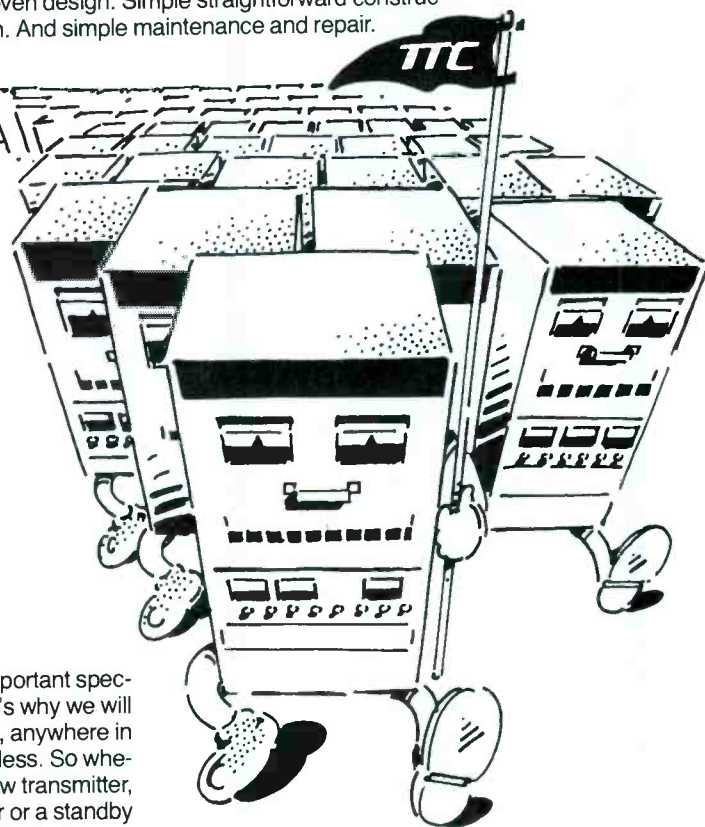
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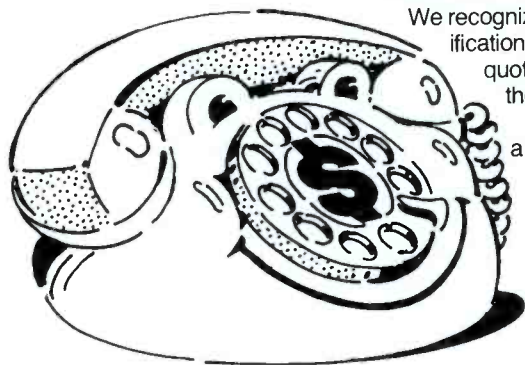
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some systems, but I think they are advantageous to editors and should be included in more equipment. Some of these items include:

- low cost, 1-board TBCs, more within the reach of schools, industrial training centers, etc.;
- simple programmable switchers allowing an editor to see dissolves, fades and basic wipes with keying over backgrounds for work-print sessions or edited master tapes;
- built-in generators offering sync, blackburst and color bars;
- smaller time code reader/generator/slave units for each VTR;
- more simple relay control for external devices;
- user-selectable editing on Field 1 or Field 2 and software-adjustable frame accuracy; and
- film conversion software for 30 TV frames to 24 film frames and 24-frame video editing hardware and software.

None of these are outside the realm of today's technology. Most are priced outside the realm of many smaller editing companies' budgets, however.

Quality control

Another major item I have found lacking is quality control in editing controller systems. As a user of many types of systems, I have noted a tendency of some manufacturers to rush systems into the editing suite without fully testing and debugging the units. On newer products, research and development has not been completed, leaving the systems to be debugged in the field on the customer's time.

More often than not, the editing system will not work *out-of-the-box*, as customers might expect. Factory burn-in of critical components and alignment of modules that do not require connection to the customer-supplied equipment should ensure fast, accurate hookup of any piece of editing-associated equipment. Even the simplest system should not be thought of as an off-the-shelf item, such as a monitor, piece of test equipment or other stand-alone device. But the customer may lose confidence in equipment and the manufacturer if the system does not function quickly and operate as advertised.

The more complex the system, the longer it might take to install and connect the controller to the customer's own equipment. However, a week for installation should be sufficient, if all the needed information was supplied before delivery and if the customer-supplied equipment was installed and

pre-wired as much as possible.

As a user, do not expect the supplier to do all of your installation, unless arrangements are made in advance. There are problems when the installer walks into a bare room expecting to see your equipment ready to connect to the new editing system.

More suggestions

You have just about made up your mind on the equipment you will buy. The demonstration was outstanding and the sales pitch was convincing. You are about to invest in a major editing system purchase. But have you considered the manufacturer's reputation? Can you expect field service support? Is there a spare parts inventory at the local field office, in case you need replacement parts? Are trained technicians and engineers available to help you solve a problem by phone, if your installation is located away from the nearest field office?

What about training manuals and system documentation? Are the materials written in simple terms that you can understand? Is training available for you and your staff? Is the training to be at the factory or on-site? It would be better if training were carried out on your system, rather than at the factory, where the hands-on equipment would not likely be configured the way your suite is planned.

As you place your order, be specific. If you are not sure of yourself, seek help. Many consultants and engineering firms are well-versed in dealing with editing systems. No matter what the cost might be, it will save you money and aggravation in the long run and will ensure your major investment when the new system is running properly within the shortest possible time.

Final notes

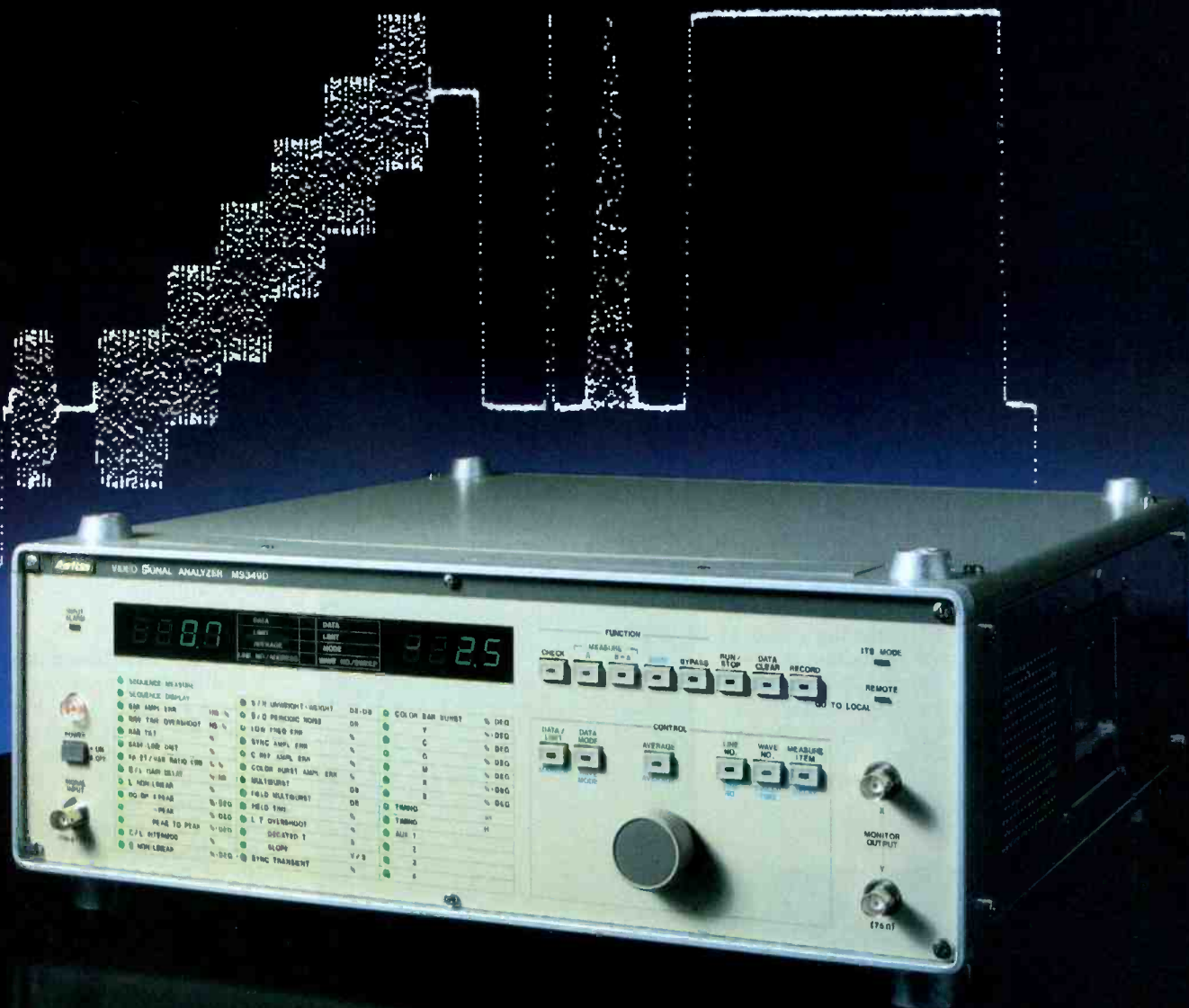
As for the ultimate editing system, I do not believe it exists yet. But with today's technology, videotape editing is becoming more practical for more people at a lower cost than ever before. If designers and builders will listen to those of us who use their equipment, if they will strive for more efficient systems and easier-to-use equipment, videotape editors will applaud them for the efforts—even if the system they create is not the ultimate system.

Editor's note:

Additional aids to purchasing videotape editing equipment may be found in the 1983 *Spec Book* issue of **Broadcast Engineering**. See "Guide to Buying a Video Editor" on page 40.

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Preserving technology

By Jerry Whitaker, radio editor

To continue our observance of 25 years of publication, **Broadcast Engineering** presents a look at some museums and libraries across the country dedicated to preserving technology.

The mass communications media of radio and television are two of the most significant creations of the 20th century. The ability of persons across the country and around the world to communicate with each other, and experience each other's cultures and ideas, is a monumental development. Most of us have difficulty conceiving of a world without instant communication to virtually any spot.



The Ampex Museum of Magnetic Recording recounts the history of recording technology in 28 separate displays. Pictured on the left wall are examples of magnetic recording media—including wire, steel band and tape—covering the period 1898-1965. Examples of early portable and home audiotape recorders are shown on the right.

25th
ANNIVERSARY

Broadcasting (along with telephone technology) has brought the world closer together than the early pioneers of the art could have imagined. Seventy-five years have passed since Charles D. (Doc) Herrold founded a voice station (as it then was known) at San Jose, CA. Developments between then and now have been marked by many inspired breakthroughs and many years of plain hard work.

The 25th anniversary of **Broadcast Engineering** provides an opportunity to remember those who have brought broadcasting to the current state-of-the-art.

The first broadcaster

It is difficult to answer the question, "Who was the first broadcaster?" Much depends on what is defined as *broadcasting*. Regarding AM radio, the grandfather of the broadcast industry, there were five stations that exhibited a rich tradition of being first in broadcasting: KDKA of Pittsburgh, WWJ of Detroit, Herrold's station at San Jose (which eventually became KCBS, San Francisco), WHA of the University of Wisconsin, and WGY of Syracuse, NY. Each of these stations was first in its own way, and each played a significant role in establishing the foundation for radio broadcasting.

An industry such as ours—constantly looking toward tomorrow and the developments it will bring—should stop from time to time to measure where it has been. Fortunately, there are several excellent museums and libraries across the country dedicated to this end. Such efforts at preserving technology allow us to remember the past, and make for a smoother transition into the future.

The Ampex Museum

The Ampex Museum of Magnetic Recording, located at Ampex Cor-

Editor's note:

Because of space limitations, this article did not appear in our May 1984 *Anniversary Issue*, which celebrated **BE's** 25th anniversary. This material rounds out our salute to the history, and future, of broadcasting.

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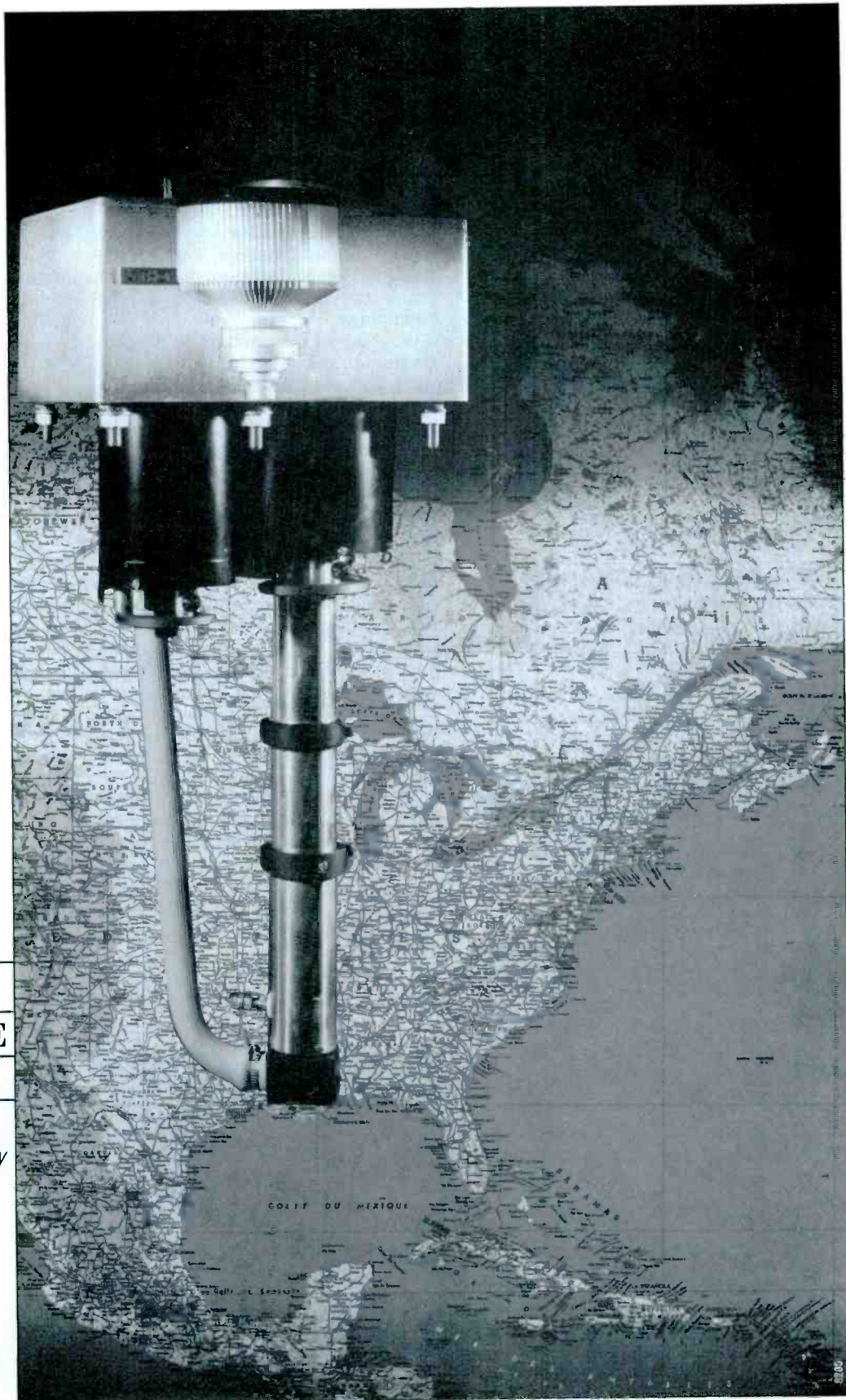
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porate headquarters in Redwood City, CA, covers the technology spectrum from a rare 1911 telegraph Model C wire recorder to today's sophisticated audiotape and videotape recorders. The museum, developed over a 2-year period under the direction of consulting curator Peter Hammar, represents an investment of more than \$1 million. The museum has been designed for lay and technically oriented visitors, and accommodates people interested in quick tours, or deeply interested in the technology.

Working as a consultant to Ampex, Hammar has obtained assistance from such industry pioneers as the 3M Company, BASF, AEG-Telefunken, Agfa-Gevaert, Studer, Sony Corporation, and the ABC, CBS and NBC networks, in gathering information and locating equipment for the center. Ampex has a long history of contributions to the advancement of magnetic recording technology. The company introduced the first successful US audiotape recorder in 1948 and the first videotape recorder in 1956.

Hammar worked closely on the museum project with the late Harold Lindsay, who designed America's first professional audio recorder, the Ampex Model 200. (Lindsay died in April 1982, shortly before the museum opened for a preview showing.)

The museum is arranged in a series of 28 stations, each with its own TV monitor to augment traditional photos and text that accompany each piece of historic hardware. The large number of video displays and special effects sets the museum apart from other facilities.

The Ampex Museum is in a constant state of evolution, with new displays

appearing from time to time. One of the planned additions to the facility is a computer-generated graphic information system that will give visitors detailed information on a particular item of interest. A series of short videotaped minidocumentaries also will be added to the center's video system to give visitors the stories behind the development of audiotape, data tape and videotape recording.

For more information on the Ampex Museum of Magnetic Recording, refer to the March 1983 issue of **BE** (page 310).

Broadcast Pioneers Library

The Broadcast Pioneers Library, located in Washington, DC, contains a wealth of material on broadcast history from the mid-1800s to the present. The library has not attempted to amass all available documents under one roof, but instead has concentrated its staff's expertise on referring the researcher to the best possible sources, whether in-house or elsewhere.

The center cooperates with and collects information about the holdings of hundreds of complementary agencies and private collectors, as well as networks, stations and various national associations. Included in the library's holdings are more than 20,000 photographs, 6000 research studies and pamphlets, 5400 books, 1380 scripts, 1450 discs, 745 audiotapes, and 23 videotapes and kinescopes.

Among the priceless articles on hand are the text of the first international shortwave papal broadcast with Pius XI and Guglielmo Marconi in 1931; correspondence between Elmo Pickerill (a telegraphy and air-to-



The Ampex Museum includes a comprehensive display of important videotape recorders produced since 1956. The mannequin at the left of the photograph is holding an Ampex VR-3000, the first portable VTR, introduced in 1967. The larger recorder in the center is an Ampex AVR-1, the industry's first modular system. To its right is an Ampex VR-2000, the first highband color VTR, introduced in 1964.

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With the best features of our previous switchers in hand, we also listened to our customers and added better specifications. Control of multilevel systems, output delay trim, input clamp and DC output coupling, along with power alarm protection are part of our response to the demand for a better switching system. Physical packaging, clean appearance and better shielding to reduce radiation are also added features.

Redundant control card capability, coax party line, RS-422 control and SMPTE RS-422 computer control, vertical interval switching and internal refresh memory are other features built into or available as options in this state of the art switcher.

Those features are combined with six newly introduced switcher control panels, enhanced software for existing panels, and easy compatibility with existing equipment. The result is a switching system that allows you to expand, yet maintain most of all of your present Bosch control panel investment.

The switcher also interfaces with our TCS-1 Machine Control System, providing easy control of tape, film and other video/audio equipment.

Things You Should Know

Multi-level system control

Operational compatibility with existing TVS/TAS-1000 switching control panels and options is built-in. With the added enhanced or Party Line B operation mode,

seven levels of switching can be controlled, i.e., Video, Audio 1, Audio 2, Time Code, etc. Expansion of up to 450 inputs and 150 outputs can be made to each switching level without system protocol modification. Larger systems are available with slight modifications to the system control protocol.

New technology

Advances in video and audio technology have been added to significantly improve specifications. Crosstalk is better than 60 dB for video and 85 dB for audio under worst conditions, with less than 0.02% harmonic distortion.

Input clamp plug option

Switching disturbances are minimized and video performance is optimized with a plug-selected option for input clamping.

Output delay trim

Timing outputs of the switcher to other systems has been simplified with output delay adjustments. When output timing is critical, the convenient adjustment makes trimming the delay an easy operation.

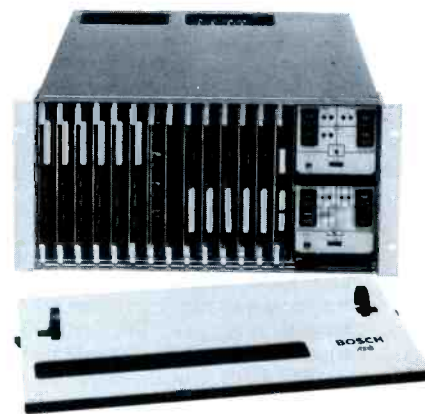
Card and power supply alarms

Monitor circuitry has been included on cards and the main power supplies. In event of failure, the user is alerted by a red LED. Test points, fuses and a green LED are located on the power supply front panel for each output voltage.

Optional redundant power supplies also provide protection from outages. If one fails, the second supply can handle the load until the first is replaced.

Computerized testing

Priority computerized testing is 100% on all video switchers, with hard copy printout



supplied. Test accuracy and resolution are at least one order of magnitude better than commercially available test equipment for comparable tests.

Remote control

Optional remote control by tone-dial access is also available. If you're the station manager or chief engineer, you can control all station feeds right from your desk or from the outside with a tone-dial telephone. Confirmation comes directly from the switcher — verbally — with a voice that can be programmed in several languages.

Another option allows you to monitor switching status of your complete system. Switching and confirmation from the system party line are displayed for inputs and outputs of both audio and video crosspoints.

Call or write to Robert Bosch Corporation for details on the new TVS/TAS-2000 and other members of the Bosch switcher family.

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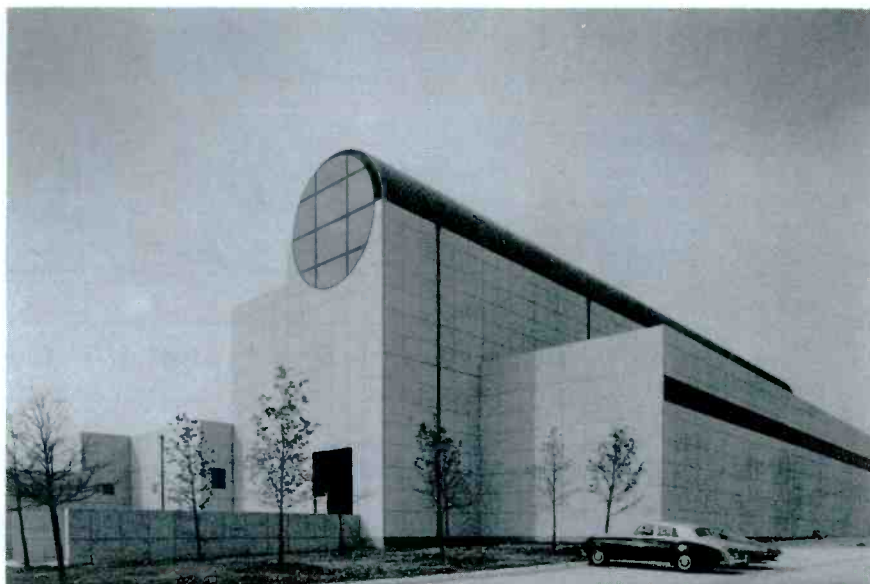
Peter Hammar, consulting curator of the Ampex Museum, shows off one of the centerpieces of the museum, an Ampex VRX-1000 videotape recorder. This machine was the fourth one produced by Ampex and the first delivered to a customer, the CBS Television Network, in 1956. CBS kept the machine in operation for 22 years before returning it to Ampex in 1978.



A re-creation of a 1950-era TV master control room from the National Broadcast Museum is shown. The film chain and rack gear are fully operational.

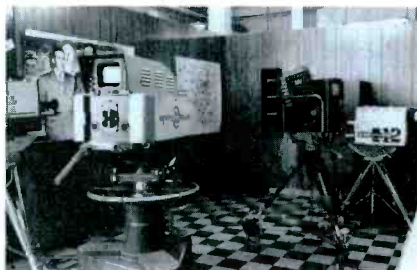


A re-creation of the WFAA-AM, Dallas, control room as it appeared in the 1940s is shown. This exhibit, similar to many others at the National Broadcast Museum, is fully operational.



The Dallas Communications Complex, which will house the National Broadcast Museum, is a major motion picture/video production center. The \$12 million facility includes sound stages, video production centers, office buildings and service centers. The National Broadcast Museum will open its doors at the Dallas Communications Complex in January 1985.

ground communications pioneer) and Lee DeForest, Marconi and David Sarnoff; and scripts of historic radio and TV programs from 1932 to date. Photographs include early antennas, technical equipment, studios and transmitting equipment from the 1920s to the present and various radio personalities during the '20s and '30s.



Shown is a collection of TV cameras at the National Broadcast Museum. Included are an RCA TK-41 and several DuMont black-and-white cameras.



Shown are some of the more than 40 Edison and RCA phonographs manufactured between 1897-1912, contained in the National Broadcast Museum.

The Broadcast Pioneers Library has provided background information for many organizations and individuals, including William S. Paley, Eric Sevareid, the National Association of Broadcasters and the Smithsonian Institution.

The library once was described by founding president G. Richard Shaftro as a "remarkable show of pride" by the broadcast industry. He said, "Broadcasting in America has a great heritage. It has combined the skills of the inventor, the creative producer and the entrepreneur to link every household into one great society."

The National Broadcast Museum

The Dallas/Fort Worth-based National Broadcast Museum has grown out of one man's long-time fascination with communications. Bill Bragg, a Dallas TV engineer, is the museum's founder and director. The museum (a non-profit enterprise) consists of more than 100,000 pieces of vintage equipment, printed and transcribed materials, and memorabilia. The center is designed to educate and inform the public about the history of broadcasting and contributions made by the broadcast industry to society.

The museum has an unusual attitude toward visitors of all ages—they are welcomed to touch many of the exhibits for a hands-on learning experience. This is an appealing feature for guests, whatever their personal experience or background. Children especially appreciate visiting a museum where things are "touchable." The facility has entertained guests from every state and from many foreign countries.

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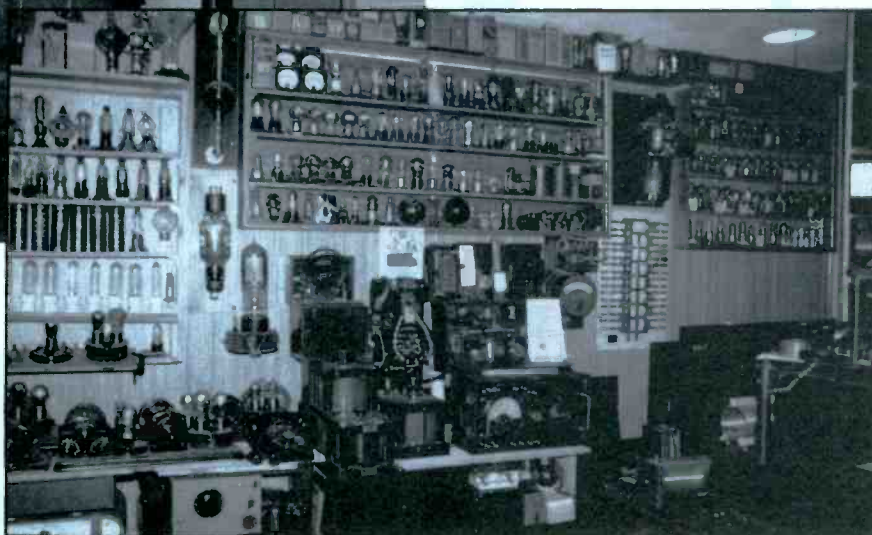
The Museum of Broadcasting houses a vast collection of radio and TV programs from the early days of broadcasting to the present. Facilities include a computer-generated card catalog listing system of radio and TV programs available from the museum.

satellite uplinking capabilities.

Forest Hills Wireless Museum

The Forest Hills Wireless Museum is a 1-man effort dedicated to recording and preserving the history of radio and wireless communications. The museum, run by Phil Weingarten, is located in a private 8-room house in Forest Hills, NY. A large main room on the lower level serves as the museum area, where all artifacts are on display. Other rooms in the house are devoted to restoring old equip-

Shown (at right) is part of the Forest Hills Wireless Museum collection of early vacuum tubes and communications gear.



A portion of the Forest Hills Wireless Museum collection of transmitter couplers and crystal receivers used by amateur radio operators circa 1910 is shown.

The amount of equipment on display at the museum is impressive. Included are two huge radio station transmitters, radio and TV studio equipment, audio control boards, turntables, microphones and disc lathes. One area of the facility is arranged to depict a typical 1960s-vintage TV station control room, complete with engineering consoles,

monitors and film equipment. Next door to this area is a mini TV studio containing TV cameras from the 1950s and 1960s, including the first type of color camera. A favorite of all ages is the working 1938 vintage control console once used by radio station WOAI (San Antonio, TX), where guests can spin records and play disc jockey.

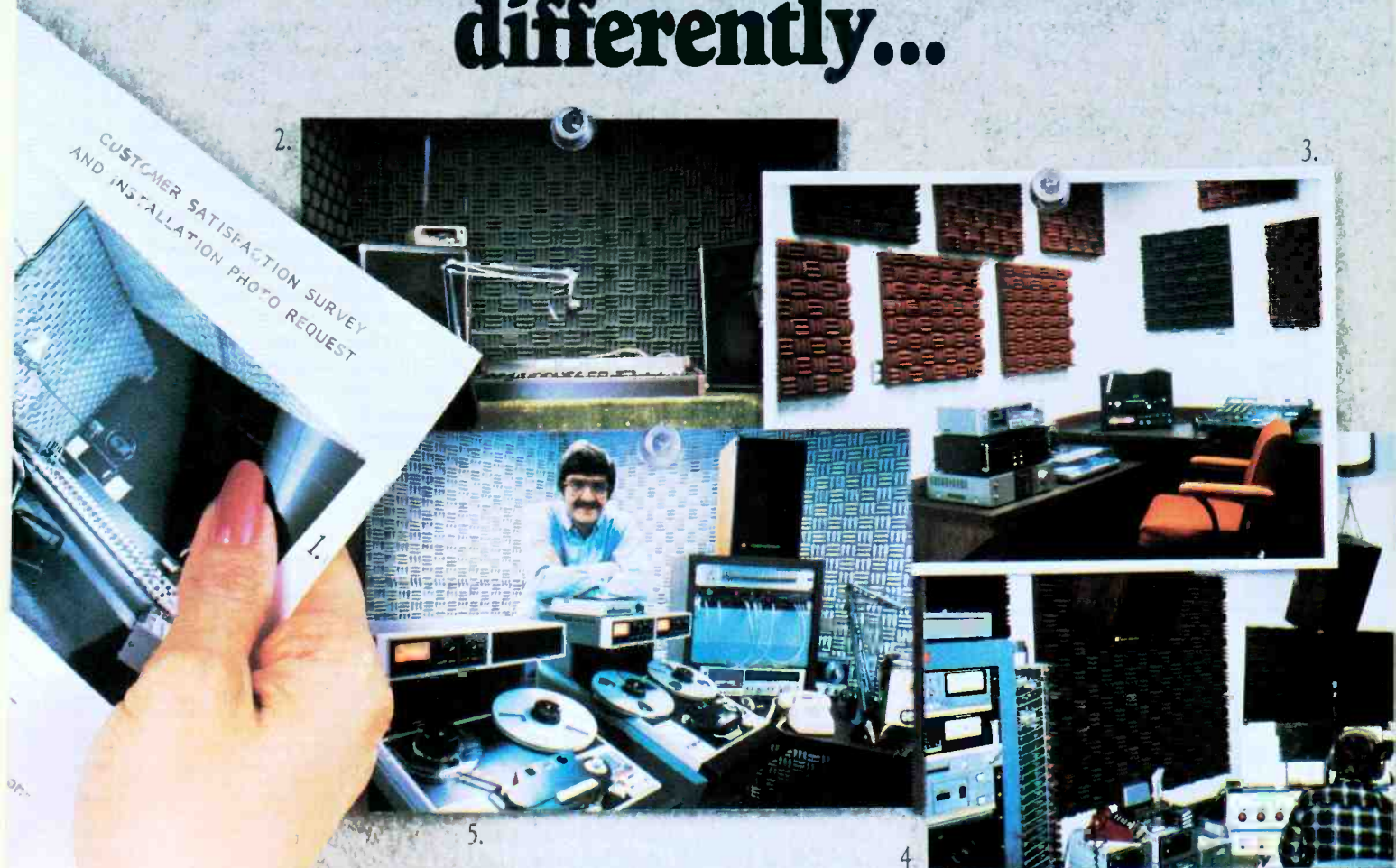
In addition to providing an educational atmosphere, the museum also serves as a meeting place for engineering associations in the Dallas/Fort Worth area. The National Broadcast Museum (now in temporary storage) is in the process of relocating to the rapidly growing Dallas Communications Complex, and will reopen in January 1985. The Dallas Communications Complex is strategically located between Dallas and Fort Worth, near the D-FW Airport. The new facility will provide more than twice the space of the original downtown Dallas location, and will include larger studios and state-of-the-art editing and

ment to working condition. A glass-working lab is used for rebuilding early radio tubes, and a well-equipped machine shop is used for metal and wood-working. Restoration can range from repairing a wooden cabinet by turning out a knob dial or binding post on the lathe to inserting a new filament into a vintage radio tube.

Storage rooms contain supplies no longer available from commercial sources, such as Bakelite and hard-rubber panels, tubing spools of Litz silk, cotton-covered magnet wire, round and square bus bar wire, varnished cambrick spaghetti tubing and thousands of other items.

The museum contains a wide variety of historical communications equipment, including a Marconi 2.5kW wireless sparkgap station made in 1910; French aircraft rotary sparkgap transmitters and crystal receivers used in France during World War I; various examples of early microphones, crystal detectors, tubes and relays; and 1920-era radio

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The museum's radio collection includes a 1920 broadcast of Franklin D. Roosevelt (then candidate for vice president of the United States), an

To interpret its collection to the public, the museum conducts special exhibitions and seminars on a regular basis. Some recent programs have included the Disney TV productions, the satire of Bob (Elliott) and Ray (Coulting), and the drama of Rod Serling. The museum's exhibit area covers four floors and includes an auditorium and radio/TV viewing stations.

- The Ampex Museum of Magnetic Recording, Ampex Corporation, 401 Broadway, Redwood City, CA 94063.
- The Broadcast Pioneers Library, 1771 N St. NW, Washington, DC 20036.
- The National Broadcast Museum is in the process of relocating its facilities to the Dallas Communications Complex. Reopening is set for January 1985. Pending the reopening, interested persons may contact museum founder/director Bill Bragg at 2001 Plymouth Rock, Richardson, TX 75081.
- The Forest Hills Wireless Museum, 67-61 Alderton St., Forest Hills, NY 11374.
- The Museum of Broadcasting, One East 53rd St., New York, NY 10022.

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Broadcast transmitter maintenance

By Jerry Whitaker, radio editor



The transmitter is generally the most expensive piece of equipment at a broadcast station, and one of the units most vulnerable to damage, as well. Whether or not a station has a standby transmitter, the importance of proper maintenance cannot be emphasized too strongly. Many stations unwisely skimp on transmitter maintenance efforts, reasoning, "If it breaks, we can always use the standby." But, will the standby work? Moreover, how much extra downtime and expense will the minimum-maintenance policy create?

Maintaining a broadcast transmitter is a predictable, necessary expense that all stations must include in their operating budgets. Tubes have to be replaced no matter what the engineer does; components fail every now and

then; and time must be allocated for cleaning and adjustments. By planning for these expenses each month, many unpleasant surprises can be avoided.

Although the reason generally given for minimum transmitter maintenance is a lack of money, the cost of such a policy can be deceptively high. Problems that could be solved for a few dollars, if left unattended, may result in considerable damage to the transmitter and a large repair bill. A standby transmitter in the back room often can be a lifesaver. However, its usefulness sometimes is overrated. The best standby transmitter in the world is a main transmitter in good working order.

Contrary to popular belief, equipment failures are not solely dependent on the power company and the will of God. Many failures are preventable. Through accurate observation of the transmission system, degradation of the air product can be avoided.

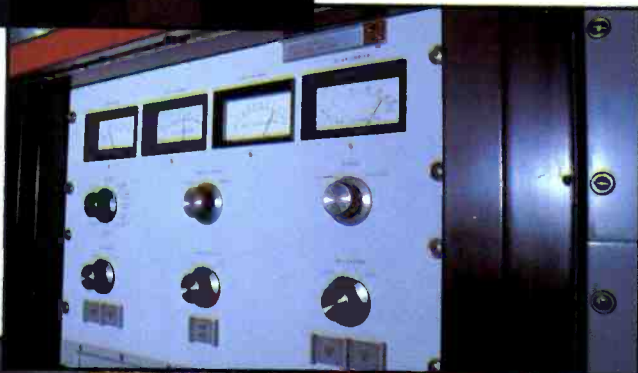
An aggressive maintenance program is the key to a reliable, high quality transmission system. Such a program may seem expensive in terms of money and time, but it is a bargain in the long run. A well-built transmitter can give faithful performance for decades, if maintained properly. In the case of a major market station, which can afford to replace the system every five years or so, an aggressive maintenance program will provide top-dollar return to the station when it sells the "old" transmitter.

Routine maintenance

Most problems in a transmitter can be prevented through regular cleaning and inspection, and close observation. The history of the unit is important in a thorough maintenance program so that trends can be identified and analyzed.

The front panel can tell a great deal about what is going on inside of the unit. All front-panel meter readings should be recorded on a regular basis in the maintenance log, as well as the positions of critical tuning controls. (See Figure 1.) This information gives the engineer a history of the transmitter and can be a valuable tool in noting problems at an early stage. The most obvious application of this logging is to spot failing tubes, but component changes can be found as well.

For example, consider the case of an IPA and PA stage in an AM transmitter that has lost neutralization. (See Figure 2.) Neutralization adjustment is made by moving taps on a coil, and none have been adjusted. The history of the transmitter (as shown in the maintenance record) reveals, however, that the PA grid tuning adjustment has, over the last two

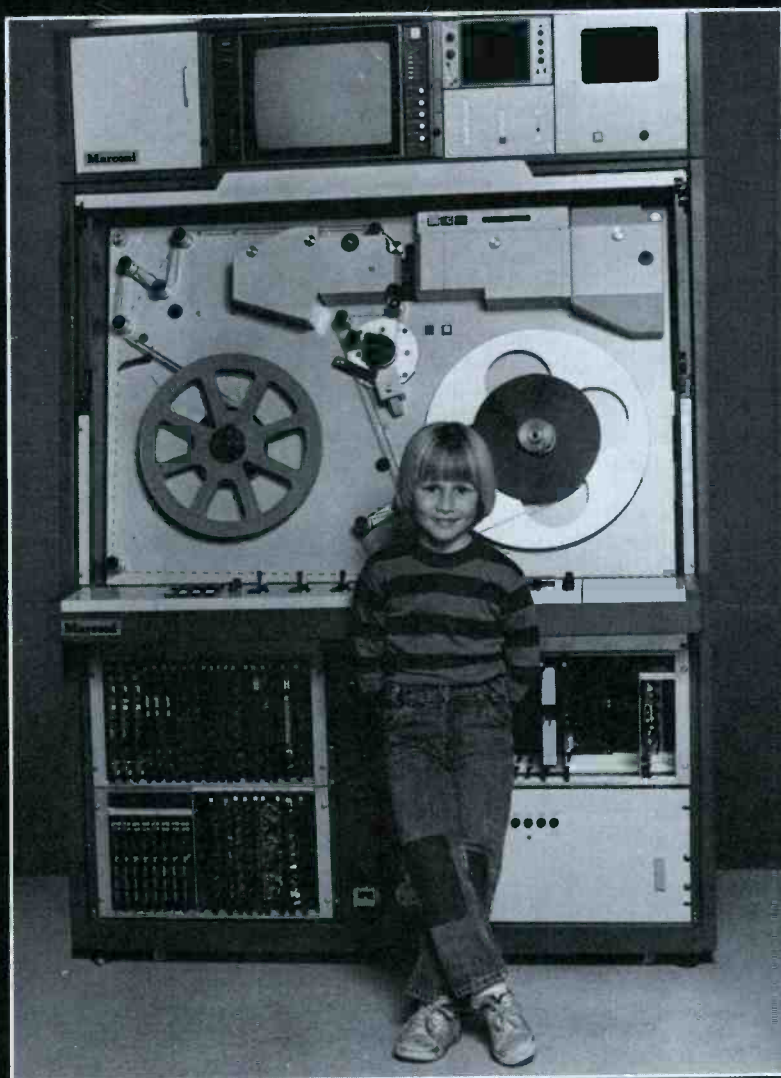


Photos: Jeff Moot



Proper transmitter maintenance is essential to reliable performance. A thorough maintenance program will reduce downtime and guarantee top performance from the transmission system. The author is shown at the transmitting plant of KPDJ-FM, Eureka, CA. A Collins-Rockwell 831-G2 20kW transmitter is used at the installation to feed a 10-bay circularly polarized transmitting antenna for an effective radiated power of 100kW from 2650 feet above sea level.

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Figure 1. Complete and accurate logging of important transmitter parameters is essential to preventive maintenance and troubleshooting. A complete history of the transmitter allows the engineer to spot trends in the operation of the equipment. Shown is an example of a transmitter parameter form that should be filled out regularly by the station engineer.

years, been slowly moving into the higher readings. An examination of Figure 2 leads to the conclusion that the problem most likely is C-601.

The tuning change of the stage was so gradual that it was not thought significant, until an examination of the transmitter's history revealed that continual retuning in one direction only was necessary to achieve maximum PA grid drive. Without the history, time could have been wasted in substituting capacitors in the circuit, one at a time (costing a couple hundred dollars each). Worse yet, the engineer might have changed the tap on coil L-601 to achieve neutralization, further hiding the problem.

Creating a history of the line and tank pressure for pressurized transmission lines helps identify line or antenna problems. Once the regulator is set for a desired line pressure, the tank and line readings should be recorded each week and charted. If possible, make the observations at about the same time of day each week. Ambient temperature can have a significant effect on line pressure, so any temperature extremes should be noted in the transmission line log when the pressure is recorded. The transmission line pressure usually will change slightly between carrier-

PARAMETER	TYPICAL VALUE	MEASURED VALUE
RF power output	18.3kW	
Plate current	2.8A	
Plate voltage	7.55kV	
Screen current	380mA	
Screen voltage	650V	
PA grid current	110mA	
PA bias voltage	490V	
PA filament voltage	6V	
Left driver cathode current	142mA	
Right driver cathode current	142mA	
Driver screen voltage	275V	
Driver screen current	35mA	
Driver grid current	1mA	
Driver plate voltage	1.85kV	
28V power supply	27V	
Reflected power	15W	
Transmission line pressure	3.9psi	
Tank pressure	1500psi	
Transmitter hours	5412	
Exciter AFC	Center scale	

on and carrier-off (depending on the power level). The presence of RF can heat the inner conductor of the line, causing the pressure to increase.

After a few months of charting the gradual loss of tank pressure, a pattern should become obvious. Deviation from the normal amount of tank pressure loss should be investigated.

Visual inspection

Complete visual inspection of the transmitter is an important part of routine station maintenance. Overheated resistors can be spotted easily, as can leaky electrolytic capacitors and leaky oil-filled capacitors in the high voltage supply. By checking the transmitter just after sign-off, excessive heating of high voltage RF capacitors can be accomplished. Transmitting capacitors should never run hot. They may run warm, but generally only because of thermal radiation from other components in the circuit, such as tubes. (Be sure to discharge capacitors before testing them. They can pack quite a punch.)

Coils and RF transformers rarely show signs of overheating. Occasionally, a coil will typically run hot (due to RF, not dc), and discoloration of several loops will be noticed. The

transmitter manufacturer should be consulted to determine whether such heating is normal.

Power supply transformers should be checked for excessive heating just after sign-off, as should oil-filled modulation transformers (if used). Any oil-filled transformer also should be observed for signs of leaking.

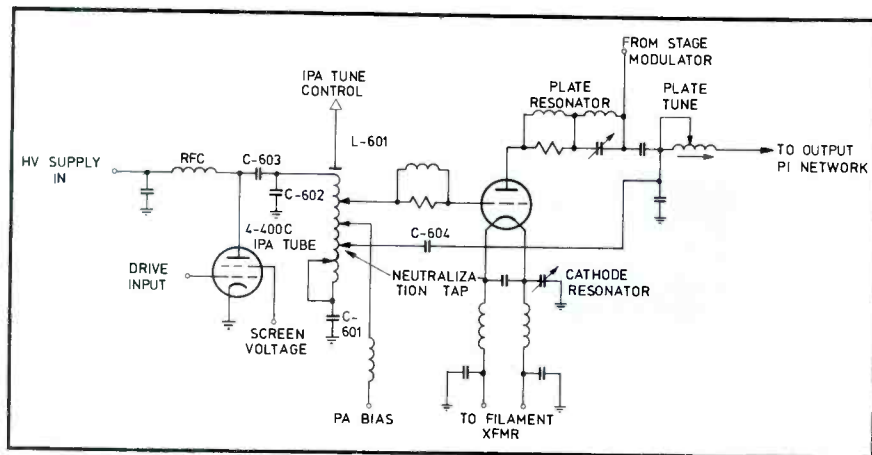
Relay contacts should be cleaned periodically, as should power contactors. Experience will tell what devices need to be cleaned more often than others. Unless problems are experienced with an enclosed relay, do not bother cleaning it. More harm than good can be done by disassembling components that show no signs of problems for detailed inspection. Never be afraid to service a component, but, on the other hand, if it is not broken, do not try to fix it.

Barrier-strip contacts should be regularly inspected for tightness and proper crimping. Crimping can be checked by lightly pulling on the wire with a pair of long-nose pliers where the wire enters the solderless terminal connector. (Occasionally the wire may come off in your hand.) Check for tightness of connectors to individual components, particularly in the high voltage power supply and RF tank networks. All connections should be tight, but do not overtighten.

Plug-in power tubes must be seated firmly in place and the anode connection must be tight for proper operation. Once in position, do not disturb the tube assembly unless trouble is experienced. Problems sometimes can be created by removing a tube or other component for inspection. If a tuned cavity assembly is set up and working properly, leave it alone.

A large part of proper routine maintenance of a transmitter is cleaning. Cleaning does much more than keep the transmitter looking neat. It provides an opportunity to visually inspect each component and gauge any

Figure 2. An example of how detailed logging of transmitter readings and tuning control positions can aid in troubleshooting work. The example shown involves an IPA and PA neutralization problem in an AM transmitter. A history of IPA retuning (through adjustment of L-601) helped determine that loss of neutralization was caused by C-601 changing in value.



changes a part might show. An overheated resistor or leaky capacitor may be overlooked if the parts are coated with a layer of dust or dirt. High voltage standoffs, insulators and components can be cleaned using isopropyl alcohol and a soft cloth.

Cleaning is also vital to the power tubes contained in a transmitter. An anode congested with dirt is a poor radiator of heat, possibly leading to shortened tube life. Likewise, air filters that are not changed often enough will restrict air flow to the tubes and other heat-generating components. Cleaning of transmitter components is important for proper heat exchange from the device to the cabinet. An aggressive cleaning program will result in a transmitter that looks brand-new year after year and, more importantly, performs reliably.

Once the transmitter is clean, keeping it that way for long periods of time may require improving the air filtering system. Most filters are inadequate to keep out very small dirt particles (microdust), which can become a serious problem in an unusually dirty environment. Microdust also can become a problem in a relatively clean environment after a number of years of operation. In addition to providing



Figure 3. An example of how additional filtering can be added to the air intake port of a transmitter. Standard furnace filter panels can be used and held in position by adhesive tape squares. Alternatively, special computer room filtering material can be cut to size and placed over air intake ports. Care should be taken to ensure that no loss of air pressure inside the equipment results from the additional filters.

a well-filtered air intake port for the transmitter building, additional air filters can be placed in front of the normal filter assembly. One or two of the commercially available furnace filter panels can be secured to the air intake port (as shown in Figure 3) with small squares of 2-sided adhesive tape. With the extra filter in place, it generally is necessary only to replace the outer filter panel. The transmitter's integral filter assembly will stay clean, eliminating the work and problems associated with pulling the filter assembly out while the transmitter is operating. Keeping the trans-

mitter air intake clean is vital to proper operation of the system, because dust can cause a drastic reduction in the output of blowers and fans in the transmitter, collecting on the surfaces of the blower cage, blades and ducting.

Temperature control

Tight control over ambient temperature should be exercised at the transmitter plant to prevent thermal cycling wear on semiconductor devices and overheating of power vacuum tubes. Tubes require a huge volume of cool air to achieve full life expectancy. Room cooling requirements vary con-

siderably from one location to another, but some general statements on cooling apply to all installations.

A transmitter greater than 1kW must have its exhaust ducted to the outside whenever the outside temperature is more than 50°F. Transmitter buildings must be equipped with refrigerated air conditioning units when the outside temperature is higher than 80°F. The exact amount of cooling capacity needed is subject to a variety of factors, such as actual transmitter efficiency, thermal insulation of the building itself and size of the transmitter room. Here again, though, some generalizations can be made. Radio

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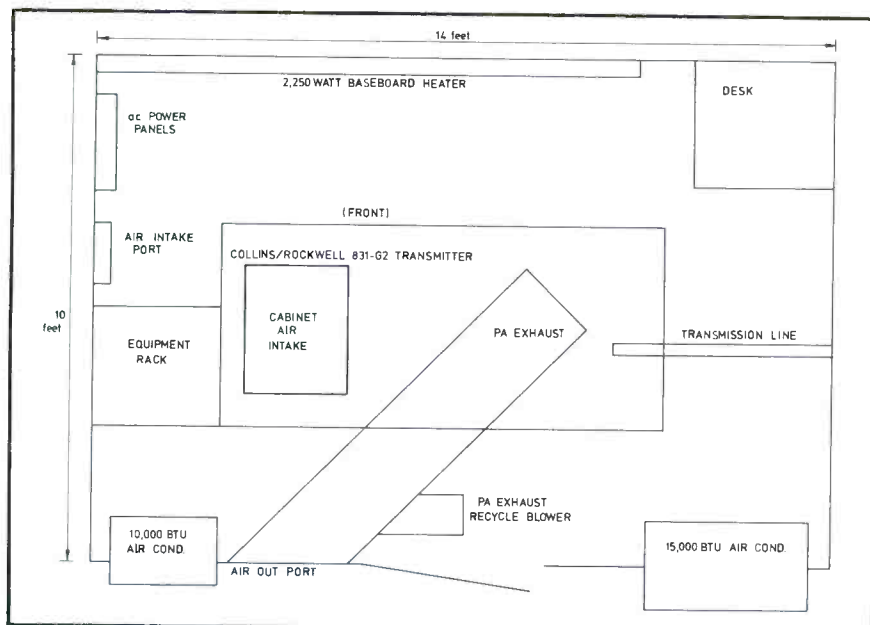


Figure 4. A typical heating and cooling arrangement for a 20kW FM transmitter installation. Ducting of PA exhaust air should be arranged so that it offers minimum resistance to air flow. Ideally, the transmitter PA exhaust would go straight up through the roof of the building.

transmitters up to and including 5kW usually can be cooled (if the exhaust is efficiently ducted outside) by a 10,000 BTU air conditioner. 10kW installa-

tions should have 17,500 BTU of air conditioning and 20kW plants should be provided with at least 25,000 BTU of air conditioning. Larger installations, or TV plants, should be studied by an air conditioning expert.

Figure 4 shows a typical 20kW FM transmitter plant installation. The building is oriented so that the cooling activity of the blowers is aided by normal wind currents during the summer months. Air brought in from the out-

side for cooling is well-filtered in a hooded air intake assembly that holds several filter panels.

This layout includes two air conditioners, one 15,000 BTU and the other 10,000 BTU. The smaller unit's thermostat is set for slightly greater sensitivity than the larger air conditioner, allowing small temperature increases to be handled more economically.

It is important to keep the transmitter room warm during the winter, as well as cool during the summer. Provisions should be made for heaters and PA exhaust recycling blowers. A transmitter that runs 24 hours a day should not need additional heating equipment, but stations that sign off for several hours during the night should be equipped with electric room heaters (baseboard types, for example) to keep the room temperature above 50°.

PA exhaust recycling can be accomplished by using a thermostat, some relay logic and a solenoid-operated register or electric blower. By controlling the room temperature to between 60°F and 70°F, tube and component life will be improved substantially.

Regardless of the age or type of transmitter, an aggressive maintenance program easily will pay for itself in reduced downtime and failures, and increased performance.

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calendar

July 17-19

The Fourth Annual WOSU Broadcast Engineering Conference will be held at the Fawcett Center for Tomorrow at Ohio State University, Columbus, OH. Final plans for the conference are still being completed.

Some of the speakers for the conference include: Oscar Reed, Atlantic Research; Robert Greenberg, FCC; John Kean, NPR; Michael Rau, NAB; Dr. E. Stoll, Modulation Sciences; Don Garlick, Scala Electronics; and Greg Silsby, Electro-Voice. Other industry representatives will be at the conference for presentations and to serve on panels.

For more information, contact John H. Battison, director of engineering, WOSU-AM/FM/TV, 2400 Olentangy River Road, Columbus, OH 43210.

Sept. 16-19

The National Association of Broadcasters has canceled its annual Radio Programming Conference (scheduled for August in Atlanta) and will join the National Radio Broadcasters Association for the Radio Convention and Programming Conference in Los Angeles. (See Associations on page 16.)

Sept. 21-25

The 10th International Broadcasting Convention, IBC-'84, will be held at the Metropole Conference and Exhibition Center in Brighton, United Kingdom. For more information, contact the IBC Secretariat, the Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, United Kingdom.

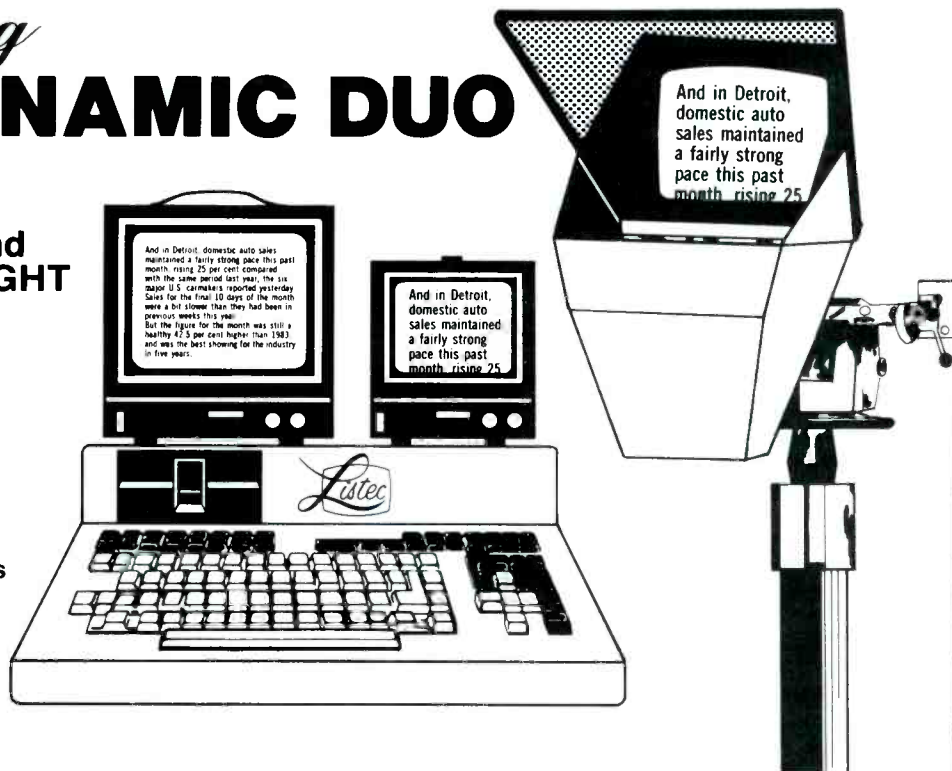
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¹Dynamic Tracking and U-Matic are trade names of Sony Corporation.

²The Panasonic VHS NV-8950 is V-locked with modification by FOR-A Corporation. Contact FOR-A Sales Department for complete information.

people

Moseley Associates has announced the appointment of **Paul McGoldrick** as manager, systems engineering. He will be responsible for management of major projects, both domestic and international.

Comprehensive Video Supply has appointed **Michael D. Schimmel** to the position of Eastern sales manager. Schimmel is responsible for training, monitoring and supporting the company's Eastern sales representatives and dealers as well as managing the company's Eastern distribution network.

Bernie K. Yasunaga, executive vice president, Fuji Photo Film USA, and **John Dale**, vice president and general manager, Magnetic Products Division, have announced a mutual agreement by which Dale will act as a consultant and represent Fuji Magnetic Products in special industrial markets.

Bruce C. Gabrielson has joined the staff of Comsearch Applied Technology. Gabrielson will manage CAT's growing Tempest/EMC organization as its program manager.

Bob Jones has been promoted to national sales and marketing manager at Schneider Corporation of America, for TV lenses for broadcast and professional applications.

Belden Cord Products has appointed three new field sales representatives: **David Anderson**, **Keith Barber** and

Melody Davis. They recently completed a 12-week training program at the division headquarters in Geneva, IL.

Kinsley D. Jones has joined Larcen Communications Equipment as manager of Western US sales, and has opened up a new office located at 19003 E. Oxford Drive, Aurora, CO 80013; 303-690-9427. **Lew F. Page**, who is responsible for Eastern US sales, is moving to new offices located at 14440 Cherry Lane Court, Suite 201, Laurel, MD 20707.

Lake Systems has announced the appointment of **Terrence Barnum** to the Broadcast Television Division. This division services the broadcast and CATV industry as well as the high end industrial and educational user.

N.L. "Nibs" Jochem has retired following a distinguished 43-year career with the Gates Radio Company and Harris Broadcast Group. Jochem spent most of his first 14 years with the company as a radio design engineer, advancing to the position of director of engineering in 1955. In 1960, he was promoted to vice president of engineering. In 1971, Jochem took the reins as vice president of product management in 1976, as vice president of special projects, he assumed responsibility for all company resale products and developed an active value engineering program.

Shure Teleconferencing Systems has announced two additions to its sales staff. **Dolores L. Morrison** has been appointed to the position of sales consultant, covering the

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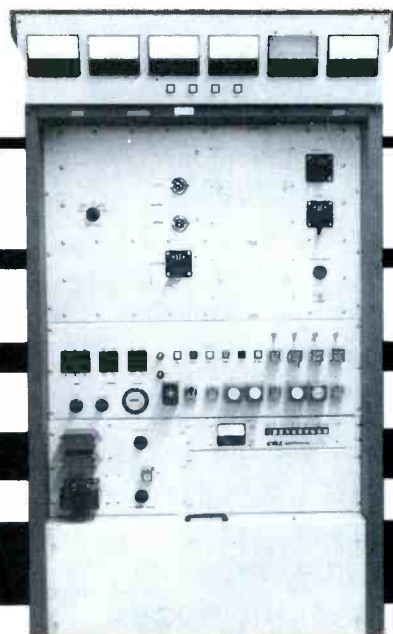
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Great Lakes states. **Cyndia S. Bishop** has been appointed as the new sales consultant for the Southwestern states.

[:~:~)]]]

feedback

Clarification

We would like to clarify a point made in the article, "Audio Monitor Update," which appeared in the March 1984 issue of **BE**, page 58. An **editor's note** at the end of the article stated that one of the speakers covered in the update report had become "a standard at many facilities." Although this is true of the speaker in question, the same can also be said of several other highly respected loudspeakers, such as the JBL 4312. We did not intend to imply that any particular speaker has become an **industry standard**, nor did we intend to imply endorsement by **BE** of any product (speaker or otherwise).

Loudspeaker equipment is manufactured by a number of different companies, offering a wide variety of features. Stations interested in purchasing loudspeakers should consult the **BE Buyers' Guide** issue (September 1983, page 170) for a complete listing of manufacturers.

BE staff

AM stereo

Continued from page 4

tion has carefully researched the applicable antitrust laws to avoid any problems with the government. The organization promotes generic AM stereo and the multimode receiver concept.

AM Stereo Broadcasters Association

A national organization has been formed for persons interested in the improvement of AM broadcasting through implementation of stereo operation and development of improved consumer receivers. The non-profit AM Stereo Broadcasters Association seeks to keep its members updated on AM stereo developments, including transmission equipment, receivers, programming, business matters, promotion and listener trends. The group does not favor any particular transmission method, and encourages the multimode receiver concept.

The organization recently completed a survey on the interest in AM stereo operation in various markets across the country. Results from the questionnaire—mailed to AM station managers—show a significant amount of interest in AM stereo in all markets, from large to small. Broadcasters who said they did not plan to convert to AM stereo operation said their decision was based on budgetary or format reasons.

NRBA conducts survey

In an attempt to assess the current state of AM stereo usage by radio stations across the country, the National Radio Broadcasters Association (NRBA) has launched a nationwide survey of all AM radio station managers.

The questionnaire asks managers about their AM stereo capabilities and plans for the future. According to Bernard Mann, NRBA president, the survey is meant to be a census of AM stereo operations to determine within the radio industry what the future of AM stereo is going to be.

The survey also will ask AM broadcasters not involved in stereo operation their reasons for staying on the AM stereo sidelines.

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Continued from page 12

Other alternatives to NASA launches via conventional rockets will be available in the future as NASA gradually gets out of the commercial satellite launching business and turns it over to US private industry. NASA shuttle launches are subsidized heavily by the US government to promote shuttle missions. This may continue until 1989, but at that time the cost of a shuttle launch is expected to increase from the current cost by at least 70%. Based on dual payloads, shuttle launches cost approximately \$15 to \$20 million per satellite. When the cost of a shuttle launch is normalized, it is expected to be in the \$25 to \$35 million range, which will not be competitive with Ariane's \$25 to \$30 million launch cost because of other advantages provided by Ariane.

Actually, the Ariane was designed to compete with the Atlas/Centaur rocket, which has launched 29 of the most advanced communication satellites into orbit over a 12-year period with a 95% success rate. Its current launch cost of \$45 to \$50 million will be reduced when it is available from private industry, and it will compete with Ariane, whose launch costs may rise because of a temporary lack of competition and, possibly, less subsidization by the French government in the future. The Atlas/Centaur and the Ariane will compete for the satellite launches in the payload weight class that will predominate for domestic applications in the next decade.

Thus, although the status of satellite launching technology is temporarily uncertain because of the STS-10 problems, future prospects for low risk and cost-effective launches are solid because of the increased focus on rocket reliability that will result, and the new competition in the launching marketplace. [7-2000]

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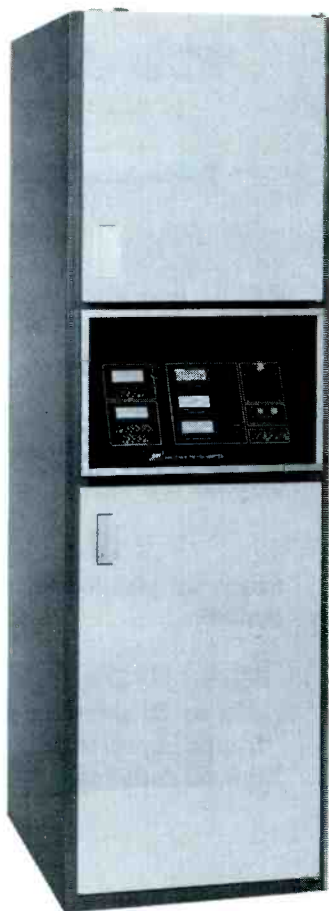
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News

Continued from page 14

the eventual success of DBS service is the ease with which a customer can purchase a receiving unit and have it installed and repaired. Nationwide retail chains such as Sears and JC Penney already are selling and installing receiving equipment for subscription television. DBS equipment would be a logical extension of this activity.

The 289-page study forecasts the DBS services, equipment and programming market in the United States, Canada and Mexico. DBS equipment manufacturers, distributors and programmers are profiled.

For more information, contact Customer Service, Frost & Sullivan, 106 Fulton St., New York, NY 10038; 212-233-1080.

!:-?~)))))

Editorial

Continued from page 10

corner should consider donating the machine and some technical assistance to a deserving museum or media archives. (The Ampex AVR-1 quad VTR can be the most important machine in a TV archivist's collection. The saying is, "If an AVR-1 won't play back a tape, then the tape can't be played back.") Media archives cannot preserve programming without hardware. Broadcasters may even qualify for a large tax deduction for donation of machines and their services to the archives.

Organizations with outstanding potential for expanded preservation programs include the American Film Institute and its new National Center for Video and Film Preservation, the ATAS/UCLA Television Archives, UCLA Film and Radio Archives (all in Los Angeles) and the Museum of Broadcasting in New York. These and other archival organizations deserve our financial support if they are to fulfill our media preservation needs.

Editor's note:

If you have any ideas or questions about programming or equipment preservation and how you can help, call Peter Hammar at 415-941-0295 or the Ampex Museum, 415-367-3127.

!:-?~)))))

FCC update

Continued from page 6

clear channels. The notifications include full particulars regarding the power to be used, as well as the period of operation that will be permitted. No application process is involved. Stations need only indicate their desire to operate pre-sunrise to the FCC and state how any power reduction involved will be accomplished. Pre-sunrise operation can begin as soon as the necessary letter is sent to the commission.

The authorizations being sent set forth the maximum power that can be used for pre-sunrise operation, but such operation is not mandatory. Stations may operate with lower power or may decline to operate at all during the pre-sunrise period. Pre-sunrise operations can begin as early as 6 a.m. local time.

More than 180 stations on Canadian Class I-A clear channels are affected by this change, which was made possible as a result of the new bilateral AM agreement with Canada.

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Colour temperature stability has always been limited by the stability of the CRT, but now BARCO INDUSTRIES introduces the CTVM 4 range with AKB (Automatic Kinescope Biasing). The AKB system, developed by BARCO INDUSTRIES, automatically stabilizes picture tube colour temperature and guarantees black levels which remain constant with time, temperature and CRT parameter drifts.

In contrast with stabilization systems based on current feedback, the AKB system also corrects for CRT leakage currents.

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The BARCO INDUSTRIES AKB system is suitable for use with all CRT's, whether equipped with a delta or unitized gun, and will be installed in the entire CTVM 4 range (20"/14"/delta/ dot-in-line/slot-in-line).

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service life, making them the most cost-effective you can buy. The CTVM 4 range represents the dawn of a new era for users, permitting greater confidence in colour reproduction and making troublesome maintenance a thing of the past.

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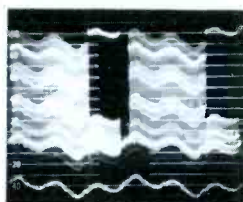
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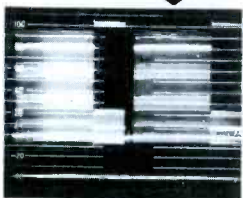
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TV stereo approved

The FCC has adopted rules that will allow the TV aural baseband to be used for TV stereophonic sound, second-language programming, paging and any other broadcast or non-broadcast use.

The technical rules permitting TV stereo do not specify a single standard for multichannel TV sound (MTS). Instead, the commission decided to allow marketplace competition in MTS systems and services. However, protection of consumer investments in TV sets designed for the preferred (Zenith) method of transmission will be provided by ensuring that sets equipped for the Zenith system will not respond to signals from other systems.

Also under the new rules, the commission will:

- permit public broadcasters to use non-public subcarriers commercially;
- encourage non-broadcast use of subcarriers, such as for paging, but require coordination of such uses with the appropriate FCC bureaus; and
- not apply the fairness doctrine or equal opportunities provisions of the Communications Act to subcarriers that require special equipment to be received.

The question of whether cable systems should be required to carry stereophonic TV audio, second audio program channels or other ancillary services will be considered in another Notice of Proposed Rulemaking.

Must-carry rulemaking request denied

The FCC has denied a request by Turner Broadcasting Systems to initiate a rulemaking to consider eliminating the cable TV must-carry rules. Generally, these rules require cable systems to carry all local or significantly viewed TV broadcast signals without regard to displacement of satellite- or microwave-fed services such as HBO, the superstations, ESPN or the Cable News Network.

Turner said that the rules should be repealed because they violate the First Amendment by requiring carriage of particular types of programming; they are not needed and do not serve any important governmental interests, because local signals can be received by cable subscribers off the air; and they are unfair and anti-competitive in that they guarantee local stations cost-free cable distribution, while other program services must pay for carriage or may be unable to find channel capacity because of a system's must-carry obligations.

The commission rejected Turner's proposal because of the lack of evidence relating to the impact deletion of the rules likely would have on local TV stations. A more complete factual basis would be needed, the commission said, to justify such a radical shift in the competitive relationship between the broadcast and cable TV industries. Further, the commission said that the growth in cable system channel capacity has made mandatory carriage less burdensome and the impact of non-carriage more significant for local stations.

Station totals released

The commission has announced the following totals for broadcast stations licensed as of March 31, 1984:

AM radio	4745
FM radio	3566
FM educational radio	1141
UHF commercial TV	344
VHF commercial TV	534
UHF educational TV	173
VHF educational TV	112
UHF low power	78
VHF low power	194

Total radio	9442
Total TV	1435

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ADM Technology, Inc.	IFC	Dilor Industries	78	Microtime, Inc.	75
A.F. Associates	155	Dolby Labs, Inc.	97	Midwest Corp.	1,8-9
AKG Acoustics	87	Victor Duncan, Inc.	60	Modular Audio Products	102
Acrodyne, Inc.	109	Dubner Computers	77	R.K. Morrison	146
Agfa-Gevaert	31	Dynair Electronics Inc.	107	NEC America, Inc.	28,59
Alexander Mfg. Co.	26	EECO, Inc.	135	NTI America, Inc.	42
Alpha Audio	151	ESE	165	Rupert Neve	65
Amek of America	120	Eagle Hill Electronics	146	Opamp Labs Inc.	146
Ampex Corp.	11,40-41	Eastman Kodak	94-95	Orban Associates, Inc.	121
Anderson Labs	32	Electrex Co.	88	Otari Corp.	45
Anritsu America Inc.	143	Electro-Voice, Inc.	129	P.T.S.I.	131
Antenna Technology Corp.	13	For-A Corp.	165	Perrott Engineering	108
Anton/Bauer	67	Garner Industries	53	Philips Test & Measuring Instruments Inc.	139
Armco Financial Corp.	62	Graham-Patten Systems	128	Polyline Corp.	116
Asaca/Shibasoku Corp. of America	93	Grass Valley Group	7	Potomac Instruments	44
Audio-Technica U.S., Inc.	133	Great American Market	46, 152	Precision Echo	60
Audio-Video Engineering Co.	168	Hannay Reels	124	Q.E.I.	166
Auditronics, Inc.	99,120	Hitachi Denshi America Ltd.	34-35	Quad Eight/Westrex	27
B & K Dynascan	92	Howe Audio Productions, Inc.	61	RCA Camera Tube Marketing	3
Barco Industries	166A-166B,167	ICM Video	64	RTS Systems, Inc.	30
Belar Electronic Labs	62	Ikegami Electronics, Inc.	25,111	Research Technology Inc.	48
Beyer Dynamic Inc.	79	Image Video Ltd.	132	Joseph Schneider Optische Kreuznach	158
Bittree	152	Interactive Systems Co.	88	Scientific-Atlanta	117
Robert Bosch Corp.	147	International Tapetronics Corp/3M	91	Shure Brothers	119
Broadcast Video Systems	152	JBL, Inc.	101	Sony Corp.	39, 56-57, 82-86
C.O.A.R.C.	152	Jensen Transformers	137	Standard Tape Laboratory	146
CSI Electronics Mfg. Co.	164	K & H Products	122	Studer ReVox	125
Calvert Electronics Inc.	14	L.W. International	116	Switchcraft	71
Canon USA Inc.	33,43	Leader Instruments Corp.	5	TTC/Ampro Scully	102
Centro	29	LEMO USA, Inc.	157	TTC/Wilkinson Radio Division	141
Cetec Antenna	68	Lerro Electrical Corp.	15	Tascam div TEAC Corp. of America	103
Cetec Vega	127	Lexicon, Inc.	55	Tektronix	17,18-19,20-21
Chyron Telesystems	115	Peter-Lisand Machine Corp.	106	Tentel Corp.	146
Circuit Research Labs	37	Listec Television Equipment Corp.	160	Texscan Corp.	153
Clear-Com Intercom Systems	74	3M Video Tape	72-73	Thomson-CSF	145
Comex Systems	142	3M Professional Audio/Video	123	Union Connector	149
Comrex Corp.	28	MCL, Inc.	38	Varian	IBC,47
Comtech Data Corp.	105	Maxell Corp. of America	69	Ward-Beck Systems Ltd.	BC
Continental Electronics Mfg. Co.	23	McCurdy Radio Industries	66	Will-Burt/TMD Div.	112
Crosspoint Latch Corp.	174	Microdyne Corp.	63	Winsted Corp.	108
Datum, Inc.	162				

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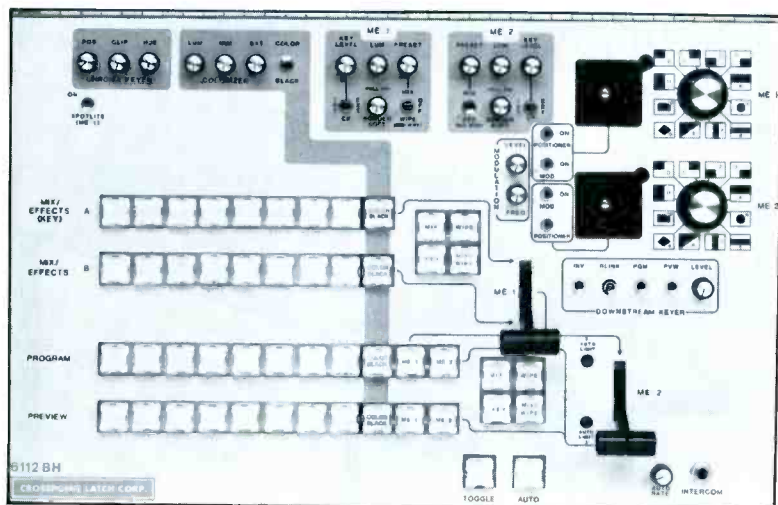
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