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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
To know how good your camera tube is, look it straight in the eye.

For better color pictures, compare the color of the photoconductors. This simple comparison demonstrates why you'll get better broadcast quality with Saticon II. The dark red faceplate of Saticon II shows its selenium-arsenic-tellerium photoconductor. The lighter reddish-yellow faceplate of the Plumbicon tube reveals its lead-oxide photoconductor. This color difference indicates significant Saticon II advantages. Because the darker photoconductor absorbs more light, picture quality is enhanced. On the other hand, Plumbicon's lighter color photoconductor reflects more light at all visible wavelengths, as shown in the chart below.

Because Saticon II reflects less light, you benefit with reduced flare and less blooming. Low-light colors maintain their integrity and accuracy.

As a consequence, Saticon II does a remarkably good job of handling high contrast scenes in uncontrolled lighting conditions because of its low flare. What's more, Saticon II's photoconductor is a glassy, amorphous, high resistivity film. Its structure serves to ensure high resolution, high sensitivity and unmatched depth of modulation.


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Take out the doubt.
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, WQWE, 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 WQVE, 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
Two Leaders with an important following.

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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, 660kHz, 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 compilator 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 shortspaced 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 channel.
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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
The rich radiance of hues captured in their true position within the spectrum. Radiance achieved through the combination of superior chrominance with unparalleled luminance. Radiance resulting in a video tape of sensational color. Ampex 197.

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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 costs increase 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 affected 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, Ariane space, 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 manufactured as 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 unless 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, manufactu-
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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.

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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 satellite 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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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 subject 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.

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-tee 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.

Working Group tentatively agrees on format

The SMPTE ¼-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.

Virginia station cited for life-saving efforts

A Virginia station cited for life-saving efforts

A Virginia station, WVAB, has been the National Association of Broadcasters’ Certificate of Merit – for virtually saving a child’s life. The certificate 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.
NO ONE WATCHES TELEVISION CLOSER THAN TEKTRONIX.
SEE IT, SYNC IT, SAVE IT, TEST IT...GET A CLEARER

1740 Waveform/Vector Monitor (Right)
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.

110-S Frame Synchronizer (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.

1980 Automatic Video Measurement Set
(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!
Behind the scenes, behind the programming, the glamour of television, success still depends on signal quality.

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

For more than 30 years, Tektronix technology has stayed a step ahead to help you solve problems in color television: Whether you’re broadcasting live feeds from a bike race in northern California, or sending signals via satellite to thousands of television stations around the world—our products are helping you get a clearer picture of the video signal.

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.

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

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THE NEW TEKTRONIX 1750: HEADS OFF PROBLEMS YOU DIDN'T KNOW YOU HAD...UNTIL IT WAS TOO LATE!

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 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.

A compact 5 25 inch package, mechanically interchangeable with many other "half-rack" packages, allows easy installation in new or existing facilities.

If you see the advantages of comprehensive signal monitoring, you'll like what you see in the 1750.

For more information on this or other Tek television products, or for the number of your nearest Tek sales office, call our toll-free information service today: (800) 547-1512. In Oregon, (800) 452-1877.

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Tektronix, Inc., P.O. Box 1700
Beaverton, OR 97075

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The Netherlands
Tel: 18312-18328

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Tektronix Canada Inc.
P.O. Box 6500
Sarnia, Ontario L4M 4V3
Phone 705/737-2700

Circle (15) for Literature
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.
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. The politically-inspired "market-place" decision hasn't affected the technical performance of the PMX System one bit.

Hearing is believing.
With the PMX System, AM Stereo music sounds like FM Stereo music. So it makes for higher listener appeal and better numbers: For audience and the bottom line.

The Winning Combination
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.
Continental Electronics Mfg. Co.
PO Box 270879 Dallas, Texas 75227.
Phone: (214) 381-7161

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 1.25 slopes, instead of usual 1:1.5.

Circle (250) on Reply Card

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 51/4-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.

Circle (251) on Reply Card

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.

Circle (252) on Reply Card

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.

Circle (253) on Reply Card

ALPHA VIDEO & ELECTRONICS

Alphatized VCRs: Sony 5850, 5800, 5600 and 5000 U Format VCRs with balanced audio, shuttle improvements, optional SMPTE track and time code restripe.

Circle (254) on Reply Card

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.

Circle (255) on Reply Card

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.

Circle (256) on Reply Card

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.

Circle (257) on Reply Card

ATLAS TOWER

G605: 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.

Circle (258) on Reply Card

AUDIO BROADCAST GROUP

Studio systems: Equipment from turntables to cart decks, all fully operational, is housed in custom-designed furniture for the broadcast studio, human-engineered for operating ease.

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

Circle (259) on Reply Card

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.

Circle (280) on Reply Card

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 SMPT/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
Northeast: (201) 368-9171 Midwest: (314) 878-6290 West Coast: (213) 534-0050 Southwest: (713) 445-0100 Southeast: (813) 884-2046

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.

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-ons 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.
82E: 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.
IT'S YOUR CHOICE...

248
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

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

Unit 1, Fairway Drive, Greenford, MIDDX UB6 8PW U.K.
Telephone: (01) 578-0957 Telex: 923003
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 80 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.

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

Broadcast 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 1¼-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 RT 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 INTL.

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 compounded 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.
MASTERING THE MIND'S EYE

BROADCAST PLUS

U-MATIC VIDEOCASSETTES

AGFA BP — the promise...delivered.

AGFA VIDEO

AGFA-GEVAERT

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 factory production facilities include 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.

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-89: 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 INTL.

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, Geotron, 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 40, 80 and 160 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


Circle (290) on Reply Card

EMERGENCY ALERT RECEIVER

SCA model 3 subcarrier receiver: For reception of FM SCA transmission, 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

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: Pre-wired patch panel in a chassis, with hinged rear panel for easy access to jacks, uses 22-gauge stranded wire and RS-232.

Circle (293) on Reply Card

GIESE ELECTRONIC


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 F.2.1 for 30mm Cameras

KEY SPECIFICATIONS
- Focal length: 15-270mm
- Max. Relative Aperture: 1.2.1 (15-218mm);
- 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 F.1.6 for 25mm Cameras

OVER 500 CANON 18X LENSES NOW IN SERVICE IN THE U.S.A.!
NOW HITACHI HAS A 1" VTR TO MATCH THE ACHIEVEMENT OF OUR COMPUTERCAM 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 recycle 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 9C 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.
HARRIS BROADCAST GROUP

TVE-605: 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 ±1.5° 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.

HOLADAY INDUSTRIES

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

HI-3006: Isotropic broadband magnetic field strength meter.

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.

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.

HARRIS BROADCAST GROUP

ITC/3M

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

INDUSTRIAL ACOUSTICS

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

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.

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.

KINEMETRICS/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.

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 proportional 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 cue to be performed with one key. Interfaces available for popular dimmer products.

Idea: Lighting control system.

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/8 channels) and PWR-30 (15W/channel) 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 or output 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.

KME/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.

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.

CIRCUIT RESEARCH LABS, INC.

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 subcarrier generator, places up to five independent subcarriers on FM baseband 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 af-fidavits 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 expansion 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 output.

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 fluid 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.
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.
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.

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.

Welcome to the Ampex
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 goodwill that pays off on the bottom line.

Captive facilities find that Creative Command Centers can be equally effective for their needs, turning 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

Exceptional 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.

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."
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.

MOSELEY ASSOCIATES
PCL-606/C: Studio transmitter link operating at 1.7GHz.
MRC-1600 options: Remote-control CRT and logger for the microprocessor-based transmitter control equipment.

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.

NAUTELE AMPTE 20: AM transmitter, providing 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.

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.

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.

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

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

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

PRISMACRAPHICS
Media kit: Includes holder for your audiocassette tape presentation.

QEI
695 exciter: Less than 0.025% distortion in synthesized design with 5-20W output, includes modulation.
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 every lens is diaScope-equipped for modern microprocessor-controlled cameras.

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

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

*1" cameras. Also available in 30mm plumbicon.
monitoring and built-in peak counter. 695T30kW: 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 166

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

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 automatically 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).

See ad on page 168

Circle (33) on Reply Card

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

Circle (33) on Reply Card
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 ¼" 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 ±7½% vari-speed, dynamic braking for gentle tape handling, and it's the only machine in its price category that's available with a full-function 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 ¼-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

Circle (34) 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

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 1/4-inch and 1/2-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 systems.
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 audicassettes, 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.
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.S-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

VECTR IX
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

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 Old Six Mile Road, Suite 708 Birmingham, AL 35209 205/342-2824

**ARKANSAS**
Gray Communications Consultants 6105 Meadows Drive, Suite 1-1 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 213/502-1960
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 Camhuaenga Blvd., Los Angeles, CA 90028 213/462-1392
Broadcast Marketing Associates 2211-C Fontaine Drive San Jose, CA 95131 408/946-2336

**FLORIDA**
Gray Communications Consultants 1031 N.W. 91st Terrace Gainesville, FL 32601 904/378-2896
Gray Communications Consultants 1857 N.W. 79th Avenue Miami, FL 33126 305/591-3637
Midwest Corp. 3331 N.W. 82nd Avenue Miami, FL 33122 305/450-5555
Pro Audio General Store 2480 S.E. 52nd Street Ocala, FL 34478 904/626-9088 (FL WATS only 800/342-0168)
Gray Communications Consultants 1605 South Bumby Avenue Orlando, FL 32806 305/896-7414
Gray Communications Consultants 5401 Southern Comfort Blvd. Tampa, FL 33611 813/885-1411
Midwest Corp. 6302 Benjamin Road, Suite 403 Tampa, FL 33614 813/885-9308

**GEORGIA**
Gray Communications Consultants 404 Sandtown Ave. Albany, GA 31705 912/883-2158
Midwest Corp. PO. Box 888759 Atlanta, GA 30356 404/457-4300
Gray Communications Consultants 9664 Clearview Avenue Doraville, GA 30340 404/455-3121
Pro Audio General Store 1805 Kimswery Drive Marietta, GA 30060 404/425-0630
Allied Broadcast Equipment 4405 Bell Blvd., Suite 314 Union City, GA 30291 404/964-1464

**ILLINOIS**
Pro Audio General Store 746 Crypus Lane Carol Stream, IL 60188 312/231-1120
Allied Broadcast Equipment 5095 N. Elston Chicago, IL 60630 312/794-2224
AVC 747 Church Street, Suite A6 Emminstur, IL 61206 312/279-6580

**INDIANA**
Midwest Corp. 8455 Keystone Crossing, Suite 101 Indianapolis, IN 46240 317/251-5750
Allied Broadcast Equipment 635 South “E” Street Richmond, IN 47374 800/426-6954

**KENTUCKY**
Midwest Corp. 1 Spent 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 301/777-4903
Perco 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. 1263 Wheaton Avenue Detroit, MI 48284 313/689-9730

**MINNESOTA**
AVC 2709 East 25th Street Minneapolis, MN 55406 612/729-9305

**MISSOURI**
Antech Labs 11116 Olive Street Road St. Louis, MO 63141 314/962-5656

**NEW MEXICO**
Dyms 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 East Avenue Syracuse, NY 13206 315/437-0301

**NORTH CAROLINA**
Midwest Corp. 2845 Interstate 85 S. Charlotte, NC 28208 704/399-6336

**OHIO**
Midwest Corp. 7500 Wall Street Cleveland, OH 44125 216/447-3745
Midwest Corp. 4410 Westerville Road Columbus, OH 43072 614/476-2800

**PENNSYLVANIA**
Perco Phelps 490 S. St. John Church Road Camp Hill, PA 17011 717/761-2240
KASS Electronics Distributors 2502 Township Line Road Drexel Hill, PA 19026 215/449-3300
Lerro Electric Corp. 3125 North Broad Street Philadelphia, PA 19132 215/223-8200
Midwest Corp. 526 Rochester Road Pittsburgh, PA 15237 412/364-6780

**TENNESSEE**
Gray Communications Consultants 115 Science Lane Nashville, TN 37210 615/863-9176
Midwest Corp. A7-156 Space Park South Nashville, TN 37211 615/331-5791

**TEXAS**
Television Systems 2419 Putman Drive Austin, TX 78758 512/637-1769
Allied Broadcast Equipment 1201 East 15th Street, Suite 309 Pano, TX 75074 214/423-6667

**VIRGINIA**
Alpha Audio 2049 West Broad Street Richmond, VA 23220 804/358-3852
Midwest Corp. 1395 Air Rail Avenue Virginia Beach, VA 23455 804/484-6296

**WASHINGTON**
Allied Broadcast Equipment 1112 South 34th Street, Suite 312 Federalway, WA 98033 206/927-4337

**WEST VIRGINIA**
Midwest Corp. 300 First Avenue Nitro, WV 25143 304/772-2921

June 1984 Broadcast Engineering 49
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 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-normalling, 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
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 PMS/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, 4xfs 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:
This 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 "go" 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.

Circle (40) on Reply Card

garner industries

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

June 1984 Broadcast Engineering 53
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

Ultrafine 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

See ad on page 80

AMEREK 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 10

AMPEREX ELECTRONIC

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

63XQ: 30mm DG Plumbicon tube.

XQ4187/85XQ: 1/2-inch high stability DG Plumbicon.

XQ3457/87XQ: 1/4-inch magnetic static DG Plumbicon.

XQ3467: 1/4-inch Plumbicon tube for low cost, high performance cameras.

YK1263: Klystron.

Circle (363) on Reply Card

See ad on page 13

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

Simulat-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 19

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 0.2lc 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 workstations, 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

AVX-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.

ACI-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.

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
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) 841-8711.

Sony Broadcast Products Company, 800 Queen Anne Rd., Teaneck, NJ 07666. © 1984 Sony Corporation of America. Sony and Trinitron are registered trademarks of Sony Corporation.
CM68A/CM22A: High definition color monitors in 26-inch and 20-inch CRT sizes, displaying 1125-line images from RGB or Y/C\textsubscript{w}/C\textsubscript{b} 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 INTL.
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 Telescine projector: Phase-locking dc-servo drive and real 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 rewinder, 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, multimers.

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 textural weather data from Weather Services Int’l: preview channel with instant swap to on-air.

Circle (379) on Reply Card

AVANTEK
AR-2000: Simulchannels 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-repairable 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-B LIGHTING SYSTEMS
20-201/T light: Tall cyclorama lights, rated 2kW per mixture for cys 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.

Newscast Datagraphics: Graphics generator system with two steps of resolution, 640x484V pixels (4096 colors) and 1920x484V 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.

Triod 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 (expansible 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 5kHz 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 re-stressing. 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 ¾’.

To find out more about the SP3, the most newsworthy camera around, call NEC at 1-800-323-6556. 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

Circle (42) 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 ¾-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
J16x9BIE zoom: The 9-162mm focal length is expandable to 18-324mm with an integral tele-extender, yet weighs only 1.8 kg for ¾-inch cameras.
J40x9BIE lens: A ¾-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.

Howe Audio Productions, Inc.
3085 A Bluff Street
Boulder, Colorado 80301
303/444-4693
For more information: 800/525-7520

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.
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, receiving, 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 ½-inch optics, scratch-resistant glass.

Duplikin III: Duplicating device for transfer of 35mm slides to videotape, for ½-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) on 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
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.

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.

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

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 a low center of gravity designed to accommodate today's cameras, from an ARRI J-6 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- or 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
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.
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
SB01C-MRC/MD-100: 10W solid-state transformer and 100W amplifier from Comwave for ITFS operation.
B16S series: Bogner MDS/ITFS antennas for omnidirectional or cardioid 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/OF S band in requested area of interest.
Circle (408) on Reply Card

COMPUT-PROMPT
CP series: Telemapping 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 transductor 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

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: (716)772-0719

Circle (51) on Reply Card
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 B800 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-680 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 a 2-channel digital delay. Its products include 710 2-channel mic preamp module, 700P playback-only digital processor and D700 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, stop, 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 switches 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.

- **Smaller, more densely packed Epitaxial™ oxide**
- **Molecular Fusion Binder for a stronger, cleaner bond**
- **New base film with improved dimensional stability**
- **Molecular Fusion Binder**
- **Friction-balanced backcoating**

The Epitaxial™ contribution: higher video, brighter chroma.


**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.**
Dynamic Technology
Continued
providing 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.
EECONOLINE: Entry level post-production and editing time code products, including MTC-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.
K3351W 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 ¼-inch U Format and ¾-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 col- or monitor, 240-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 weathergraphics package. Interfaces for Zephyr broadcast transmission, Collins Doppler radar and RRWS 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 800S: Multittrack 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 condition and charger system.
FPC1: New line of Frezz power charger systems.
Circle (437) on Reply Card

FUJI PHOTO FILM USA
H521 BR: ¼-inch U Format broadcast videotape cassettes, Beridox formulation.
Circle (438) on Reply Card

GE/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.
5555 N. Elston Avenue • Chicago, IL 60630 • (312) 792-2700

Circle (55) on Reply Card
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.
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 1 1/2 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.
applications, a receive-only system and an elliptical-design transmit/receive system.

**GM9015/A:** LNA/LNC, GASPET design; for Ku-Band, rated 150°C.

**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 5¾-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/Lighteshiser:** 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-light chase source.
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.**

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 (448) 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 inter-face 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, ¼-inch and ½-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
ADS1 enhancements: Freeze-frame/field, remote-control and dropout compensation capabilities added to the TBC system.

Circle (450) on Reply Card

HUGHES ELECTRONIC DEVICES
IRS-24X40: 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 ¼-inch Lineplex and ¼-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 19V high resolution color monitors.

TKC-990: Autoset telecine TV camera system, using computer control and dioscope with digital geometric correction for less than 0.05% registration error p in a 3-tube prism optical configuration.

Circle (456) on Reply Card
See ads on pages 25 and 111

INDUSTRIAL SCIENCES
APE: 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 ¼-inch Saticon's and f/1.4 prism-opts 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

Dubner Computer Systems, Inc. 158 Linwood Plaza Fort Lee, New Jersey 07024

Circle (59) on Reply Card

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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, ½-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 enhancement 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 prererecorded 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.

Circle (60) on Reply Card

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 breakaway half pocket and pin, TLG or PBD receptacles. Main power is fed from the rear by cable or optional G100 connector. Packs can be stacked in any combination and still allow access to all parts and controls.

The DMD 224 three phase dimmer module has output voltage regulation, a full-sized preprogramming pin, digital continuous self trimming and short circuit protection.

The new 1200 series expansion manual control console has direct or cross face submaster selection, spilt dipless crossfader and bump/pedal buttons.

For the full story on our complete range of equipment contact us at:

DILOR INDUSTRIES LTD.

Lidcombe Industrial Park Technology For The Arts™

Suite 219, 37/292 2nd Ave., Squamish, B.C. VON 3G3

Telephone: (604) 892-9301 Telex: 04-5302

Dealer Inquiries Invited

Circle (60) on Reply Card

78 Broadcast Engineering June 1984
Why Beyer mics represent a viable alternative to the usual choices in Broadcast.

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, omni-directional 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 lavaliere mics, small is not enough.

Electret condenser lavaliere 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

Beyer Dynamic, Inc. 5-05 Burns Avenue, Hicksville, New York 11801 (516)935-8000

Circle (61) on Reply Card
Laid Telemadia
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.
LFM-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 timescale 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
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, removable gen-lock, VBI line selection; provides blackburst if input fails or unprocessed video if unlocked to input.
PFP-600: Frame and power supply for audio DA system, consisting of PAA-650 DAs, PAA-651 DA with metering and PAM-625 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-mixer 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, Quick-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

LOWELL-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

MUB & ASSOCIATES
MUB-14: Mobile production vehicle, based on Grumman coach, with 6x7 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, towed 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-
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
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
Mole electronic 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-foot 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 earphone.

Bel-Air cases: Molded equipment transportation cases carrying ATA proval.

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 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.

650R2: 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 ¾-inch rack-mount package with ±3dB 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.

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.

1/2 EDITING

BVU-2000 IN CONSOLE
- Multiple machine configurable, changeable and upgradable
- Wide DT range, from -1 to ±3 X standard speed
- Video/audio confidence re-play
- 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

BYW-48 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
- Spin Dub-in/Dub-out connection for BVU-820 and Betacam® series U-matic
- 9-pin VRC/BY component input/output
- Component and composite outputs

BVU-2000 RECORDER
- All features of BVU-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
- 3-pin, 4-Pin sampling
- Drop-out compensation with Y/C separation
- Built-in Velocity Compensation, Sync Pulse Generator, Video Processor and Audible DOC Generator
- Full remote control function
- OT playback with BVH-2000/2000

3/4 EDITING

BVH-2000 optional plug-in timecode for BVU-2000
- Generator/Reader with VITC/LTC capability
- Character Generator
- User bit display

BVU-820 RECORDER
- Built-in, full-screen editing functions
- Dynamic Tracking
- Playback from -1 to ±3 X standard speed
- Simultaneous video playback in record mode (Video Confidence)

BVU-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 ±3 X standard speed

BYW-10 BETACAM® PLAYER
- Full Shuttle and log functions
- Built-in Time Code Reader and LED display
- Selectable Dolly™ 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 (213) 773-6045; in the Southeast (404) 458-7671; in the Southwest (214) 659-3600; in the West (213) 841-8711.

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Paltex (Datatron)  
Continued from page 81  

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: ENC/EFP camera, designed around prism-optics and three 1/3-inch ST-MC Saticon, 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.


AK-30 camera: Three 1/3-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 monaural tubes for uncanny live intelligibility and the C-568 short shot gun for the "external reach" with switchable roll-off to eliminate rumble and wind noise.

For a sound reputation...choose AKG.

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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.

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GLENTRONIX, Toronto, Ontario (416) 444-8497

Circle (63) on Reply Card

PHILIPS SYSTEMS

LDK-26: Midstudio LDK-6 compatible 1/2-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 1/2-inch LOC DG Plumbicon and operates from battery or through triax.

LDK-54: VRC camera, designed around 1/2-inch HS Plumbicons, combines with LDL-2000 1/4-inch Lineplex recorder for independent ENG use and backed by LDL-2020 portable production unit, LDL-2010 studio VTR and LDL-2006 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-0302: 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 (458) on Reply Card

PICTURE ELEMENT LTD.
Video sequence processor: Digital video record and playback system with digital editing and effects features.

Circle (459) 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 (591) on Reply Card
Our TOMCAT cartridge recorders/reproducers and BMX series of broadcast consoles deliver trendsetting on-line performance in broadcasting systems worldwide, from Boston to L.A., Australia to Great Britain.

Unquestionably the industry's standard of excellence in broadcast equipment

**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 - 619-436-3911 - 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.

TCF-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.

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.

Q-TV

VPS-500: Electronic computer-based prompter system.

VIV: Virtual image videoprompter magnifies images for easier use.

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.

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 autocan scanning, 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.

TCF 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.

QUANTE magnifies images based prompter from and revised. (006-31P) TV form 525


ROEHDE & 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.

ROHDE & SCHWARZ

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.

REES ASSOCIATES

Facilities construction, design, consultation.

Circle (511) on Reply Card

RESEARCH TECHNOLOGY INTL.

Videotape storage: Studry modular rack designed for videotape storage for U-matic. VHS and Beta Formats, compatible with previous film storage equipment.

VT6500: One-inch videotape cleaner system, providing sapphire burning edges, wiping tissue and vacuum techniques.

Circle (512) on Reply Card

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

Circle (506) on Reply Card

See ad on page 3

Circle (507) on Reply Card

Circle (508) on Reply Card

See ad on page 30

Circle (509) on Reply Card

See ad on page 48

Circle (514) on Reply Card

Circle (515) on Reply Card
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.

**Don't Miss The Delta Revolution**

**INTERNATIONAL TAPETRONICS CORPORATION**

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3M hears you...
from
B & K-PRECISION

NTSC
STANDARDS
plus
MULTIBURST
for under $1,000

Model 1251 $995
- Generates standard NTSC color bars with or without -10V 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.

ROS COR 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 Plumbicon, 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.
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 720Hz and high frequency boost above 3kHz for natural sound and controlled low frequency roll-off to reduce external noise.
Circle (522) on Reply Card

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 ⅞-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

See ad on page 119
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 ⅛" 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/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
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 importance 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

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.

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HONOLULU (808) 833-1661  WASHINGTON, DC (202) 956-9220
MONTREAL (514) 766-3481

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
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-6300/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.

2001: Heavy-duty vertical equipment rack, in blue and beige, offering 61%-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 technique.

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.

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STOREEEL

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 Q/6R: Video camera wireless 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 1/4-track, 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 assignable 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 widespread (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/GEOTELE

Passive transmitter: System providing 10dB of equalization for 16PEVL 1420 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 255dB for padding or simplified measurements.

RACAL Soregard: 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-BXD: 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 226 for
Ampex
VPR-2

CN 234 for
Sony BVH 2000

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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/converters, 200W-20kW.

FM transmitters: LFFM 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 ¼-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 (642) 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 (643) 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 INTL 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.

4CM 4,000G: 400kW power tetrode.

Klystrode: VHF power amplifier, combines grid cathode configuration of the tetrode with grid-controlled, density-modulated beam, focusing and output cavity/collection 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 INTL.
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 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
The new 300 Series Audio Production Console has been specifically designed to complement the latest audio and video technology. It's the only console in its class, offering mono or stereo inputs each available with or without equalization, output submastering, audio-follow-video capability, a comprehensive user-programmable logic system, and a wide range of accessories for custom tailoring to your specific requirements. Available now. Call us collect for further information.

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Tel: (901) 362-1350
Telex: 533356
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 application 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 Acric 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 panels consist of 8 strings of 16 panels operated in series. A PV module supplies a peak power of 180W, with 4 strings in parallel providing a total of 720W peak power. The battery bank consists of eight 12V-200AH batteries in series, attached to a 6kVA transformer with an inverter to switch the power supply to the transmission system.

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.

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.
Our Scientists Had To Operate In A Vacuum To Give You A New Quality Of Sound.

The quality of any sound system begins at its source. Precision in the power supply is vital to capturing and maintaining the fullness and subtlety of amplified sound. The need for that exactness is why we insist on operating in a vacuum rather than depending on outside sources.

A vacuum tank, to be precise. An environment in which our transformer is created with an air expulsion process. Where air pockets are purged from multi-layers of the transformer’s high grade core laminations, and the core made airtight with a special impregnating sealant.

This process gives us impeccable control of transformer function and quality. Which gives you the assurance of the most efficient transfer of power possible, and an end to the acoustical “buzz” that so often fights sound purity.

To a lot of manufacturers the lowly transformer is far down on the list of priorities. For us, every element in the sound system relies on the exacting performance of every other element, and must be painstakingly attended to.

Whether you’re driving your studio monitors in a demanding final production mix with our 6000 Series amplifiers, or making critical adjustments to signal quality with our peak or RMS limiter/compressors, you’ll find our audio science giving outstanding clarity to your work. To find out which system is designed to meet your needs, contact your authorized JBL/UREI professional products dealer today.
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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102 Broadcast Engineering June 1984

Circle (72) on Reply Card
Creative choice is what TASCAM's broad line of professional mixing consoles is all about. Starting with our M-30, we've packed more artistic choice into a modestly-priced package than any console in the industry. This versatile 8x4 is ideal for everything from basic recording to video production and comprehensive small studio applications.

Increased flexibility highlights the M-30's big brother, our M-35. This durable 8x4 combines wide-ranging function capabilities with operating ease. The M-35 features 4 separate sub groups, solo, independent monitoring, built-in effects loop, and much more.

For more elaborate production demands, our rugged new M-520 console gives exceptional precision and complete control of your 8 and 16 track recording, overdubbing and mix down. The M-520's creative options include multiple inputs per channel, 8 independent subgroups, stereo solo-in-place, PFL, balanced and unbalanced inputs and outputs, multiple auxiliary mixes, and long-throw faders.

And if you're recording needs are met by 8 tracks, our M-512 console gives you the sophisticated functions, easy operation, and technical quality of the M-520, with fewer input channels.

See your TASCAM dealer today. He'll tell you about these and a wide range of other professional TASCAM mixers, and get you hands-on with the console that was built for you. Or write for more information to TASCAM, TEAC Professional Division, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

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Circle (73) on Reply Card

No matter how complex your audio production requirements, TASCAM has the right console to do the job.
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
It's really very simple. Just switch from expensive phone lines to Comtech's new DART 384 (Digital Audio Receiver Terminal) and receive your network audio directly from the satellite with full fidelity, less cost, and greater control than ever before.

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1. 10-20% lower cost than the other guys (Lease or Purchase).
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The DART 384 is user-friendly. It is designed for easy installation and maintenance. The indicators are really useful for accurate antenna pointing and isolating problems. If you need help, Comtech and Allied are ready to respond quickly.

The DART 384 Terminal consists of Comtech’s high-performance 3.8 meter antenna, low-noise amplifier, antenna-mounted down converter and demodulator shelf with 8-channel program capacity. Channels can consist of a mixture of audio channels and one voice cue channel.

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For a closer look at this audio receiver terminal alternative, call Allied Broadcast Equipment toll free at 1-800-428-6954.
Howard Broadcast programs
Stations that offer encouraging additional employee education
Stations that offer tuition reimbursement
Stations that offer changed since elimination of the First Class License
Engineers that rate their pay as "good" or "fair"
Engineers that think their pay and benefits have not changed since elimination of the First Class License
Stations that offer merit pay incentives
Stations that offer tuition reimbursement as a method of encouraging additional employee education
Stations that offer in-house or out-of-house educational programs

Table II.
Questionnaire results on station hiring preferences and employee compensation.

<table>
<thead>
<tr>
<th>Category</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station preference for replacing the First Class License as a means of ensuring technical competence:</td>
<td></td>
</tr>
<tr>
<td>SBE Certification Program</td>
<td>42%</td>
</tr>
<tr>
<td>General Class FCC License</td>
<td>31%</td>
</tr>
<tr>
<td>No licensing</td>
<td>8%</td>
</tr>
<tr>
<td>Statewide professional licensing</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>12%</td>
</tr>
<tr>
<td>Qualifications used by stations for hiring decisions:</td>
<td></td>
</tr>
<tr>
<td>Vocational or military school</td>
<td>76%</td>
</tr>
<tr>
<td>High school</td>
<td>16%</td>
</tr>
<tr>
<td>College degree</td>
<td>8%</td>
</tr>
<tr>
<td>Engineers that rate their pay as &quot;good&quot; or &quot;fair&quot;</td>
<td>74%</td>
</tr>
<tr>
<td>Engineers that think their pay and benefits have not changed since elimination of the First Class License</td>
<td>82%</td>
</tr>
<tr>
<td>Stations that offer merit pay incentives</td>
<td>62%</td>
</tr>
<tr>
<td>Stations that offer tuition reimbursement as a method of encouraging additional employee education</td>
<td>33%</td>
</tr>
<tr>
<td>Stations that offer in-house or out-of-house educational programs</td>
<td>27%</td>
</tr>
</tbody>
</table>

techical 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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engineer on staff, nearly 62% said that their stations did not use the services of a consulting engineer from time to time.

When asked what qualifications should be used to replace the First Class License, 42% favored the Society of Broadcast Engineers Certification Program. The next largest percentage (31%) said that the General Class FCC License was acceptable. As for education, the majority of respondents (76%) indicated that vocational or military training was the primary qualification used by their stations in hiring decisions.

Regarding compensation, 74% of the engineers responding rated their wage and benefit packages as fair or good. Another 62% said that their stations offered at least some pay incentives for more skilled responsibilities, such as equipment maintenance.

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-house), nearly one-third offer at least partial tuition reimbursement for courses taken to improve job skills. There also seems to be a definite relationship between radio stations that offer good wage packages and stations that also offer educational opportunities or tuition reimbursement.

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.

Final thoughts

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 before. At many stations, the emphasis is changing from equipment maintenance to new construction. Forward-thinking stations are following this route to improve their position in the marketplace.

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.

Acknowledgement

The author would like to express his appreciation to Wayne Sander and Steven Andes of the National College of Education for their statistical assistance.
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The Signal of Reliability

Circle (79) on Reply Card
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 KPDJ-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 package (version 2.6) to correct the double audio problem and several other minor troubles. The service KPDJ 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 KPDJ’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 KPDJ-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 KPDJ-FM/KRED-AM in Eureka, CA.
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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

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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FCC Type Accepted

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 leadership in the field of broadcast instrumentation solidly backs this technological advance.

The proliferation of receivers from GM’s Delco Electronics, Inc., MacIntosh Labs, Sherwood Electronics, Chrysler Corporation, Concord Electronics, Samsung Electronics and others not yet announced, is creating a sizeable C-Quam audience. With the outstanding performance of this equipment, you can be sure that the audience will stay tuned to your Delta C-Quam AM Stereo transmission system.

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 commercial 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 programmable 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, ±15Vdc and +24Vdc to the system. A battery backup carries the memory through power outages to 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 +4dB, 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 subassemblies 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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Circle (83) on Reply Card

Ampex International is exclusive distributor for Chyron Graphics Systems outside the U.S.A.
(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 (S/I/O) and main PROM cards.

This conversion process takes about 30 minutes to complete. Before installing the new S/I/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-II), contact IGM Communications, 4041 Home Road, Bellingham, WA 98225.
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Mail to: Scientific-Atlanta, Satcom Division, Dept. A-R, 3845 Pleasantdale Road, Atlanta, GA 30340
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 are often 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...
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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, almost 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 short haul requirements of RS-250B, are built using PFM techniques.

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Wavelength division multiplexing (WDM) 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. GVG'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
IN THE BATTLE OF THE ROUTING SWITCHERS, THERE'S A NEW HEAVYWEIGHT CHAMPION.

<table>
<thead>
<tr>
<th>VIDEO</th>
<th>3M Series H 128 x 32</th>
<th>Fernseh TVS-TAS 2000</th>
<th>Grass Valley GL 340</th>
<th>Grass Valley Horizon</th>
<th>Utah Scientific AVS-1</th>
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<td>-75/20</td>
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<td>-92/15k</td>
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<td>Freq Resp &amp; Max Out (dB uBm)</td>
<td>± 1.30</td>
<td>± 2.24</td>
<td>± 1.24</td>
<td>± 1.24</td>
<td>± 2.24</td>
</tr>
<tr>
<td>Over Freq Range</td>
<td>20-20k</td>
<td>30-15k</td>
<td>20-20k</td>
<td>30-15k</td>
<td>30-15k</td>
</tr>
<tr>
<td>Com Mode Rej Ratio (dB)</td>
<td>80</td>
<td>75</td>
<td>80</td>
<td>65</td>
<td>70</td>
</tr>
</tbody>
</table>

*Data not available

Compare our Series H Hybrid Switching Systems to the competitors, and the advantages are easy to see. If you'd like to compare a few more specs, call us toll-free at 1-800-325-1684. In Minnesota, call toll-free 1-800-792-1072. Outside the continental U.S., call International Operations collect at 1-612-736-2549. You'll be knocked out by all our advantages. Broadcast and Related Products Division.

3M hears you...
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 particular 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.
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.

2. Front Panel Controls—Immediate access to repro levels, EOM stop delay time, and treble EQ for both speeds. Mode switch selects track 1, track 2, mono, or stereo; a calibrate/uncalibrate button switches from front panel adjustable output to standard reference level.

3. EOM Stop Delay—Adjustable from 0 to 24 seconds. Front panel indicator illuminates when 25 Hz signal present.

4. Switchable Sensor Circuit—The 25 Hz sensor circuit may be switched out of the signal path to allow extended bass response.

5. Easy Maintenance—Modular plug-in circuit boards make servicing a breeze. Most parts subject to wear are easily accessible and quickly replaceable.

6. Lightweight and Compact—Weight is a mere 40 pounds. Front panel dimensions are 19" x 15¼"; depth is 8". Rack mount flange is standard.

7. All Formats—Choose mono or 2-track stereo; 3.75/7.5 or 7.5/15 ips speed combinations.

8. One Plug Does All—A single Cannon multipin connector carries all the audio, status, and remote signals. These signals may also be accessed through parallel XLR and DIN connectors.

9. Studer Revox Quality—A fully professional machine in every respect, the PR99 Replay Only features die-cast aluminum alloy chassis and head-block, servo-controlled capstan motor, contactless full logic switching, and a Studer-made play head. Careful German craftsmanship shows in meticulous attention to every detail.

10. Attractive Pricing—Best of all, the new PR99 Playback Only actually costs less than last year's best-selling reproducer. So before you order an automation system or replace your present decks, call or write for more details. You'll find that the Revox Automation Advantage was well worth the wait.

STUDEP REVOX
Studer Revox America, Inc.
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Nashville, Tennessee 37210
(615) 254-5651

Circle (95) on Reply Card
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 Willford 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 5084, Indianapolis, IN 46220.
Improved sensitivity and system range, with ultralow noise.

Cetec Vega's top-of-the-line PRO PLUS R-41 and R-42 wireless-microphone receivers have quickly become the worldwide standard of excellence. Overall quality of the PRO PLUS wireless system is equal to wired microphone systems, with respect to dynamic range, signal-to-noise ratio, distortion, etc. We invite your comparisons. Check these features of the new, improved PRO PLUS receivers:

- **GaAsFET front end.**
  Provides the highest achievable sensitivity for maximum system range. Also incorporates a high-performance helical filter.
- **Lowest distortion.**
  0.25% maximum, 0.15% typical.
- **Measurably the highest signal-to-noise ratio and widest dynamic range.**
  Quiet as a wire. With DYNEX II (a new standard in audio processing), SNR is 101 dB (108 dB A-weighted). System dynamic range is 133 dB including transmitter adjustment range, from input for maximum nondistorting gain compression to noise floor.
- **"Infinite gain" receiver.**
  Improved performance in the critical threshold region, superior handling of multipath conditions, better SNR, and constant receiver audio output level.
- **Professional audio circuits.**
  Output is adjustable from +20 dBm to -60 dBm in four ranges. Also featured are selectable phasing and 0.2-watt independent headphone amplifier.
- **True dual-receiver diversity.**
  The R-42 diversity system is the most reliable method to avoid dropouts. The R-41 nondiversity receiver has all of the other features of the R-42.

PRO PLUS wireless-microphone systems achieve the highest performance possible with today's advanced technology.

Write or call for further information and location of your nearest dealer: Cetec Vega, P.O. Box 5348, El Monte, CA 91734. (818) 442-0782.

The best wireless gets even better.
Audio Mixer which will Our 612
Auto AFV way

Then to edit you involved with editing. 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.

Circle (575) on Reply Card

ALPHA AUTOMATION

The BOSS SMPTE time code is the basis of operation for the BOSS edit-
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 half angle 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.

“Test equipment philosophy” of design.

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:

“Consistent quality audio requires the test equipment accuracy we've built in to every SENTRY Studio Monitor. If you need quality you need SENTRY.”

“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.”

When quality really counts, professionals count on Electro-Voice.

Circle (96) on Reply Card

June 1984  Broadcast Engineering  129
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 respondents, 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.

ampex VPR3. Serial interfacing systems include self-diagnostics, displaying equipment status in an LED-type display on the P 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, MicroLoc or control track editing options allow split edits and animation.

Circle (580) on Reply Card

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 coding. 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
Double Double Double

NEW 20" color monitor

value

With the introduction of the new Philips LDH 6220 20" color monitor, there are now two opportunities to buy color television monitors of amazing value and quality.

You already know about the Philips LDH 6200 14" monitor with its super sharp picture quality and true color fidelity – the result of a hi-brightness self-converging picture tube and precision in-line gun. The new 20" monitor retains this benefit along with all the other features of the LDH 6200, such as two video inputs, RGB inputs, external sync, split screen and many more. And this model has comb filter decoding as standard.

The two monitors represent the perfect choice for all monitoring applications in television systems. Together they prove that high quality does not have to mean high cost.

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BE 4-6-84
**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 EDL90 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 log. 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 microprocessor-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.

Circle (585) on Reply Card

**MONTAGE COMPUTER SYSTEMS**

**The Picture Processor.** Introduced at NAB-'84, this is a video production...

---

**WE ARE READY TO SWITCH HIGH DEFINITION AND COMPONENT FORMAT SIGNALS...NOW.**

The 9300 is a 16X16 RGB switcher that combines density, quality and economy without using any single-sourced semiconductors. It is a switcher that handles RGB or component signals and provides 20MHz of useful bandwidth. Three separate RGB inputs are switched simultaneously in the vertical interval.

The control system interfaces the comprehensive line of Image Video routing switcher control panels. The 16X16 RGB switcher including power supply is neatly packaged to fit into 12 rack units!

Available in several configurations 16X16 video only, 32X32 video only 16X16 AFV, 32X32 AFV, and multi-levels.

Talk to us about your switching needs...We are switching on the future.
When you'd give an arm and a leg for an extra foot...

**A-T gives you a hand!**

The new AT835.

Now there's a new way to reach out and hear The Audio-Technica AT825 Condenser Line + Gradient Microphone. It's barely longer than a legal pad, but it zeroes in on the sound you want to hear, while blocking out noise from the sides and rear.

**Baby Brother**

The new AT835 is 4 inches shorter than our famed AT815a and its remote-powered brother, the AT815R. Yet its performance in the field is remarkably close. The major difference is a slightly wider (60°) acceptance angle at higher frequencies. Credit a sophisticated "Fixed-Charge" element for the truly impressive sound and excellent directional control. The AT835 short "shockgun" fits in whether you are recording "actualities" for the evening news, picking up dialogue for film or A/V, or eavesdropping from the sidelines.

**With Guts**

Our FET impedance converter is super quiet, and runs for months on a single "AA" flashlight cell. The balanced, phased output matches any remote or studio input from 150 to 1000 Ohms without problems. And the AT835, like all A-T condensers, is built to take real punishment. Even so, it weighs just 7½ ounces for easy fishpoling or extended hand-held use.

If your goal is better control of your sound at moderate cost, your Audio-Technica sound specialist has a brand new answer. The AT835.
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.

Circle (566) on Reply Card

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 ¼", ¾- 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.

Circle (587) on Reply Card

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.

SONY

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 GVC 300 with DVE, audio and E-MEM, also Cox T-16 switcher for Vanguard; and ATR interfacing for Otari MX series.

Circle (588) on Reply Card

PANASONIC

AU-A30. Designed specifically for Panasonic RECAM equipment, the AU-A30 controller works with the AU-3000 studio editing recorder, handling YIQ or NTSC edits. Insert and assemble edits combine with goto, preview and review functions, logging is provided, along with two bidirectional 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.

Circle (589) on Reply Card

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.

Circle (590) on Reply Card

BMV series. BMV-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 BUV 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-5000 controls 3-machine operation with BVH and BUH 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 BMV-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 CVG-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 GVC component switching equipment.

Circle (591) on Reply Card

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.
COUNT EMME™ IN

Count EMME™ in as the new criteria for excellence in computer assisted editing control. At EECO, we’ve wed the newest technology with the best of the past and the foresight of the future. We’ve combined new levels in creative expression with the flexibility of list management. And added a price that makes others “high-priced.”

Our concept: go with the best. Search out and bring together the best qualified development team. Each one in the forefront of editing expertise. Rely on their first hand knowledge, listen to their many years of editing experience, let them pick and choose the best features from a multitude of familiar editing systems and leave the door open to the state-of-the-art. But don't stop there, add input from a large cross section of professional editors.

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EECO
Computer Controls for Video Production
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 ¼-inch and ½-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
Audio Transformers
Choose from a wide variety of types and packages

Computer optimized design
100% tested – consistent quality
Low distortion
Wide bandwidth
Minimum transient distortion (overshoot & ringing)

INPUT TRANSFORMERS AND SPECIAL TYPES

<table>
<thead>
<tr>
<th>Model</th>
<th>Application</th>
<th>Impedance Ratio</th>
<th>Turns Ratio</th>
<th>20 kHz Max Input Level*1 (dBu)</th>
<th>Typical THD Below Saturation (%)</th>
<th>Frequency Response (dB ref. 1 kHz, 20kHz)</th>
<th>Bandwidth ~3dB (kHz)</th>
<th>20 kHz Phase Response (degrees)</th>
<th>Over-Shoot (%)</th>
<th>Magnetic Shield*1 (dB)</th>
<th>Number of Ferrocore Shells</th>
<th>Package*1</th>
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</thead>
<tbody>
<tr>
<td>JE-16-A</td>
<td>Mic in for 900 ohm</td>
<td>150-600</td>
<td>1.2</td>
<td>+ 8</td>
<td>0.036/0.003</td>
<td>-0.08/-0.05</td>
<td>170</td>
<td>-1.75</td>
<td>1.7</td>
<td>30</td>
<td>-1</td>
<td>1</td>
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LINE INPUT

<table>
<thead>
<tr>
<th>Model</th>
<th>Line in</th>
<th>Impedance Ratio</th>
<th>Turns Ratio</th>
<th>20 kHz Max Input Level*1 (dBu)</th>
<th>Typical THD Below Saturation (%)</th>
<th>Frequency Response (dB ref. 1 kHz, 20kHz)</th>
<th>Bandwidth ~3dB (kHz)</th>
<th>20 kHz Phase Response (degrees)</th>
<th>Over-Shoot (%)</th>
<th>Magnetic Shield*1 (dB)</th>
<th>Number of Ferrocore Shells</th>
<th>Package*1</th>
</tr>
</thead>
<tbody>
<tr>
<td>JE-11P-9</td>
<td>Line in</td>
<td>15K-15K</td>
<td>1.1</td>
<td>+ 26</td>
<td>0.025/0.003</td>
<td>0.03/-0.30</td>
<td>32</td>
<td>-3</td>
<td>3</td>
<td>30</td>
<td>-1</td>
<td>1</td>
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<tr>
<td>JE-11S-1</td>
<td>Line in</td>
<td>15K-15K</td>
<td>1.1</td>
<td>+ 27</td>
<td>0.045/0.003</td>
<td>0.03/-0.25</td>
<td>85</td>
<td>-2</td>
<td>2.3</td>
<td>30</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>JE-6110K-B</td>
<td>Line in bridging</td>
<td>30K-1800 (10K-600)</td>
<td>4.1</td>
<td>+ 24</td>
<td>0.005/0.002</td>
<td>-0.10/-0.30</td>
<td>75</td>
<td>-1</td>
<td>1</td>
<td>30</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>JE-10KB-C</td>
<td>Line in bridging</td>
<td>30K-1800 (10K-600)</td>
<td>4.1</td>
<td>+ 19</td>
<td>0.033/0.003</td>
<td>0.11/-0.08</td>
<td>160</td>
<td>-2</td>
<td>2</td>
<td>30</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>JE-11SSP-BM</td>
<td>Line in split coil</td>
<td>600-150-600</td>
<td>1.1</td>
<td>+ 22</td>
<td>0.035/0.003</td>
<td>0.03/-0.00</td>
<td>120</td>
<td>-5</td>
<td>3</td>
<td>30</td>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>JE-11SSP-BM</td>
<td>Line in split coil</td>
<td>600-150-600</td>
<td>1.1</td>
<td>+ 23</td>
<td>0.035/0.003</td>
<td>0.25/-0.00</td>
<td>160</td>
<td>-3</td>
<td>3</td>
<td>30</td>
<td>-1</td>
<td>5</td>
</tr>
</tbody>
</table>

1. Max input level = 1% THD; dBu = dB 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 cases in 80% nickel mu-metal cans with wire leads.

NICKEL CORE OUTPUT TRANSFORMERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Construction</th>
<th>Nominal Impedance Ratio</th>
<th>Turns Ratio</th>
<th>20kHz Max Output*1 across (a) windings</th>
<th>600kHz Formulation Loss (dBm)</th>
<th>DC Resistance per Windings (Ohm)</th>
<th>Typical THD Below Saturation (%)</th>
<th>Frequency Response (dB ref. 1kHz, 20kHz)</th>
<th>Bandwidth ~3dB (kHz)</th>
<th>20kHz Phase Response (degrees)</th>
<th>Over-Shoot (%)</th>
<th>Package*1</th>
</tr>
</thead>
<tbody>
<tr>
<td>JE-123-BMCF</td>
<td>Quadrilateral 80% nickel</td>
<td>150-500</td>
<td>1.1</td>
<td>0.28</td>
<td>2</td>
<td>1.11</td>
<td>20</td>
<td>0.004/0.002</td>
<td>-0.02/-0.10</td>
<td>450</td>
<td>158</td>
<td>-4</td>
</tr>
<tr>
<td>JE-123-BMCF</td>
<td>Quadrilateral 80% nickel</td>
<td>150-500</td>
<td>1.2</td>
<td>0.21</td>
<td>2</td>
<td>1.09</td>
<td>19</td>
<td>0.004/0.002</td>
<td>-0.02/-0.10</td>
<td>450</td>
<td>128</td>
<td>-3</td>
</tr>
<tr>
<td>JE-123-BC</td>
<td>Quadrilateral</td>
<td>150-500</td>
<td>1.1</td>
<td>0.4</td>
<td>2</td>
<td>1.08</td>
<td>20</td>
<td>0.004/0.003</td>
<td>0.01/-0.00</td>
<td>450</td>
<td>168</td>
<td>-1</td>
</tr>
<tr>
<td>JE-123-DL</td>
<td>Quadrilateral</td>
<td>600-150-600</td>
<td>1.2</td>
<td>0.27</td>
<td>2</td>
<td>1.0</td>
<td>19</td>
<td>0.005/0.003</td>
<td>-0.02/-0.01</td>
<td>450</td>
<td>245</td>
<td>-2</td>
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<tr>
<td>JE-123-DLC</td>
<td>Quadrilateral</td>
<td>150-500</td>
<td>1.1</td>
<td>0.23</td>
<td>2</td>
<td>1.11</td>
<td>10</td>
<td>0.006/0.003</td>
<td>0.03/-0.01</td>
<td>450</td>
<td>125</td>
<td>-2</td>
</tr>
<tr>
<td>JE-112-LCF</td>
<td>Quadrilateral</td>
<td>150-500</td>
<td>1.2</td>
<td>0.33</td>
<td>2</td>
<td>1.16</td>
<td>20</td>
<td>0.014/0.003</td>
<td>-0.03/-0.01</td>
<td>450</td>
<td>205</td>
<td>-1</td>
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<tr>
<td>JE-123-ALCF</td>
<td>Quadrilateral</td>
<td>66.7-6.3</td>
<td>1.2</td>
<td>26.5</td>
<td>3</td>
<td>1.33</td>
<td>8</td>
<td>0.125/0.003</td>
<td>0.04/0.06</td>
<td>190</td>
<td>46.6</td>
<td>-6</td>
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<tr>
<td>JE-115-LCF</td>
<td>Bridge w/ split pri.</td>
<td>600-150-600</td>
<td>1.2</td>
<td>0.30</td>
<td>1 (sec)</td>
<td>1.7</td>
<td>63</td>
<td>0.058/0.002</td>
<td>-0.02/-0.01</td>
<td>100kHz</td>
<td>155</td>
<td>-4</td>
</tr>
</tbody>
</table>

6. Multitier construction has no faraday shield.
7. All specifications are for 0.01 source, 5000 load.
8. Source amplifier = 3dB @ 10kHz
9. Output transformers are horizontal channel frame type with wire leads, vertical channel frames available.

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.

Circle (107) on Reply Card
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 of the equipment normally found in a TV production studio, all under an auto assembly mode. For such systems, 1/4-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 condition 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...
At last, a practical solution to the age-old problem of color balancing your picture monitors—the PM5539 color analyzer.

Working directly off the screen with three color-sensitive photodiodes, the PM5539 gives you quick and easy readings of the three primary colors—separately or simultaneously—referred to a previously-set white standard. This means that in a matter of minutes every color monitor you need to watch can be set up to have the same color temperature and intensity.

Once the PM5539 matches all your monitors, you’ll see all the difference in the world. The PM5539 is the quantitative way to eliminate the qualitative “calibrated eye-ball.” For nationwide sales and service information call 800-631-7172, except in Hawaii, Alaska and New Jersey. In New Jersey call collect (201) 529-3800, or write Philips Test & Measuring Instruments, Inc., 85 McKee Drive, Mahwah, NJ 07430.

Color temperature should normally be adjusted at both high and low light levels. Balance of the three primary colors should track at the “grey” levels in between. To facilitate “grey scale tracking,” the PM5539 has a wide sensitivity range (1 to 300 NIT’s full scale).

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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 a distinct, proper keyboard layout. 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 redifiinability 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 ambidiextrous.

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 will provide some 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 dependent 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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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
- 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 41.
Anritsu's Video Signal Analyzer

Here's the economical new Video Signal Analyzer that's making everyone from broadcast engineers to maintenance technicians sit up and take notice. This compact instrument can analyze over 40 different CCIR- and FCC-recommended test signals.

At the studio or in the field

The Video Signal Analyzer MS349D is ideal for monitoring signals from pickup locations or in the broadcast studio. It features direct digital readings of waveform distortion and S/N ratio, allows comparison of measured data to preset limits, and even has a 10ns resolution wave memory for tracking down those elusive ghosts.

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The Video Signal Analyzer can be used for measurements along all kinds of transmission lines: satellite links; terrestrial microwave lines; submarine cable, CATV and industrial TV systems; even optical transmission links. A GPIB interface helps make it ideal for unattended far-end monitoring.

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The addition of the sophisticated Anritsu MG311 Signal Generator turns the MS349D into an analyzer system for complete end-to-end video measurements. And when a printer is added, the MS349D can reproduce both measured data and the actual video signal, to make sure your video is always looking good.

To see for yourself just how pretty video can be, contact your Anritsu representative.
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.

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 (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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orporate headquarters in Redwood City, CA, covers the technology spectrum from a rare 1911 telegraphophone 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 will also 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-
Bosch responds to the demand for a better switching system

Experience is said to be the best teacher. At Robert Bosch Corporation, our distribution switcher experience has produced the newest member of our switcher family, the TVS/TAS-2000.

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.

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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.

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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 recording 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.

Robert Bosch Corporation
Video Equipment Division
P.O. Box 31816, Salt Lake City, Utah 84131 - (801) 972-8000
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.

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.

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 1877-1912, contained in the National Broadcast Museum.

The Broadcast Pioneers Library has provided background information for many organizations and individuals, including William S. Paley, Eric Severeid, the National Association of Broadcasters and the Smithsonian Institution.

The library once was described by founding president G. Richard Shafiro 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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June 1984 Broadcast Engineering 149
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.

**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 satellite uplinking capabilities.

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Part of the audio-video stations used at the Museum of Broadcasting for viewing material on file is shown. A separate auditorium is used for large-scale presentations and seminars.

Museum of Broadcasting

The Museum of Broadcasting, located in New York City, is a unique non-profit institution that collects, preserves, interprets and exhibits radio and TV programs for broadcast professionals, students, scholars and the public. The museum was founded in 1974 by William S. Paley (founder chairman of CBS) and today houses some 20,000 programs in cassette form (both audio and video) covering more than 60 years of broadcasting history.

The museum's radio collection includes a 1920 broadcast of Franklin D. Roosevelt (then candidate for vice president of the United States), an eyewitness account of the Hindenburg disaster and Edward R. Murrow's This...is London World War II broadcasts. Also available to the visitor are tapes of the Fred Allen and Jack Benny shows and reports on the dropping of the first atomic bomb on Hiroshima.

The museum’s TV collection includes a wide range of programs from 1939 to the present. The collection ranges from such famous dramas as Marty and Requiem for a Heavyweight to the plays of Shakespeare. News clips include the landmark CBS documentary series, See It Now, and highlights of the Senate Watergate Hearings.

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 (Goulding), and the drama of Rod Serling. The museum's exhibit area covers four floors and includes an auditorium and radio/TV viewing stations.

Editor's note:

Persons wanting more information on the museums and library covered in this article may contact the individual facilities at these addresses:
- 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 1986. Pending the reopening, interested persons may contact museum founder/director Bill Bragg at 2001 Plymouth Rock, Richardson, TX 75081.
- 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
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Circle (126) on Reply Card

June 1984 Broadcast Engineering 155
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 taps 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.

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TYPICAL VALUE</th>
<th>MEASURED VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF power output</td>
<td>18.3kW</td>
<td></td>
</tr>
<tr>
<td>Plate current</td>
<td>2.8A</td>
<td></td>
</tr>
<tr>
<td>Plate voltage</td>
<td>7.55kV</td>
<td></td>
</tr>
<tr>
<td>Screen current</td>
<td>380mA</td>
<td></td>
</tr>
<tr>
<td>Screen voltage</td>
<td>650V</td>
<td></td>
</tr>
<tr>
<td>PA grid current</td>
<td>110mA</td>
<td></td>
</tr>
<tr>
<td>PA bias voltage</td>
<td>490V</td>
<td></td>
</tr>
<tr>
<td>PA filament voltage</td>
<td>6V</td>
<td></td>
</tr>
<tr>
<td>Left driver cathode current</td>
<td>142mA</td>
<td></td>
</tr>
<tr>
<td>Right driver cathode current</td>
<td>142mA</td>
<td></td>
</tr>
<tr>
<td>Driver screen voltage</td>
<td>275V</td>
<td></td>
</tr>
<tr>
<td>Driver screen current</td>
<td>35mA</td>
<td></td>
</tr>
<tr>
<td>Driver grid current</td>
<td>1mA</td>
<td></td>
</tr>
<tr>
<td>Driver plate voltage</td>
<td>1.85kV</td>
<td></td>
</tr>
<tr>
<td>28V power supply</td>
<td>27V</td>
<td></td>
</tr>
<tr>
<td>Reflective power</td>
<td>15W</td>
<td></td>
</tr>
<tr>
<td>Transmission line pressure</td>
<td>3.9psi</td>
<td></td>
</tr>
<tr>
<td>Tank pressure</td>
<td>1500psi</td>
<td></td>
</tr>
<tr>
<td>Exciter AFC</td>
<td>5412</td>
<td>Center scale</td>
</tr>
</tbody>
</table>

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
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 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 transmitter 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 considerably from one location to another, but some general statements on cooling apply to all installations. A transmitter greater than 1 kW 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 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.
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 installa-
tions, 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 sen-
sitivity 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. Prov-
sions should be made for heaters and PA exhaust recycling blowers. A trans-
mmitter that runs 24 hours a day should not need additional heating equip-
ment, but stations that sign off for sev-
eral 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 control-
ting the room temperature to between 60°F and 70°F, tube and com-
ponent life will be improved substantially.

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nance program easily will pay for itself in reduced downtime and failures, and increased performance.
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TV exhibitors
White Instruments
Continued from page 98

± 10dB adjustment range, continuously variable low-cut filter and low noise operation.
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200: Microprocessor-controlled real time audio analyzer system, software-dependent, to expand or modify the analyzer's functions as needed.
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and waveform monitor/vectorscope equipment.
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See ad on page 108

WINSTED
H8508: VTR console for non-rack-mounted Type 5 and Series 800 U-matic front-load units; includes writing surface and editing controller mounting shelf.
G8300: Custom console for top-load VCRs, including three pull-out shelves, edit controller shelf and mounting locations for audio mixing

WOLF COACH
B-103: New generation news unit, consisting of transferable body, with increased work room within the vehicle.
VC-201: EFP vehicle.
Magic Room: Expandable side unit demonstrated on videotape.
Circle (556) on Reply Card

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 10.)

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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FOR-A's Digital Time Base Corrector (FA-410) now offers Dynamic Tracking' compatibility for both the SONY Broadcast U-Matic' (BVC-820) and the PANASONIC VHS (NV-8950)' VTRs. All of the FA-410 features from extraordinary transparency in operation to good human engineering (not to mention price!) are now enhanced with the ability to fully utilize Dynamic Tracking modes for fast and slow motion and still frame. For broadcast, cable and editing, the FA-410 is dynamically better than ever.

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'Dynamic Tracking and U-Matic are trade names of Sony Corporation.
'The Panasonic VHS NV-8950 is V-locked with modification by FOR-A Corporation. Contact FOR-A Sales Department for complete information.

Circle (130) on Reply Card
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 Larcan 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 Terrance 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
Why this magazine and more than 750 others let us go over their books once a year.

Some magazines, we're sorry to say, keep their readers undercover. They steadfastly refuse to let BPA (Business Publications Audit of Circulation, Inc.) or any other independent, not-for-profit organization audit their circulation records.

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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

The National Association 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.
Satellite update
Continued from page 12

tured by a European consortium based in France. Ariane space launches from Kourou, French Guiana, in South America, close to the equator. The dual-payload capability of the Ariane allows it to compete effectively with other conventional rockets and even the shuttle, particularly in the current circumstances. Recent successful launches, after some initial expected failures, have firmly established the Ariane rocket as the primary alternative to a NASA conventional rocket or shuttle launch.

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.

The PAM booster rocket required for a shuttle launch adds significant cost, and a larger apogee rocket also is needed on the satellite, compared to that required with an Ariane launch. This is true because the latter's near-equator launch site places a satellite in an elliptical orbit at a much smaller inclination to a true equatorial orbit, requiring a smaller apogee rocket to achieve geostationary orbit.

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.

Other launch options that will be available, all in the conventional rocket class, will include the Delta rocket, which has been the workhorse launcher for most of the domestic satellites in the past 12 years for smaller satellites, and the Titan rocket, for larger payloads than the current Ariane or Atlas/Centaur rockets can handle. A host of other new hopefuls are possible contenders for the satellite launch market, including several companies hoping to develop and market low cost rockets that would offer launches at a fraction of the cost of current launches.

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.

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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 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.
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.

Warm-up time is greatly reduced and the CTVM 4 reaches correct colour temperature in less than 30 seconds after switching on.

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).

The excellent specifications, features, reliability, and AKB stability of the CTVM 4 range ensures that these display instruments will require virtually no maintenance throughout their long 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.

For further information about the pacesetting CTVM 4 range, ring or write to BARCO INDUSTRIES n.v. Th. Sevenslaan 106 B-8500 Kortrijk Belgium Tel. (0)56/21 11 24 Tlx. 85 842 barind b
TV stereo approved

The FCC has adopted rules that will allow the TV rural 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 channel capacity, 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 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:

<table>
<thead>
<tr>
<th>Type</th>
<th>Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM radio</td>
<td>4745</td>
</tr>
<tr>
<td>FM radio</td>
<td>3566</td>
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*Patent applied

More information on the new GEN II KPA for the 80's is available from Varian Microwave Components and Subsystems Division. Or the nearest Electron Device Group sales office. Call or write today.

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