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THE COVER this month is adapted from NAB brochures promoting this year's greatest broadcast equipment show: NAB-'84/Las Vegas. The 62nd Annual Convention and International Exposition's theme is "You've Got What It Takes," recognizing that, in an election year, voters have the power to elect candidates who represent their views.

As BE goes to press, the NAB has not completed its brochure cover plans. So, we adapted the initial drawings to produce this cover. The rotating world denotes the convention's worldwide scope that makes it exciting and successful.

NAB-'84/Las Vegas
- April 29-May 2
- Las Vegas Convention Center

NAB CONVENTION GUIDE—Most of this issue is devoted to pre-show coverage of NAB-'84/Las Vegas. Extensive research went into compiling data from manufacturers exhibiting at this year's convention to make our exclusive coverage as detailed and complete as possible. The results, in terms of articles and special sections, can be seen in the contents listing to the left. This special coverage will help attendees plan for the show or make it easy to obtain data on new products for those who cannot make it to Las Vegas this year. In any event, look for BE's extensive wrap-up in our June and July issues.

NEXT MONTH marks BE's 25th anniversary of serving broadcasters around the world. Besides our usual offering of departments and articles, we will review some highlights of this dynamic, changing era of broadcasting.

1984 NAB CONVENTION SPECIAL
23 NAB-'84/Las Vegas
By the BE staff
26 Engineering Conference of NAB-'84/Las Vegas: Bigger than ever
By Ed Williams, staff engineer, National Association of Broadcasters, Washington, DC
42 NAB exhibit profile: Sony Broadcast
46 NAB-'84/Las Vegas exhibitor roundup
200 NAB-'84/Las Vegas convention exhibitor guide
218 NAB-'84/Las Vegas product directory

OTHER FEATURES
254 Conversations
An interview with Bob Ricci, president, United Media, Anaheim, CA
258 Plant tour: Cetec Antennas
By Jerry Whitaker, radio editor
282 The videodisc revolution
By Arthur Schneider, A.C.E., BE post-production consultant, Agoura, CA
286 NEC's new 3-chip CCD color camera
By Masao Mitsui, director of engineering, NEC America, Elk Grove Village, IL
298 Audio crosspoint switching: A design example
By Bob Zavrel, applications engineer, Siliconix, Santa Clara, CA
304 Frequency coordination put to the test
By Richard Rudman, BE spectrum management consultant, and chief engineer, KFWB Radio, Los Angeles, CA
306 The Klystrode: An old idea with new applications
By Merrald B. Shrader and Donald H. Pries, Varian Associates, EIMAC Division, Palo Alto, CA
314 Updating FM facilities
By Jerry Whitaker, radio editor
323 Field report: Studer A-810 tape recorder
By David Smith, chief project engineer, audio, Editel, New York, NY

STATION-TO-STATION
331 Adding blue-gun-only capability to the Sony PVM-1900
By Carl Armon, technician, WNEV-TV, Boston, MA
334 Simple remote-control tally drivers
By Robert Ramsaur, engineer, KBYU-TV, Provo, UT

DEPARTMENTS
4 News
6 FCC update
10 Editorial
10 Coming events
12 Associations
14 AM stereo update
16 Satellite update
78 Calendar
274 Feedback
336 Business
343 People
346 Index of advertisers
348 Classified ads

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Study predicts 8 million LPTV households by 1990

By 1990, some 8 million TV households will be receiving broadcast service via low power television. Of these households, 75% will receive advertiser-supported service, while the remaining households will subscribe to some form of pay LPTV.

These are the main conclusions of a recent study, "Low Power Television: Will it Take Off by 1990?" The study was prepared by Michael Couzens for the New TV Reporter, a broadcast technology newsletter. Couzens, a former FCC staffer who headed the commission's LPTV inquiry, currently practices law in San Francisco.

The heyday of LPTV construction will be during 1986 and 1987, according to the study. By the end of 1987, some 1370 stations are forecast to begin operations. By 1990, the station count is predicted to reach 2000.

Adequate broadcast spectrum is available to accommodate an average of two stations through the Top 50 markets, and an average of four in the second 50 markets numbered 51-100. The markets from 101-200 can accommodate an average of six new LPTV stations. Station growth is predicted to approach these limits by 1990 in the Top 200 markets, resulting in 750 new stations.

The remainder, or 1250 stations, are expected to start up in smaller communities, outside the Top 200. The new station estimate includes upgrading of approximately 500 conventional TV station translator repeaters.

In its analysis of competitors, the study said that the largest single obstacle to LPTV development by 1990 will be the difficulty of configuring multichannel LPTV stations under common management. Cable Television (CATV), direct broadcast satellites (DBS) and multipoint distribution service (MDS) all will be offering multichannel services. The study concludes that LPTV will enjoy higher circulation, but lower revenues, than either DBS or MDS by 1990.

Copies of the study are available for $10 from the New TV Reporter, P.O. Box 421556, San Francisco, CA 94142.

Whitaker to speak at NAB'84

Jerry Whitaker, BE radio editor, will deliver a technical paper titled "Transient Overvoltages...Their Causes and Cures," during the upcoming NAB Convention to be held April 29-May 2.

His presentation will include a detailed analysis of the problems faced by broadcasters due to power company voltage surges and the damage that can be caused by such electrical disturbances at radio and TV facilities. Special emphasis will be placed on the methods available to broadcasters to protect sensitive transmission and computer-based equipment. To further the industry's understanding of the overvoltage problem, Whitaker will write a chapter on ac voltage power supplies and power conditioning for the soon-to-be-released Seventh NAB Engineering Handbook.

Whitaker also is scheduled to speak at the upcoming Ohio State University Engineering Conference (July 17-19) and will present a special engineering paper titled "Writing for Technical Publications."

Continued on page 338
Two Leaders with an important following.

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New US-Canada AM broadcasting agreement signed

On Jan. 17, 1984, a new bilateral AM agreement with Canada was signed in Ottawa. The new agreement establishes standards and procedures that henceforth will govern the protection that the United States and Canada provide to each other's AM broadcasting services. It supersedes the North American Radio Broadcasting Agreement (NARBA) insofar as the United States and Canada are concerned.

The agreement incorporates a plan that includes all the AM assignments the United States and Canada have recorded as notified and accepted under NARBA, plus a list of approximately 650 additional AM assignments on the 32 channels that under NARBA had been classified as US and Canadian Class I-A clear channels (25 US and seven Canadian).

The mutual adjustments that made it possible to develop the list of protected new assignments have necessitated some modifications of the facilities proposed by both the United States and Canada. US applicants concerned were informed during the negotiations, and have consented to such modifications. The administrations of both countries wish to proceed further with carrying out the needed adjustments before the channels in question are opened up to the submission of further applications.

This means that the freeze on the filing of applications for unlimited-time stations on the 25 US Class I-A clear channels will remain in effect for another six months. However, this freeze does not apply to applications for construction permits that are mutually exclusive with applications for license renewal, nor to mutually exclusive applications that are timely filed in response to cutoff lists.

Similarly, Canada has agreed to defer for six months the notification of assignments on the US clear channels and, to permit orderly transition to the newly agreed basis for the assignment by the United States and Canada of unlimited-time stations on each other's Class I-A clear channels, both countries also will defer for the same period the notification of new assignments on the seven Canadian Class I-A clear channels: 540kHz, 690kHz, 740kHz, 860kHz, 990kHz, 1010kHz and 1580kHz. This will not affect the continuing opportunity to apply for stations on these seven channels in locations more than 650 miles from the United States-Canada border.

Also, the new agreement permits post-sunset operation by US daytime stations for the first time, liberalizes the protection standards for pre-sunrise operations, and opens the way for a general nighttime power increase from 250W to 1000W for Class IV stations. The commission already has begun to implement the pre-sunrise and post-sunset arrangements and has issued a rulemaking notice concerning Class IV power increases.

Repeal of regional concentration of control rules proposed

In a Notice of Proposed Rulemaking issued in January, the FCC proposed eliminating rules that prohibit any party from owning, operating or controlling three commercial AM, FM or TV stations in cases in which any two stations are located within 100 miles of the third and there is primary service contour overlap between any of the stations.

These rules, which were adopted by the FCC in 1977 to eliminate the need for case-by-case resolution of regional concentration of control issues, have proved neither accurate nor consistent in identifying circumstances likely to involve concentrations of control. The commission said it thinks that the current rule may impose substantial and counterproductive costs on the broadcast industry. For example, restricting multiple ownership in the same region may preclude the realization of economies of scale and operational efficiencies that might permit the production and presentation of new programming, the improvement of existing facilities or even the activation of unused allocations.

Also, the commission said that there has been substantial growth in the number and variety of media outlets in recent years. Since 1977, when the rules were adopted, competition in the communications marketplace has been significantly heightened by the development of new technologies. This trend is expected to continue and expand with the introduction of low power television, new multichannel MDS and direct broadcast satellite services. These developments strongly suggest a need to re-evaluate the assumptions on which the regional ownership limitations were based.

The commission is asking for comments on the adequacy of the current rule, the impact of the growth of new media outlets on the diversity of voices and levels of competition in regional markets, and whether the rules should be changed or eliminated.

Common carrier applications accepted

The commission now is accepting applications from FM broadcast licensees wishing to offer common carrier services on their SCAs. Such services were authorized specifically in the SCA deregulation order in BC Docket No. 82-536.

The commission said that stations wishing to file applications (on Form 401) for common carrier authorizations at this time should be prepared to amend them, if necessary, in the event the deregulation order is changed on reconsideration.

Cuban interference issue addressed

The FCC has released a Notice of Proposed Rulemaking regarding payments by the United States Information Agency to AM stations in the United States for expenses incurred in mitigating the effects of Cuban interference. To implement this program, the commission is seeking to establish standards in three areas:

• identifying a threshold level of interference that would trigger eligibility for compensation;

• specifying the types of expenses that would be compensable; and

• setting up procedures to be followed to obtain compensation.

Because attempts to negotiate a solution to interference problems with Cuba have proved unsuccessful, the commission has issued special temporary authorizations to affected stations permitting power increases and alterations in directional patterns to restore service to at least parts of their normally protected interference-free areas lost to Cuban interference. The Radio Broadcasting to Cuba Act, effective Oct. 1, 1984, contemplates providing compensation to licensees that have made changes for this reason.

[1-Z(=3)]
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When TBS wanted a second fully-equipped mobile production unit, they chose Midwest Corporation, the company with the reputation for meeting every challenge in the field. From 47 foot teleproduction units to ENG vehicles, Midwest can custom-design a mobile system that insures network quality production in the most difficult locations. For TBS's wide-ranging sports and news coverage, Midwest used its M40 Series to develop the SuperTruck, 44 feet of unparalleled technical and production potential.

Large enough to cover any sports or major news event, it's stocked with state of the art video and audio equipment, from companies like Ikegami, Grass Valley and Ampex. Because only the finest equipment is utilized, everything Midwest builds has an amazing track record for enduring the demanding conditions of on-location shoots. TBS noticed, and moved to Midwest. For more information on how to keep your show on the road, call toll-free, today. (800) 543-1584.
TBS delivers for you

To catch the action of a play-off game or a major news event, even a SuperStation needs the ability to keep its show on the road. So TBS asked Midwest to design a second mobile production unit that meets three criteria: First, it's large enough to handle any on-location assignment from a major sporting event to a live concert to a presidential visit. Second, with its equipment specifications it produces the finest results in the industry, and finally, it's ready for lease on an as available basis. Midwest's solution is the 44 foot SuperTruck II. When SuperTruck II goes on the road, it will cover the assignment with:

- Five (5) Ikegami HK-357 Cameras with Fujinon 44:1 Lenses
- Two (2) Ikegami HL-79 Cameras with Fujinon 17:1 Lenses
- 24 Input Grass Valley 300/3A Production Switcher
- Three (3) Ampex VPR-2B One Inch Slo-Mo Tape Machines
- Abekas Still Store System
- Solid State Logic Triple Stereo Audio Console
- Ampex ADO Digital Effects Unit
- Chyron 4100 Graphics Generator

With two "SuperTrucks" TBS has increased its ability to generate a wide range of programming from sporting events to documentaries. In addition, TBS can lease one of its units for your assignment that requires network quality. So for that major assignment in the field, put a SuperTruck on the road for you.

TBS's SuperTruck will be on display at NAB '84 at the Midwest Corporation booth.

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As we head into what appears to be another record-setting convention at NAB '84/Las Vegas, we sense an unusual air of excitement. In part this may be attributed to the show's first politically oriented theme: "You've Got What It Takes." But that is only part of the picture.

Some careful thought unveils multiple implications behind this year's theme:

- As voters, we have the power to elect candidates who best represent our views on critical issues.
- As broadcasters, we have the most effective communications tool to reach out to the public and encourage them to turn out in record numbers to exercise their voting privilege.
- As broadcasters, we have the communications power to help shape and form public opinion on candidates and issues.
- As broadcasters, we have the most effective communications channels to provide early, rapid reports on election returns and trends.

This final point already is surfacing to cloud the 1984 political arena. Congressional hearings have been held to consider muzzling broadcasters to keep them from projecting election results before the polls are closed nationwide. Rep. Timothy Wirth (D-CO), chairman of the House Subcommittee on Telecommunications, Consumer Protection and Finance, has spearheaded efforts to constrict broadcasters, but so far has not been successful. This problem of projecting election results emerged dramatically in 1980 when the networks predicted that Ronald Reagan would win some three hours ahead of the closing of polls on the West Coast. Compounding the situation, President Jimmy Carter conceded defeat while much of the nation was still voting.

The NAB '84/Las Vegas convention will help broadcasters begin to perfect their communications and sales tools for riding the tide of politics in this election year. The program is loaded with sessions and panels focusing on what broadcasters can and cannot do in a deregulated environment.

But the convention is just a starting point. NAB plans to provide member stations with how-to kits that detail voter activities across the country, offer suggestions that have worked for other stations, show how to use the campaign as a promotional tool and identify source/location of election-year material.

It is easy to get wrapped up in new equipment at the annual NAB show. But, at NAB '84, let us not lose sight of our show theme. Indeed, we do have what it takes. So, let us take what we have and put it to maximum use, but with the attitude of service and responsibility that makes broadcasting the greatest communications media on earth.

coming events

April 29-May 2
NAB 62nd Annual Convention, Las Vegas, NV

May 3-6
ITVA, Las Vegas, NV

May 12-15
Audio Engineering Society (AES), Anaheim, CA

May 20-23
Broadcast Financial Management Association (BFMA) 24th Annual Conference, New York, NY

May 30-June 2
American Women in Radio and Television 33rd Annual Convention, Chicago, IL

June 3-6
National Cable Television Association (NCTA) Annual Convention, Las Vegas, NV

June 10-15
Broadcasters Promotion Association (BPA) 27th Annual Seminar and Broadcast Association, Las Vegas, NV

June 24-27
CCBA Convention

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
NRBA Annual Convention, 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 51st Technical Meeting & Exhibits, New York, NY

Oct. 27-Nov. 3
 SMPTE 125th Annual Conference, New York, NY

Oct. 28-Nov. 1
Scientific-Atlanta Earth Station Seminar

Dec. 3-5
Radio Television News Directors Association (RTNDA) International Conference, San Antonio, TX

Dec. 5-7
Western Cable Show, Anaheim, CA

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UHF reassignment proposal for private land mobile use opposed

In comments filed with the FCC, the NAB has opposed a supplemental petition for rulemaking of the Los Angeles County Sheriff's Department to reassign UHF TV Channel 19 for public safety land mobile use and to reallocate Channels 14-20 in the largest urban markets. NAB has requested that the commission not institute a rulemaking on the sheriff's petition and, instead, consider proposals to meet public safety land mobile needs through new technologies and advanced spectrum management techniques.

NAB said that the lifesaving and emergency communications needs of the LA County Sheriffs would not be well-served because of the high potential for interference caused by lawful UHF TV transmissions. Furthermore, Channel 19 reassignment could create undue interference to UHF TV reception in the Los Angeles area.

The association said that the future expansion of both full-power and low power UHF television would suffer, as would programming diversity, if reallocation of Channels 14-20 in the largest urban markets became a reality. The proposal that UHF television use reallocated channels on a secondary basis is impractical and inconsistent with the Communications Act, NAB said.

The filing also said that changing the existing UHF TV taboos would serve neither the interests of the LA Sheriff's Office nor the public, and that their proposed elimination in favor of encouraging improved receiver technology should be evaluated realistically in the context of the present UHF marketplace.

FCC asked to correct FM translator abuses

Edward O. Fritts, NAB president, has asked the chairman of the FCC, Mark Fowler, to take action to correct FM translator violations. In a letter to Fowler, Fritts cited a resolution passed by NAB's Radio Board of Directors calling for the FCC to rectify a nationwide pattern of translator abuses.

He said several FM translators are violating commission rules that limit program origination to 30 seconds/hour and the agency's policy that restricts the airing of advertising matter only to those translator licensees that are legitimate community groups. He also said there is concern that several translators are receiving programs via microwave and/or satellite feeds—program sources not allowed under existing regulation.

The NAB president asked that the public, translator licensees and current and potential translator applicants be alerted to the commission's requirements and the penalties for violations.

Reliance on support facilities to be determined by NAB survey

The NAB is conducting a mail survey to determine how broadcasters rely on various telecommunications facilities, such as telephone, microwave and satellite systems, to reach the public. All TV stations and more than 2000

Continued on page 341
Capture sound at its purest.

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For further information, call us, or write.
NAB looks at AM stereo

The status of AM stereo probably will be a hot topic once again at this year's NAB convention. An engineering session devoted to AM stereo has been scheduled for 4:30-6:30 p.m. on Tuesday, May 1. The session will be chaired by Mike Rau of the NAB, and will consist of a panel discussion on the status of AM stereo development and implementation. Panelists will include representatives from the FCC, various receiver and transmitter manufacturers, and attorneys. Proponents of each system will be invited to be present in the audience.

Another engineering topic scheduled for NAB-'84 of interest to AM stations now operating in stereo, or planning to convert to stereo, is scheduled for Saturday, April 28. The paper, titled “Broadbanding Directional Antenna Systems for AM Stereo,” will be delivered as part of a radio engineering session set for Saturday afternoon.

Convention to feature equipment/demonstrations

AM stereo equipment manufacturers will be out in force at the convention again this year. Most companies plan to exhibit working systems on the convention floor, and outside demonstrations are planned by some proponents. Motorola, for one, will show its C-QUAM system in operation using 1984 Buick automobiles equipped with Delco AM stereo receivers.

The convention will see some new entries into the AM stereo equipment manufacturing group, including Time and Frequency Technology, Broadcast Electronics and Delta Electronics. Delta recently received type acceptance from the FCC for its C-QUAM (Motorola) exciter and modulation monitor.

New developments are expected at the convention in the AM stereo receiver field, which also should be of interest to stations involved in, or planning to convert to, stereo operation. Several receiver manufacturers have said that they plan to begin offering new AM stereo/AM receivers to consumers in the near future. It is expected that these new entries into the AM stereo receiver market will give a substantial push to the move to get stereo AM radios into the hands of the listening public.

Kahn introduces stereo converter

Kahn Consumer Products has announced agreement with several AM stereo broadcasters to purchase and promote its new AM stereo adapter product that will convert any Motorola-only AM stereo car radio to a multimode receiver. The new All Four converter is designed to receive stereo broadcasts from any of the four FCC type-accepted AM stereo systems. Kahn said that the adapter, which will connect to a C-QUAM (Motorola single-mode) automobile receiver in a manner similar to the FM converters of 10-20 years ago, will cost less than $10 each in large quantities.

This thirty day no obligation free trial offer must end on May 31, 1984. So, if you've been reading our ads, and thinking about getting an Eventide H949 for your station, now's the time to act. Contact your Eventide dealer, or call Eventide for more information.

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**TV transmission techniques**

TV transmission techniques for domestic satellite systems have remained similar over the past few years, because there has been no need to change. The basic FM transmission mode adopted for the Canadian Broadcasting Corporation (CBC) network via the Anik 1 satellite in 1973 was not optimal in terms of delivering the maximum possible performance, but it was adequate. The major growth that has occurred in cable television over the past eight years also has been based on the same transmission parameters, which were derived from practices used for terrestrial microwave links. The basic parameters that have been the satellite industry standard are as follows:

- **video baseband**: 4.2MHz;
- **audio channels**: subcarriers centered on 6.8MHz;
- **maximum RF deviation**: one-half of the available bandwidth: less 4.2MHz (for example, 13.8MHz for 36MHz transponder);
- **RF deviation by audio subcarrier**: 2MHz;
- **RF deviation by energy dispersal**: 0.8MHz; and
- **RF deviation by video baseband**: 13.8MHz - 2.8MHz = 11MHz

These transmission parameters are extremely conservative regarding RF bandwidth occupancy because the model assumes a direct addition of all contributors to RF carrier deviation. Thus, the RF carrier deviation due to the video baseband has been limited by this assumption, which in turn limits the video signal-to-noise (S/N) ratio performance. A more realistic model would consider the video and audio contributors to RF deviation to be non-coherent, allowing a greater

---

*Applied to RF signal to minimize interference into 4GHz terrestrial microwave.*

---

An opportunity for C-Band DBS systems with antennas in the 4- to 6-foot diameter range, and could provide additional rain fade margin for medium power Ku-Band DBS systems. One such Ku-Band system already is in operation in the eastern United States (United Satellite Communications) and HBO also is considering DBS delivery via C-Band satellites similar to Galaxy or medium power Ku-Band satellites.

FM transmission will remain an attractive technique for delivery systems in which signal protection and/or downlink optimization are not critical. This will be true for the majority of satellite TV signals in which the inherent cost-effectiveness of FM and the need to adhere to standard receiver technology are more important. In those cases, optimized video deviation may be used to maximize video S/N performance and to minimize interference from adjacent satellites, which will become a more significant problem as C-Band satellites are spaced 2° apart. One type of application in which optimized FM transmission will be used is broadcast-type video conferencing.

Recently, a number of companies have used 1-way TV transmissions (with voice return hookups) to conduct meetings with geographically scattered branch offices, instead of bringing representatives to the head office or a central location. A significant cost saving can be realized, and the 1-way mode is effective for such applications, particularly if no need exists to protect the programming from competitors. In fact, the technique is so popular that one major hotel chain is planning to provide such meeting services as part of its regular package to attract more business customers. Because large projection screens are used, optimization of video S/N is mandatory; the low definition 525-line NTSC video signal needs all the help it can get.

Various enhanced video transmission techniques are being developed to improve image definition on large screens and, in some cases, this will involve greater bandwidth requirements. New medium power Ku-Band satellites will offer transponder bandwidths ranging from 43-72MHz, and new hybrid satellites (C-Band and Ku-Band) will provide some 72MHz C-Band transponders. This also will create opportunities to configure net...

Continued on page 252
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.

118-AS Audio Synchronizer (Above) No more lip sync problems! Tek's new 118-AS 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!
PICTURE OF YOUR SIGNAL WITH TEKTRONixon!

Behind the sets, 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 scenes in quality television.

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

494/494P Spectrum Analyzer (Above) An unprecedented value! Counter frequency accuracy, baseband through microwave coverage and unique HELP mode to guide less experienced users. Store up to nine displays and ten set-ups in non-volatile memory. Portable and rugged, the 494 is backed by a three-year warranty!
POWER
INTENSITY
FOCUS
SCALE
VERT POS
HORIZ POS

INPUTS

PHASE
GAIN
FIELD
LINE SELECTOR

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

TYPE 9-F

MICRO PROCESSOR
BASED DIGITAL
COUNTER

AND

SMPTE/EBU EDIT TIME CODE
GENERATOR AND READER

Frame rates of 24, 25 and 30 frames are selectable from the front panel with the 30 frame dropframe and non-dropframe selectable.

Counter automatically converts from footage/frames to meters to Hours/Minutes/Seconds/Frames.

Input either 2-phase TTL level with 90 degree phase shift or TTL level pulses and FWD/REV signal.

Tach pulse generated serial time code in SMPTE/EBU format.

Selectable frame rate 24, 25, 30 frames with drop-frame selection for NTSC.

Time code input for jam preset or time code readings.

Output of counter is 32 bit BCD or BCD.

MAGNA-TECH ELECTRONIC CO., INC.
630 Ninth Avenue, New York, N.Y. 10036
Telephone (212) 586-7240  Telex 126191  Cables "Magtech"
Circle (308) on Reply Card
Broadcasters are getting ready to flood Las Vegas for the industry's most prestigious convention: NAB-'84/Las Vegas, the 62nd Annual Convention and International Exposition. Exhibitors from around the world are feverishly working on booth displays and special surprises to make this year's show better than ever, with many companies taking additional booth space because the convention center has more space available.

This year's theme for the convention is "You've Got What It Takes," a theme to encourage broadcasters to use their persuasive power to get voters to turn out this election year.

In our opening article, "Engineering Conference of NAB-'84/Las Vegas: Bigger Than Ever," the NAB staff lays out the welcome mat and provides a glimpse of some of the planned activities. This is followed up with BE's comprehensive exhibit coverage for NAB-'84.

Our coverage includes:
- a profile of one of last year's exceptional exhibitors;
- a complete listing of exhibitors, alphabetically, with established and new products listed by model number and name and description;
- a comprehensive product directory that lists product categories and exhibitors showing those products;
- late exhibitor data received just before press time.

Details of the NAB-'84/Las Vegas show are still being released as BE goes to press. An updated map and exhibitor data will be distributed at the show to help you further. The final program will be available upon registration, but our pre-NAB coverage provides a broad outline of what is being planned for you at this year's exciting convention.

Our NAB pre-show coverage...

Engineering Conference of NAB-'84/Las Vegas: Bigger than ever
By Ed Williams, staff engineer, NAB, Washington, DC

NAB exhibit profile: Sony Broadcast
Exhibit roundup
Convention exhibitor guide
Product directory

April 29-May 2
The Convention Center
Las Vegas, NV
Most comprehensive exhibit for broadcast equipment
More than 300,000 square feet of exhibit space
Distinguished Service Award to Elton H. Rule, ABC
Engineering Award to Otis Freeman, Tribune Broadcasting
Major addresses by James McKinney and Mark Fowler, FCC
Entertainment by Paul Anka

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

Registration hours:
- 9 a.m.-5 p.m. Saturday
- 8 a.m.-5 p.m. Sunday, Monday
- 9 a.m.-5 p.m. Tuesday
- 9 a.m.-noon Wednesday
On Saturday mornings, children all over America are being entertained by a unique new CBS-TV series, "Benji, Zax and the Alien Prince." What makes this show unique is more than a lovable dog. It's the fact that this Mulberry Square Productions project is the first network series entirely shot and edited on 1/2-inch tape. And the system they selected was Panasonic Recam.

One of the reasons Joe Camp selected Recam is its incredible YIQ M-Format picture quality. Another reason is its portability. It makes changing scenes and locations fast and easy. And that's important on a tight production schedule.

What's more, this "Benji" production utilizes Recam's remarkable 1/2-inch off-line editing system, after which, each show is transferred to 1-inch for television broadcast.

Recam was also selected by ABC.
Benji TV series possible.

Joe Camp, Creator of Benji.

Sports to record their momentous ascent of Mt. Everest for "The American Sportsman." And by the producers of the epic science-fiction film "Dune" to record "The Making of Dune" for TV broadcast in 1984. You can see "Benji, Zax and the Alien Prince" on Saturday mornings.

But you can see Recam right now. Just call your nearest Panasonic regional office:
Northeast: (201) 348-7336
Midwest: (312) 981-4826
Southeast: (404) 925-6835
Southwest: (214) 258-6400
West: (714) 895-7200

Panasonic
AUDIO-VIDEO SYSTEMS DIVISION
Circle (309) on Reply Card
This year's NAB Engineering Conference begins on Saturday, April 28, with a full day of radio and TV production and engineering sessions. That's right — Saturday (the day before the main event begins). This is the perfect time for a distraction-free day of technical presentations and demonstrations. Plan to arrive Friday night, April 27 (a time, by the way, preferred by the hotels and airlines). Convention registration begins at 9 a.m. Saturday. Engineering sessions start at 11 a.m. and continue until 5 p.m., with a break for lunch.

Many station technicians and broadcast engineers have commented that the 1½ days allocated for technical sessions during past NAB conferences have not been adequate to cover the expanding range of technical expertise demanded of station engineers. The new Saturday sessions add one more full day to the conference at a time convenient to most registrants. This addition to the convention should be relatively easy to arrange with hotels and airlines, and should be economical compared to the cost of the entire convention. Added without cost to your schedule are engineering workshops beginning at 7:30 p.m. on Tuesday.

The Saturday program features two concurrent sessions. For radio, there will be a production engineering session followed by radio engineering presentations. For television, the morning session will be devoted to implementing multichannel sound for television, followed by production engineering topics in the afternoon.

TV multichannel sound will be a hot topic at the convention this year, as evidenced by the displays of stereo sound TV receivers at the spring Consumer Electronics Show, the expression of interest by program producers and the FCC's publicly announced interest in avoiding an AM stereo situation. Also the Broadcast TV Systems Committee (BTSC) of the EIA has voted unanimously to recommend the adoption of a single transmission and noise reduction system as a broadcast standard. The Saturday session will present a series of papers and demonstrations on techniques for producing stereo and the conversion of TV plants and transmitters to the BTSC multichannel system. The Monday session, "Multichannel TV Sound — The System," will present papers on the new equipment and how it was developed and tested.

The Saturday session on radio production engineering will feature presentations on the difficult problems faced by radio stations in producing digital, stereo, talk and sports programming on a local level. Following this session will be a series of papers on important radio engineering topics, including multistation FM antenna sites, AM grounding systems and transient overvoltage protection.

After the Saturday engineering sessions, a good dinner (and maybe a show), Sunday morning can be devoted to the exhibits, followed by the formal opening of NAB’s 62nd Annual Convention and International Exposition at 2:30 p.m.

**Monday's sessions**

Monday morning features the AM/FM allocations session with reports on a new omnibus FM docket affecting nearly all FM stations, and a wrap-up of changes in the AM band as a result of recent agreements between the United States, Canada and Mexico.
In the world of audio production, tension is a killer. Draining creative energy and making tight deadlines impossible. If you’re still trying to do today’s job with yesterday’s technology we’ve just solved one of your headaches. Our prescription is a dose of our deuce, the TASCAM 42.

Everything you’ve considered to be a must is there, and a whole lot more. Balanced and unbalanced, with individual connector to interface with broadcast automation equipment and SMPTE control, the 42 fits anywhere.

To more precisely control tape tension, and yours, our rugged transport is built with a full computer control on all three motors. Our autolocator function with Return-to-zero and Search-to-cue doesn’t just start putting on the brakes when it hits the mark, it stops on the dime.

You also get a positive/negative real time counter and a precision splicing block mounted just below the plug-in fixed mount head assembly, where it belongs. That translates to faster, more accurate editing, and the peace of mind that comes with it.

To learn more about the hottest half-track in the under $2,500 class see your TASCAM dealer or write TASCAM Production Products, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.
The Monday morning TV sessions are devoted to new technology, satellite systems and UHF transmitter efficiency.

The session, “Television – New Technology,” features reports on the development of a new video cart machine, the state-of-the-art in video recording, solid-state imaging devices and other topics of general interest to TV personnel.

Substantial new developments in satellite technology will be reported in the TV satellite systems session, along with new information on 2° spacing, interference suppression, the torus antenna and Ku-Band network distribution.

A full session on UHF efficiency will feature reports on the multiple-depressed-collector and other improved-efficiency klystrons and transmitters. Advanced UHF receiver design also will be examined.

Monday afternoon is free for radio engineers to tour the exhibits with their managers to inspect the latest in broadcast technology, consult equipment manufacturers, purchase hardware (and software) and renew acquaintances with old friends. Be sure to plan your tours to the exhibit area carefully, using maps and lists to avoid wasting time in finding the booths you plan to visit. Because virtually everything a station needs is shown in the exhibit halls, the convention provides the perfect opportunity to implement technical plans by purchasing or examining facilities slated for later purchase.

The Monday afternoon TV session is devoted to a detailed description of the EIA/BTSC-approved (and possibly approved by the FCC as well by the convention) multichannel TV sound system. This session, with one Saturday on implementing the BTSC system, will give TV broadcast engineers the complete story on the new stereo transmission method.

Monday afternoon’s two special sessions focus on non-ionization radiation and broadcast auxiliary systems. Although the EPA will not be releasing its proposed guidelines for radiation limits until sometime during the summer, the session on radiation limits is important to stations that want to be up-to-date on sources of reliable and accurate information on the topic.

Broadcast auxiliary systems are the life line for stations using STL links, RPU, ENG and other important auxiliary services. The session on these systems will feature reports on the state of the broadcast auxiliary bands, new frequency assignments and methods for improving auxiliary band spectrum efficiency.

**Tuesday’s sessions**

On Tuesday morning, sessions are scheduled titled, “Radio New Technology” and “Advanced TV Systems.” Radio engineers will find particularly interesting the presentations on AM improvement methods, optimization of directional patterns, enhanced FM stereo coverage, amplitude-compandored sideband transmission (ACS), and use of microprocessors in transmitters to improve performance.

TV engineers will be treated to a full session on domestic and foreign advanced TV system developments. These are important presentations that foretell the ways in which television will evolve over the next decade.

After the Tuesday morning radio and TV technical sessions comes the engineering luncheon, during which the NAB Engineering Achievement Award will be presented to Otis S. Freeman, director of engineering, Tribune Broadcasting Company, and senior vice president, engineering, WPIX, New York. The featured speaker for this gathering will be James McKinney, chief of the FCC’s Mass Media Bureau.

On Tuesday afternoon, TV engineers will be given time off to attend the exhibits with their managers and examine the latest equipment developments.

In the meantime, radio engineers can attend the session on satellite and digital technology, which is followed by a roundtable discussion on AM stereo. Although most radio stations have a satellite receiver, station engineers will appreciate presentations on network distribution via digital satellite systems, and basic satellite technology.

The state of AM stereo remains uncertain, with stations and receiver manufacturers cautiously approaching the engineering aspects until more is known about multisystem receivers or trends toward a single system. This problem is further complicated by the concern of AM stations that subcarriers for data or load management may be incompatible with AM stereo, and skywave interference from other stereo AM stations using different systems may cause receiver malfunctions. The session will address these and other issues in a lively roundtable discussion with, among others, the FCC, equipment manufacturers, lawyers and NAB staff members.

Interference to broadcast reception is the topic of a special Tuesday afternoon session that will feature reports on major interference problems faced by broadcasters. This is a growing
Five alarm hotel fire, 400 guests, three competitors and one news editor who eats cigars for breakfast.

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Get it fast.  
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The pressure in this business is extraordinary.  
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Superior back-coating technology and precision-engineering ensure that Fuji stands up to all the punishment dished out in the editing room. In fact, stop-motion capabilities increase to over 180 minutes. And Fuji’s smoother, denser BERIDOX coating makes sure your tape heads suffer less abrasion than ever before.

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You don't hear the fluorescent lights, motors, SCR dimmers, static, buzz, hum and handling noise with Canare L-4E6S. This shielded professional microphone cable is immune to electro magnetic noise due to its unique Star-Quad configuration. Compared to the leading 2-conductor microphone cable, Canare L-4E6S offers 10 times more rejection of the worst source of EMI...Impulse noise from SCR dimmers. This cable blocks the noise, but not the program. Its low series resistance and low capacitance give L-4E6S extended frequency response, in mic runs of over 300 feet the 2 dB downpoint is at 50 kHz.

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problem, and radio and TV engineers should keep abreast of the subject.

Activities on Tuesday will conclude with an evening series of workshops with experts on various subjects. The idea is to permit station engineers and technicians to work directly with the experts and personnel from other stations to solve problems and discuss certain issues. The workshops begin at 7:30 p.m. Be sure to check them out before making other evening plans.

Wednesday's activities

Wednesday morning brings the session on spectrum management for engineers, just before the FCC commissioners’ forum. This year the main topic of the forum will be technical deregulation, current FCC technical rule enforcement policy and a description of the capabilities of the FCC monitoring van. There also will be a panel of FCC engineers on hand to answer questions from the audience. Sometimes during the conference, the FCC monitoring van will be open for inspection and staff members will be available to explain its operation.

So that is it for the 1984 NAB Engineering Conference. No engineer should miss this convention.
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.
Automatic, continuous, reliable broadcasting.
Introducing the Panasonic MVP-100.

Now broadcast automation takes a giant leap forward with the introduction of the MVP-100. To start with, it incorporates the YIQ ¼-inch M-Format. And that means picture quality that not only surpasses ¾-inch and 2-inch, but actually rivals 1-inch tape. All with the reliability and economy of ½-inch, M-Format recording.

But the Panasonic MVP-100 will do more than make your programming look better; it will also make broadcasting easy. The reasons: its automatically threaded, computer-controlled tape transport systems. The MVP-100 lets you schedule in advance and automatically air program length material, news spots, editorials, commercials, station IDs and promos. All with time-code accuracy. It all adds up to totally reliable automation of your station’s broadcast day. The MVP-100’s spot player and recorder will even make those unfortunate moments of “dead air” disappear since protection copies are easily dubbed and are programmed to take over the moment broadcast continuity has been interrupted.

Still, with all the MVP-100 has to offer, you can put it to work at a surprisingly affordable price. Audition the Panasonic MVP-100. Once you do, don’t be surprised if you end up carting your present video cart machine away.

For more information on what the MVP-100 can do for your station, call the Panasonic New Technology Products Group at (201) 348-7471.

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M-Vision™
The Complete Recording and Playback System

Panasonic
Broadcast Systems
With a bold new change in organization and a dedicated focus on broadcast video, Panasonic Industrial Company suddenly has emerged as a major contender in the broadcast marketplace.

Recently, under a new management structure, complete with strengthened marketing and field engineering/service forces, Panasonic's image in the broadcast video market has undergone a rapid metamorphosis. This new Panasonic marketing approach is matched with products that meet today's professional market needs, with a substantial investment in R&D to create new products as the market evolves. Thus, Panasonic Industrial Company has become a major force to be reckoned with, a supplier of M Format component video equipment that meets today's market needs as well as the future's.

In the eyes of many teleproduction and broadcast professionals, this moment at Panasonic has been a long time coming. Now that it has arrived, the market is quickly responding to the realignment of priorities at Panasonic Industrial Company.

**Background and growth**

The parent company behind the Panasonic operations is the prestigious Matsushita Electric Industrial Company Ltd. (MEI) of Osaka, Japan. MEI now produces more than 14,000 different kinds of products: employs more than 125,000 people worldwide; and has 46 manufacturing plants and 34 sales companies.

The sales from this giant, complex operation amount to more than $16 billion annually, of which about 66% of the products are for consumer markets with products bearing the names of Panasonic, Quasar, Technics and National. With worldwide sales steadily growing, MEI's net income for 1983 exceeded $774 million, up more than 16%, from 1980.

Because it operates on a global basis, MEI has had to develop strengths to compete in the worldwide economic environment. This has meant local and international attention to R&D.

**R&D: The lifeblood**

The only certainty in the electronics industry is constant and rapid progress—in technology, products and production facilities.

For a company to survive in this fast-moving industry, it must move equally fast in adapting its products to new electronics technology that is constantly emerging. But Matsushita Electric has done much more than simply keep pace. It has set the pace with the NCP system, and new products derived thereof, such as the MVP-100 videotape cart machine.

**MECA - A growing force in America**

MEI activities were launched on the North American continent in 1953 with the opening of a New York office.

The success of this venture led to the founding of Matsushita Electric Corporation of America (MECA) in 1959—the same year that Alaska and Hawaii were admitted to statehood.

Even in its early years, MECA's growth was steady and impressive. In 1961 the name Panasonic was selected...
as a brand name, followed in 1974 by the acquisition of Quasar and adoption of the Technics brand name. In 1975 MECA moved into its present headquarters in Secaucus, NJ, and the stage was set for an accelerated growth and expansion in sales and staff.

In the United States alone, in the past 25 years, MECA has grown from a 3-man sales force to an organization of impressive statistics: more than 7000 employees and a network of six sales companies, seven manufacturing operations, and one service and engineering company. Sales from this complex operation in 1983 exceeded $2.8 billion, with 20% of the North American sales coming from Western Hemisphere manufacturing plants.

The results include products with high performance and a strong image: a corporation that is eminently successful in its operations, and a productivity that is enviable.

In anticipating future growth, MEI is now shifting more effort to other markets—robotics, communications, office equipment and broadcast video.

By putting emphasis on these markets, without decreasing its attention to the consumer markets, MEI expects to increase sales in these growth markets up to 50% of its sales within the next decade. This is an ambitious undertaking, but none of the visions at MEI have been small.

**Broadcast video**

Broadcast video equipment is particularly attractive to Panasonic in its North American market, and it is the Panasonic name that will blaze the trail. The products that are spearheading this market penetration are the RECAM 1/2-inch camera/recorder system and the MVP-100 Multifunction Video Player.

The roots for these products go deep, but they burst into public view with dramatic impact at the 1981 NAB Convention in Las Vegas. Panasonic not only introduced its combined camera/recorder system, the RECAM, but also introduced studio recorder/players and an edit controller—the complete package.

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**RECAM: The complete 1/2-inch M Format camera/VTR system**

RECAM was developed as a professional studio system as well as for ENG/EFP production. As such, it heralds a new era of quality, lightness, portability and compatibility into professional video.

At right are shown the major components of the system: the camera, attachable VTR, edit controller and studio VTRs. However, besides introducing a new standard of excellence in equipment design with RECAM, Panasonic also introduced a new level of compatibility. Thus, the RECAM camera and VTR can be used as separate building blocks, with interfaces that allow the camera to function with any recorder and the recorder with any camera.

The AK-1020 Gen-Lock Adapter, when connected to the camera in place of the VTR, allows the AK-100 camera to be used with any conventional VTR. Alternately, the AU-S100 NTSC Adapter interfaces the AU-100 recorder to any conventional NTSC camera.

The new AK-30 camera and AU-220 portable field recorder add significant features to 2-piece field production and newsgathering. Especially valuable is color playback in the field.

Keeping all its customers in mind, Panasonic designed RECAM to be selected as a complete package or to be phased in as needed. Thus, although RECAM is revolutionary in terms of technology and performance, it can be considered evolutionary in terms of adaptability into a customer's facility.

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**Keiichi Takeoka**
President
Matsushita Electric Corporation of America (MECA)

"In just 25 years, MECA has grown from a 3-man operation importing and selling portable radios out of a small office in New York City to one of America's leading electronics companies. Today, MECA has more than 7000 employees and annual sales of $2.8 billion.

"We are known in the United States largely by our Panasonic, Quasar and Technics products. But MECA produces and markets a wide variety of goods, ranging from electronic components to industrial robots. In all, we comprise 14 organizations in North America, including six sales firms, seven manufacturing operations and one service and engineering company.

"Through these companies, MECA is striving to become an organization contributing to American society by being deeply rooted in this country."
The MVP-100: A revolutionary multicassette player system

The Panasonic MVP-100 M-Vision Player is a Multifunction Video Player that takes full advantage of the high-quality video and unique features offered by the M Format technology. It is designed to provide the features and flexibility needed by many broadcast, teleproduction, cable, industrial, and educational facilities. With the MVP-100, TV programming now enters a new era of ease-of-operation, reliability and long playtimes. And quality need not be sacrificed, from the point of picture origination, through post-production editing, right to the final playback. Distribution and exchange of program material is enhanced by the use of lower-cost, smaller, and lighter standard VHS cassettes, using M-Vision Component Video Recording.

Much of today's news, sports, commercials, documentaries and entertainment shows are taped on-site using 1/2-inch tape format, with reluctant tolerance of video signal quality degradation. When better quality is demanded, higher cost, size and weight are the accompanying penalties in the use of 1-inch tape recorders. The response to the needs of the TV industry for lower-cost, better quality is the Panasonic M-Vision 1/2-inch tape format.

Most of the income revenue of the TV station is derived from the playback of short-segment commercials through a cart or reel player. End users well understand the expense, limitations and problems encountered in using 1-inch and 1/2-inch tape technology in these applications.

The MVP-100 plays all of the TV station's programming needs, short and long—automatically, economically, accurately, reliably and in high broadcast quality.

The MVP-100, with its innovative improvements offers an attractive solution to these drawbacks of earlier equipment. In fact, for its intended video applications, users may come to refer to it as the Most Valuable Player. The basic model can be supplied with 4 to 24 transport decks. However, it can be arranged initially with fewer decks and provisions for future expansion.

The manual controller is capable of directing up to 24 transports into 24 random-access sequences. The computer controller aids memory in depth using 128K RAM for all-day programming. Information exchange from the traffic department is handled by floppy disk, IBM language compatible. An RS-422 port is supplied for communication from station-automation devices. Log verification data is supplied besides the built-in printer. The thought given to look-ahead error checking and correction, diagnostics and alarm systems. Extensive video and audio switching, redundant dual channel outputs, including dual signal processing and TBCs, make the MVP-100 a most reliable player. Instead of merely previewing a sequence, a spot reel can be instantly recorded in either of the two record decks supplied. Then the operator can double roll the sequence and a spot reel, or he can double roll two spot reels.

Combined with the RECAM system, the MVP-100 makes it possible to have an all-1/2-inch videotape operation in broadcasting or production.

Furthermore, the customer has a full choice in satisfying his equipment needs. He can select a totally new installation or phase in M Format components as he retires other equipment.

MVP-100 features
1. Up to 24 separate transport decks and threading mechanisms for reliable, redundant playback.
2. Simple, fast automatic threading for error-free operation.
3. Decks are removable from MVP-100 for easy maintenance.
4. Two decks may be used to record the entire sequence of a station break for built-in spot reel playback.
5. Each cassette will hold 20 minutes of spot segments. T160 cassettes record 30-minute programs to provide play of all programming needs.

This makes it possible for professionals to plan ahead for a total component RECAM system in the future without having to scrap NTSC 1/2-inch equipment that is still providing good service. A concept as evolutionary as you, the customer, want to make it.

More recently, a second chapter in the RECAM was written. At the 1983 NAB Convention, Panasonic introduced its revolutionary videotape cartridge machine, the MVP-100. This product also established a landmark, the first major contribution to video insert and program playback since quad decks were introduced in 1969 and 1971.

As with RECAM, the MVP-100 is the next logical equipment addition to the Panasonic line, providing a specialized tool with high quality and versatility for commercial and post-production editing, right to the final playback. Based on the 1/2-inch M Format, the MVP-100 provides the quality that is needed when integrating multiple video sources for post-production editing. At the same time, the MVP-100 achieves play times compatible with the broadcast environment.

Now, for the first time in TV history, the MVP-100 makes it possible for TV broadcasters to consider seriously total automation for on-air broadcasts. But even if automation is not a major consideration, the MVP-100 adds a new dimension of freedom in inserting commercials, IDs, promos, news, editorials and public service announcements into broadcast programs. Multiple spots of various lengths may be recorded on one cassette. A complete directory is indexed at the front, addresses searched and spot-cued by time code. The directory consists of information stored in the time code track during the first few seconds of the tape. It contains the following listed contents that will be read into the computer memory, displayed on the menu monitor, and used to fast-forward the tape to park at the correct address for the spot designated by previously entered data:
1. Title and spot number
2. Spot duration
3. House ID
4. Agency ID
5. Directory ID
6. Time code address in
7. Time code address out
8. Number of times aired
9. Agency play priority
10. First air date/remove date
11. User-inserted information
6. Many short spots may be recorded on one cassette. A complete menu is indexed at the front. Addresses are searched and spot cued by time code for significant cost reductions.

7. Standard, low cost cassettes are readily available with a reliability record of billions in use throughout the world.

8. Control of machines is by serial data access RS-422 compatible for MC automation.

9. Total editing system control with the ability to actuate playback and record, audio and video cueing, and on-line start sequences on any transport, in any combination.

10. Off-line sequencer for all-day spot reel assembly random access, multisource library for reliable, cost-saving programming.

11. Highly flexible systems switching configurations, monitoring and playback. 24 video, stereo audio and time code sources to A and B outputs.

12. 76"x46"x30", approximately 8 transports
    76"x71"x30", approximately 16 transports
    76"x86"x30", approximately 24 transports

Program-length material also is handled by the MVP-100 with the introduction of the 30-minute cassette. Thus, the entire station's playback may be channelled through the MVP-100, reliably, automatically, inexpensively and in top quality.

The crowning achievement in the MVP-100 concept may well be that all these advances are provided at a modest price, well within the budgets of most facilities. Thus, the MVP-100 provides a quantum jump forward in technology and capabilities at a price considerably less than that of traditional, more restrictive equipment.

**Panasonic's new structure**

The development of the RECAM and MVP-100, specifically for broadcasters and video producers, has firmly launched Panasonic into a new market – broadcast video. To properly serve this market, Panasonic created its New Technology Products Group in January 1984. Under the direction of Koichi Sadashige, Vice President, this group is responsible for spearheading Panasonic's push into a wide range of new market areas that will use the company's high technology capabilities to serve growth markets of the future. One of these markets is the broadcast video field, with Morris Washington as National Sales Manager and Nick Hudak as Systems Development and Marketing Manager.

But marketing is not the only concern of Panasonic. It must serve its customers, and that means the establishment of an appropriate engineering and service network to support sales. Today this network divides the United States into five regions. A regional sales engineer is available to service Panasonic Broadcast customers from their nearest field office, in addition to the national RECAM service center in Secaucus, NJ.

**M Format: The turning point**

As previously noted, the broadcast market has anxiously awaited Panasonic's attention to its field. The M Format has served as the turning point for Panasonic, allowing it to focus its full attention and expertise on a totally new market, competing with a new wave of high technology products for broadcast video.

We often read that 1/2-inch tape is nearly as good as 1-inch tape, but...
M-Vision: The complete broadcast system, origination through editing to playback

The science of videotape recording has recently been augmented by a new technique—the technique of recording the luminance signal and the color signals on separate tracks. Known as dual-track recording, this technique eases considerably the problems of luminance-to-chrominance crosstalk, and removes many of the picture artifacts, such as moire and color-misregistration, which have plagued the recording art since the earliest days of color recording.

It is the purpose here to offer a brief preliminary explanation of the system, to aid the reader in understanding the formal specifications of M Format recording.

A single chrominance channel is generated, but instead of summing this chrominance signal with luminance to produce a composite color signal, both the chrominance and the luminance are sent separately to the recorder, where each of the two signals is recorded on its own private track. No subcarrier is used. Instead, the I and Q components are converted directly to FM signals occupying differing frequency bands, and these two FM signals are recorded on the color track.

This system offers the two fundamental advantages of freedom from color-framing considerations when editing, and freedom from the hue errors which arise when a subcarrier signal on tape is time-modulated by head-to-tape speed variations. There is no contamination of video caused by subcarrier crosstalk, nor any video impairment caused by heterodyne or “color under” by-products.

**Track format**

The video-track format of this dual-track system is shown in Figure 1. As the figure shows, two parallel video tracks are written diagonally across the ½-inch-wide tape, at an angle of about 4.7°. The uppermost track of the pair is 2½ mils wide, and contains the color signal. The tracks are about 4.1 inches long, and are written by a pair of heads spaced about 5½ mils apart, with the luminance head lagging its associated color head by about an eighth of an inch.

In addition, there are four longitudinal tracks: two audio, one time code and one control track. The 30 mil Audio 1 and Audio 2 tracks are spaced apart by a 30 mil guard band, while the Time Code (Audio 3) track, at 15 mils width, is only 15 mils from the 20 mil control track at the bottom edge of the tape. These longitudinal tracks are recorded at approximately 8ips.

**Figure 1**

**Figure 2**

**Figure 3**

**Figure 4**

A top view of the drum (Figure 2) shows that there are two such pairs of luminance/color heads. Each head pair writes one field; each drum revolution writes a frame. Each pair is preceded by a flying erase head, mounted at 30° to the writing pair. These two flying erase heads enable the system to generate clean insert edits.
M systems
The luminance signal, which is either derived directly from the camera or encoded from an NTSC signal, is converted to an FM signal which deviates from 4.3MHz to 5.9MHz, as shown in Figure 3.

The I and Q signals, derived in the same way as the luminance signal, are converted to a 5.0MHz-to-6.0MHz deviation FM signal (for I) and a .750-to-1.25MHz-deviation FM signal (for Q). These FM signals are summed, and the sum is recorded on the color track, as indicated in Figure 4.

The Q signal is linearly recorded, with the I signal itself providing the high-frequency bias needed for such near recording.

In effect, there are three independent M channels in the system, with I and Q separated from each other by frequency division multiplexing, and Y turned separated from I and Q by the use of a completely separate track.

This 3-channel arrangement yields the highest possible between the characteristics an NTSC recording system must have and the recording capabilities of 1/2-inch videotape. Sync is recorded in the Y and I signals to provide an automatic timing reference between the two tracks.

uial-track characteristics
The format described briefly above offers the following advantages:
1. Editing without concern for color framing.
2. Freedom from color misregistration resulting from envelope delay.
3. Freedom from differential phase and gain distortions.
4. Greatly improved color signal-to-noise ratio for both fine-grain and streaky noise.
5. Freedom from subcarrier-caused moiré.
6. Low tape cost, through use of VHS standard cassettes.
7. High quality multigenereubbing and editing.
8. High quality dual-channel audio, plus time code, due to 8ips speed.
9. Simple, uncomplicated signal processing. No TBC needed to dub or cut-edit.
10. Simple, uncomplicated mechanical handling of tape, for greater tape life.

Specifications
The full specifications of the MVP-100 are provided in a paper that details the track dimensions, transport geometry and signal processing for this recording method. We invite you to read these specifications for a detailed understanding of how the system achieves its performance. For a copy of these specifications, write Panasonic at 201-348-7471.

Highlights of MECA and the RECAM Development
1959 — Matsushita Electric Corporation of America (MECA) established.
1961 — Panasonic selected as a brand name.
1975 — Headquarters moved from NYC to NJ.
1976 — RECAM established Panasonic Company. The Quasar Electronics Company was purchased.
1979 — Design goals established. Matsushita began hardware development.
1980 — Matsushita working model of FM/FM color recording system, M Format, tested and accepted. Compression/expansion color system rejected. RECAM prototype shown to NHK.
1981 — RECAM working system consisting of recording cameras, studio recorder/players and an edit controller shown at NAB and Montreux conventions.
1982 — NAB and SMPTE, complete M Format system products available. Format documents for interchangeability specifications submitted to SMPTE.
1983 — MVP-100 Multifunction Video Playback cart machine prototype shown at NAB. Pre-production model shown at SMPTE. Customers on back order.
1984 — New Technology Products Group formed Jan. 1, 1984, of which Panasonic Broadcast Products is included. Production model of MVP-100 multifunction video player shown at NAB. Immediate deliveries available. Matsushita Electric Corporation of America celebrates its 25th anniversary of progress and dedication.

Nick Hudak
Manager, Systems Development and Marketing
New Technologies Group
Panasonic Industrial Company

"When we introduced the MVP-100 multifunction video player to the industry at the 1983 NAB Convention, we took a bold, dramatic step forward. Not since 1969 and 1971, when quad cart decks were introduced, has the industry seen such a dramatic approach to handling commercial inserts. Based on the new M-Vision 1/2-inch tape technology, the MVP-100 represents a quantum leap forward in air combinations of inserts and programs, putting broadcasters for the first time on the brink of complete TV station automation.

"And, all this is possible while retaining the high professional quality available in the emerging 1/2-inch tape and systems technology. Furthermore, the MVP-100 system can be custom tailored, with a variety of multiple decks available to meet the differing needs of many customers. Thus, the features and benefits of the MVP-100 provide distinct advantages to everyone in the TV operation: management, traffic, sales, engineering, news, financial and programming."

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combination video camera/recorder system at the 1981 NAB Convention, we rocked the industry. Not only did we show a highly advanced camera/recorder unit, we showed a complete system with studio recorder/players and an edit controller.

"You need a total system to meet the needs of broadcasters and producers. With RECAM we go a step further and let end users make individual choices. Although they can use the RECAM camera and recorder as a unique pair, they may use them separately interfaced to any existing system—the camera to any recorder and vice versa. The beauty of this design is that the customer can buy a complete system or individual components as needed. He can start with a complete new system or phase in specific components. He's in command because he can adapt new equipment into his operating system without obsoletting existing equipment that he wants to keep in service."

without reference to a specific reason. The above noise comparison measurements of multigeneration recordings illustrate the differences. In the amplitude-modulated noise of luminance and chrominance measurements, 1/2-inch tape holds up well compared to 1-inch. However, the phase-modulated noise figures, or FM noise, of 1/2-inch is far superior to 1-inch performance.

Why is that? Because of that elusive, difficult-to-measure, variable picture impairment called moire. Moire is caused by the heterodyne or beat frequencies caused by contamination of video signals wherever subcarrier is present. The herringbone suit or striped shirt illustrate this video contamination. Picture elements are generated into the video where none existed before. Consider the video impairment of several generations of NTSC recording.

In M Format 1/2-inch tape, there is no subcarrier recorded on tape. Therefore, there is no moire or spurious signal problem to impair true video fidelity, generation after generation. One-inch tape, because it is a composite video recording with subcarrier present to cross-talk into video, suffers from moire and spurious signal impairment. Therefore, 1-inch tape is nearly as good as 1/2-inch M Format tape.

The response in the marketplace has been gratifying. Acceptance of both the RECAM and the MVP-100 is growing rapidly, especially with products readily available to meet the increasing demands. Not since the introduction of the portable cameras in the early 1970s has the industry demonstrated such enthusiasm for a new line of video products.

Industry acceptance is illustrated by the diversification of users: ABC’s American Sportsman for the Mt. Everest climb: CBS’s Saturday morning children’s show. Benji: the movie preview of Dune: CNN news coverage in Philadelphia: 20-20’s underwater documentary of San Ignacio’s treASURE: WNEV-TV for documentaries and now for news: and WHNS-TV and KMPH-TV for total automated playback of program length and short spot material, plus many, many more.

Although this is just a beginning, it is one that will serve as a benchmark for Panasonic’s entrance into the broadcast video market.

Panasonic Broadcast Systems
New Technology Products Group
One Panasonic Way
Secaucus, NJ 07094

Bibliography
The following provides a brief guide to additional reading on the M Format 1/2-inch videotape technology.


"Why I and Q?" R.N. Hurst, RCA.


RECAM and MVP-100 brochures. Panasonic Publications.
The Most Reliable Cap & Coil Tester On The Market: The “Z Meter” is a totally unique, Triple Patented Capacitor/Inductor Analyzer that will locate defective caps, coils and special devices that all other testers miss—we guarantee it!

The Only Complete Capacitor Analyzer On The Market: Extensive testing by our engineering staff has shown that value only testers and bridges will assist you in finding a mere 25% of all the defective capacitors you come across. Only the “Z Meter” checks all 3 critical capacitor parameters: value, leakage (at full rated voltage up to 600 V) and most importantly, dielectric absorption (patented), to catch the other 3 out of 4 bad caps that all the rest miss.

Patented, 100% Reliable Inductor Testing: The “Z Meter” measures true inductance (patented), not inductive reactance as bridges do. This means the “Z Meter” measurements are not related to frequency, assuring you of dependable, accurate and consistent readings—every time!

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NAB exhibit profile:

Sony Broadcast

The NAB convention, the world's leading show for broadcasters, provides an opportunity for exhibitors to do the unusual and unexpected. Within the framework of NAB restrictions on what exhibitors can and cannot do, companies devote a tremendous amount of time, talent and money to create exceptionally attractive and meaningful displays for the convention.

Each year we include in our NAB pre-show coverage an inside look at an outstanding exhibit from the previous year's convention. Last year we were impressed with the Sony display, and we asked the company to detail its efforts to develop the exhibit.

Although many people were amazed by its size and futuristic design, nearly everyone agreed that Sony Broadcast Products Company's 1983 NAB exhibit was a success. Titled, "Bringing Vision to an Industry," the 14,000-square-foot space center became a hot attraction for NAB's 30,000 visitors. The combination of innovative design and high technology was the key to the company's capability for displaying a wide range of products to a large number of attendees.

An insight into the planning, preparation and logistics involved in putting together an exhibit of such magnitude has been provided by Irwin Ungerleider, manager, shows and exhibits, Sony Broadcast Products Company, in this interview.

Q: In many ways, Sony Broadcast's 1983 NAB exhibit broke tradition. How was the initial concept formed? What were your goals?
A: In previous shows, we had employed the traditional fortress design, in which walls are set up around the perimeter of a booth area and all the hardware and demonstrations are held inside. For 1983, because we were working with the largest area that had ever been sold at NAB, management's idea was to create an open-air environment strikingly dif-

The huge Sony exhibit facility included a demonstration of high definition television (HDTV). The company's HDTV studio camera can be seen at the right.
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The answers bear the simplicity of common sense: no good. Which is why Sony created the yardstick for all 1" videotape: the Sony V-16.

The V-16 is based on the assumption that the only good tape is a perfectly consistent tape. And to achieve this consistency Sony has developed exclusive tape production techniques, created special binding materials, lubricating oils and additives. And then each batch of V-16 is submitted to over 16 quality-control checks where meticulous attention is paid to every detail from dropouts to print-throughs.

Any Sony tape that isn't perfectly balanced in picture quality, runnability, durability and audio will never find its way into your editing suite.

So if you're looking for the best overall performance in a 1" tape, look for the one that's superior in 16 points, not just some of them: V-16 from Sony.  

© 1984 Sony Tape Sales Company, a division of Sony Corporation of America, Sony Drive, Park Ridge, New Jersey 07656. Sony is a registered trademark of Sony Corporation.
This special section alphabetically lists the NAB-'84 exhibitors and previews products to be displayed in Las Vegas. The parenthetical number following the exhibitor name is the booth site in the convention hall. If a company did not have a booth at press time, an asterisk (*) appears in place of the number. A dagger (†) indicates that a company's NAB form was not returned at press time. In such cases, data was generated from the NAB listing and/or BE files.

Below each exhibitor listing is a number by which the Reader Service Card may be used to provide additional exhibitor data. Also, if the exhibitor is advertising in this issue, the location of the ad is indicated for additional details about the company's NAB-'84 exhibit products.

Although this section will be a valuable aid in planning convention activities, caution should be exercised. The listing here is comprehensive as of press time, but changes are still occurring in exhibitor sign-ups, products being shown and booth assignments. Check the final program at NAB-'84 to make your final plans. Look for the BE wrap-up of this convention in our June and July issues.

### Exhibitor Roundup

#### ABP Systems
- See at booth
- Circle (401) on Reply Card
  - See ads on pages 51, 138 and 139

#### ADC Magnetic Controls
- Established products
- Pre-wired audio and video jackfields
- Audio connectors
- Coaxial connectors
- New products
- Hum-bucking equipment
- SJ2000: Self-normalizing coaxial jack
- Circle (402) on Reply Card
  - See ads on pages 51, 138 and 139

#### ADM Technology
- Established products
- 9000 series: Stereo, microprocessor-based, on-air and production consoles
- VP series: Audio post-production console, coupling video editing with audio
- 2442 series II: 168-input, 24-mix bus on-air or production console with four or eight submasters and two outputs
- 1642 series II: On-air and production TV audio console
- ST series II: Radio on-air and production consoles
- Audio DAs, patch bays, signal processors and related audio products
- New products
- Stereo TV on-air and production console with multiple stereo line preselection, stereo line input modules, stereo signal processing, submaster grouping and master output modules
- Circle (403) on Reply Card
  - See ad on inside front cover

#### AEG-Telefunken
- See Bayly

#### AF Associates
- Established products
- Turnkey systems and mobile units
- Marconi B3411: CCD telecine
  - (1611)

#### AVS6000: Digital standards converter
- AFA custom products
- New products
- Protek computer support and automation systems for broadcast and film production and post-production
- Circle (404) on Reply Card
  - See ads on pages 58 and 59

#### AT1-Audio Technologies
- Established products
- P100: Encore series, phono preamp
- P1000: MicroAmp series, phono amp
- M1000: MicroAmp dual mic amp
- L1000: MicroAmp dual linebuffer amp
- DA1000/DA2000: MicroAmp audio DAs
- New products
- DA1000: Modular audio DA system
- VU1000: MicroAmp series LED meter, power amp and 8x1 audio switcher
- DA208/416: Encore series, dual 1x4 and quad 1x4 audio DAs
- Circle (405) on Reply Card
  - See ad on page 240

#### AT&T Communications
- Established products
- Genesis graphics board
- FCT graphic creation terminal
- System 85 business management system
- Dimension PBX telephone system
- Transportable earth station terminals
- New products
- See at booth
- Circle (406) on Reply Card

#### AT&T Information
- Established products
- Dial-it service
- New products
- See at booth
- Circle (407) on Reply Card

#### AVC Systems
- Established products
  - (331)

#### AIR-7: Harrison radio console
#### PRO-7: Harrison video post-production console
#### MTR-10: Otari reel-to-reel ATR
#### MTR-90: Otari 24-track recorder
#### BTX: Machine synchronizer
- New products
- See at booth
- Circle (408) on Reply Card

#### Abekas Video Systems
- Established products
- A42: Video slide projector using 5¼-inch Winchester disk memory
- New products
- AS2: Digital special effects system for on-air and production including various image manipulations in single- or dual-channel forms with DataKey effects memory
- Circle (409) on Reply Card

#### Accurate Sound
- Established products
  - (*)

#### Accu-Weather
- Established products
- AS-200: High-speed audiotape duplicator
- 180: Starbird deluxe studio boom
- New products
- See at booth
- Circle (410) on Reply Card

#### Acrodyne
- Established products
- TRH/10KA: 10kW high-band VHF TV transmitter
- TRH/250A: 250W single-tube VHF TV transmitter
- (1228)

### Additional Listings

For more information on special sections alphabetically listed, see ads on pages 51, 138 and 139.
The ingredients of Varian’s new S-Tube bring super-high efficiency.

Varian's new “S-Tube” klystron operates at super-high efficiency—translating to significant savings in electric utility costs for UHF-TV broadcasters. The new S-Series, 5-cavity klystron provides significant improvement in operating efficiency through a unique configuration of tuning and cavity loading.

**Efficiency-tuned for 10% improvement.**

The new S-Series klystrons are tuned to maximize efficiency while maintaining useful gain. The Q of the second cavity is reduced by external loading and the output cavity is optimized by use of a variable visual coupler. These tubes will provide efficiency improvement of up to 10 percentage points over current high efficiency types when used under equivalent conditions.

**Interchangeable with Varian H-tubes.**

The most practical aspect of the new S-Series tubes is the complete interchangeability with the Varian VA-953H-Series tubes, providing broadcasters maximum flexibility in planning new equipment acquisitions.

More information on Varian’s new S-Tube is available from Varian Microwave Tube Division, or any Electron Device Group worldwide sales organization.

Varian Microwave Tube Division
611 Hansen Way
Palo Alto, California 94303
Telephone: 415-424-5675

Varian AG
Steinhauserstrasse
CH-6300 Zug, Switzerland
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  - 3 13-1 x 2 Canon lenses
  - 1 17-1 x 2 Fujinon lens
- 4 Ampex VPR2B Recorders
  - 1 VPR 20B
- Grass Valley 300-2AN Switcher
  - Dual Channel DVE
  - Chyron 4100 Series
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  - 64 mic inputs to 16 mixers
  - RTS 40 station intercom
  - RTS 12 station IFB

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Lerro Electrical Corporation
3127 N. Broad St., Philadelphia, PA 19132
(215) 223-8200
Adams-Smith (1724)
Established products
2600LG/LR: Longitudinal time code generator/reader
2600VG/VR: VITC time code generator/reader
2600TI: Translator interface for VITC editing
2600CI: Character inserter
2600CR: Longitudinal time code restorer
2600St: RS-232/SMPT/E RS-422 serial interface
2600SY: Tape synchronizer
New products
2600MTC/STC: Master transport controller for automatic VCRs
2600DEC: Digital data entry controller
2600DEC: Event/edit controller for audio editing
2600CD: Controller display

Advanced Music Systems (1330)
Established products
RMS-16: Digital reverberator
DMX 15-805: Digital delay and stereo pitch changer
A/V Sync: Digital audio delay synchronizer
New products
RMX-16: Enhancements including new reverb programs
DMX-15-805: Enhancements including new editing facilities

Advanced Videotech (1100)
Established products
PRC-1: Voice-actuated, 2-way radio headset
MX5V: 5W, 4-channel, hand-held, 2-way radio
New products

Acrodyne (1228)
Continued
TRU/10KA: 10kW UHF TV transmitter
TRU/5KA: 5kW UHF TV transmitter
TRU/100A: 100W UHF modulated translator
TRU/1KA: 1kW UHF modulated translator
TRU/1KA: 1kW UHF transmitter
TLU/30: Dual 30W UHF translators in hot-standby mode
New products
See at booth
Circle (412) on Reply Card

Ask Gordon, Alan

Alden Electronics (1336)
Established products
C200R/S: Stand-alone color weather display system
New products
See at booth
Circle (418) on Reply Card

Alexander Mfg. (1714)
Established products
In-board battery packs: BP20A-11, BP60A, JVC-1, BP90
Out-board battery packs: 7600, 7700
CR90-1: Battery charger
New products
See at booth
Circle (419) on Reply Card

Allen Avionics (1827)
Established products

American Radio History
Circle (284) on Reply Card

VR2: Digital video effects system
AC20A: Dual-channel TBC or synchronizer with production effects
VIP: Digital video effects system
AC20A: Dual-channel TBC or synchronizer with production effects
ESP II: Low cost broadcast still-store and graphics system with digital production effects
AC21A: PAL dual-channel TBC with production effects

Not all equalizers are created equal. You know that from experience. So do we. Our years of parametric design experience let us build so much performance and versatility into our 672A (mono) and 674A (stereo) graphic/parametric equalizers that Modern Recording & Music (October, 1981) described the 674A as "...the most powerful equalizing tool for pro audio work that I have yet to come across". They clearly appreciated the versatility and functionality of eight bands of EQ with fully adjustable center frequency and bandwidth, plus the availability of 12dB/octave highpass and lowpass filters to limit signal bandwidth or to serve as a full electronic crossover.

No matter what your application—production, program shaping, room tuning, reinforcement work, or clean-up chores—you can count on Orban's heavy-duty professional construction and equally professional documentation and service. Find out why the Orban 672A/674A's are truly the "un-equalled equalizers!"

Orban Associates Inc. 645 Bryant Street
San Francisco, CA 94107 (415) 957-1067
TLX: 17-1480

The unequalled equalizer.
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.

Be sure to visit us in Booth 1320 at the NAB Show, April 29—May 2 in Las Vegas.

Circle (24) on Reply Card
Stop using bad tape.
Reduce tape dropouts.
Improve video quality.

The RTI Videotape Evaluator/Cleaner finds control track and other physical damage that makes a tape useless. It can even print out exact damage locations.

You'll know instantly which tapes shouldn't be used.

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

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

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

Circle (420) on Reply Card
See at booth

HEC-1000: Hum eliminator
New products

Circle (421) on Reply Card
See at booth

Allied Broadcast Equipment (639)
Established products

Mics, mic mixers, audio amplifiers and audio monitors
Audio recording equipment
New products

TELEMIX II: Telephone interface with software control for 15-line fully conferenceable talk-show control
Circle (421) on Reply Card

Allied Tower Company (409)
Established products

Towers
Tower equipment
Tower services
Prefabricated buildings
New products
See at booth

Circle (422) on Reply Card

Allop (1177)
Established products

VHS and Beta video cleaners
Ultraline audiocassette deck and deluxe cleaning system
Orbitrac record cleaning system
58040: Record stylus care kit
79000: Microcassette cleaner
New products

67000: U-matic video cleaner with solution
67500: U-matic cleaner refill kit
60200: Ultraline VHS video cleaner
60210: Ultraline VHS refill kit
10086: Micro maintenance kits for computers
Circle (423) on Reply Card
See ad on page 241

Alpha Audio (210)
Established products

Sonex acoustic foam
New products
See at booth

Circle (424) on Reply Card
See ad on page 275

Altran Electronics (124)
See at booth

Circle (425) on Reply Card

Amber Electro Design (422)
Established products

3501: Distortion/noise measuring system
New products

5300: Programmable distortion/noise measuring system
Circle (426) on Reply Card

Amco Engineering (1218)
Established products

Equipment racks, consoles, computer desks, desk-top cabinets, enclosures and work stations
New products
See at booth

Circle (427) on Reply Card
See ad on page 285

AMEK Consoles (1620)
Established products

BCO-1: Portable dc-powered field mixer
TeleVideo 1000/2500: Stereo live/production consoles
Matchless production/music mixer
M-4000: Film console modules for re-recording
New products

Telecine 7000: Telecine transfer preliminary
CLO-1: 2-stage limiters
Circle (428) on Reply Card
See ad on page 209

American Horizon (1122A)
See at booth

Circle (430) on Reply Card

American Image (653)
Established products

Circle (25) on Reply Card

4700 Chase Ave., Lincolnwood, IL 60646
*Illinois, Alaska, Hawaii or outside the U.S.A., call 312/677-3000

Circle (275) on Reply Card

Circle (285) on Reply Card

Circle (209) on Reply Card

Circle (241) on Reply Card
"WHY?"

WHY DO SEVEN MAJOR PRODUCTION HOUSES IN NEW YORK CITY CHOOSE FUJINON LENSES?

According to John Martin of Modern Telecommunications, Inc., MTI chose FUJINON P17 x 16.5ESM lenses because "the lens delivers the highest performance we've seen in any lens today...smooth zoom and focus...sharp, clear pictures...FUJINON service before and after sales is unmatched by the competition. We deal with most of the major advertising agencies as well as all the networks and they are quite critical of the end product. We need great pictures to satisfy our customers. So, to get the best pictures, we chose the best lenses...FUJINON."

<table>
<thead>
<tr>
<th>PRODUCTION HOUSE</th>
<th>FUJINON LENS</th>
<th>PRODUCTION HOUSE</th>
<th>FUJINON LENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCR Video Corporation</td>
<td>P44 x 18ESM</td>
<td>Reeves Teletape</td>
<td>P17 x 16.5ESM</td>
</tr>
<tr>
<td>155 East 55th Street</td>
<td>P30 x 20ESM</td>
<td>United Video Services</td>
<td>P30 x 20ESM</td>
</tr>
<tr>
<td>MATRIX Video</td>
<td>P17 x 16.5ESM</td>
<td>VCA Teletronics Center Stage</td>
<td>P16 x 17ESM</td>
</tr>
<tr>
<td>727 11th Avenue</td>
<td>P14 x 16.5ESM</td>
<td></td>
<td>P30 x 20ESM</td>
</tr>
<tr>
<td>MODERN TELECOMMUNICATIONS, Inc.</td>
<td></td>
<td></td>
<td>P44 x 18ESM</td>
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<tr>
<td>1443 Park Avenue</td>
<td></td>
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</tr>
<tr>
<td>NATIONAL VIDEO CENTER</td>
<td></td>
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</tr>
<tr>
<td>460 West 42nd Street</td>
<td></td>
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</tr>
</tbody>
</table>

For more information on the P17 x 16.5ESM and other high quality FUJINON products, contact your FUJINON office nearest you.

672 White Plains Rd., Scarsdale, NY 10583
2101 Midway, Suite 350, Carrollton, TX 75006
4855 Atherton Avenue, San Jose, CA 95130
118 Savarona Way, Carson, CA 90746

Circle (26) on Reply Card

Photographed at Modern Telecommunications, Inc.

www.americanradiohistory.com
American Image (653)†
Continued
TV production
Syndicated radio programs
Broadcast consulting
Music library
New products
See at booth
Circle (431) on Reply Card

Amperex Electronics (1412)
Established products
XQ1427/2427/3427: ½-inch Plumbicon tubes
XQ1070/2170/3170: 1-inch Plumbicon tubes
XQ1410/4500: 30mm Plumbicon tubes
New products
XQ4607: ½-inch HS DG Plumbicon
83XQ: 30mm DG Plumbicon
XQ4187 (85XQ): ½-inch DG Plumbicon
XQ457 (87XQ): ¼-inch DG Plumbicon
S4083: ¼-inch Plumbicon for low cost, high performance cameras
YK1263: Klystron
Circle (429) on Reply Card

Amplex Corporation (1400)
Established products
VPR-3, VPR-80 and VPR-2B: Type C VTRs
VPR-5: Portable type C VTR
FPC-10: Portable ENG VRC camera/ recorder
ACE and HPE: Editing systems
AVC 4100 series: Video production switchers
ADO: Digital special effects system
ESS-3: Still-store and graphics system
New products
See at booth
Circle (432) on Reply Card

Amplex Tape Division (*)
Established products
196: 1-inch helical videotape
197: U-matic videocassettes
456: Grand Master professional audiotape
406/407: Professional audiotape
101/102: Beta/VHS videocassettes
175: Quad videotape
New products
See at booth
Circle (433) on Reply Card

Ampel Systems (1745)
Established products
ECM series: Edit code reader/generator, master with VITC and VITC reader/character inserter/translator
STG 300: Safe area/safe title generator
1260: Video character generator
1275A: Time display
Evertz time code products
New products
4900: VITC/longitudinal edit code reader/generator
3600D: Edit code reader/generator/character inserter
4500: Portable VITC/longitudinal generator/reader
4600: VITC source identification system
DV8800 series: Modular DAs for audio, video, video clamping and equalizing.

Anchor Systems (1618C)
Established products
AN100: Self-contained 25W sound system in walnut cabinetry
AN150: AN100 system in black vinyl
AN200: 55W sound system in walnut cabinetry
AN250: AN200 system in black vinyl
New products
Porta-Com: Cabled intercom systems
Snakes: Mic multi-input cables and boxes
Circle (435) on Reply Card

Andrew (1201A)
Established products
UHF-TV transmitting antennas for all power levels
Microwave antenna systems
Coaxial cable and rigid transmission line
Circular waveguide for UHF-TV
Standby antennas
Guyed and self-supporting towers
Fiber glass and concrete equipment shelters
Project management and field installation services
New products
See at booth
Circle (435) on Reply Card

Angenieux (1201)
Established products
TV and film zoom lenses, including:
15X7: System for ¾-inch format
15X9 and 25X10: For ¾-inch format
12X16: With 2X range extender
15X17: Lens assembly
New products
See at booth
Circle (437) on Reply Card

Anixter Brothers (1171)†
Established products
Antennas, point-to-point
Antennas, satellite
Antennas, microwave
Antennas, 2-way
New products
See at booth
Circle (438) on Reply Card

Antenna Technology (1737)
Established products
SIMULSAT: Multibeam antennas in 3.3m, 5m and 7m equivalent sizes
New products
SIMULSAT-7: 7m equivalent earth station antenna for TV broadcast
Circle (439) on Reply Card

Anton/Bauer (1337)
Established products
ProPac13/14: Snap-On nicad. 4Ah battery packs
ProPac90: Pro VTR battery
SV-13: Snap-On silver 13.5V/12Ah battery
30/13: Universal battery belt
LSQC/LSQ4: Lifesaver 8-hour single and quad chargers
LSFC: Lifesaver 1-hour fast charger
SPS-5/SPS-5: ac power supplies
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-tellurium 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. That'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.


*Used by permission of trademark owner.

RCA
Take out the doubt.
Circle (44) on Reply Card

www.americanradiohistory.com
Anton/Bauer (1337)
Continued

SNDS: Diagnostic battery evaluation unit
LG-UD: Black Beauty universal light head
Micro Control: Compact camera control unit
New products

MicroLight: Lightweight modular lighting system for universal portable applications
MicroControl: Unit for Ikegami 79E Portable undercover VRC system for up to 8-hour surveillance applications in any lighting situations
Miniature camera/monitor safe area generator

Circle (440) on Reply Card

Anvil Cases
Established products (1112)
Equipment transport cases for broadcast, teleproduction and cine equipment
GSA cases
New products
See at booth
Circle (441) on Reply Card
see ad on page 170

Apert-Herzog
Established products (1703)
Model A2: Digital frame synchronizer
Model H2: TBC-frame synchronizer
Model H: TBC-frame synchronizer
VBB-1: Distribution amplifier IC
1x24: 1-in/24-out DA
New products

Circle (442) on Reply Card

Aphex Systems Ltd. (513)
Established products
AXII-5: Studio aural exciter
AXII-1B: On-air aural enhancer
AXB: Low cost aural exciter
EQP-2: 3-band sweep EQ in powering rack unit
CX-1: Modular compressor-expander
15 37A: VCA IC
New products

Circle (444) on Reply Card
see ad on page 292

Applied Digital Technology (1730)
Established products
Synchronizers. SMPTE time code
New products
See at booth
Circle (445) on Reply Card

Arbitron (802)
Established products
AID applications for sales
Program and promotional graphics
TV meter services
New products
See at booth
Circle (446) on Reply Card

Aries Antennas (1770)
Established products
TV antenna systems and services, including installation, measurements, analysis and refurbishment of older systems
New products
See at booth
Circle (447) on Reply Card

Arrakis (211)
Established products
100RS: Routing switcher
150SC: Audio console
5000SC: Audio console
2000SC: Audio console
2000R: Audio console
Mic mixers, pre-amps, power amps, audio DAs, LED/VU level indicators
New products
See at booth
Circle (448) on Reply Card

Arriflex (1421)
Established products
35BL-3: 35mm motion picture camera
35-3: 35mm MOS film camera
16SR-2: 16mm film camera
Zeiss motion picture camera lenses
ARRI HMI lights
ARRI CineLib: Crane for film and video cameras
BTM 616: Film editor with video interface
New products
ATC: ARRI SMPTE time code unit for ARRI film cameras
Wheeled base for CineLib
ARRILITE: Portable tungsten lighting kits
Circle (449) on Reply Card

Circle (28) on Reply Card

LJ-12
AUDIO TAPE RECORDER REPRODUCER
1. Complete microprocessor control of all transport and audio functions resulting in unprecedented operational stability and flexibility.
2. SMPTE compatible with versatile accessory connector containing all vital signals, including RS-232 serial input and output.
3. Digital adjustment and storage of audio parameters eliminates trimpots and allows front-panel adjustment and multiple alignment settings in non-volatile memory (no batteries).
4. Most accurate vari-speed ever offered, with precise digital control of capstan speed from 3 to 36, IFS, and real-time vari-speed correction of the tape timer display.
5. Simplicity by design — in operation and construction.

THE L.J. SCULLY MFG. CORP.
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.
203/386-2332

Circle (29) on Reply Card

LJScully
THE ORIGINAL SCULLYS

Circle (28) on Reply Card

See at booth
Circle (442) on Reply Card

See at booth
Circle (444) on Reply Card

See at booth
Circle (445) on Reply Card
Ikegami has just made it impossible for any quality-minded high resolution color monitor user not to consider looking into an Ikegami monitor. They call it the 9-Series, two new monitors (13V and 19V) with standard features that include a High Resolution Shadow Mask CRT with a Self-Converging In-Line Gun; American Standard Matched Phosphors; a Comb Filter to preserve luminance resolution; pulse cross and R-Y/B-Y outputs. We think you'll call it just what you've been looking for. Along with its streamlined design and easily serviced modules, Ikegami's new monitors follow in a tradition of excellence. Each offers high stability, exceptional performance and proven reliability. Together with Ikegami's Delta-Gun Series, the 9-Series provides yet another reason to look into the monitors that more and more video users are spending their time looking into. Isn't it time you looked into Ikegami monitors?

Ikegami is the supplier of Color Monitors to ABC for its coverage of the 1984 Winter and Summer Games.

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607: (201) 368-9171 • Northeast: (201) 368-9171
West Coast: (213) 534-0050 • Southwest: (713) 445-0100 • Southeast: (813) 884-2046 • Canada: (201) 368-9179

Circle (29) on Reply Card
Chances are we've already done one just like it! The fact is, we've designed, fabricated and installed video systems of every size and configuration—from ENG vans to large mobile production systems, from insert stages to multicamera production studios, from 3/4” editing rooms to state-of-the-art post-production suites, film-to-tape facilities, videotape duplication centers, satellite network playback facilities, etc.

That's why more and more production and post-production companies, broadcasters, cable operators, corporate users and advertising agencies have come to rely on us—for our experience and engineering knowhow, and our ability to get the job done on schedule.

And they know it makes good economic sense, too. Because while we’re doing what we do best, they can concentrate on doing what they do best!

So pick a video system. And then call us, today!
He's 5½ going on 6 and he isn't a genius. But the Marconi Line Array Telecine B3410 doesn't need a genius.

Unlike other telecines, the Marconi B3410 is fully digital. That means, among other things, it can deliver full performance within two minutes from the time you switch on. It does not require tweaking or day-to-day adjustments, and there is no registration drift or tubes to replace. The stability of its electronics is simply superb!

Once it's started, you'll appreciate the Marconi B3410 for its fully digital processing and CCD image sensors that provide an extraordinarily true video picture. Moreover, the Marconi B3410 has a light bias facility that resolves dark areas of the film. It converts into all international standards and interfaces with all available color correctors.

For more information on specifications and the cost of the Marconi B3410, call us in New Jersey (201) 767-1000 or in California (213) 466-5066.

Please See Us at NAB Booth 1611

A.F. ASSOCIATES INC.
ADVANCED SYSTEMS AND PRODUCTS FOR THE VIDEO INDUSTRY
AFA PRODUCTS DIVISION 100 STONEHURST COURT, NORTHVALE, NJ 07647

Circle (30) on Reply Card
Artel Communications
Established products
SL-2000: Fiber-optic transmission system for video/audio/data
EN-1000: Portable fiber-optic ENG/EFP transmission system
T/R-2000: Long distance video transmission plug-in modules
T/R-2150/2121: Dual-channel audio subcarrier system for SL-2000
T/R-2210: Data transmission subcarrier plug-in modules for the SL-2000
ACU-2000: Alarm control unit for multichannel fiber-optic video/audio/data systems
T/R-2013: High resolution fiber-optic video transmission system for computer graphics communications and high definition RGB video
T/R-2000L: Long distance transmission system for broadcast-quality video/audio
S-1000: Low profile card frame for SL-2000 fiber-optic function modules
HDVT/computer graphic products
New products
Circle (450) on Reply Card

Asaca/ShibaSoku
Established products
925R: Video noise meter
CMM20-14/11: High-resolution color monitors
CMM20-14/7: High-resolution in-line color monitors
Digital signal generators
Video production switchers
Portable signal generators
New products
Circle (450) on Reply Card

Associated Press
See at booth Circle (452) on Reply Card

Atlas Tower
Established products
Series: AM, FM and TV broadcast towers
New products
Circle (453) on Reply Card

Auburn
Established products
MC1: Machine control system
New products
Circle (454) on Reply Card

Audio
Established products
System III: Videocassette tape loader, reloader, rewinder for U-matic, VHS and Beta
619-P: Cassette-to-cassette transfer unit accessory for System III
200-9: Audiocassette timer, rewinder, exerciser
Cassette labels
Video splicers for U-matic and ¾-inch formats
Audiotape loaders for cassettes, broadcast and 8-track discs and Nagra reels
New products
619-R: Video rewinder for U-matic, VHS and Beta formats to operate with other equipment in unloading and reloading cassette housings
Circle (455) on Reply Card

Audio-Cord
Established products
A Series: Cartridge tape recorders and reproducers
B Series: Premium line cartridge recorders and reproducers
New products
TDS Series: Twin-deck cartridge tape reproducers
Circle (456) on Reply Card

Audio + Design/Calrec
Established products
F769X: Stereo compressor/limiter with expander, gate and EQ
Express Limiter: Stereo compressor/limiter processor with expander
Easy-Rider: Dual mono/stereo compressor/limiter
Transdynamic: Multiband processor for AM, FM or TV
Ampak-8: 8W monitor amp
Scamp: Modular production processor
TCR1: Portable EBUs/SMPTE time code reader/segmenter
E900: 4-band, dual mono or stereo EQ
CM2000 series: Condenser microphones
New products
Scamp: Enhancements to multiband processing system for AM, FM and TV
F601/D60: Super-dynamic limiter and delay line
PROPAK: Semi-pro to pro level interface plus EIAJ digital recording option
COMPEX-2: Compressor/expander with expander and gate for broadcast or production
Minimizer: 2-output portable or studio mixer handles 8 to 16 inputs, with 19-inch, rack-mount model available
SOUNDFIELD: Totally coincident stereo mic
Assignable console places more than 100 channels within easy reach of one operator
SCAMP: Modules include S30 expander/gate and S31 compressor/limiter
Ambisonic mono/stereo compatible surround sound system with broadcast encoders
Circle (457) on Reply Card

Audio Broadcast
See at booth Circle (458) on Reply Card

Audio Developments
Established products
145: Pico and field mixers with 4 and 8 inputs
New products
Circle (459) on Reply Card

Audio Developments
Established products
AD-062: Portable 8- to 16-input, 3-output audio mixer
AD-145: Portable 4- to 8-input, 2-output audio mixer
AD-166: Portable 3- to 4-input, 1-output audio mixer
New products
See at booth Circle (460) on Reply Card

Audio Kinetics
Established products
Q-Lock 3.10-3.10-2: Synchronizer
Q-Soft-SFX: Sound effects assembly software
Q-Soft-ADR: Dialogue replacement software
Q-Soft-Conform: Audio track editing software
New products
Q-Lock 3.10 enhancements including software for digital audio editing
Maslermix: Console automation system, using floppy disk-based memory, adaptable to various consoles with retrofit packages available for non-autonomous ready systems
Circle (461) on Reply Card

Audio-Technica US
Established products
AT815a: Battery-powered shotgun mic
AT835: Battery-powered short shotgun mic
AT815R: Phantom-powered shotgun mic
AT836: Studio dynamic uni mic
AT802: Studio dynamic uni mic
AT813R: Studio electret condenser uni mic
New products
AT803a: Battery/phantom-powered miniature omni lapel mic
AT811a: Battery/phantom-powered miniature uni lapel mic
Circle (462) on Reply Card

Audtronics
Established products
200 Series: On-air broadcast consoles
700 Series: Multichannel audio mixing consoles
1100 Series: Audio accessory systems
RTW peak program meters
New Products
300 Series: Audio production console
Circle (463) on Reply Card

Aurora Systems
Established products
Aurora/100: Digital videographics and animation system
New products
See at booth Circle (464) on Reply Card

Autogram
Established products
AC Series: 6- and 8-channel audio consoles
IC-10: 10-channel audio console
Microgram: Microprocessor-controlled console with live-assist and automation capabilities
New products
See at booth Circle (465) on Reply Card

Broadcast Engineering April 1984

www.americanradiohistory.com
Shure's new FP31 Mixer takes a big weight off your shoulders.

Introducing the most innovative field production mixer of its kind. Shure's FP31. You won't find another mixer this small with these features, dependability and ease of operation.

The FP31 measures only 6 5/16" x 5 5/16" x 1 7/8", and weighs just 2.2 pounds! Incredibly, it offers the same important features as much larger mixers. Plus, a few of its own.

Every channel has a mic/line level and a low-cut filter switch. And to prevent overload distortion, there's a built-in limiter with adjustable threshold.

The FP31 can be powered by two internal 9-volt batteries, or from an external 12-volt source. A green LED flashes to remind you that the mixer is on. Phantom and A-B power are also provided to operate lavaliere and shotgun microphones.

A slate tone can be laid down on the tape for locating specific takes, and there's also a built-in mic for voice slating.

The mixer also has two separate mic/line outputs for 2-camera shoots and a tape output to feed a cassette. For monitoring, there are two stereo headphone jacks—one 1/4-inch and one for miniplugs. The FP31's rugged nylon carrying case allows you easy access to every mixer function and lets you piggyback the mixer on your VCR or other equipment.

For ENG, EFP and film use, Shure's FP31 has everything you need to make your mix a perfect success. Coming from a mixer this small, that's quite an accomplishment.

For more information on Shure's FP31 Mixer, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.
Overvoltage - Undervoltage Deal With It.

Proper and steady voltage is essential to the operating efficiency and tube life of a transmitter. Automatic voltage regulators are the most overlooked components of a transmitter installation. Don’t ignore your transmitter’s needs.

**USE THE AVR MOST SUPPLIED BY TRANSMITTER MANUFACTURERS:**

**HIPOTRONICS AUTOMATIC VOLTAGE REGULATORS**

Models Available
- Voltage: 240 V, 380 V, 415 V, 480 V, 2400 V, 4160 V
- Single & Three-Phase

Input Ranges: +9/-14%, +20%
Correction Rate: Up to 20 volts/sec.
Amps: 40 A - 900 A

Options:
- Individual Phase Control
- Line Bypass Switch
- Special Output Adjustment (50-100%)
- Custom Design

NAB: Booth 1779

**M1000: Tannoy monitors**
- New products
- See at booth

**Circle (468) on Reply Card**

**BIW Cable Systems**
- Established products
- Camera cables and assemblies
- VTR cables and assemblies
- Triaxial cable and assemblies
- New products
- VTR cables with quick disconnect and armored features
- Fiber-optic cables and assemblies

**Circle (488) on Reply Card**

**BSM Broadcast Systems**
- Established products

**Circle (837) on Reply Card**

**ADA Series: Audio DAs**
- New products
- Series 200: 10x1 audio routing switcher
- Series 1000: 10x10 audio routing switcher
- Series 5000: 150x150 audio-video routing switcher with computer control

**Circle (489) on Reply Card**

**BTX**
- Established products
- 4790: Softouch audio editing system
- 4700: Shadow II ORP binder
- 6000/6100: Cypher modular time code system
- New products
- 4735: Transport command console
- 7000: The System intelligent synchronizer/controlled editor
- 4790 options: Mass storage unit and printer options

**Circle (470) on Reply Card**

**B-W Lighting Systems**
- Established products
- AC power distribution equipment grid systems
- Fixtures
- Lighting control equipment
- Cyclorama track and curtain systems
- New products
- 20-201/F: Cyclorama lights and accessories

**Circle (471) on Reply Card**

**William Bal**
- Established products
- Custom carrying and shipping cases for audio and video equipment and accessories, featuring heavy-duty Survivor and Road case lines
- New products
- Silverlan: Superior strength and durability combined into carrying case line

**Circle (472) on Reply Card**

**Barrett Associates**
- Established products
- Reconditioned used broadcast equipment covering spectrum from transmitters to turntables
- New products
- DB-8: Davbar Space Saver broadcast automation system

**Circle (473) on Reply Card**

**Basys**
- Established products
- Newsfury: Broadcast newsroom computer system
- Clipfury: Library system for videotape
- Personal Assistant: Single-user newsroom computer system
- New products
- See at booth

**Circle (474) on Reply Card**

**Bayly Engineering Ltd.**
- Established products
- S3181: 100W FM solid-state transmitter
- S3180: 500W FM solid-state transmitter
- MDST3158: Solid-state stereo encoder
- FM15H: 5W VHF hand-held transceiver
Now is the Time to Cut Your Land Lines!

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.

Six Major Benefits

Ordering the DART 384 Terminal gives you six immediate benefits:
1. 10-20% lower cost than the other guys (Lease or Purchase).
2. Better performance under marginal conditions.
3. Immediate off-the-shelf delivery.
4. Avoid phone troubles—forever.
6. Quick response to customer's problems.

DART 384 is priced 10-20% below the other guy's model and yet our bigger 3.8 meter antenna gives it more performance margin per dollar. It gives you everything you need to match or exceed all network audio quality requirements. Comtech's 3.8 meter antenna also operates better under the proposed 2° satellite spacing compared to the competition's 2.8 meter.

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.

And there you have it. Better service. Lower costs. The proven path to profits since the beginning of business.

For a closer look at this audio receiver terminal alternative, call Allied Broadcast Equipment toll free at 1-800-428-6954.
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 (34) on Reply Card

AM BROADCASTING - HIGH FIDELITY
Are these terms mutually exclusive?
☐ YES ☐ NO ☐ DON'T KNOW

Surprisingly, many broadcasters may not know that the correct answer to this question is no. Large sums of money are spent each year to purchase new transmitters, new studio equipment, new audio processing equipment and to modify antenna systems for improved AM sound. Unfortunately, until now, there has been no such thing as a professional quality AM monitor receiver. As a result, the perceived fidelity of an AM signal has been severely restricted by receiver performance.

Potomac has developed the SMR-11 Synthesized Monitor Receiver which will let you hear and measure the quality of your transmitted AM signal... perhaps for the first time. Features include: Crystal Stability; 60 dB Signal to Noise Ratio; Audio Frequency Response ±0.5 dB, 20 Hz to 8 kHz; Total Harmonic Distortion less than 0.2% (95% Modulation) at audio frequencies above 40 Hz... please write for complete descriptive brochure.

THIS DIAL WILL TUNE YOU IN TO THE NEW SOUND OF AM BROADCASTING

Potomac Instruments
932 Philadelphia Ave.
Silver Spring, MD 20910
(301) 589-2662

Circle (35) on Reply Card

Bayly (124)
Continued
FM14H: 4W UHF hand-held transceiver
FM25H: 25W VHF mobile transceiver
FM25HA: 25W UHF mobile transceiver
FM45V: 45W VHF mobile transceiver
Omniplexer: STL system
New products
See at booth

Circle (475) on Reply Card
see ads on pages 303 and 325

Beaveronics (1313)t
Established products
712: 4-bus, 12-input video production switcher with Eff/Eff Amp and Mix Amp
Bl-154: 4-bus, 15-input video production switcher with Mix/Eff Amp and Eff Amp
Bl-156: 4-bus, 15-input video production switcher with two Mix/Eff Amp Systems
QMS: Favag precision master clock systems
DSK-6-DL: Stand-alone downstream keyer, specifically designed for character generator inserts
Clocks, master/slave
New products
See at booth

Circle (476) on Reply Card
see ad on page 312

Belden Electronics (203)t
Established products
Series: AM modulation and frequency monitors
Series: FM modulation and FM stereo monitors
Series: TV modulation and frequency monitors
Series: FM and TV SCA monitors
Series: AM, FM, TV RF amplifiers
New products
See at booth

Circle (477) on Reply Card
see ad on page 312

Belden Communications (1628)t
Established products
Series: Lee filters Colormedia
HMI: High wattage unit that replaces brute arc lights
Lee resin camera filters
New products
See at booth

Circle (478) on Reply Card

Beston/McInnis-Skinner (1020)t
Established products
Newscan: Computerized newsroom with unlimited workstations
Data Prompter: Prompting system for electronic newsmroom
Marquee 2000/3000: Production character generators with optional font compose, animation programmer
New products
Data-Graphics: Direct-broadcast computer graphics system for maps, charts and graphics from hargraphs to intricate weather maps
Circle (479) on Reply Card

Beyer Dynamic (426)t
Established products
M series microphones
CV series microphones
CK series microphones
In growing numbers, broadcasters and postproduction houses are using the 200 to add ambience to their audio. The 200’s Hall and Chamber programs add reflected energy to dry voices, delivering fullness while maintaining clarity and articulation. Simple adjustments of the 200’s size control can produce ambiances that identify an unlimited variety of spaces, such as a wooden cabin, an empty factory, a long corridor, or a stone temple. Scenes and dialog acquire more meaning – and the audience’s ears appreciate ambience as much as their eyes appreciate color.

A reliable, cool-running, affordable package.

Human-engineered panel controls for easy, intuitive operation.

On-board mixing.

Programmable nonvolatile memory for storing up to 10 user setups with instant recall.

Now with the Lexicon Model 200 Digital Reverberator, broadcast audio takes on new color.

Size control – from the smallest closet to grandest canyon.

Balanced input and output connections with a maximum signal level of +24 dBm – in full stereo.

Hall, Chamber, and Plate programs – each with 10 preset variations.

www.americanradiohistory.com
After You’ve Experimented, Call Us. We Know What It Takes.
The Only Complete Talk Show System.
P.O. Box 269, 60 Union Ave
Sudbury, MA 01776 617-443-8811

Circle (37) on Reply Card

What could you do with a VHF-TV Transmitter with 30% fewer parts?

In a word, Relax.

NEC PCN-1200 Series VHF-TV Transmitters with exciter output options have 30% fewer circuit parts than conventional-type transmitters. That’s 30% fewer parts to worry about. You get more reliability, less maintenance.

And because conventional tuning capacitors and sliding-type inductances have been eliminated, you get broad-band frequency coverage with no tuning adjustment.

Find out what more you could do with a VHF transmitter with fewer parts. Call NEC at 1-800-323-6656.

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

Circle (38) on Reply Card

Beyer Dynamic (428)
Continued
DT series headphones and headsets
New products
MC734: Studio condenser mic
MC736: Short shotgun mic
MC737: Long shotgun mic
MPC50: Acoustical boundary mic
Circle (480) on Reply Card
see ads on pages 264 and 265

Bird Electronic (1825)
Established products
460-490 Series: Thruline wattmeters
8700 Series: Water-cooled Termoline coaxial load resistors
8600 Series: Moduload terminations
8080: Digital calibrator
4390 Series: Digital RF power analyzers
3000-5000 Series: FM coax filters
3100 Series: Watcher RF power monitor/alarms
New products
8572: 225kW forced-air dry load resistor
8570: 15kW forced-air dry reject load and termination
4030: Relative field-strength Thruline plug-in elements
Circle (481) on Reply Card

Bogen Photo (1705)
Established products
3068: Fluid head/tripod/dolly system
3145: Video caddy
3124: Tripod/fluid head/dolly system
3140: Tripod with mini fluid head
3128: Micro fluid head
3063: Mini fluid head
3061: Heavy-duty tripod
TSELG and TSELF: Cases
7000 and 7050: Quartz Lamps
3098: 6-foot light stand
2900: Super clamp
New products
7300: M-100 portable video light
2930: Magic Arm
7567: Custom pack for TSE cases
Circle (482) on Reply Card

Bogner Broadcast (1319)
Established products
High-power UHF-TV transmitting antennas
Low- and medium-power UHF and VHF slot and dipole transmitting antennas
CP FM transmitting antennas
MDS and ITFS transmitting/receiving antennas
LPTV transmitting antennas
New products
Base station antennas for 800-900MHz
SMR and cellular radio
Circle (483) on Reply Card

Robert Boach (1603)
Established products
KBF-1/KCF-1: QuarterCam VRC system
TVS-2000: Routing switcher
FDL-60: Telecine
RG5-4000: Graphics-animation system
Mach One: Videotape editing system
MC Series: Color video monitor
BCN Series: 1-inch B VTRs
RME Series: Production switchers
New products
RME: New switcher models
FDGR: Grain reducer for FDL-60
FRP: Color correction system for FDL-60
Circle (484) on Reply Card
see ads on pages 309 and 319

www.americanradiohistory.com
A NEW DIMENSION IN MASTER CONTROL SWITCHING

Utah Scientific, the industry's number 1 supplier of routing switchers, has now applied its talents to an allied area—Master Control Switching. Designed for immediate conversion to stereo and/or station automation, Utah Scientific Master Control Switchers are designed to deliver superior performance today while accommodating your future needs as well.

- Two models: two bus and three bus
- The industry's best performance specs
- Full preset capability with "goof-proof" single-button execution
- Integral edge, shadow, outline and color matte
- 28 direct inputs plus two assignable from panel
- Alphanumeric readouts on assignable inputs
- All-digital interconnect via RS-422 lines
- Top quality switches
- Stereo-ready—just add the matrix and one card
- All panel functions software controlled
- Machine control for two telecines and ten VTRs included
- Available with or without station automation system
- Preroll times individually assignable and user alterable
- Full audio over/under capability
- Separate 8 x 3 audio only matrix included
- Four large LED VU meters

Utah Scientific

1685 West 2200 South
Salt Lake City, Utah 84119

Telephone: (801) 973-6840
Toll Free: (800) 453-8782
TWX: 910.925.4037

Circle [59] on Reply Card
Bowen Broadcast Service
Established products
Engineering design and consultant services
Quad VTR repair services
New products
See at booth
Circle (485) on Reply Card

Broadcast Audio
Established products
Series II: 9- to 16-mixer modular stereo audio consoles
System 14: Digitally controlled 14-mixer console
System 20: 20-mixer advanced console
System R: 8-mixer rotary pot console
System 5: 5-mixer rotary pot console
BA-235: Monitor amplifier
BA-6x4: Audio DA
New products
BA-126: Rack-mount monitor amplifier/speaker system
Circle (486) on Reply Card

Broadcast Cartridge
Established products
Tape cartridges: Aristocart, Capitol, Audiopak, Fidelipac, 3M Scotchcart
Storage systems
Cart reloading service
Alignment tools and accessories
Fone box
New products
AA-4: Capitol/Audiopak cartridge
Circle (487) on Reply Card

Broadcast Electronics
Established products
FM transmitters with 1.5kW, 3.5kW, 5kW and 30kW power levels
FX-30: FM exciter
Control 16x: Program automation system
SAT-16: Satellite automation system
Series 3000/2100: Single-deck cart machines
Series 5300: 3-deck cart machines
Series 5500: 5-deck cart machines
Series 12C: Turntables
Series 50, 150, 250 and 350: Audio consoles
Audio and transmitter accessories
New products
See at booth
Circle (488) on Reply Card

Broadcast Microwave Services
Established products
TBT 50A/TBR-50A: 2-lb. frequency-agile ENG transmitter/receiver
CGA-1: Gyro-controlled helicopter ENG system
TBT-202/TBR-202: Intercity link T/R systems
TBA-14: Low-cost video remote receiver
TBR-2(K): Frequency-agile full feature portable microwave receiver
TBR-1(1)K: Rack-mount microwave T/R systems
New products
TBR-2(K): ac/dc-powered, field serviceable microwave transmitter of modular, frequency-agile design
BKS-5, 8, 12: Remote-controlled earth station with 30-station memory and auto “go-to” capability
Circle (489) on Reply Card

Broadcast Music
Established products
Syndicated radio program services
New products
See at booth
Circle (490) on Reply Card

Broadcast Programming Int'l
Established products
Music programming for automated and live-assist radio stations
New products
Newly developed adult contemporary, album rock, album rock/CHR crossover and country formats
Circle (491) on Reply Card

Broadcast Supply West
Established products
Prorax all-mahogany cartridge racks in wall-mount or carousel styles
Proamp PP220: Stereo phono preamp
Probe turntable base for SP15 and SP23 Technics systems
ME3009: Tonearms
S220: Syntec tonearms
New products
See at booth
Circle (492) on Reply Card

Broadcast Systems
Established products
BJ-200: Pre-wired audio jack panels
BJ-240A: Pre-wired audio jack panels
Custom TV system design and construction services
New products
DC-8: Video cart machines, designed for low-cost automated playback of commercials, PSAs and programs
PROPAC equipment consoles for editing suites, small production systems and mobile units
MC Series: Machine control panels for film and VTR equipment
Circle (493) on Reply Card
see ads on pages 235 and 343

Broadcast Technology
Established products
AU3101: Line amp
AD3108: 1x10 DA
AP3216: 10W power amp
AS3316: 1x101 audio crosspoint switch
PS3400: Power supply card + 14V, 400mA
EG3501: Remote control 10-band graphic EQ
VU3722: 20-segment LED VU/peak indicator card
MA110: Meter amp
DA7111: 1x10 DA system
CF9101: Card frame
MM2121: Mix minus portable mixing console
P1230: Program interrupt director station
HA1290: Battery-powered headphone amp
New products
Vector 4000: 24-channel single pair monitor DA system
Vector 1: 12-channel hard-line amplified selectable monitor system
M12112: Mix minus console with 5-level priority interrupts
M12326: 6x6 mix minus with program interrupts
Telephone hybrid with full AGC
Circle (494) on Reply Card
see ad on page 253
Let's face it. Listeners will never know that the Delta Series, ITC's new generation of cartridge machines, has improved cart guides, a crystal-referenced servo capstan motor with a vapor-honed non-magnetic shaft, and high-speed recue. They won't care that the Delta's modular design makes alignment and service convenient.

Listeners won't know about Delta's microprocessor-controlled digital cue tone detector and exclusive ITC playback head. Delta's compact size and choice of four configurations won't matter to them.

And the average listener won't know that ITC sells more professional cartridge machines than all other manufacturers combined. Or that the Delta Series replaces the Premium Line, previously the standard of value in the industry.

A lot of the things that make the Delta Series special... features that matter to you... don't matter to your listeners.

But that's okay. Because the thing your listeners care the most about is exactly what the Delta Series gives them... great sound.

The Delta Series sounds great... for you and for your listeners!

INTERNATIONAL TAPETRONICS CORPORATION
2425 South Main Street / P.O. Box 241 / Bloomington, Illinois 61701
Call Toll-Free: 800-447-0414
From Alaska, Hawaii and Illinois call collect: 309/828-1381

Circle (41) on Reply Card

www.americanradiohistory.com
Broadcast Video Systems (1326)
Established products
COX 600: Encoded color corrector with time code control
EV4060: Combined waveform/vector monitor
SA-101: Safe area generator
BVS video delay lines and filters
COX 303: NTSC/PAL encoder (dual standard)
New products
COX CV-P-100: Video processor. accepting RGB from computer regardless of scan rates. encoding NTSC/RS170A video
BVS D-1000: NTSC decoder
COX component color corrector
COX component switcher

Circle (495) on Reply Card

Cox (496) on Reply Card

Bryston Ltd. (517)
Established products
2BLP: 50W. single-rack unit audio amp
3B: 100W audio amp
4B: 200W audio amp
New products
2BLP enhancement: 50W. single-rack unit audio amp, with balanced XLR connections and front panel repeat access

Circle (497) on Reply Card

Byline Magazine (906)
(CBS Radio Stations News Service)
Established Services
Multiple 90-second news feature broadcasts on subjects important to today's news-oriented adult radio listener
New services
See at booth

Circle (498) on Reply Card

CAT Systems (1014B)
Established products
5200/5250: Computerized remote control system for satellite facilities
6200: Computerized remote control system for broadcast
New products

Circle (499) on Reply Card

CEI-Panavision (*1)
Established products
Foton: Studio color camera, 25mm and 30mm format
Panacam: Electronic cinematography camera

Circle (499) on Reply Card

310SP: EFP color camera with "film look" special performance features
New products
See at booth

Circle (500) on Reply Card

CMC Technology (1425)
Established products
Refurbishing services for audio and quad video heads
Videomax TD-800: Bulk tape demagnetizers
Quadhead and VTR accessories
New products
Replacement video heads for C-format machines such as VPR 218-3 and 90, featuring an auto-tracking record/reproduce video head

Circle (501) on Reply Card

CMX/Ornex (1839)
Established Products
CMX 3400 and 3400+: Large-scale editing systems
The Edge: Medium-scale editing system
New products
See at booth

Circle (502) on Reply Card

CRL Audio (300)
Established products
SMP-800: Matrix AM stereo limiter
APP-400/SPP-800: Multiband mono and stereo AGCs
SEP-400A: 4-band compressor/expander
SMP-880: FM peak controller
PMC-300A: AM mono peak controller

AT NAB '84 SHINTRON ANNOUNCES...

EMPERESS 2000
A BRILLIANT NEW SWITCHER

690
A TIMECODE READER/GENERATOR

270
AUDIO FOLLOW VIDEO MIXER
And for component video people we will have...

MC1 LONG-AWAITED INTERMATRIX CONVERTER

12X SERIES ROUTING SWITCHER

VISIT US AT BOOTH #1417

SHINTRON Company Inc.
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Tel. (617) 491-8700 Telex: 921497

Circle (42) on Reply Card

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hanumeric menus
1 prompt users
ough 18 reverb
ffects programs
their 59 variations
numeric sliders
for complete control
of up to 32 parameters
per program
Interface for tape storage
of user-created reverb
and effects variations
Self-diagnostics
Splits — two independent,
1 in/2 out, 15 kHz stereo
reverbs in one package
Software expandable — ready to answer the
needs of tomorrow

xcel with the Lexicon
224 XL
Reverberation/Effects Processor

the most critical recording
and listening environments,
the 224XL has become the bench-
mark for value, sonic quality, and
ative potential. Now, with the
addition of the Lexicon Alphanu-
meric Remote Console (LARC),
224XL users can enjoy unpar-
leled ease of operation and
expanded creative possibilities.

*Field conversion to XL is available
for owners of 224X systems.

For more information, call or
write for our new brochure that
describes the XL's advanced fea-
tures and includes a Lexicon
"Glossary of Reverberation
Terms."

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

Circle (43) on Reply Card

www.americanradiohistory.com
CRL Audio (300)
Continued
SCA-300: SCA subchannel generator
New products
FM stereo generator using a new technology in FM transmission
Circle (503) on Reply Card

CSI Electronics (507)†
Established products
T-1-A: AM transmitter
T2.5A1: AM transmitter
T-10-A: AM transmitter
T-1-F: IPA FM transmitter
FM5000E: FM transmitter
FM12000E: FM transmitter
T-25-F: FM transmitter
EX-20F: FM exciter
T-25-A1: AM transmitter

Alarms—status
Generators: Stereo, SCA
New products
See at booth
Circle (604) on Reply Card

see ad on page 15

Cablewave Systems (108)
Established products
4.5-inch jacketed coaxial cable
Wellflex coaxial cable in ¼-inch, 1/16-inch, 3-inch and ¾-inch OD sizes, with air dielectric
New products
FCL low-loss foam dielectric Wellflex coaxial cable, jacketed in ¼-inch, 1/16-inch and 1/4-inch OD sizes
See at booth
Circle (605) on Reply Card

see ad on page 261

Calvert Electronics (125)
Established products
EIMAC transmitting tubes
RCA power and camera tubes
Thomson-CSF translator tubes
Miscellaneous replacement components
New products
See at booth
Circle (506) on Reply Card

see ad on page 165

Calzone Case (1179)
Established products
Various types of shipping and carrying cases for video production equipment
New products
See at booth
Circle (507) on Reply Card

see ad on page 244

Cambridge Products (1328)†
Established products
Series: RF and UHF coaxial connectors
New products
See at booth
Circle (508) on Reply Card

The Camera Mart (1018)
Established products
Numerous audio, video and film production products available for purchase or rental
New products
See at booth
Circle (509) on Reply Card

Canare Cable (1732)
Established products
L4E6S: Starquad audio cable
3C-2VS/5C-2VS: Low-loss video cables
R360: Cable reels with three brake positions
New products
See at booth
Circle (510) on Reply Card

see ad on page 30

Canon USA (3012)
Established products
J13X5BIE and J15X5.5B Series: ENG lenses
J20X5.5BIE, J25X11.5BIE Series: EFP lenses including PV40X13.5BIE and P40X18BIE Series: O/B lenses
Accessories for all types of broadcast lenses
New products
P18X15BIE and PV18X11BIE: Studio lenses for 1-inch and 1¼-inch format cameras
J40X9.5B: Field lens for ⅛-inch format cameras
J18X9: ENG lens for ⅛-inch camera formats
Circle (511) on Reply Card

see ad on page 135

Capitol Magnetic Products (208)
Established products
A-2: Broadcast cartridge
AA-4: Broadcast cartridge
New products
SGS-4: Lubricated mastering tape
Circle (512) on Reply Card

see ad on page 308

CeCo Communications (1010A)
Established products
Distributor for Amperex, EIMAC, ITT, RCA, Sylvania, Varian and Westinghouse receiving, industrial and transmitting tubes
New products
Video stocking department carries large selection of video equipment and accessories from Hitachi, NEC, Panasonic and Sony
Circle (513) on Reply Card

Celestial Mechanix (441)†
Established products
Marketing programs to promote radio stations
New products
See at booth
Circle (514) on Reply Card

see ads on pages 248 and 249

Celwave RF (202)
Established products
Antenna systems and hardware
Transmission lines and pressurization equipment
Coaxial cable and wire
Patch panels and cables
New products
See at booth
Circle (515) on Reply Card

Central Dynamics (1409)†
Established products
CD480/4/18: Compact Video production switcher
CD480-10/24: Video production switcher
CAP2XL: Computer-assist production accessory
MC990-7/24: Master control switcher

Circle (520) on Reply Card

Century 21 Programming (204)
Established products
Automation programming services
New products
Super Cart: Instant delivery of music library on carts
Super Schedule: Music rotation schedules
Circle (519) on Reply Card

Century Precision Optics (1781)
Established products
Telephoto and wide-angle lenses for video
Custom lens service and modification
Wide-angle adapter for video zoom lenses
New products
Periscope (snorkel) lens for cine and video cameras features camera mount and lens interchangeability, based on f/3.8 (T14) multicoated optical elements
Circle (518) on Reply Card

see ad on page 277

Cetec Antennas (509)
Established products
JTC: CP TV spiral transmitting antenna
JSCP: CP FM antenna
JHCP: CP FM super power antenna
JBCP: CP FM broadband antenna
JSP: CP FM spiral panel antenna
Radomes
New products
See at booth
Circle (521) on Reply Card

see ad on page 187

Cetec Vega (1401C)
Established products
77D: Pocket transmitter
R-31: Pro receiver
April-June
A 4-day course on digital image processing offered by Integrated Computer Systems will present topics including image acquisition; enhancement; tracking and coding; and image processing software and database structures. The course will be offered as follows: April 10-13, Boston; April 24-27, Phoenix, AZ; May 1-4, Palo Alto, CA; May 8-11, Washington; and June 19-22, Los Angeles. For more information, contact Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45405, Los Angeles, CA 90045; 213-417-8888.

April 8-12
National Public Radio (NPR) will hold its annual affiliates’ convention at the Hyatt Regency Crystal City in Arlington, VA. Technical sessions are planned for two days of the convention, although at press time a listing was not available. Additional sessions are scheduled for programming and financial matters. A number of broadcast equipment manufacturers plan to attend the convention, although there will not be a formal equipment show.

April 25-27
EDS’84 will be held in the Las Vegas Hilton Hotel, Las Vegas, NV. For the first time in the convention’s 47-year history, distributors are invited as exhibitors. For more information, contact Electronic Industry Show Corporation, 222 S. Riverside Plaza, Suite 1606, Chicago, IL 60606; 312-648-1140.

April 29-May 2
NAB’84 will be held in Las Vegas, NV. For more information, see our pre-convention coverage that begins on page 23, or contact NAB, 1771 N St., NW, Washington, DC 20036.

May 5-9
The European Cable and Satellite Television Exhibition and Conference (EUROCAST’84) will be held in Basel, Switzerland. Awards will be presented for achievements in cable and satellite hardware and software. For more information, contact Cable & Satellite Television Exhibitions Ltd., Five Barratt Way, Tudor Road, Harrow, Middx United Kingdom HA3 5QC.

May 13-17
The Anaheim Convention Center in Anaheim, CA, will be the site of Computer Graphics ’84, the Fifth Annual Conference and Exposition of the National Computer Graphics Association. Included in the six technical sessions will be “Election’84: Network Videographics for Political Coverage” and “Videodisc and Computer Graphics.” For more information, contact Department YY, National Computer Graphics Association, 8401 Arlington Blvd., Suite 601, Fairfax, VA 22031; 703-698-9600.

May 14-17
The International Conference on Communications (ICC’84) will be held in Amsterdam, the Netherlands. Topics include communication switching, communication networks, radio communications, and satellite and space communications. For more information, contact Dr. T.A.C.M. Claesen, Secretary ICC’84, Philips Research Laboratories, WY-2, 5800 MD Eindhoven, the Netherlands.

May 15-18
Communications ’84, an international exhibition, will be held in Birmingham, England. The biennial trade fair attracted more than 430 exhibitors from 17 nations in 1982. A 3-day conference program, organized by the IEE, will complement the exhibition activity. For more information, contact Kallman Associates, US Representative, 5 Maple Court, Ridgewood, NJ 07450; 201-652-7070.

May 20-23
The Grand Hyatt Hotel in New York City will be the site of the 24th Annual Broadcast Financial Management Association Conference. Topics at the approximately 33 general sessions and workshops will include accounting standards, fraudulent billing, cable television, automation, public broadcasting and special concerns of BFMA’s Canadian members. Gene F. Jankowski, president, Broadcast Group, CBS, will be the luncheon speaker on Tuesday May 22.

May 23-25
The Eighth Annual Conference on Teleconferencing and Interactive Media will be held in Madison, WI. The program will report on the current status of and trends in teleconferencing, computer conferencing, videotex and other interactive systems. For more information, call 608-262-2569.

June-July
A series of film and video workshops will be held in Rockport, ME. For more information, call 207-236-8581.

June 13-15
A course titled “Video Teleconferencing” will be held at George Washington University in Washington. The course covers progress in video teleconferencing technology and describes the latest systems. For more information, contact Chip Blouin at 202-676-8527; George Harrison at 202-676-6106, or either Blouin or Harrison at 800-424-9773 (Tuesday-Friday).

September 21-24
Learn about audio techniques from professionals at the 13th Tonnemiestertagung Muenchen. Subjects discussed will include radio, television, recording, film, video theater and public address audio applications. In addition to many technical sessions, an exhibition of sound equipment and practice-oriented field trips will round out the experience. For more details, contact das Bildungswerk des Verbandes Deutscher Tonnemisteer Organisationsbuero. Postfach 101950. D-5000 Koeln 1 West Germany.

September 21-25
The 10th International Broadcasting Convention, IBC’84, will be held at the Metropole Conference and Exhibition Center in Brighton, United Kingdom. The growing interest in higher definition and enhanced TV pictures and the distribution of programs and information by cable and satellite will be covered in depth. For more information, contact the IBC Secretariat, the Institution of Electrical Engineers, Savoy Place, London WC2R 0BL United Kingdom.
THE REASON YOUR EDITING COMPONENTS DON'T WORK TOGETHER IS BECAUSE THE PEOPLE WHO CREATED THEM DIDN'T.
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.
INTRODUCING THE FIRST TOTAL SYSTEM

SONY/MCI JN-600 SERIES AUDIO CONSOLE

SONY/MCI JN-24 24-TRACK AUDIO RECORDER

BSW-2000 1" RECORDER

BVT-2000 1" TBC

BVU-820 3/4" RECORDER

BVT-800 3/4" DIGITAL TBC

BYW-40 1/2" RECORDER

RS-422

BYE-5000 CONTROL PANEL

SONY/MCI JH-24 24-TRACK AUDIO RECORDER
A SYSTEM IS ONLY AS GOOD AS THE SUM OF ITS COMPONENTS.

1/ST EDITING

BVH-2000 IN CONSOLE
- Multiple machine configurations, changeable and upgradable
- Wide DT range: from -1 to +3 X standard speed
- Video/Audio confidence replay
- Self-diagnostics with visual and audible malfunction alarms
- Plug-in Time Code Generator/Reader (optional)
- Plug-in Timebase Corrector (optional)
- 2 hours record/play time

BVH-2500 RECORDER
- All features of BVH-2000 plus:
  - Full C Format compatibility
  - Real time, variable and frame-by-frame recording, using DT head
  - Full-color framing
  - Instantaneous and repeatable rewinding byerasable DT head

BVU-2000TB
- 9-bit, 4 Fsc sampling
- Drop-out compensation with Y/C separation
- Built-in Velocity Compensation
- Sync Pulse Generator, Video Processor and automatic Advanced Sync Generator
- Built-in remote-control function
- DT playback with BVH-II00/1100A/1180/2000 and BVU-820 VTRs

BKH-2100 OPTIONAL PLUG-IN TBC FOR BVH-2000
- Plug-in, 3-circuit board Digital TBC
- 8-bit 4 Fsc sampling
- Remote-control capability

BKU-2015 OPTIONAL PLUG-IN TIMECODE FOR BVH-2000
- Generator/Reader with VITC/TC capability
- Character Generator
- User Bit Display

3/4" EDITING

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

1/2" EDITING

BVW-40 BETACAM® RECORDER
- Compressed Time Division Multiplex video recording system
- Built-in Timebase Corrector with Digital DOC
- Full Video/Audio insert and assemble editing, with preview/ review, forward/reverse trim, selectable pre-roll and auto edit input/output functions
- 9-pin RS-422 serial and 36-pin parallel remote ports
- 7-pin Dub-In/Dub-out connection for BVU series U-matic
- 12-pin YR/YB/Y component input/output
- Component and composite outputs

BVW-10 BETACAM® PLAYER
- Full Shuttle and Jog functions
- Built-in TBC with Digital DOC
- Built-in Time Code Reader and LED display
- Selectable Dolby® noise reduction
- Plug compatible with wide range of external systems
- Only front access required
- Component and composite outputs

At Sony, we do more than guarantee the best total system. We guarantee the best individual components. The machines you see on these pages, which comprise the three established formats of the broadcast industry, represent only a small sampling of the Sony universe of post-production products. Each component, while different in price and scope of features, shares five things in common. Unsurpassed quality, reliability, durability, ease of maintenance, and excellence of value that Sony is famous for.

So whether you buy the Sony system piec 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) 833-5550; 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.

© NSS Sony Corporation of America. Sony is a registered trademark and Betacam is a trademark of the Sony Corporation.
WPMT Mohawk Broadcasting of York, Pa. had a clear vision of what they needed. They wanted a state of the art facility, turnkey operation, brought in on time and in budget. The Lerro Corporation came through on all counts.

The Lerro Corporation has the people, experience and creativity to design, engineer, install and provide the follow up support for your facility. Let us show you, face to face, what we can do for you.

For information, contact The Lerro Corporation, 3125 N. Broad Street, Philadelphia, Pa. 19132 • (215) 223-8200.
Enough. From now on we make our own tape.
Here's Dynamax.™ A new brand of brilliant audio tape, formulated to satisfy the special requirements of the broadcast professional. And not the mass production standards of consumer tape.

To create Dynamax, we built a brand new manufacturing facility, and had each piece of production equipment designed to our own specs. Now we can monitor and control the manufacture of every inch of tape we put in our cartridges.

As a result, the mechanical and electrical properties of Dynamax are superior to those of any lube tape available in the world today.

The 1 mil Mylar® base film used for Dynamax broadcast tape is almost twice as thick, and twice the weight, as that used in the ScotchCart.™ And our cross-linked urethane resin binder system guarantees the best possible bonding of the oxide, totally unlike the cheap vinyl adhesives used by 8-track manufacturers in consumer tape.

The bonding is so positive, so permanent, that oxide shedding, and the problems shedding creates are virtually eliminated. This combination of features means that tape life of 10,000 plays or more can be expected from Dynamax broadcast tape, in Fidelipac cartridges.

Fidelipac is making a new brand of broadcast tape, Dynamax, formulated to satisfy the special requirements of the broadcast professional.

Fidelipac cartridges loaded with Dynamax.

Phase stability is enhanced by maintaining constant tape width, and smooth, clean edges. On our own tape slitting equipment, we can control tape width to 1/1000 of an inch. So, the stereo phase performance of our Master Cart,™ loaded with Dynamax, is truer than ever.

I'd like to send you a sample Fidelipac Master Cart loaded with Dynamax broadcast tape. Just circle our number on the reader response card in this magazine, or write me, Arthur Constantine, at the address below.

Test Dynamax broadcast tape yourself. Measure the long life. Delight in the transparent sound.

See us at NAB Booth 411.
CMX taste and a Convergence budget? ...Get Lightfinger™!

Now, the editor that made new technology, like touch-screen editing, affordable brings you Advanced List Management (ALM™). The result is a system that’s ideal for both experienced pros and occasional editors. ALM features include: Cut and Paste: Cut on an image instead of an edit boundary, to insert or delete material.

Scene Note Sorting: Evaluate and review alternative takes by using scene notes to sort, find or list.

Reel Directory: A touch-selectable “table of contents” for all of the information on your tape.

Film Edge Reading: Edge numbers from any format or brand of film can be transferred to, or read from, user bits. Actual edge numbers will also appear on your list printout.

Source/Record VTR Slaving: Source-Trak™ allows you to match your source machine to your record machine at any point within an edit.

List/VTR Sync: ListTrak™ lets you sync-lock your list and your record VTR, and move them together for visual list management.

Lightfinger can be easily expanded by adding a basic two machine system up to one with more than 16 machines, and such added features as multiple roll, interface to mixed effects switches and VITC. Prices for a complete, two machine system start at $15,950.

For full details, call or write:

Control Video
1640 Dell Avenue, Campbell, CA 95008
(408) 866-7447

Circle (46) on Reply Card

Christie Electric
Established products
ReFLEX-20: Series of 20-minute “burping” chargers and super nicad battery packs
New products
SMT: Low cost ReFLEX-20 system
maxERASE: High-power bulk tape degauser, adjustable for various widths and types of high coercivity video and audiotapes

Circle (523) on Reply Card

Chyron
Established products
Chyron IV: Graphics and titling system with Digifex effects and MGM
Chyron RGV-2: Graphics and titling system with camera font composer
VP-1: Low cost character generator
VP-2: Low cost character generator
New products
See at booth

Circle (524) on Reply Card

Cine 60
Established products
Rechargeable nicad batteries for belts, packs, VTRs and on-camera use
Universal nicad fast chargers
30V Sun-Gun lights and belts
New products
Switchable Sun-Gun battery belts and packs for 30V, 4A/7A and 14.4V, 8A/14A
On-camera batteries for operating 14V cameras and 14V lights simultaneously
4-channel life guard fast chargers for 2A and 7A batteries
On-camera battery light and Sun-Guns at 12V, 13.2V and 14.4V

Circle (525) on Reply Card

Cinema Products
Established products
Mini-Worrall: Geared head
Steadicam Universal Model III:
Lighter, more streamlined design of Steadicam
Ikegami EC-35 with Cinema Products accessories
J-8: Joystick zoom control
Camraprompter: Portable camera prompting system
Universal studio matte box
GSMO 16mm camera
Co-ax digital remote control systems
in NTSC and PAL-B standards
RDS/HMI Fresnel spotlights
RDS/HMI Uni-focus lighting system
Todd-AO-Video anamorphic video lens system
New products
Camraprompter L: Prompter system for 35mm and studio cameras
Mini-Mote: Remote controlled pan-tilt head for 16mm/35mm film and EFP/ electronic cinematography video cameras
CP EFP studio rig for film-style setup system for most popular EFP cameras
Skymount camera stabilizing system for aerial photography with film or video cameras
RDS/HMI dimmable, flicker-free ballasts and 6K Fresnel spotlight
RDS 4A, 6A and 8A batteries and quick charger

For more information, contact: Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025
Our LiveLine System is the industry standard for news, weather and sports electronic graphic production!

Who’s Got #200?
Congratulations to KSAT-TV, San Antonio, Texas!

With over 200 systems now in use at stations coast to coast, ColorGraphics far outsells all other graphics systems! Here’s a partial list of major LiveLine system purchasers: Gannett, Metromedia, the CBS Network and O&O’s, Corinthian, Outlet, United Television, Post-Newsweek, Times-Mirror, The KING group, Taft...and most of the nation’s major station groups. Many of our LiveLine systems are also in use at market sizes 100 and lower!

Why Is LiveLine the Leader?
It’s extremely fast; has an ultra-high resolution display; is simple to use; interfaces to major data bases like WSI, Accu-Weather, and Weather Central; has special graphics packages for live sports score display from National SportsTicker, election coverage results news graphics and weather animations; and is backed by our reputation for quality and service which is unequalled in the industry! In 1984, watch for new dial-up color radar and more!

Join the electronic graphics revolution with

ColorGraphics Systems, Inc.
A Dynatech Broadcast Group Company
5725 Tokay Blvd., Madison, WI 608-274-5786

See Us at NAB Booth 1116
Cinemills
Established products
DeSisti: Lighting kits
Daymax: Gas discharge globes
Series: Lee special effects gel and resin camera filters
Series: Cine 60 on-board and belt-type nicad batteries
New products
See at booth
Circle (527) on Reply Card

Cipher Digital
Established products
700: SMpte code reader with 4-keyer character generator
701: SMpte code generator with jam sync
722A: SMpte code reader/generator character generator
733: Portable SMpte code reader
710A: SMpte/EBU code reader
735 Series: Full function SMpte/EBU readers
760: State-of-the-art SMpte/EBU reader
768: State-of-the-art SMpte/EBU code generator with VITC option
9010: Vertical Interval Time Code Generator/Translator
9050: VITC reader/translator
700-1000 Series: High resolution character generator
New products
See at booth
Circle (528) on Reply Card
See ad on page 280

Clear-Com Intercom
Established products
MS-808: Mainframe housing up to eight intercom and eight IFB channels with a dedicated line
IFB Series: 1-way program interrupt IFB system
PIC-4/82001B: Allows daisy-chain of two IFB program controllers for 8-channel outputs to talent
KB-112: Remote intercom station
KB-111A: 2-channel intercom station
KP-100: Portable remote intercom station
New products
CP-360: Portable remote station adaptable to Clear-Com and RTS systems, places two channels on a single mic cable
TW-12: Interface enabling Clear-Com systems to work with PTS type equipment
Circle (529) on Reply Card
See ad on page 160

Clyde Electronics
Established products
ALPHA: Modular mixing desk
DELA: Logic-controlled auto level-controlled push-button mixer/switcher
C-DUB: Multiswitcher IP mixer
CETB1: Talkback unit
New products
See at booth
Circle (530) on Reply Card

Colorado Video
Established products
250CT: Slow-scan/freeze-frame transmitter for 512x240-pixel stills in NTSC color within 7.5kHz bandwidth
250CR: Slow-scan receiver
New products
See at booth
Circle (531) on Reply Card
See ad on page 186

ColorGraphics Systems
Established products
NewStar: Computerized newsroom system
LiveLine III: Real time graphics for TV
New products
ArtStar: Paint-type graphics computer, featuring simultaneous work station, dual independent video, high resolution and low price
MiniStar: Sealed-down version of NewStar, but fully upgradeable
Frame storage: Freeze-frame digital frame store
Circle (532) on Reply Card
See ad on page 83

Colortran
Established products
Pole OP fresnel lights in 1kW, 2kW and 5kW sizes
Dimension Five lighting control system
Patchman portable lighting control system
New products
Color Arc: 2000 ST: Short-throw follow spot with xenon lamp
Dimension Five II lighting control system
Designer remote lighting system
Circle (533) on Reply Card
See ad on page 219

Columbine Systems
Established products
5360: IBM 516 CPU
New products
See at booth
Circle (534) on Reply Card

Cetec Vega
Cetec Vega’s R-31 PRO is your best value in a wireless-microphone receiver. When you compare the price, compare the performance too. And the size. And the features:
• "Infinite gain" receiver technology. Improved performance in the critical threshold region. Superior accommodation of multipath conditions. Better signal-to-noise ratio and constant receiver audio level output.
• High signal-to-noise ratio and wide dynamic range.
• 97 dB (103 dB A-weighted) with DYNEX II; 77 dB (83 dB A-weighted) non-DYNEX.
• DYNEX II, a new standard in audio processing.
  Can be switched in and out. To accommodate transmitters with or without DYNEX II.
• Power-source flexibility.
  Dual 115/230 Vac, 50-60 Hz operation, and external +12 to +24 Vdc for vehicular and portable use.
• Attractive compact case.
  Only 7.15 inches wide, 1.72 inches high, and 8.25 inches deep.
• True helical-resonator front-end filter.
  Plus all of the other standard features expected in Cetec Vega’s professional wireless equipment, famous for quality and reliability.
  Write or call for further information on the R-31 PRO wireless-microphone receiver, and for the location of your nearest dealer; Cetec Vega, P.O. Box 5348, El Monte, CA 91734. (213) 442-0782. TWX: 910-587-3539.

Circle (48) on Reply Card

NEW

Your best value in wireless.

Cetec Vega
the professional's wireless.
The Asaca/Shibasoku monitor like the human eye resolves certain colors best; reds, oranges, yellows, and flesh tones. The I-Q decoding system enables the monitor to display these colors at a higher resolution using wide band demodulation of 1.3 MHz rather than 0.5 MHz as in R-Y, B-Y systems. We cared enough to give you a monitor with the I-Q to reproduce the best possible pictures. We know you’re smart enough to buy it.

SMART

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

SHARP

COLOR

FEATURES
- 20” and 14” models available—high resolution delta CRTs.
- I-Q wide band demodulation system.
- Complete board interchangeability between models.
- Switchable high performance comb filter and aperture correction.
- Multi-standard capabilities (NTSC, PAL, SECAM) on all models.
- Switchable from the front panel (20” model). No adjustments necessary because of digital sync circuitry.
- Dynamic focus insures perfect focus on all areas of CRT. Adjustable from the front panel.
- Special feedback circuits guard against color changes due to variations in temperature.
- Active convergence—40 controls allow precise adjustment on all areas of CRT.
- Pulse cross with expanded vertical blanking interval.
- TWO YEAR WARRANTY ON ALL PARTS AND LABOR INCLUDING THE CRT.

ASACA CORPORATION

ASACA/SHIBASOKU CORP. OF AMERICA
12509 Beatrice Street  Los Angeles, CA 90066  (213) 827-7144  (800) 423-6347

Circle (49) on Reply Card

www.americanradiohistory.com
29 broadcasters bought the new Harris Medalist™ in its very first week! Here's why.
Wide input switching flexibility. Transparent audio performance. Choice of attenuators. Adaptable to any application. Excellent cost/benefit ratio. Broadcasters across the country cite these as major reasons for choosing the new Medalist dual stereo audio console over all others.

**Switching Flexibility**

Input selectors switch after the mic preamp, allowing intermix of mic and other types of sources on any channel. The Medalist also gives you six selector positions each for headphone and speaker monitoring.

**Superb Audio Quality**

Harris engineering makes the Medalist remarkably transparent. The Signal-to-Noise ratio of 95 dB beats the competition by 10 to 20 dB, and is typical of the Medalist's outstanding performance.

**Linear Or Rotary: Take Your Pick**

Harris gives you a choice—two styles of linear and two styles of rotary attenuators. Intermix rotary with linear if you like, to suit your station's particular needs.

**Easy To Install... Easy To Maintain**

The barrel terminals on the input and output circuits connect quickly and surely. Additional preamps and program amp interconnect with plug-in ribbon cables. Also, you can change attenuator modules—even while you're on the air—in about the time it takes to cue up a record.

**Now In 8, 10 and 12 Channels**

The Medalist is equally well suited for AM/FM/TV on-air and production applications. Take your choice of three models—8, 10 or 12 channels.

Learn more about the Harris Medalist family of audio consoles. Write Harris Corporation, Studio Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.
**More Tests More Accuracy Less Time...**

The QEI Model 691 Tuneable Stereo & SCA Modulation Monitor *

That's right, QEI's 691 performs more than 40 proof-of-performance, sound quality and troubleshooting tests (up to 4 tests simultaneously) with greater accuracy and in less time than possible before.

Most functions and test connections are on the front panel in easy to read, easy to use groupings. QEI's auto-ranging meters guarantee correct readings every time and SCA capability is a simple matter of an optional plug-in module.

* FCC Type Approval No. 3-244

For the full story and complete specs on the QEI 691, call us or write to:

**QEI Corporation**
One Airport Drive
P.O. Box D
Williamstown, NJ 08094
(609) 728-2020

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<table>
<thead>
<tr>
<th>Columbine (1323/118) Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>5291: IBM CRT display</td>
</tr>
<tr>
<td>522: IBM printer</td>
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<tr>
<td>Traffic system software</td>
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<tr>
<td>Media, music, production billing software</td>
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<tr>
<td>Accounting, payroll, general ledger software</td>
</tr>
<tr>
<td>New products</td>
</tr>
<tr>
<td>5581: IBM 8/38 CPU with broadcast software</td>
</tr>
<tr>
<td>5160: IBM personal computer with broadcast system software</td>
</tr>
<tr>
<td><em>Circle (534) on Reply Card</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comark Communications (1217) Established products</th>
</tr>
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<tbody>
<tr>
<td>UHF TV transmitters from 10kW to 220kW</td>
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<tr>
<td>Waveguide and coaxial transmission systems and components</td>
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<tr>
<td>Modulators, exciters, IF correction systems, diplexing equipment and RF components</td>
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<tr>
<td>Turnkey RF installations capability worldwide</td>
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<tr>
<td>New products</td>
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<tr>
<td>CTT-U-110S 110kW Series: UHF TV transmitter</td>
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<tr>
<td>WTB-1500 Magic T: RF power combiner with switchless bypass system</td>
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<tr>
<td>CAP-110M: Auto multiplexed diplexer system</td>
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<tr>
<td>CBP-20: BCD/ABC pulsing system</td>
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<td>CCP-145: ED and ICPCM corrector system</td>
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<tr>
<td>CTE-20: Exciter system</td>
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<tr>
<td>CM-100S: Modulator with IF SAW filter</td>
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<tr>
<td>CTP-20: Mod anode pulsing system</td>
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<tr>
<td><em>Circle (535) on Reply Card</em> see ad on page 3</td>
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</tbody>
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<tr>
<th>Comex Corporation (1508) Distributed products</th>
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<tbody>
<tr>
<td>Broadcast equipment, including Ultimate, JVC, Texscan and Real World Technologies</td>
</tr>
<tr>
<td>New products</td>
</tr>
<tr>
<td>See at booth</td>
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<tr>
<td><em>Circle (536) on Reply Card</em> see ad on page 333</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Communications Graphics (830) Established products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotional materials, including window decals and bumper stickers</td>
</tr>
<tr>
<td>New products</td>
</tr>
<tr>
<td>See at booth</td>
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<tr>
<td><em>Circle (537) on Reply Card</em></td>
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<tr>
<th>Comprehensive Video Supply (1145) Established products</th>
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<tbody>
<tr>
<td>MX-1002: Portable 3-channel mic mixer</td>
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<tr>
<td>IR-1000: Portable light dimmer wireless receiver</td>
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<tr>
<td>IRT: Portable light dimmer wireless transmitter</td>
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<tr>
<td>New products</td>
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<tr>
<td>MS-2000: Deluxe mini 2-camera switcher with effects</td>
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<tr>
<td>MX-1001: Pro 3-channel portable mic mixer</td>
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<td>Associate Producer: Production/budget control software</td>
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<td>PowerScript: Scriptwriting software</td>
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<tr>
<td>Apple Edit Lister: CMX-compatible editing software</td>
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<td>480: Bilflora fluid effect head and clamp assembly</td>
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<tr>
<td>SC8000-1: II: PAG sequential battery charger</td>
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<td><em>Circle (538) on Reply Card</em></td>
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<tr>
<th>Compucon (1405D) Established services</th>
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<tbody>
<tr>
<td>Engineering services for communications planning including:</td>
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<tr>
<td>Satellite earth station interference analysis and coordination (TVRO, T-R)</td>
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<tr>
<td>Terrestrial microwave frequency planning and coordination</td>
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<tr>
<td>Cellular, land mobile, LPTV, MDS and DTS/DEMS engineering</td>
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<tr>
<td>License application preparation.</td>
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<td>Continued frequency protection</td>
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<tr>
<td>On-site field support</td>
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<tr>
<td>Communications marketing research</td>
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<tr>
<td>Systems design</td>
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<tr>
<td>Time sharing services</td>
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<tr>
<td>FM engineering, applications preparation</td>
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<td>New services</td>
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<td>See at booth</td>
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<td><em>Circle (539) on Reply Card</em></td>
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<th>Computer Broadcasting (624)</th>
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<td>See at booth</td>
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<td><em>Circle (540) on Reply Card</em></td>
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<tr>
<th>Computer Concepts (404) Establishd products</th>
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<tr>
<td>Broadcast computer systems for traffic, sales/management, billing/accounts receivable, co-op/copy, payables, payroll, general ledger, word processing, database management, music management/playlist production, electronic spreadsheet, background music billing, linked with program automation systems</td>
</tr>
<tr>
<td>New products</td>
</tr>
<tr>
<td>Broadcast computer system copy and co-op management system</td>
</tr>
<tr>
<td>Micro-Bridge 80: Allowing Wang hardware to run programs written for personal computers</td>
</tr>
<tr>
<td>Rate card optimizer program, allowing combinations of rate, spot load, spot length and dayparts to be analyzed for maximum profitability</td>
</tr>
<tr>
<td><em>Circle (541) on Reply Card</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer Graphics Lab (1143) Established products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Images: Image manipulation and graphic enhancement systems</td>
</tr>
<tr>
<td>Tween: 2-dimensional computer-based animation</td>
</tr>
<tr>
<td>New products</td>
</tr>
<tr>
<td>CAAS II: Computer-assisted animation system, including hardware and software for full cartoon animation projects</td>
</tr>
<tr>
<td>Images II: Low-cost still-frame electronic graphics creation device</td>
</tr>
<tr>
<td>3-DV: 3-dimensional animation system for full-color shaded surfaces, multiple light sources and resolution to 1024x972 pixels</td>
</tr>
<tr>
<td><em>Circle (542) on Reply Card</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comrex (400) Established products</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLX, RLX, TLX: Frequency extenders</td>
</tr>
<tr>
<td>SLX: Remote sports console</td>
</tr>
<tr>
<td>AGA: Auto gain adjuster</td>
</tr>
<tr>
<td>CTA, LPQRA: Cue system</td>
</tr>
<tr>
<td>CRA, TV aerial monitor</td>
</tr>
<tr>
<td>202: Studio/telephone conferencer integrator</td>
</tr>
</tbody>
</table>

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**Circle (51) on Reply Card**
RVS-517
VIDEO PRODUCTION SWITCHER

A SUPERB SWITCHER FOR STUDIO, POST-PRODUCTION, OR MOBILE USE.

Just one member of the Ross Video family

Learn more about the complete line of Ross Video production switchers and the Encore Memory System at N.A.B. booth 1110

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613-652-4889 Telex 05-811579

USA:
Ross Video Inc.
P.O. Box 880
Ogdensburg, N.Y. 13669

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no other NAB cartridge meets these exacting standards

We designed the ARISTOCART cartridge 10 years ago. Its features have been widely copied but it continues to outperform competing products because we alone take the trouble to check each unit we ship for phase stability and frequency response in conformity with NAB specifications.

our guarantee
If any ARISTOCART cartridge should fail to meet NAB AM/FM performance specifications on a properly aligned cart machine, we will replace it at our sole expense.

Comrex
Continued
450RA/TA: Wireless microphone system
New products

PTLX: Portable 2-line frequency extender transmitter

RLX: Rack-mount 2-line frequency extender receiver
PLX II: Frequency extender transmitter
RLX II: Frequency extender receiver

Circle (543) on Reply Card

Comsearch
Established products
Service: Communication engineering services, satellite earth station interference studies with site acquisition, private network design, terrestrial frequency planning including STL & TSL, frequency protection, FCC application preparation, DEMS/DTS frequency coordination, microwave path surveys and RFI/EMI measurements

Service: LPTV engineering services and cellular radio services

New products
See at booth

Circle (544) on Reply Card

Comtech Data
Established products
RCV 350: Downconverter, SCPC, 3-channel converter
5m fiberglass transportable transmit/receive antenna
Series: 24-channel frequency agile receiver

Com-Tek Communications
Established products
Concept 1: Adult contemporary program format
Concept 2: Adult rock program format
Concept 3: AOR program format
Concept 4: Country music format
New products
Concept 5: MOR radio format
Promotion: The Disneyland Radioaction

Telephone Game

Circle (547) on Reply Card

Connect-Air Int'l.
Established products
Cable assemblies: Camera, communications, broadcast, data

New products
See at booth

Circle (548) on Reply Card

Connectronics
Established products
Musiflex: Wire and cables, including: Multipair audio, instrumentation and data cables
Speakerflex sound reinforcement, monitor, lighting and communication systems cable
Rockflex musical instrument cable
Quadflex 4-way interconnection cable
Phonoflex audio interconnect and patch cables
Studiflex audio studio cable
Accessit: Audio signal processors

Great British Spring: Reverb unit
SECK Producer: Mixing console
New products
Key Technology XLR-type connectors

Circle (549) on Reply Card

Conrac
Established products
Model 6142: Master 19-inch color video monitor
Model 7211: 13- and 19-inch PIL CRT RGB monitors
New products
Model 6200: Class 1 master monitor in 13- and 19-inch PIL CRT sizes with switched NTSC/RGB inputs and Colormatch phosphors
Model 2800: 9-, 15- and 19-inch monochrome monitors for 800TVL resolution
Model 7300: RGB ultrahigh (1000-line) resolution, designed for flicker-free computer graphics

Circle (550) on Reply Card

See ads on pages 158 and 159
When Choosing Quality
The Choice Is
LEMO Electronic Connectors

LEMO Audio-Video Connectors

Designed to maximize communication capabilities within a minimum of space. Available in coax, triax, multipin and mixed coax-multipin configurations.

RELIABILITY: Positive locking mechanism and gold plated contacts assure consistent signal transmission to 1.5 GHz.

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RUGGEDNESS: Connector components are precision machined. Locking mechanism is totally protected by outer shell, virtually eliminating accidental disconnections and damage to locking mechanism, cables and contacts.

SPEED: Connectors engage and disengage simply and quickly by pushing and pulling axially on the outer shell of the plug.

Over $1 million inventory stocked in Santa Rosa, California, sold by a network of representatives in North America.

For technical data and catalog, as well as the name of your local representative, please call or write LEMO U.S.A., INC. (707) 578-8811, TELEX 340-933, P.O. Box 11006, Santa Rosa, California, 95406.
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DTMF REMOTE CONTROL PRODUCTS FROM MONROE ELECTRONICS

6000 Series Remote Control
From $395
Systems available for either telephone or 2/4 wire and radio communications to monitor and control unattended equipment.

- Selectable access code.
- 6 or 12 independent relays and status inputs.
- Audio input to monitor remote audio source.
- Internal test tone generator.
- Power supply for 117 VAC, 60 Hz.

Write or phone for further information or literature. Dealer inquiries invited.

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299 Evans Ave., Toronto, Ontario, Canada M8Z 1K2
416/255-8231 - Telex 06-967578

Continenta1 Electronics (101)
Established products
AM transmitters in 1kW, 5kW, 10kW and 50kW power levels
FM transmitters in 2.5kW, 10kW, 20kW, 25kW, 27.5kW, 40kW, 50kW and 55kW power levels
302A AM stereo exciter
802 FM exciter
Audio consoles with 8 and 10 channels
New products
See at booth

Control Concepts (1751A)
Established products
Iatron transient overvoltage suppressors
New products
See at booth

Control Systems (227)
Established products
New products
See at booth

Control Video (1157)
Established products
Light Finger computer-aided editing system
Sword computer-aided cuts-only editing system
Video sequencer for up to 31 VTRs
Sabor spot editor for video sequencing system
New products
A.L.M.S. advanced list management system
Film edge number writer
Disk editing system
See at booth

Convergence (1430)
Established products
Super 90: Single-source video editing system
202: Sync roll/cut-only video editing system with list management and auto assembly
203: A/B roll video editing system with list management
204: A/B roll advanced list management system with two auto assembly modes
New products
EditDroid: Specialized post-production system for disk or tape developed in conjunction with LucasFilm Ltd.
CI-90: Character inserter placing time code digits into video being recorded, providing window dub

Cool Light (1329)
Established products
TTDR-01 Tri-Lites
New products
MCKTS6 improved Starkap lighting kit includes four Mini-cool lights, two stands, lamps, lenses, filters and other accessories and grip items
See at booth

System L-100: Computerized color correction for positive and negative film
System 30: Computerized color correction for the Sony BVX-30
System 60CZ: Color corrector for film-to-tape and tape-to-film transfers
New products
See at booth

Countryman Associates (1720)
Established products
Microphones
New products
ISOMAX TVH: Hypercardioid lavaliere mic
ISOMAX III: Directional flexible extension tube recording mic
ISOMAX IV: Directional flexible tube mic for high quality voice applications

Crest Audio (204C)
Established products
Audio professional power amplifiers
New products
See at booth

Crosspoint Latch (1321)
Established products
6112: Production switcher
6112BH: Incandescent lamp button version of 6112
6129 Series: 8-, 16- and 24-input production switchers with LED or incandescent lamp buttons
6139K: Microprocessor-controlled switcher with serial RS232/422 I/O
6403: Programmable editor switcher interface
6124: Production switcher
New products
6116: Component switcher, including four component and three encoded video inputs with optional microprocessor-controlled editor interfaces
7239: Auto Drive controller for 6139K switchers and serial control for editor inputs
6150: Master control switcher for 16 inputs, with microprocessor control, clock and 2-event take
7209: 99-event controller for 6109 switcher
Printer driver option with serial I/O for editor control

Crown Int'l (428)
Established products
Audio power amplifiers, including D-75, D-150A-2, PS-200, PS-400 and DC-300A-3 systems
PZM microphones
New products
PZM-180: Pressure zone microphone at reduced price for semi-pro and sound reinforcement market
125P: Microphone for recording, reinforcement, broadcast and ENG applications

See at booth

CORPORATE COMMUNICATIONS CONSULTANTS (1161)
Established products
System 80XL: Computerized color correction: film-to-tape transfer
System 80B: Computerized color correction system for the Bosch FDL-60A2
See at booth

Circle (555) on Reply Card

See ad on page 100

Circle (558) on Reply Card

See ad on page 352

Circle (559) on Reply Card
TOMCAT — The preeminent cartridge recorder and reproducer, offering superb reproductive quality. Matrix, 7½ and 15 IPS MONO/STEREO, 3 tones and fault detection are standard.

BMX — The undisputed leader of on-air audio consoles. Exacting design and construction yield optimal performance quality. Modularity combines user-friendliness with maintainability. Source machine control is standard in 10, 14, 18, 22 and 26-input consoles.

ABX — This new WORLD-CLASS OPERATIONS console is the first console designed for production requirements of radio broadcasting. In 18, 26, and 34-input sizes, the ABX provides the positive attributes of BMX in a 2, 4 or 8-TRACK production configuration. With additional busses, 2-MIX/MULTITRACKING, SLATE/OSCILLATOR, multi-studio TALKBACK, 4 SENDS/RETURNS, full metering, 4 telephone MIX-MINUSES and much more, the ABX is unique.

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Call TOLL-FREE 800-874-2127 for your full-color brochure T. BMX, ABX, STUDIO CABINETRY systems or PACIFIC RECORDERS & ENGINEERING CORPORATION products.

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Established products
Radio Broadcast Business Computer System
Music Library Software
New products
See at booth
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Cybernetic Data
Established products
See at booth
Circle (562) on Reply Card
dbx
Established products
900 series signal processors
dBm meter
Type I and II noise reduction systems
Compressor/limiters
Sound enhancers
New products
700 digital audio processor
710 2-channel mic pre-amp module
700P playback-only digital audio processor
D700 digital disc-mastering delay
Circle (563) on Reply Card

Peter W. Dahl
Established products
3-phase 5kW plate transformer
1kW and 5kW modulation transformers and reactors
High voltage rectifiers
Primary transient suppressors
New products
HV rectifiers for 40kV PIV and forward currents to 25A
Primary transient suppressors in MOV and selenium configurations
Circle (564) on Reply Card

Dalsat
Established products
Earth stations: Transportable Consulting: Engineering Installations: Turnkey New products
See at booth
Circle (565) on Reply Card

Bill Daniels Company
Established products
Catalogs: Broadcast equipment New products
See at booth
Circle (566) on Reply Card

Data Communications
Established products
Business automation products and services for the broadcast industry BIAS traffic system REPLINE and SESSAM1 systems
New products
BUYLINE business automation, to link stations, representatives and agencies for speeding up the buy process IBM PC software for financial applications with BIAS system interfacing
Circle (567) on Reply Card

Datatek
Established products
D-2200: Bidirectional data matrix, destination oriented, SMPTE standard, expandable to large system configurations
Circle (568) on Reply Card

Datatron
See Paltex

Datatronix
Established products
Series 300: Modular amp systems and audio components Series 500: Modular compressor/limiter, EQ, oscillator systems Series 440: Conductive plastic illuminated scale faders Series 7000: Remote-controlled amp systems Series 8000: VU and PPM meter amps New products
Series 2000: Smart intercom systems Series 1000: Small studio smart intercoms

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The Classic Case

The PORTA-BRACETM Video Recorder Case.
Our ENG/EFP special includes: leather handle • heavy-duty, non-skid shoulder strap • swivel hooks • waist belt • extra-capacity side pouch with mike pouch • front slip pocket • two sewn-in front pockets • cable strain-relief loops • velcro cable and headset hangers • sewn-in and removable white balance cards. It's protection and portability and we care about the details.

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Box 246, North Bennington Vermont 05257 (802) 442-9118

Circle (57) on Reply Card
Why our new radio is heavier than you'd expect.

When we introduce a brand new portable microwave transmitter with innovative features like continuously variable power from 3 to 12 watts and a linear GaAs FET power amp, our customers also expect it to be “bulletproof”.

So, we build in modular plug-in circuit boards for quick service; multilevel RFI shielding for superior integrity, and an integral heat sink to eliminate dependence on the antenna bracket. Plus, a linear power amp eliminates spurious response to provide excellent spectral purity, while its one stage (versus the usual 4) reduces still further the probability of failure.

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For information about our complete line of ENG equipment call or write, Harris Broadcast Microwave, 967 Stierlin Road, Mountain View, CA 94043. Phone: 415-969-9100. Telex: 17-2584 HARFARVID
The definition of the best color camera

No matter how you define your color camera needs, you will want to be certain you have chosen the best tube for the job. And no technical appraisal can be complete without EEV Leddicons.

Highest picture quality

Lag or smearing under low-light conditions is a common effect with most tubes – but less with EEV Leddicons! Instead of the twin-light pipe used by some competitors, Leddicons incorporate a unique light bias arrangement with a 10-hole and sintered quartz diffusing disc system for minimal shading. Differential lag is minimised by balancing the response speeds of the green, red and blue channels; so a football in flight will always look like a football – not a flying saucer! Light biasing is variable on 30mm and 25mm Leddicons. On 30mm types, biasing is integral so there is no need for a clumsy adaptor.

High resolution

EEV is the only manufacturer to make three different target layers to optimise resolution for each color channel. The advantage of this unique feature can be clearly seen in the Leddicon’s much better performance.

Faithful color imagery

Faithful color imagery is all about reproducing what the eye sees. And that is exactly what Leddicons do. Extended reds have a precisely-engineered response and a matched infra-red filter is incorporated to provide cut-off where you want it.

Reduced highlight image retention

Highlight image retention can be a production team’s nightmare – the wrong choice of tube and highly polished orchestra instruments can end up looking like the aftermath of an aerobatics display. With EEV Leddicons, the problem is minimised by a unique target manufacturing process. The result is you can rely on Leddicons, even in the very difficult extended red channel where other tubes are simply unable to cope.

Better tube quality – plus longer life

At long last a manufacturer who is prepared to talk about blemishes – but then we know Leddicons average less spotting than other tubes! The secret lies in the fact that all Leddicons must satisfy the most exacting manufacturing, testing and quality control standards. These not only preclude loose particles from the inside of the tube but also ensure longer tube life.

Optimised geometry and registration

The optimised electron optical design of Leddicon ensures the best possible geometry without distortion. Registration too is equally distortion free – we can, in fact, supply computer-matched sets for all three channels.

Unique anti-microphonic features

Nothing tests a tube more rigorously than the range of frequencies generated by an orchestra. With EEV’s unique anti-microphonic mesh assembly, Leddicons provide the cleanest pictures – even from cameras operating in areas of high ambient acoustic noise.

FOR FURTHER INFORMATION ON LEDDICONS, CALL US TODAY.
IN USA Toll free 800 431 1230 (except for NY State).
EEV Inc Corporate Office, 7 Westchester Plaza, Elmsford, NY 10523.
Tri-State Sales Office, 7 Westchester Plaza, Elmsford, NY 10523. Tel: 914 592 6041.
Northern Sales Office, 19001 49th Place, N E Seattle, WA 98155. Tel: 206 363 2700.
IN CANADA EEV Canada Ltd., 67 Westmore Drive, Rexdale Ontario M9V 3Y6. Tel: 416 745 9494. Telex: 06 989 363.
First for customer service

EEV is not only concerned with manufacturing the best tubes but also ensures the best delivery and after-sales service. Our reputation in this respect, like that of our Leddicons, is second to none.

To serve the needs of our broadcast customers in the USA and Canada best, we sell direct from our centers in New York and Toronto where we maintain a large inventory as well as full test facilities.

When you add up all the facts about EEV Leddicons, there is only one conclusion – namely, the definition of the best tubes for your camera. But don’t leave it at that. Next time specify Leddicons for your new equipment and as replacements. Then find out what that definition really means in practice.

Comprehensive range

EEV Leddicons are specified throughout the world for virtually every type of studio, EFP and ENG camera. The range covers 30mm (1 in), 25mm (1 in), 18mm (3/4 in) and 12mm (3/8 in) sizes. And the comprehensive choice of front- and rear-loading types includes diode gun, low output capacitance (LOC) diode gun, triode gun and tetrode gun highlight overload protection (HOP).

EEV Leddicons are fully interchangeable in most types of camera including:

<table>
<thead>
<tr>
<th>Camera Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCC10/20/21</td>
<td>HL79/81/83</td>
</tr>
<tr>
<td>MNC80</td>
<td>TC80/85</td>
</tr>
<tr>
<td>BVP300/330</td>
<td>HK312/322</td>
</tr>
<tr>
<td>MKVIII/IX</td>
<td>TK47</td>
</tr>
<tr>
<td>CEI310</td>
<td>KCU/KCK40</td>
</tr>
<tr>
<td>SK91/96</td>
<td>TK76</td>
</tr>
<tr>
<td>FOTON 1</td>
<td>LDK5/15/25</td>
</tr>
<tr>
<td>SK110</td>
<td>TTV1515/1516</td>
</tr>
</tbody>
</table>

EEV Camera Tubes is a registered trademark of EEV Lead Oxide Camera Tubes.

Circle (59) on Reply Card See Us at NAB Booth 1335
Datatronix (1504)
Continued
318: DA with high common mode reject
PTIS: User programmable telephone interface
1604A: Stereo production/post-production console
2424: Summing crosspoint matrix, to 24x24
701A: 18W audio power amp
941: VCA automation fader
Circle (569) on Reply Card

Datavision
See at booth Circle (570) on Reply Card

DataWorld
Established products
9200-637: Source ID encoder
9320-402: Source ID reader
9530-150: Digital time display
New products
5303: SMPTE/EBU longitudinal and VITC generator/reader
9550: Multitrow character generator/reader
9241: Automatic videotape search system
9400: Multiline video data encoder
9200: Multiline video data reader
Circle (571) on Reply Card
see ad on page 318

David Green Broadcast Consultants
See Green, David

Davis & Sanford
Established products
Tripods, stands and pedestals
Tripod heads, fluid heads
Dollies
New products
Fluid heads
Circle (572) on Reply Card

Delcom
Established products
AE-3: Auto effects interface
VO-5850D: Delcom/Sony advanced U-matic VTR
Design: Custom systems, studio or remote
Consulting: Engineering
Vans: Mobile, design/constructions
New products
Control room furnishings, consoles
Cabinetry
Circle (573) on Reply Card

Delta Electronics
Established products
TCA Series: RF ammeter systems
CPB-1: Common point bridge
FMC-1: FM modulation controller
APC-1: Automatic power controller
6730E: Coaxial transfer switch
OIB-3: Operating impedance bridge
AM-1: Antenna monitor
RCS-IV: Microprocessor-based remote control system
New products
A5E-1: AM stereo exciter
ASM-1: AM stereo modulation monitor
RG-4: Receiver/generator

RCS-IV: ATS option for remote control system
Circle (574) on Reply Card
see ad on page 145

Desisti Americas
Established products
DLK Series: Portable lighting kits
2000/2010: HMI softlights
RC110: 1kW fiber-glass fill light
DC Series: Molded polyethylene location light cases
OCM/DeSisti: Motorized hoist rigging studio suspension system
New products
Tizio: 200W CID Sun Gun with electronic ballast
Pilota Series: Discharge follow spots in 1kW and 2.5kW sizes
90.100: Brass super strong C-clamps
50.100: Junior-size stand with wheels
Americas: 200W sealed-beam hand-held HMI light and 1.2kW sealed-beam spot light
Brass scenery clamp with adapters for lights
52 series: Fresnel studio lights in 300W, 500W, 850W, 1kW and 2kW ratings
Circle (575) on Reply Card

DeWolfe Music Library
Established products
Music library
Sound effects library
Prerecorded music for use in any A/V production

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A Subsidiary of Nagra-Kudelski, Switzerland

NAGRA MAGNETIC RECORDERS INC.

Film or Video Sound by

NAGRA KUDELSKI
a passion for perfection

Steen enthusiasm inevitably leans the Stefan Kudelski-Nagra design team to build the best, as with our IV-S. This portable, stereo mastering recorder incorporates all the functional specifics professionals need . . . Like instant read-out of channel level differences, weighted signals for disc groove depths, current consumption and battery voltage. And there's a position filter circuit to correct undesirable acoustical effects, plus two switchable, damped potentiometers. Share the enthusiasm. Ask for details.

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Breaking the price/performance barrier

Compare these standard features with any competitive system

 STANDARD FEATURES:
• Distributed intelligence
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• Animation
• Printer output
• Status display generator
• Frame accurate
• Built in sync generator
• Much more...

OPTIONS:
• List management
• Dual disk operating system
• Off line communications package (an industry first)
• A/B roll & sync roll
• General purpose interface (for external devices)

SEE US AT NAB BOOTH 1308
Circle (68) on Reply Card

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Why your Commercial doesn’t look as good on the air as it did in the projection room.
— There are many technical complex reasons, but the only thing you have to know is that your commercial is transferred using THE SYSTEM 60XLB2 or THE SYSTEM XL II computerized scene-to-scene color correctors for Film-to-Tape and Tape-to-Tape, the leaders and pace setters of “The State of the Art.”

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Sachtler
Camera supporting systems
- All-in - up to seven - steps of drag, dependently adjustable for pan and tilt,
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Phone (89) 3204041, Telex 5215340

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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.

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fessional video tape...when and where you need it.

You have the option of professional-quality and broadcast-quality Eastman professional video cassettes in both ½-inch (VHS and Beta) and ⅛-inch (U-Matic standard and mini) cassette sizes. Broadcast-quality 1-inch tape (helical "B" and "C" format) is scheduled to be available in mid-1984. We offer an excellent selection of video cassettes and video tapes for use with NTSC as well as PAL/SECAM TV systems.

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DALLAS (214) 351-3221  TORONTO (416) 766-8233
HOLLYWOOD (213) 604-6131  VANCOUVER (604) 926-7411
HONOLULU (808) 833-1661  WASHINGTON, DC (703) 526-9220
MONTREAL (514) 761-3481

Overseas, call the local Kodak company.
Motion Picture and Audiovisual Markets Division, Eastman Kodak Company,
343 State Street, Rochester, NY 14650

Circle (64) on Reply Card
New products
CBG-2: Enhancements include high resolution, more colors per image, dual keyboard operation, new 3-D software, hardware anti-aliasing and an optional third plane electronic still-store

Circle (585) on Reply Card

Dynair Electronics (1404)
Established products
Series 25: 20x20 AFV routing switcher
System 21: 50x10 AFV routing switcher
Series 10: 10x10 AFV routing switcher
System 23: Machine control and data switch
Series 5300: Modular DA equipment
Series 1500: DA and switching equipment

Circle (587) on Reply Card

EVERTZ closes the Time Code price / performance gap!

EVERTZ presents a new generation of LTC and VITC products at prices comparable to traditional longitudinal only systems, but with all the advantages that vertical interval time-code offers.

We have taken a quantum leap forward in time-code technology. These products combine the best of LTC and VITC to provide the ultimate in performance, flexibility and reliability.

Because longitudinal time-code remains popular as a powerful production tool we are also introducing several new LTC generators and readers combining our time tested designs with the latest advances in micro-chip technology to offer you superb edit code equipment at affordable prices.

See our comprehensive line of time-code equipment at the AMTEL booth, #1745 at N.A.B.

EVERTZ closes the Time Code price / performance gap!

Circle (586) on Reply Card

Dreamdata (1728)
See at booth

Circle (586) on Reply Card

Dubner Computer Systems (1630)
Established products
CBG-2: Videographics generator
GCC-12: Color corrector computer automation for film or tape to tape transfers

Circle (587) on Reply Card

E.G.R.
See Emergency Alert Receivers

EECO (1314)
Established products
EECONOLINE: Entry-level preproduction time code generator, reader, character generator
MTG-550: Time code generator
PTG-560: Portable time code generator SMPT/EBU time code source
TCR-550: Time coder reader
VCG-750: Video character generator for VITC and LTC code formats
VIG-850: VITC/LTC generator/reader
VIR-950: VITC reader
MQS-100A: Multicue synchronizer for up to three transports
IVES: Intelligent video editing system

New products
IVES enhancements: A/B capabilities and special effects control
Multimachine computer-assisted editing system with SMPT/EBU LTC/VITC or control track control, with 9-machine capability

Circle (590) on Reply Card

See ad on page 107

EEG Enterprises (1155)
Established products
EN210 and EN230: Line 21 captioning encoders
DE101: Line 21 video decoder
MC2-210: Captioning computer
EDAC-1: Line 21 text processor
New products
EN230: Dual-line encoder
DE201: VBI addressable decoder
TE-510: Teletext video data bridge
TV network alert system
TV network control system

Circle (591) on Reply Card

EEV (1335)
Established products
P8160/96: 1-inch DG Leddicons
P8460: ½-inch DG Leddicon
P8462: ½-inch DG LOC Leddicon
P8440: 30mm DG Leddicon
8134V1: 1-inch vidicon
P8038: 1-inch vidicon
8541A: 1-inch vidicon
4CX10,000: AM/FM transmitter power tubes
4CX15,000: AM/FM transmitter tubes

Circle (65) on Reply Card
SERVICES
• Project Management
• Total Site Construction
• Electronic Systems Integration
• Delivery Service on Specialized Vehicles
• Sales and Manufacturing Support—Worldwide

PRODUCTS
• Equipment Shelters and Towers
• Broadcast Antennas and Transmission Lines
• Terrestrial Microwave Antennas
• Coaxial Cables and Elliptical Waveguides
• Earth Station Antennas

Let's talk. Stop by. Visit Booth 1201A at the NAB Show.
Andrew Corporation, 10500 West 153rd Street, Orland Park, IL 60462.
Circle (66) on Reply Card

LET US DO IT ALL!

Our people in the booth wearing this button have all the answers.

ANDREW
Our concern is communications.
A: EECO's Pioneering Past.
- 1967—EECO develops first television time code editing system, called ON-TIME™.
- 1970—EECO works with the SMPTE to help establish an industry standard for longitudinal time code.
- 1971—EECO is presented an Emmy Award citation for outstanding engineering achievement for the development of time code and equipment for videotape editing.
- 1972—EECO pioneers first synchronizing system utilizing time code and a microprocessor to control both sprocketed and non-sprocketed transports.
- 1974—EECO introduces first low power time code generator CMOS chip.
- 1976—EECO, jointly with RCA, develops first microprocessor controlled videotape editing system—the RCA AE600 for the RCA TR600 VTR.
- 1978—EECO receives an Academy Award citation for the application of code and control systems in motion picture production.
- 1980—EECO works with the SMPTE to help establish industry standard for vertical interval time code.
- 1980—EECO, jointly with RCA, develops videotape editing system incorporating longitudinal and vertical interval time code editing capabilities—the RCA AE800 for the RCA TR800 VTR.
- 1982—EECO introduces IVES™ Intelligent Video Editing System, a complete post-production system for two VCR's.

A: EECO's Innovative Future.
EECO is unveiling new solutions in multi-machine editing control. Our latest innovative milestone: A computer-assisted videotape editing system, capable of multi-machine control of any mix of up to 9 professional 1/2", 3/4" and 1" VTR's or multitrack ATR's and a production switcher.

Providing ease and speed of operation, our new editing system utilizes distributed processing and multiple keyboard configurations for use by either videotape or film editors.

We've also expanded our IVES Editing System with the addition of complete A/B control of three 1/2" and/or 3/4" VCR's...the IVES A/B™ enhancement option.

EECO's forward direction in editing is backed by a history as an industry pioneer and product innovator, including a full line of longitudinal and vertical interval time code generator and reader peripherals to fit every price and capability range and a multique synchronizer for enhancing audio for video.

For additional information or the name of your nearest EECO Authorized Distributor call (714) 835-6000 Ext. 419. EECO Incorporated, 1601 E. Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659.

EECO® Computer Controls For Video Production

SEE EECO'S NEW SOLUTIONS FOR EDITING AT NAB BOOTH #1314

Circle (68) on Reply Card
www.americanradiohistory.com
Elcom-Bauer
Established products
AM and FM transmitters
New products
See at booth
Circle (600) on Reply Card

Electro-Controls
See at booth
Circle (1499) on Reply Card

Electrohome Ltd.
Established products
EVM Series: High resolution monochrome video monitors in 9-, 12-, 15-, 17- and 23-inch sizes
TV projection systems
New products
See at booth
Circle (602) on Reply Card

Electro Impulse
Established products
Dry, forced-air FM dummy loads
Calorimeters
Wattmeters
Attenuators
New products
See at booth
Circle (603) on Reply Card

Electro Voice
Established products
Sentry Series: Broadcast studio or control room monitor speaker systems
Professional microphones
New products
Sentry 100EL: Powered studio monitor speaker system
ELX-1: 4-input, 1-output mic/line mixer in portable or rack-mount unit. Internal limiting, oscillator and ac/battery supply
8000 Series: Audio mixing consoles
Circle (604) on Reply Card
See ad on page 317

Electronic Research
See at booth
Circle (605) on Reply Card

Electronic Systems Labs
Established products
200: Mixing console
EA803: Telephone hybrid
1000: Broadcast console
S20: Reportophone
2000 Series: Microphone stands
Audio cables, cable drums, cable snakes
New products
See at booth
Circle (606) on Reply Card

Emcor Products
Established products
See at booth
Circle (607) on Reply Card

Equipment cabinets
EMI/RFI shielding
ESQ cabinets
New products
See ad on page 131

Emergency Alert
Established products
67kHz and 92kHz SCA receivers with various decoders
EBS receivers for homes, hospitals, industries, schools
New products
See at booth
Circle (608) on Reply Card

Environmental Satellite Data
Established products
Dial-up weather satellite pictures from GOES East & West, with infrared and visible data and water vapor imaging
Accu-Weather feature and forecast graphics to complement ESD real time imagery
New products
PMT-100: Weather graphics production system with high resolution graphic and font generation, more than 200 frame storage, animation. frame loops, RRWDS local color displays. Doppler radar displays, automated broadcast and/or dial-up data acquisition
Circle (609) on Reply Card
See ad on page 300

Euro Equipment
See at booth
Circle (610) on Reply Card

Eventide
Established products
SP2016: Programmable effects processor and reverb system
BD955: Broadcast delay line
BD931/932: Broadcast delay lines
H949: Harmonizer for audio time compression. pitch change, delay, flanging, etc.
APX252: Real time audio spectrum analyzer software for Apple computer
Timesqueeze Jr.: Time compression system for audio film and video use
New products
New effects software for SP2016
Circle (611) on Reply Card
See ad on page 14

Excalibur Industries
Established products
Reusable shipping containers
New products
See at booth
Circle (612) on Reply Card

Fabtronics
Established products
M750 Series: Audio patch panels with prewired jacks or punch blocks
M76-DA: Distribution amplifiers
M62-P/L: 8-channel P/L system
M81: Intercom matrix
175: Intercom stations in 1.75-inch rack-mount format

List of products and items available from various companies.
The more you see, the more we hear...

Look who’s talking about Dubner now.

While we claim no responsibility for the famous line, “Build a better mousetrap and they’ll beat a path to your door,” we’d like to think it might have been said about the Dubner CBG-2 video graphics/animation system. In any case, we thought you might like to hear what your colleagues are saying about us:

“The CBG-2 is undeniably the most novel and flexible state-of-the-art real-time animation graphics device currently available.”
— Mark Bernardo, Chief Graphics Design Engineer, Olympics ABC Television

“We needed a machine that would allow us to compete effectively in an already competitive market. The CBG-2 gave us the capability to create weather maps and news graphics quickly, it could be operated by department personnel, and it was the best buy on the market.”
— Bob Plummer, Director of Engineering, Fisher Broadcasting KOMO (Radio & Television, Seattle)

“It’s a digital computer and animation tool that allows artists to create quality animations independently. The CBG-2 is relatively inexpensive, it works fast and enhances the creative process with real-time imagery.”
— Elaine Schwartz, Computer Animator Atlantic Image (New York animation house)

“The CBG-2 is much faster and less expensive than standard film animation. The real-time animation, clean key capability, expandability and great software support make it one of the best computers around.”
— Corinne Sousoulas, Art Director Motion Picture Laboratories (Memphis post production house)

“The CBG-2 is a valuable tool due to its ability to create effective graphics quickly. It offers three dimensional animation, graphic enhancement, and character generation all in one unit. And these features are difficult to find in any one machine.”
— Victoria Henigman, Electronic Graphic Designer WPBT-TV (Miami PBS Affiliate)

“The Dubner was purchased for its advanced animation capabilities, its ability to be upgraded via software, and its cost effectiveness. We love it!”
— Dan Sokol, Vice President, Engineering Video Post & Transfer (Dallas post production house)

With all the nice things being said about Dubner, all we can say is thank you. We plan to keep up the good work. You’ll keep seeing it and we’ll keep hearing about it.

For a free demonstration of the Dubner CBG-2, call (201) 592-6500, or write.

Dubner Computer Systems, Inc. 158 Linwood Plaza Fort Lee, New Jersey 07024
Circle (80) on Reply Card
Fartronics (1709)
Continued
New products
Series 525: Intercom station with or without tally system
Intercom rack equipment
New accessories
Circle (613) on Reply Card
See ad on page 316

Feldmar Watch & Clock (1777)
Established products
Condor digital clocks and timers
Gra-Lab interval timers
Digital stopwatches by Accusplit, Heuer, Cronus and Minerva
Seiko chronograph
New products
RR-01A: Seiko digital stopwatch with printer
RU-001: Seiko digital stopwatch with memory
Circle (614) on Reply Card
See ad on page 315

Fernseh
See Bosch

Ficon Broadcast (202A)†
See at booth
Circle (615) on Reply Card

Fidelipac (411)†
Established products
550: Master Cart II NAB audiotape cartridge
360: Master Cart tape cartridge
140: Model 360 tape cartridge
350: Model 350 tape cartridge
140B: Model 660 tape cartridge
150: Model 1200 tape cartridge
Alignment tapes and gauges, on-air lights, bulk tape eraser
Table-top bulk tape degausser
Model 65-390: Wow/flutter meter
New products
See at booth
Circle (616) on Reply Card
See ad on pages 80 and 81

Film/Video Equipment (1153)
Established products
Wide Eye I: Wide-angle lens attachment
Wide Eye II: Wide-angle lens attachment
PEP Lead-acid battery packs and belts
PEP Solar chargers for lead-acid and nicad batteries
BP90R: Replacement battery
New products
SLA12125: PEP 12V 12.5Ah battery pack for cameras, recorders or monitors
Circle (617) on Reply Card
See ad on page 144

Flash Technology (1619)†
Established products
ElectroFlash beacons and hardware
Electro Flash lighting controller
New products
See at booth
Circle (618) on Reply Card

FOR-A Corp. of America (1306)
Established products
VTW-210: Character generator
Circle (617) on Reply Card
See ad on page 299

CI-10: Color interface background and character colorizer
TKY-4600: Title keyer
FVW-3000: Video writer
TCG-3200: Time code generator
TCR-3500: Time code reader
New products
FA-430: TBC with digital image enhancement and color correction
FA-600/690: TBC with framestore or synchronizer
FA-410: TBC with dynamic tracking for BU-620 and NV-8950 VCRs
VTW-6000: Character generator
CS-4500: Color corrector system
DEC-100: NTSC to RGB color decoder
VTG-12: Video time, date, timer
Circle (619) on Reply Card
See ad on page 317

Ford Aerospace & Comm. (1507A)†
Established products
Satellite communication equipment
New products
See at booth
Circle (620) on Reply Card

Fortel (1409B)
Established products
CCDHP/HPS/1H: TRCs
Y-688*: Total error corrector
C-YIQ*: Component TBC
TBC*: TBC
DIGIBLOC Series: Including FS-1/FS-2 frame synchronizers, A5-1 audio synchronizer and RES-1 remote engineering station
Color EX: Chroma noise reducer
Record 1/2: Detail booster systems
New products
See at booth
Circle (621) on Reply Card

Fort Worth Tower (1010)†
Established products
Communications equipment shelters
Towers
Tower construction and maintenance services
New products
See at booth
Circle (623) on Reply Card

Fostex (1765)
Established products
A2/A4/AB: Reel-to-reel ATRs in 2-, 4- and 8-track formats
350M-8: 8-channel recording console
3030: Equalizer
250: 4-track cassette recorder
3050: Digital delay unit
3070: Limiter, compressor, expander gate
3180: Reverberation unit
6301: Minimixers
3010: Patchbay
B-16: 4-inch, 16-track recorder
New products
See at booth
Circle (624) on Reply Card

Frank Wooley & Company
See Wooley, Frank

Frezolini
Established products
OC1: On-camera 1/4-inch VHS-C VTR
BP-14: On-board battery packs
RSP2: Dual-channel 40W ac adapter/charger
RSP3: Ultra-light 50W on-board ac adapter
RBP90PC: Fast charge BP90 replacement battery
MBC2: 13-battery multibattery charger
FL650: Universal 12V-240V portable light head and kit
F30EC: Lighting power belts/packs/kits
HM90: BP90 adapter for most ENG/EFP cameras and lights
New products
MF12: Ultralight 100W minifill light head and kit
VB12V: VB series of 12V battery packs and camera adapters
BCD2: 2-channel battery charger and conditioner
FPC1: Frezzi power chargers
Circle (625) on Reply Card
See ad on page 270

Fuji Photo Film USA (1413)
Established products
H701E: 2-inch videotape
H621: 1-inch videotape
H521/H521BR: U-matic videotape cassettes
H421: VHS cassettes
H321: Beta cassettes
VHS and Beta Super HG videocassettes
Audio cassettes
Computer floppy disks
New products
H451: Super HG videocassettes in VHS T-120 type
Circle (626) on Reply Card
See ad on page 29

Fujinon
Established products
ENG/EFP camera lenses. including:
A7X7RM, A12X9ERK, A12X9RM, A14X9ERM, A30X11ESM and A3.5x6.5RM
Studio zoom lenses, including:
P17x16.5ESM, P28x15ESM and P44x18ESM
New products
See at booth
Circle (627) on Reply Card
See ad on page 53

GEC McMichael Ltd. (1514)
Established products
ACE: 4-field TV standards converter
GM7151/7137: 20- and 14-inch color video monitors for PAL
GM6001: Clock/loop generator
GM4001: Precision PAL comb filter decoder
Continue on page 115

110 Broadcast Engineering April 1984

www.americanradiohistory.com
I want to hear more about **Ampex Creative Command Centers**.

Please have a Sales Engineer contact me.

Name ____________________________

Organization ________________________________________________________

Address ____________________________________________________________

City ______________________ State _______ Zip ______

Phone ________________________________
Ampex Corporation
401 Broadway
Redwood City, CA 94063
M.S. 3-11
Where Does An Editor Go to Discover More Creative Control with Fewer Technical Constraints?
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-122 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.
Creative Command Center

Can Management Love a Creative Command Center?

Every Ampex Creative Command Center is, we agree, a tool to help you attain your business goals. 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 out sales training programs, internal communications and a variety of other 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. This tradition is well-known and appreciated by the many users of Ampex products.

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 in Spares, Technical Support, Training and Technical Documentation 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 into 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.”

[Image of Ampex equipment]
The Ampex "Creative Command Center" featuring ACE joystick control is a sophisticated post-production editing system offering many outstanding advantages including: hardware and software components tailored to user applications, extremely fast system speed, field-proven reliability, compatible software, easy interfacing, expandability, and single-source spares and service worldwide.
GEC (1514)
Continued

New products
Transportable elliptical Ku-Band T/R satellite terminal
GM9015A/At: 150° Ku-Band GaAs-FET LNA/LNC
GM9060: Satellite receiver
GM4001: Precision NTSC comb-filter decoder
GM7151/1737: 20- and 14-inch color video monitors for NTSC
GM8000: Series of monochrome monitors with 5½- to 20-inch diagonal CRTs
Circle (628) on Reply Card

GTE Spacenet (1339)†
See at booth
Circle (629) on Reply Card

Garner Industries (1233)
Established products
70/105/144/116: Audio and computer tape erasers
270/1400: Video, audio and computer tape erasers
3056: Audiocassette duplicator for ¼-inch reels
New products
1200: Video, audio and computer tape eraser
Circle (630) on Reply Card
see ad on page 100

Gentner Engineering (636)
Established products
Pre-wired patch panels
SPH-3: Broadcast telephone hybrid system
SPH-4: Broadcast telephone hybrid with caller control circuitry for talkshow and conferencing use
New products
TELEMIX IX: 15-line telephone interface system under microprocessor control, to mix and balance several lines simultaneously, offering remote control
Circle (631) on Reply Card

General Electric (1007)†
Established products
FEX Quartzline lamps
PEP lamps
FKK mogul bi-post lamps
Multimirror Quartzline
Comb and video bandwidth compression system
Large-screen color video projectors
Consumer electronics products
New products
See at booth
Circle (632) on Reply Card

Gerstenslager (1347)
Established products
Mobile production vans and trailers for TV
New products
See at booth
Circle (633) on Reply Card

Giese Electronic (327)†
See at booth
Circle (635) on Reply Card

Goldnugget (628)†
See at booth
Circle (636) on Reply Card

Rx for SFX
At $14,750, the totally new Chromafex 766 brings special effects within reach of every budget.

Posterize, Compress, Invert, Position. Slide. These microcomputer controlled special effects, and many more performed by the expensive image processors, can be yours in the Chromafex 766. That's right. Outstanding special effects. And for only $14,750.

There's more. The 766 also includes time base correction and frame store capabilities with infinite window performance along with freeze frame and two full fields of memory. Drop out compensation will clean up the noisiest of tapes. Perfect for remotes, it consumes only 85 watts of power.

Chroma Digital Systems has the engineering, manufacturing, marketing and service expertise, drawn from years of experience in the television equipment industry, to provide you with the support you need now and in the future.

And the Chromafex starts you with the most attractive SFX price/performance package anywhere.

If you have a problem with the high cost of SFX, we've got the solution. Chromafex 766. High priced effects. Affordably priced.

Chroma Digital Systems, 2065 Martin Avenue, Suite 104, Santa Clara, California 95050 (408) 986-6270

Circle (82) on Reply Card
With low key lighting, differential lag can be a problem. Amperex Plumbicon tubes with built in bias light increase the speed of response of the layer and lag is virtually eliminated.

Comet tailing and loss of detail in highlights are minimized by using the Amperex patented Diode Gun or anti-comet tail (ACT) tube. Both solve this problem by providing high beam current to stabilize highlights.

High audio levels can produce the annoying problem of microphonics. Amperex attacked this at its source, and all Amperex Plumbicon tubes have a unique mesh designed to prevent the build-up of mesh vibrations—not just to dampen them.

Six of TV's toughest shots and how...
ie problem of image retention. By examining layer physics and semicon-
ctor properties Amperex developed a
extended red layer. Now you can
clude brilliant reds in your scene
thout concern for image retention.

Low output capacitance Amperex
Plumbicon tubes help maintain high
signal to noise performance. This helps
prevent loss of detail and increased
video noise in low light areas of high
contrast scenes.

Because of special photoconductive
layers for each color and an optimized
electron optics design. the Amperex
Plumbicon provides the highest resolu-
tion for each image format. This
resolution is measurably higher than
earlier tubes.

**Amperex Plumbicon** camera tubes handle them.

Ordinary pick up tubes can handle ordinary TV
shots. But when you have to contend with low light
levels and bright highlights...the glare of reds and
the blare of trumpets...you need the extended per-
formance of Amperex Plumbicon camera tubes.

Amperex invented and refined the pick up tube
technology that makes it possible to handle the 6
toughest shots in TV. Since the original Plumbicon
cameras were introduced, your business has become
more competitive, more demanding. Camera designs
have become more complex. That's why we con-
tinued to invest in improving the performance of
the Plumbicon. That's why we offer today's range of
extended performance Plumbicon tubes.

Today, virtually every TV camera system — domes-
tic or imported — is designed to use the Plumbicon
tube. And that makes the handling of the toughest
shots in TV very easy. Simply specify Amperex
Plumbicon pick up tubes.

For more information call or write Amperex
Electronic Corporation, Slatersville Division, Slaters-
vile, Rhode Island 02876. (401) 762-3800. Made in
Rhode Island. U.S.A. Delivered to you in twenty-four
hours or less.

Amperex
WE MAKE IT HAPPEN
A NORTH AMERICAN PHILIPS COMPANY

Circle (83) on Reply Card
COMMUNICATION

Standards
Meets applicable interfaces.
Safe for...

Full continuous colored
Klein EMT 10.02:
Established products
Gotham Audio
CE EBS
Neumann CRW CD EBS CEB EBS
Gorman
See Dollies
Director’s viewfinders
Swintek mics
Dollies and camera supports
New products
See at booth
Circle (637) on Reply Card

Gorman Redlich
Established products
CEB EBS encoder/decoder
CE EBS stereo encoder
CD EBS decoder
CRW NOAA weather radio
CM/CMR digital antenna monitors
New products
See at booth
Circle (638) on Reply Card

Gotham Audio
Established products
Neumann Collection: Microphones, including KMR81, KMR82, KMS84, KMF4 and U89
EMT 938/948: Direct-drive turntables
EMT266: Transient limiter
EMT277: AM broadcast limiter
EMT10.02: Recording/broadcast console
Klein & Hummel self-powered broadcast monitor speakers
Colored microphone cable

Graham-Patten
Established products
1231: Downstream keyer system
612: Post-production, editor-controlled audio mixer
1200 Series: Video and audio DAs
9400 Series: Video, pulse and subcarrier DAs
New products
1203: Video DA with remote control of gain and chroma level
1213: Audio DA with remote control of gain

Gray Communications
Established products
Distributor of video equipment for broadcast, cable and professional users
System construction and mobile production vehicle design
New products
See at booth
Circle (642) on Reply Card

Gray Engineering
Established products
DT-104F/113: SMPTE/EBU time code generators
DR-107/109/115: Readers for time code or user bit displays
VR-116: Video reticle safe position generator
VIE-224/VID-225: Translator encoder and decoder systems for LTC and VITC time code
FCM-227: Film counter converter/multiplexer to VITC and LTC code
New products
EDL-230: Automatic editing logger reads, prints log of changes in frame, reel, scene or take numbers
FCG-241: Film counter converter displays time code on video monitor
VCG-228: VITC decoder and character generator

Great American Market
Established products
Scene Machine: Scene projector
Colormax: Computerized color changer
Stik-Up: Single-source luminaire Projection patterns
Instaset vacuum formed scenery
Diamond lights low-voltage electric curtain and scenery
Star Strobe
New products

Lightesizer: Lighting control equipment
Blackwrap: Flexible matte black aluminum

See Us at NAB Booth 1502
Circle (84) on Reply Card

The Swintek Mark 200 is the world’s finest and most reliable wireless intercom system. It’s simple to operate and exceptionally dependable utilizing the same technology as our systems used on the Space Shuttle. Each system is designed to meet your specific requirements using standard, fully tested, precision Swintek electronic components that are protected by rugged, industrial grade, all metal cases.

10-, 19- and 27-pair snake cables
New products
3.5mm microphone cable
SYSTEX digital audio system, featuring instant access to audio information stored on 14-inch Winchester disk drives from H-P host computer
Telefunken M21: Microprocessor controlled ¼-inch analog ATR

Graham-Patten (1227A)

Ten-X: Small audio/video routing system
3400: Video DA equipment
3200: Synch/video processing equipment
Wavelink: Fiber-optic transmission system
New products
See at booth
Circle (641) on Reply Card

See ads on pages 7 and 337

Gray Communications (1618A)

Emerson (506)

EMT10.02: Microprocessor controlled ¼-inch analog ATR

Circle (639) on Reply Card

Grass Valley Group
Established products
300/MK11: Video production switcher
1680: Video production switcher
1600-CV: Component video switcher (multiformat)
Horizon: Audio/video routing switcher
440: Audio/video routing switcher

Gray Communications (1207)

Circle (640) on Reply Card

see ad on page 164

Grass Valley Group
Established products
300/MK11: Video production switcher
1680: Video production switcher
1600-CV: Component video switcher (multiformat)
Horizon: Audio/video routing switcher
440: Audio/video routing switcher

Grass Valley Group (1207)

see ad on page 164

Great American Market (1108)

Established products
Scene Machine: Scene projector
Colormax: Computerized color changer
Stik-Up: Single-source luminaire Projection patterns
Instaset vacuum formed scenery
Diamond lights low-voltage electric curtain and scenery
Star Strobe
New products

Lightesizer: Lighting control equipment
Blackwrap: Flexible matte black aluminum

See Us at NAB Booth 1502
Circle (84) on Reply Card

See ads on pages 54, 196 and 200

David Green (417)

Established products
Audicom TC-100: Telephone coupler
Rane HC-6: Headphone amp
Sennheiser and AKG headphones
New products
See at booth
Circle (845) on Reply Card

Grosh Scenic Studios (1183A)

Established products
Lighting stands, grips, modular

See Us at NAB Booth 1502
Circle (84) on Reply Card
Presenting the Major Maintenance Tool for Dynair’s Series 10 Switch

Right. A feather duster.

We first placed the Series 10 audio/video switching systems in the field four years ago. Today, most are still maintenance-free. Unless, of course, you count dusting the buttons.

Nobody’s perfect. But we’re close.

In fact, this solidly reliable, solid-state Series 10 switching system is virtually transparent to broadband signals. And the specifications we publish are not “typical” or best case. They are guaranteed, off-the-shelf minimums.

Study them. Then consider your installation. The Series 10 uses a single coax cable for control. That’s only one economy.

Compare the cost effectiveness:

- The Series 10 switches both standard and high definition signals.
- A 72-hour battery protects the memory.
- The “in use” status of each channel is constantly displayed.
- Up to four levels of switching are available, including video and multiple video, audio and multiple audio, audio-follow-video and time code.

The Series 10 is also flexible.

Select local or remote control. Panel or desktop operation. Or both. You can start with a single level, then add levels and controls with ease.

All this, and it’s almost maintenance free. Ask us for a specification booklet.

Feather duster optional.

5275 Market Street, San Diego, California 92114 Telephone: (619) 263-7711; TWX:(910) 335-2040
Grumman Aircraft (1163A)*
Continued

studio/news sets, scenery, design/ rigging
New products
See at booth
Circle (646) on Reply Card

Grumman Aerospace (1631)
Established products
Sync Proc 501: Video processing amplifier/sync generator
Machine control system with distributed microprocessor-based remote control and status monitoring
New products
Rainbow Sound places an additional audio channel into the video format, providing a full bandwidth audio path compatible with present transmitter configurations
Circle (647) on Reply Card
See ad on page 245

James Grunder & Associates (1760)*
See at booth
Circle (648) on Reply Card

H.A. Solutec
See Solutec. H.A.

HEDCO
See Hughes Electronic Devices

HM Electronics (1130)
Established products
System 58: Wireless mic with Shure SM58 element
System 85: Wireless mic with Shure SM85 element
System 82: Body-Pac wireless mic with Dynamic Expansion II
System 22RA: Body-Pac wireless mic with 90dB range and soft compressor limiter
System 25RA: Hand-held wireless mic with 90dB range and software compressor limiter
700 Series: Cabled intercoms
WL742: 2-channel, wall-mount speaker station for 700 series
IC 150 Series: Wireless intercom
New products
System 580: Hand-held SM58 wireless microphone with RX752 flat-pac receiver
System 850: Hand-held SM85 wireless microphone with RX752 flat-pac receiver
System 820: Body-Pac wireless microphone with RX752 flat-pac receiver
BH710W: Wireless/cabled intercom interface
Circle (649) on Reply Card

Hallikainen & Friends (208)
Established products
TVA132/142: Audio mixer for AFV TV applications
TEL171: Digital metering conversion kit for Moseley TCR15A
TEL172: Digital metering conversion for Moseley PBR-30A
PCC160: Transmitter control and logging computers
New products
DRC190: Digital remote control system capable of talking to 100 sites with 100 channels of control per site
Circle (850) on Reply Card

Harris Corporation (401)
[Broadcast/RF Divisions]
(Video Systems Division)
[Broadcast Microwave Division]
Established products
AM, FM and TV transmitters
FM and TV antennas
STX-1: AM stereo generator
9165: Satellite antenna control system
TC-85: Studio camera
TC-90: ENG camera
Audio consoles
Autotron Star: Business automation
9000: Program automation
9100: Intelligent remote control system
IRIS II: Digital still-store
Frame synchronizers
TBCs
Global IX: Portable microwave transmitter 2GHz, 7GHz and 13GHz transmitter and receiver systems
TV STL systems
New products
Medalist: 12-channel audio consoles
60kW UHF-TV transmitter with high efficiency klystron
30kW VHF high-band transmitter
Continued on page 124

The New Garner 1400

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

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

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

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

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

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

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

Circle (86) on Reply Card

Broadcast Engineering April 1984
120
"Microdyne's satellite radio network gives us better signal quality and saves us over $120,000 a year."

Reduced costs – fast payback

State and regional networks need all the money they can save. That's why the Georgia Radio News Service installed a Microdyne SCPC satellite radio network system.

They found that it reduced monthly distribution costs 80% while improving signal quality.

Greater programming flexibility

But lower costs and superior performance aren't the only advantages of a Microdyne radio network. Our system is frequency agile and has an optional bandwidth selection feature that lets you change formats when you change channels.

That means you can receive any of the many radio programs now being carried on a single satellite. And that gives you more programming options and greater flexibility.

Turnkey systems

At Microdyne we manufacture nearly all of the components that make up a satellite radio network, from the uplink antenna to the downlink demodulator. And we not only design and build custom systems, we can also manage the complete installation. So all you have to do is tell us what you need and when you need it.

And of course all of our products are backed by our 48-hour repair or replacement policy and our 24-hour toll-free number for emergency engineering support.

Let us custom-tailor one for you

If saving thousands of dollars a month while improving performance appeals to you, call our Marketing Department at the number below. Ask for our free brochure on satellite radio systems. It could brighten your budget for years.
Introducing a high-performance mixer with a personality all your own.

The Ramsa WR-8616.

Inside every engineer is the desire for more creative control at the board. Now there's a post-production/recording mixer designed to make your sessions sound more like you. And less like everybody else's. The Ramsa WR-8616. And its modular design is as ambitious as your needs.

You can have 16 channels of either full stereo or mono modules. Or a combination of the two.

The WR-8616 will also save you valuable time. By letting you simultaneously monitor up to 16 channels on a multi-track machine while recording.

What's more, two discrete mixes give you full monitoring capability, which can be independent from the control room's mix.

And in the mixdown, you'll have access to all 16 inputs without having to repatch or reset the board.

You'll also find the 3-band continuously variable input EQ will give you more precise control over the highs, midrange and lows. And the six-channel remote start/stop capability lets you program materials using turntables, or tape and cart machines.

To make the WR-8616 even more compatible, we've given it a dual set of meters. Eight LED bar graphs will monitor the 16 input signals. While the six VU meters handle the Master, Group, Send, Echo outputs and Solo level.

And the balanced Mic and Line inputs and Main outputs won't let any unwanted noise come between you and your sound.

The Ramsa WR-8616. A post-production/recording mixer designed to treat you like an individual.

SPECIFICATIONS:
- Frequency Response: 20-20,000Hz, ±0.5dB
- +4dB, 600 Ohm Line Input and Output Signal Levels
- Noise: 128dB (THD 'A' WTD, 150 Ohm)
- THD: 0.05% typical at 1kHz, +20dB
- CMRR: Greater than 80dB typical
Harris (401)
Continued

MW-50C: 50kW medium wave transmitter
TTS-4: Teletext origination system
IRIS: Composition station
632C: Component insolut frame synchronizer with DNR, compress/position control and digital keyer
540: TBC with slow motion option for ¾-inch non-segmented video recorders accepting sync and subcarrier inputs
DVE system with bubble memory for curve and mosaic effects

Challenger: 2GHz portable transmitter, allowing optional 3W or 12W power output
2GHz and 13GHz STL systems
Circle (651) on Reply Card

see ads on pages 86, 87, 95, 132, 133, 152, 153 and 291

Harrison Systems (1324)
Established products

TV-4: Stereo production, post-production console with AFV capability
MR-4: Multitrack production, scoring console with AFV capability
TV-3: Multitrack stereo production, post-production console
MR-3: Multitrack scoring and remix console
MR-2: Dual multitrack scoring and remix console
PP-1: Film sound post-production console
New products
PRO-7: Stereo production console with AFV capability
AIR-7: Stereo on-air console
VSI: Video switcher interface for audio-fellow-video operation
Circle (652) on Reply Card

Karl Heitz (1747)
Established products

KINOPTIK: Lenses cine/video
Gitzo: Cine/video tripods
Canml tripods, tripods with counter-balanced heads, leveling balls, dollies, microphone booms, lightstands, projection stands, platforms
Gitzo: Spring-balanced video heads, tripods
Gitzo: Fluid heads, fluid base, tripods
Gitzo: Monopods with soft grips
380: Gitzo fluid head with 100% fluid front and rear tilt
385: Gitzo quick-release to be mounted on any fluid head
-252: Gitzo video comib tripods with spring-balanced head
Alpa Rotocamera system
New products
See at booth
Circle (653) on Reply Card

Hitachi Denshi America (1402)
Established products
SK-110: Computerized studio camera

see ad on page 82

Hughes Electronics Devices
Established products

AVM Series: AFV monitoring switchers
Audio and video distribution and signal control modular systems
Small routing switchers
New products
IRS 24x46: Video and 3-channel audio routing switcher system
VAM-110: Video alarm module
VAF-110: Video alarm frame
SVS-401: Self-powered active 4x1 video switcher
SVD-106: Self-powered audio DA
SAS-401: Self-powered active 4x1 audio switcher
SAD-108: Self-powered audio DA
Circle (860) on Reply Card

Hungerford & Company
Circle (861) on Reply Card

IBM
See at booth
Circle (662) on Reply Card

ICM Video
Established products
VE-200C: Video enhancer
VP-300C: Auto video processor
DA-5000P: Audio/video DA
SR-6600P: Satellite receiver
New products
VC-2000P: Video connector
Circle (665) on Reply Card

IGM Communications
Established products
Go-Cart 24, 42, 78 random-access cart playback equipment
Marc I: Random-access controller
BASIC broadcast automation system
New products
Instacart systems, newly redesigned for 12, 24, 36 and 48 cart-tray needs
Custom controller system for Instacart in TV production
Circle (864) on Reply Card

ITC/3M
Established products

Delta series: Line of audio cartridge tape recorder/repoductor systems
Series 91B: Audio cartridge machines with ELSA
New products
Omega stereo reproducer audio cartridge machine for budget-minded stations
Circle (865) on Reply Card

see ad on page 69

Ikegami Electronics (USA)
1011/1013
Established products

TTC-99: Telecine camera system
VTN-110A: Video/pulse DAs
Series 3/8/9: High resolution video monitors
HK-322/357A: Auto setup studio-field triax cameras
HK-302: Studio camera
HL-79E: ENG/EFP camera with auto setup, triax and accessories
New products
HL-95: Camcorder system with ¾-inch camera

Circle (685) on Reply Card

see ads on pages 147, 148, 149 and 150

Holzberg
Established products

Distributor for NEC, TTF, Logitek, Grumman Aerospace, Hedeco and Shively
New products
See at booth
Circle (657) on Reply Card

Hotronic (1331B)
Established products

AD-51 Series: TBC/frame synchronizer
Digital dropout compensation option for the AD-31
Circle (658) on Reply Card

see ad on page 229

Howe Audio Productions
(321)
Established products

7012: Rotary fader stereo audio
12-mixer console
7012A: Rotary fader console with audition and program metering
7512A: Linear fader 12-mixer stereo console, with timer and TTL logic machine control
2100: Phase Chaser phase error corrector
New products
Series of consoles using Howe VCA design in modular, expandable configurations from 6 to 24 3-input, mix-minus channels; digital machine control; spill-proof membrane switches; and various options
Circle (659) on Reply Card

see pages 147, 148, 149 and 150

see ad on page 69

Ikegami Electronics (USA)
1011/1013
Established products

TTC-99: Telecine camera system
VTN-110A: Video/pulse DAs
Series 3/8/9: High resolution video monitors
HK-322/357A: Auto setup studio-field triax cameras
HK-302: Studio camera
HL-79E: ENG/EFP camera with auto setup, triax and accessories
New products
HL-95: Camcorder system with ¾-inch camera

Circle (685) on Reply Card

see ad on page 229

see ad on page 69

see ad on page 82
LEADERS ARE ALWAYS FOUND AT THE TOP.

AND YOU'LL FIND MARK ANTENNAS AT THE TOP OF THE WORLD.

Mark antennas are at work right now—not only throughout the world—but at the very top of it. You'll find them on the peaks of the world's highest mountain, Mount Everest. And also atop the world's tallest twin buildings, the World Trade Center.

Scaling such heights is the mark of a champion. And that's true of Mark Antennas. It took over 30 years of innovative design and engineering, careful quality control, and superior long-lasting performance—backed by reliable on-time delivery—to get them where they are. And to keep them there. On top.

MARK STEERABLE ANTENNAS

The Mark 5 meter hydraulically steerable antenna system is the only one of its kind. Covers the entire geostationary arc with no change to mount members. Meets 2 degree requirements with Scalar feed. Repositioning rate of 1 degree per second. Standard control has 20 programmable positions plus one position for manual override.

MANUFACTURERS OF A FULL LINE OF POINT-TO-POINT ANTENNAS.

SATELLITE • MICROWAVE • TWO-WAY

P.O. Box 1548 • 2180 S. Wolf Road, Des Plaines, IL 60018
(312) 298-9420 • 1-800-323-5273 Telex: 282657 (Anixmark)

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Minolta Broadcast Meters

Remarkable versatility combined with superb accuracy—Minolta meters conform to CIE Spectral Response Standard.

MINOLTA TV COLOR ANALYZER II
Used for monitor set-up in TV control rooms and for on-line quality control in the manufacture of TV sets.
• Analyzer mode for white balance
• Chroma mode for setting white standard
• Matrix system eliminates cross-over interference
• Four white-memory channels: four CRT memory channels

NEW CHROMA METER II INCIDENT
ILLUMINANCE METER
LUMINANCE METER 1°

MINOLTA HAND-HELD INDUSTRIAL METERS ARE:
• Lightweight and compact
• Battery powered for portability
• Rugged—ideal for field use

For more information, write Minolta Corporation, Industrial Meter Div., 101 Williams Drive, Ramsey, NJ 07446
Or call 201-825-4500
© 1983 Minolta Corp
Product appearance and/or specifications subject to change without notice.

Circle (90) on Reply Card

Image Video Ltd. (1011/1013)†
Established products
8100: Automated master control
4100: Machine alignment system
7021: Status generator
7100: Universal serial data reader
4021: Machine interface
6200: Broadcast routing switcher
8105: Border generator
AJF: Prewired jackfield
M6010: 10x1 self-contained broadcast routing switcher
7105: Silence monitor
Custom-designed control panels
VMP-1: Voltage monitor panel
Broadcast routing switcher
9100: Routing switcher

8200N: Master control
7800: Routing switcher control panel
7300: Voltage monitor panel
7001: Dual video mix amplifier
7707: Status/character display
See at booth

Circle (666) on Reply Card

Industrial Acoustics (322)
Established products
Engineered prefabricated sound studio incorporating high acoustic isolation
New products
See at booth

Circle (667) on Reply Card

Industrial Sciences (1232)
Established products
903/904: Video production switchers
831/899: Master control switchers
2031: Matrix wipe generator
9012: Fade to black unit
New products
5000/7000 Series: Video, audio, pulse delay and subcarrier DAs
9016: Auto transition unit
APE: Automated production effects for the 904
Circle (666) on Reply Card

Inflight Services (1316)†
Established products
VSTAR4: Control/projection system
New products
See at booth

Circle (669) on Reply Card

Information Transmission (1734A)
Established products
ITS-1: TV IF exciter-modulator
ITS-20: UHF exciter-modulator
ITS-610: MDS/ITFS 10W transmitter
New products
ITS-230: 1kW UHF transmitter
ITS-254: 50W UHF amplifier
Circle (670) on Reply Card

Innovative TV Equipment (1215)
Established products
T1 through T20: Tripods
D3 through D20: Dollies
P1 through P7: Studio pedestals
H1 through H100: Pan/tilt heads
New products
P2: Pneumatic pedestal
H100FD: Fluid drag cam head
D8: Dolly
T3: Tripod
Circle (671) on Reply Card

Inovonics (304)
Established products
201: Audio limiter
215: Multifunction audio processor
231: MAP-II multiband audio processor
250: Programmable stereo audio processor
370: Replacement audio recorder electronics
380: Magnetic recording electronics for film/tape
405: Tentrol tape recorder tension servo kit
500: Real time and reverberation analyzer

Circle (672) on Reply Card

www.americanradiohistory.com
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.
Inovonics (304)

Continued

GHM PPM: Gordon Meter audio meter
New products

260: Low-cost audio processor for educational FM and LPFM
387: Multichannel magnetic reproduce amp for tape/film

Circle (672) on Reply Card

see ad on page 174

Interactive Motion Control

(*)

New products

IMC 3565: Computer and modular motion control stage may be used for model or motion control photography as well as computer graphics, computer and traditional animation

RT real time motion control system is a portable version of the 3565 motion control animation equipment

IMI-300: Interactive 3-D graphics system

Circle (673) on Reply Card

see ad on page 243

Interactive Systems

(1187 & 1132)

Established products

11: Edit control with list management
21: Off-line and industrial edit controller
31: On-line, 8-port edit control system
41: Large off-line system with jogger
Motion and Programmed Motion

New products

51: High performance edit control system with VPR3 RS-422 direct control and many other features

Circle (674) on Reply Card

see ad on page 191

Interand

(1016)

Established products

Telescop 100: Electronics graphics system

New products

Telescop 440S: Custom-designed graphics system and software to store preprogrammed charts and graphics, recalled from a stylus on a side menu panel

Circle (675) on Reply Card

Interface Electronics

(1405A)

Established products

550: Broadcast audio production mixer
550-Y: Video production version of 550
200: Portable ac-dc-powered stereo mixer
400: 12x4x2 recording mixer

New products

See at booth

Circle (676) on Reply Card

Itekco USA

(1338)

See at booth

Circle (677) on Reply Card

JBL

(615)

Established products

4301: 2 way broadcast monitor
4401: Compact studio monitor
4312: 3 way compact studio monitor
New products

4411: Direct radiator loudspeaker system using three transducers in a cluster for sound coherency

Circle (678) on Reply Card

see ad on page 31

JVC Company

(1234)

Established products

KY-950U/990U: Portable ENG/EFP cameras
KY-310U: Portable ENG/EFP cameras
ESP-7: Time code editing system for 1/4-inch VTRs
ESP-4B: Basic 1/4-inch editing system
VEP-1: VHS editing system
TM-R9U: 9-inch broadcast monitor
KM-2000: Special effects generator/switcher
CR-4700U: Portable 1/4-inch recorder

New products

DAS-800: Digital audio mastering system

Circle (679) on Reply Card

see ad on page 199

Jefferson Data

(1629)

Established products

System 90: Sales, traffic and general accounting for radio and television

Program Management System: Complete inventory and control for all syndicated program materials

Electronic News Processing (ENP): Complete newsroom computer system to handle wire services, story and script preparations, electronic teleprompter and archiving

New products

See at booth

Circle (680) on Reply Card

Jenel Consultants

(*)

Established products

Monitor setup tape

Engineering consultant services

New products

See at booth

Circle (681) on Reply Card

Jensen Tools

(1747B)

Established products

JTK-17: Technician’s tool kit
JTK-87: Field engineer’s tool kit

377B145: Heavy-duty shipping container for sensitive equipment

Circle (682) on Reply Card

see ad on page 333

Jingle Machine

(200A)

See at booth

Circle (683) on Reply Card

John B. Rudy

See Rudy

J. Osawa & Company

See Osawa

Kahn Communications

(625)

Established products

STR-77: AM stereo exciter
LP-2L: LINES-PLUS remote telephone pickup high and low frequency extender

Modulation processor equipment

New products

See at booth

Circle (684) on Reply Card

Kaman Sciences/KBS

(1607)

Established products

Business management computer systems for broadcasters

New products

See at booth

Circle (685) on Reply Card

see ads on pages 163 and 184
And now a message on Yamaha's new RM1608 recording mixer.
SPECIFICATIONS

TOTAL HARMONIC DISTORTION (THD)
Less than 0.1% at +4 dB output, 20Hz to 20kHz (all Faders and controls at nominal)

HUM & NOISE (20Hz to 20kHz) Rs = 150 ohms
(INPUT GAIN "= 60")
- 128dB Equivalent Input Noise (E.I.N.)
- 95dB residual output noise: all Faders down.
- 80dB (84dB S/N) PGM Master volume control at maximum and all CH PGM assign switches off.
- 64dB (68dB S/N) PGM Master volume control at maximum and one CH Fader at nominal level.
- 73dB (77dB S/N) STEREO Master Fader at maximum and all CH STEREO level controls at minimum level.
- 64dB (68dB S/N) STEREO Master Fader at maximum and one CH STEREO level control at nominal level.
- 80dB (70dB S/N) ECHO SEND volume at maximum and all CH ECHO volumes at minimum level.
- 75dB (65dB S/N) ECHO SEND volume at maximum and one CH ECHO volume at nominal level.

CROSSTALK
- 70db at 1kHz: adjacent Input.
- 70db at 1kHz: Input to Output.

MAXIMUM VOLTAGE GAIN (INPUT GAIN "= 60")
Pgm: 74dB: MIC IN to PGM OUT.
24dB: TAPE IN to PGM OUT.
34dB: ECHO RETURN to PGM OUT.
STEREO: 74dB: MIC IN to STEREO OUT.
24dB: TAPE IN to STEREO OUT.
34dB: ECHO RETURN to STEREO OUT.

CHANNEL EQUALIZATION
± 15 dB maximum
HIGH: from 2k to 20kHz PEAKING
MID: from 0.35k to 5kHz PEAKING
LOW: from 50 to 700 Hz PEAKING
HIGH PASS FILTER: -12dB/octave cut off below 80Hz
OSCILLATOR: Switchable sine wave 100Hz, 1kHz, 10Hz
PHANTOM POWER: 48V DC is applied to XLR type connector's 2 pin and 3 pin for powering condenser microphone.
DIMENSION (W x H x D): 37-1/2" x 11" x 30-1/4" (953 mm x 279.6 mm x 769 mm)

The specs speak for themselves. But they can't tell you how natural, logical and easy the RM1608 is to work. All the controls and switches are logically arranged to help you get the job done quickly and accurately.

And in the tradition of Yamaha's sound reinforcement mixers, the RM1608 sets new standards of reliability as well as ease of operation. For complete information, write: Yamaha International Corporation, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Ave., Scarborough, Ont. M1S 3R1.
Kangaroo Video Products (1151)
Established products
Kangaroo Video Pack: Custom carrying cases for broadcast and industrial VCRs
Kangaroo Nagra Pack: Cases for Nagra recorders
Gripper Strap: Padded shoulder straps
Kangaroo Semi-Tough: Aluminum reinforced padded case for video cameras
New products
Kangaroo Super-tough: Top-loading camera case for video cameras and VCR combo systems, with Tri-Fast zipper opening, triple-hemmed, U-shaped aluminum frames, and closed-cell foam padding and hand/shoulder straps
Circle (688) on Reply Card

Karl Heitz
See Heitz, Karl

Kavco (1509B)
Established products
KAVCART: Broadcast video cart system with programmable microcontroller, vertical, interval switching and interfacing and separate recording console featuring label printer and Sony VO-5850 master recorder
New products
See at booth
Circle (688) on Reply Card
see ad on page 173

Kavouras (1635)
Established products
Radio color weather radar remoting equipment
Real time Atmospheric Monitoring (RAM): Meteorological services and database
Triton X: Animation and GOES weather satellite image processing system
New products
Triton XL: High resolution weather graphics and animation
High resolution real time colorization system interfacing to various radar systems, including Collins Doppler radar
High speed weather data transmission via Westar III
Circle (689) on Reply Card

Kay Industries (122)
Established products
T-1300-A2: Rotary phase converter
New products
See at booth
Circle (690) on Reply Card
see ad on page 228

Keith Monks Audio (132)
Established products
Series: Range microphone stands
RCM II: Professional record cleaning machine
RCM III: Professional record cleaning machine
LS1B: Powered monitor loudspeaker
CRS01/50/2: ECM for radio station-production
MT 2: High tripod mic stand
New products
See at booth
Circle (691) on Reply Card
see ad on page 252

Keylite Production Services (1220)
Established products
Distributor for Strand-Century Ianino HMI lights, Modulights, Lowel Light kits, Rosco and Lee gels and Matthews studio grip equipment
New products
Stand-up/sit-down dolly
Circle (692) on Reply Card

Kinematics/Truetime (115)
Established products
468-DC: Satellite synchronized clock
60-DC: WWVB synchronized clock
FTM-6: Frequency/time deviation monitor
468-FPC: Field portable satellite sync clock

WWVTR MKV: Portable WWV receiver
RD-B: Remote display
New products
Simplex Interface: For master and remote timing
Circle (693) on Reply Card

Kings Electronics (1623)
Established products
RF, coaxial and triaxial connectors
Video patch panels and cords
Field service kits
New products
See at booth
Circle (694) on Reply Card

George Kleinkecht (1769)
See at booth
Circle (695) on Reply Card

---

WCCO puts its state-of-the-art equipment in Emcor's state-of-the-art enclosures.

WCCO-TV in Minneapolis/St. Paul has been a leader in broadcasting for many years and its new broadcast center is one of the finest in the industry. When it came to housing their equipment, the WCCO engineers chose Emcor enclosures. Emcor is also a leader in its field, meeting the needs of broadcasters with high quality enclosures. Choose from six distinct product lines and more than 9,000 standard items. For those who need it fast, Instant Emcor is ready to ship in five working days. In addition to standard products, we manufacture modified designs for special needs.

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Rochester, MN 55901
(507) 289-3371

Crenlo, Inc.

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Circle (93) on Reply Card

April 1984  Broadcast Engineering  131

www.americanradiohistory.com
Adda, Ampex, Harris, and Quantel all make excellent Still Stores. But more and more the choice is Harris.
Harris' new IRIS Composition Station (ICS) solves your video production problems with these exclusive features:

- Compression and Positioning
- 2X expansion
- Variable size
- Infinite border and background color
- Soft border capability
- H & V inversion
- Cut-and-paste
- Removable memory modules
- Single joystick control

Adda doesn't. Ampex doesn't. Quantel doesn't.

The ICS is sophisticated enough to complement an artist's imagination, yet simple enough for use in the hectic pace of on-air production. And it's based on Harris' new four frame synchronizer, the 650.

Here's why.

2 Harris' IRIS II offers you simultaneous access by up to six users, without costly networking of separate systems.

Adda doesn't. Ampex doesn't. Quantel doesn't.

Now when you want to expand, you can—cost effectively. Your system can grow just by adding inexpensive user stations.

3 IRIS II lets you title stills from each user station.

IRIS II gives you character generation with multiple fonts. It lets you title stills directly from each user station without tying up expensive character generation equipment.

4 IRIS II solves your still sorting and locating problems with an integral library.

In fact, IRIS II offers the most powerful search routines of any still store. Its library is also accessible by each user station, and has a capacity of over 80,000 stills.

5 Problems with identifying stills are eliminated.

You can get complete information on all the stills in your list, with full description, date, sequence, and I.D. information.

You also have the power you need to manipulate list order through addition, deletion and change of position. And, you can also link and loop your lists.

6 IRIS II gives you the storage flexibility you need for future planning.

IRIS II interfaces with the largest variety of storage drives of any still store. Several types of fixed and removable drives give you the capability of over 17,000 on-line stills. No other still store offers this flexibility. Period.

We think you get the idea. We build the most powerful, and the most flexible, still store there is. Whatever your business, if your problem is storing and manipulating video images, the best choice is the Harris IRIS II.

For more information about this superior solution to your video problems, call Dave Fabian, Product Manager at (408) 737-2100, or contact Harris Studio Division, Video Systems Operation, 1255 E. Arques Avenue, Sunnyvale, CA 94086 Telex 4992172

Circle (94) on Reply Card
Kliegl Brothers (1604)
Established products
K96 SCR: Digital lighting dimmer
Performer II/III: Memory lighting control consoles
Entertainer: Manual/memory lighting consoles
Command Performance: Memory lighting control console
New products
See at booth
Circle (696) on Reply Card

Kodak
See Eastman

Knox Video (1511)
Established products
K50: Basic titler
K128: High-resolution character generator
K500: Audio corrector
K700: Video corrector
Color Box: Dual colorizer/keyer/edger
New products
K40 Microfont: Low cost character generator
K100 Chromaface: Graphic titler
Circle (697) on Reply Card

Kohold of America (1725)
Established products
DLF-2500: HMI lighting fixture
ST-1000: Halogen lamp lighting fixture
DLF-2000: Par 64 lighting fixture and ballast
FR-1000 and DLF-575: 1000W Halogen lamp fresnel fixture
DL-PAR: Bright beam lamp systems

LTM of America (1518)
Established products
LUXARC: HMI Fresnel lights
AMBIARC: HMI open face lights
Soft-D-Box: HMI soft lights
MSL-250: HMI fiber-optic lighting systems
Minette: Low voltage camera and car lights
Peppers: Miniature quartz halogen

DL-1200: PAR-Twin lighting system
SubLight hand-held lamp
New products
See at booth
Circle (698) on Reply Card

LPB
Established products
Signature: 5-, 8- and 10-mixer mono and stereo audio consoles
Monogram: 8- and 8-mixer audio consoles for mono and stereo uses
Citation: 8- and 10-mixer audio mixers in dual stereo configurations
New products
AM-50/150: Low power AM transmitters for PSRA, PSSA, STL and LPRTS applications
VS-TIS: High performance 15M AM antennas
Circle (699) on Reply Card

L-W International (1602)
Established products
4500 M: Multimedia film/video transfer system
6000 M: Professional 16mm telecine projector
DS 2000: 16mm film digitizer
224-A MKVII: 16mm analytic projector
New products
See at booth
Circle (701) on Reply Card

Laird Telemedia (1721)
Established products
7200: Communicator character generator
5300: Multiplexer character generator
3300: Message generator

THE RADICAL SOLUTION

Efficient press feeds. When your facility hosts the electronic press you need the Radical solution, the M-18 press mult box.

One mic feeds entire press. The M-18 features two inputs and 18 outputs each with the option of mic or line level on either industry standard XLR or 1/4" phone jacks for maximum versatility.

Clean press feeds. Each of the 18 outputs are fully transformer isolated and driven by individual buffer amps. A built-in, calibrated tone oscillator allows all outputs to be set at standard levels.

Tough, portable. A rugged, aluminum industrial case houses the M-18 assuring portability and efficient set up.

The M-18
The Radical solution to a pressing problem.

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M18
PRESS MULT BOX

RADICAL ELECTRONICS
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The Widest Angle, The Highest Performance

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

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

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

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

P18 x 15 BIE F2.1 for 30mm Cameras

KEY SPECIFICATIONS

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

Also available: PV18 x 11 BIE F1.5 for 25mm Cameras
Finally!
A radio automation system for under $5,000

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- $4,900 buys everything you need to operate your present live equipment. You get a Commodore™ 64 computer with the Automate-64 operating system on a plug-in ROM cartridge, a Commodore™ Datasette recorder, a Zenith™ Data Systems monitor, a 3' high rack-mount interface unit, interconnecting cables, plus easy to understand installation and operating manuals. Low-cost printers and disk drives are optional.
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- No compromising of your format. You can air satellite networks, syndicated programming, or locally-produced music tapes, using almost any playback equipment.

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Manhattan, Kansas 66502
PHONE: 913-537-3289, call collect

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If your business relies on precise audio reproduction, the Advantage 310 insures your success. Our Audio and Noise Level Meter is a low cost, high quality, measurement device capable of delivering greater accuracy than that achievable with more expensive general purpose equipment.

The features of the Model 310 are tailored for audio test and troubleshooting. It offers:
- Isolated, balanced, Trans-Amp™ differential inputs
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- 400 Hz to 20 kHz multiple pole filter
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Circle (97) on Reply Card

Laird Telemedia (1721)
Continued
1040: Q board
1080: Pointer
New products
7204: Dual-channel option for 7200 Communicator
Circle (702) on Reply Card

Lake Systems
Established products
La-Kart: Matrix-10 random access video cart system
New products
La-Kart Matrix 6M: Random-access video cart system for 68K multi-event programming, including computer, floppy disk storage, three dual machine interfaces, six Type M VCRs, YIQ AFV matrix switcher, component TBC, ASACA video monitor and TEK waveform/vector monitors
Circle (703) on Reply Card

Landy Associates
Established products
Distributor for:
Ikegami HK-79EAL camera and monitors
Anton/Bauer ProPac 14 batteries and chargers
JVC KY-310U camera
Sachtler camera support equipment
RAMSA WR-8210/WR-130 audio mixers
CB-1: Interphase slate/border generator
S-202: Interphase 10x1 video/2- audio and tally switcher
New products
M-400: Interphase machine control system conforming to SMPTE RP-113 and using RS-422 digital bus
Arben Designs Leebset modular set design systems
Shure FP31 field production mixer
Circle (704) on Reply Card

Lang Video Systems
Established products
WSI-820: Video source identifier
One-Shot: Switcher, mixer, identifier
Two-Shot: Integrated switcher, mixer, identifier and V/A monitoring
VAX-700: Automatic 2x1 video-audio noise switcher
New products
60825: Video recording measurements generator
4070: Microprocessor-based video test generator
VSI-821E: Digital video source identifier with memory recall
Circle (705) on Reply Card

Lansing, James B.
See JBL

Larcan Comm. Equipment
Established products
TTC-3000FH: 30kW high-band VHF IF-modulated TV transmitter
New products
TEC-IV: VHF TV exciter, using SAW filtering
TTC-1000FH: 10kW high-band VHF IF-modulated TV transmitter, using
Optimod

Op-ti-mod n [Early Orbanian; deriv. of optimum modulation]

1. A broadcast audio processor built by Orban Associates to the highest standards of quality and reliability, incorporating patented circuitry to achieve a cleaner, brighter, louder airesound.

2. OPTIMOD-AM, Model 9100A; a high fidelity stereo or mono processor which achieves extraordinarily natural audio quality along with high loudness, remarkable source-to-source consistency, and FM-like brightness.

3. OPTIMOD-FM, Model 8100A/1 compressor/limiter/stereo generator; the industry’s dominant choice for optimum FM processing, with or without the optional Studio Chassis and Six-Band Limiter Accessory Chassis.

4. OPTIMOD-TV, Model 8182A; a stereo processor that brings TV audio processing into the ’80’s by combining Orban’s artifact-free multiband gated compressor with our clean “Hilbert Clipper” peak limiter and the commercial-taming CBS Loudness Controller.

5. OPTIMOD; a registered trademark.

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.
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

Be sure to visit us in Booth 1320 at the NAB show, April 29-May 2, in Las Vegas.
Larcan (1826A)
Continued

Laumic
Established products
CMX Edge: Portable computer-assisted editing system
New products
Address track time code equipment for Sony VO-8800 editing recorders
Circle (708) on Reply Card
see ad on page 221

Leader Instruments
Established products
LCG-400M: Video pattern/sync generator

LeBlanc & Dick Communications (1149)
Established products

Lightning Barrier

See LEA at NAB in Booth #302

100% LIGHTNING STRIKE PROTECTION. GUARANTEED.
You name it, LEA protects it.
Broadcast towers, buildings, power lines, plant sites, tank farms, substations, water towers, radar installations, missile launch pads...any application.
LIGHTNING BARRIER Dissipation Array Systems from LEA bleed off and control high energy electrostatic buildup between the clouds and the ground.
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No conventional lightning rod approach can possibly give you the protection that LEA'S LIGHTNING BARRIER Dissipation Array Systems provide.
So strike back at lightning. Get complete details today from LEA, Inc., a Dynatech Company, 1296 Lokeland Road, Santa Fe Springs, California, 90670 (213) 944-0916, TWX 910-586-1381.

LCG-400S: Video generator with sweep marker unit
LVS-5850B: ¼ rack vectorscope
LBO-5860A: ½ rack waveform monitor with line selector
LSG-216: Synthesized AM/FM/FM stereo signal generator
LBO-525L: 50Mz 2-channel, dual time base oscilloscope
LHC-909B/V: Video head checker
New products
LBO-5860L: ½ rack waveform monitor with expanded front panel selection of Lines 7 to 21
Circle (708) on Reply Card
see ad on page 5

Leitch Video
Established products
SPG-102/120: Sync generators
ACO-131: Auto sync changeover unit
680 Series: Video DAs
SCH-730: Sync/subcarrier phase monitor
IAD-750: Vertical interval adder/deleter
VIP-1101: Vertical interval processor
CGB-230: Encoded color bar generator
VPA-330: Video processing amp
DTS/DTD: Digital TV scanner/descrambler

CSD-510: Master clock driver
CACC-511: Clock auto change
CLK: Series analog clock
UDC-508/512: Universal digital clock
dCG-520/521: Digital clock display
New products

AVS-481: Audio video switcher
CTG-240: Combination calibration test generator
DTG-1010: Digital test generator
VPA-331: Video processing amp
Frame-store synchronizer
Circle (710) on Reply Card
see ad on page 151

Lemo USA
Established products
Connectors in coaxial, triaxial and multipin configurations for audio and video applications
New products
See at booth
Circle (711) on Reply Card
see ad on page 91

Lenco Electronic (1419)
Established products
PVS-430: V scoposcope SC/H phase monitor
PMG-312: RS170A sync generator
300: Timing system
VNM-428: Video noise meter
PSW-487: Video switchers
New products

PSG-412: RS-170A sync generator
PSG-412P: PAL sync generator
PEC-466: NTSC encoder
PEC-466P: PAL encoder
PCO-418: NTSC auto sync changeover
PCO-418P: PAL auto sync changeover
Circle (712) on Reply Card

Lexicon
Established products
Model 85: Digital audio effects processor
Model 87: Programmable digital audio effects processor
Model 224X: Digital reverb/effects processor
Model 200: Digital reverb system
Model 1200C: RS-422, high resolution audio time compressor system
Model 1300S: Stereo audio/video delay compensator
Circle (713) on Reply Card
see ad on pages 88 and 71

Circle (162) on Reply Card

Circle (709) on Reply Card
see ad on page 263

Circle (710) on Reply Card
see ad on page 151

Circle (711) on Reply Card
see ad on page 91
GM's Buick division is the first domestic automaker to offer AM Stereo radios.

Delco single-system radios, using the Motorola C-Quam™ decoder integrated circuit, will be introduced in selected 1984 models.

But one of the most enthusiastic responses to this news came from a man who isn’t even a Buick dealer. He’s Tom Cassetty, General Manager of WSM, Nashville. “I heard the Delco playing C-Quam AM Stereo at the National Radio Broadcasters meeting in New Orleans, and I was really impressed. The sound was terrific! If they’d been playing WSM, I never would’ve gotten out of the car!”

If your station had the choice, wouldn’t you really rather be heard in the new Buicks? You can be. Just call Dick Harasek at (312) 576-2879, or Chris Payne (202) 862-1549.

**MOTOROLA AM STEREO. THE WINNING SYSTEM.**
Lightning Elimination
Established products

SE-208-400: Power line surge eliminator
MB-43O/3: Power line filtering system

TETM-30-1: Transient eliminator plus RS-232 interface

CSE-HF-25K: Coaxial surge eliminator
TE(VHF)75 B: High frequency coaxial protector

Hemispherical dissipation arrays
Trapezoidal dissipation arrays

PP120-8-1: Perfect power source

New products

See at booth

Circle (714) on Reply Card

Listec
Established products

MERLIN remotely controlled crane arm

3200 Series: Tripods
Fulmar, Tern and Teal Pedestals
A-2000 Series: On-camera monitors
Avocet, Cormorant, Cygnet/Swan and Mark pan/tilt heads

New products

200 Micro Swift: Remote camera control system with shot modification, time fade, custom control panels and storage to 99 shots for single-camera pan/tilt positions, pedestal heights, zoom, focus, iris and color balance settings

A-2100 Prompter: 360 text-line memory and disk memory to 6000 lines, with variable roll speed, pause, negative/positive image and hard copy printer

See ad on page 341

Logica
Established products

Teletext equipment
Video graphics generators and systems

New products

See at booth

Circle (716) on Reply Card

Logitek
Established products

Audio mixer
MAS Series: Audio DAs
CAS Series: Audio mixers

New products

Perfectionist: 32-input mixer, featuring electronic switching, bus-swap, and pre-wired remote connection punch-block panel

PA-4: Pro audio balance/unbalance source Interface

PWR-80: Audio 80W power amp
MAS-ADJ: 1-in/4-out DA module for MAS consoles

MAS-PAI: Balance/unbalance interface module for MAS consoles

Pyramic MET-7 speakers

Circle (717) on Reply Card

see ad on page 222

Pam Lontos
Established products

Video sales training course, includes 16 videotapes
Audio sales training course, includes 24 audiotapes

New products

See at booth

Circle (718) on Reply Card

Lowell-Light
Established products

01-10: Omni-light
D2-10: DP light
S2-10: Softlight 2
T1-10: Tota-light

Complete accessory and kit systems.
Lowel reflectors and Lowell clamping, support and rigging systems

New products

See at booth

Circle (719) on Reply Card

Lyons Lamb Video
Established products

VAS IV: Video animation controller

VAS III: VHS video animation testing system

3300: Professional video animation stand
CCS: 4-axis motion control system

Innovator 1000: Animation control

New products

See at booth

Circle (720) on Reply Card

M/A-COM MVS
Established products

Skypod: Airborne ENG system
SuperScan/MiniScan: Auto track ENG central receive systems

2/2.5/7/13GHz: Portable ENG microwave systems

2/7/12GHz intercity microwave systems

23GHz point-to-point microwave

High gain disc array manual track ENG receiver system

New products

See at booth

Circle (721) on Reply Card

STOP GROUND LOOP HUM!

VIDEO HUM STOP

COIL...HSC 1

Will ELIMINATE HUM and other INTERFERENCE in Video Lines caused by differences in Ground Potential.

- For Color and Black and White.
- FLAT-DC to 6.5 MHz.
- No Low-Freq. or Hi-Freq. Roll-off.
- No Differential Phase Distortion.
- No Differential Gain Distortion.
- NoEnvelope Delay.
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- Small Compact Package 4" x 4" x 2-1/4".

ELIMINATES HUM AND INTERFERENCE:

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- Between Buildings
- On long runs in Buildings
- Between Studio and Transmitter
- On Incoming Telco circuits
- On Outgoing Telco circuits

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- Betw. Remote Truck and Microwave
- For Intertruck Hookup
- For VTR Units
- For Monitoring Lines

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ALL NEW 1984 MPCS VIDEO ALMANAC / CATALOG

THIS "INDUSTRY BIBLE" OF OVER 300 PAGES INCLUDES:

- The latest technical specifications and information on the latest models available from more than 100 manufacturers and suppliers of video products.
- Informational articles on the "Whys & Wherefores" of such products as Time Correctors, Special Effects generators, NiCad Batteries etc.
- Twenty-four pages of video equipment, systems and special packages available for rental—and their rates.
- Eight pages of video production, post-production and tape duplication services—and costs for such services.
- To obtain your FREE copy of the 1984 MPCS Video Almanac/Catalog—a $25.00 value—send your business card, or letterhead, with a check/money order for $5.00 to cover shipping & handling costs to:

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514 West 57th St., New York, NY 10019
212-586-3690

Circle (164) on Reply Card

Audio-Video Engineering Company
68 Nancy Blvd., Merrick, N.Y. 11566
Tel. (516) 546-4239

Circle (165) on Reply Card

Circle (164) on Reply Card
Now the **CHYRON RGU-2**

for under **$20,000.**

Now's the time to buy a brand new, latest model CHYRON RGU-2 graphics and tilting system at a price that's hard to resist.

The high-quality RGU-2 provides many of the most-wanted features of the industry-standard CHYRON IV: unsurpassed character resolution of 27 nanoseconds...programmed graphics animation...color for background and text on a character-by-character message basis (with the optional CHYRON Color Encoder)...a versatile multi-font library...automatic color/font change...64 color choices...and much more.

With the optional Channel Control Module, mixes, wipes and fades are available at the touch of a key. Operation is flexible and uncomplicated. Just load a software program and automatic instruction displays appear on the monitor to provide an interactive communications channel between operator and RGU-2.

So, don't delay. There may never be a better time to buy the character generator that offers most of the features found in units costing twice as much—the CHYRON RGU-2.

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**TELESYSTEMS**

A DIVISION OF CHYRON CORPORATION

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YOU CALL THE SHOTS!

Take one. Or take both. Go just about anywhere a car can go, and park with ease. Join them together in various configurations. Or split them apart. Either way, our unique dual-truck system—featuring a self-contained electronic production truck and a control room truck—is more versatile and cost-efficient than any comparable system on wheels.

Designed to suit the difficult terrain and environmental conditions of the Mountain States, our system provides the same production capabilities as much larger, conventional tractor/trailer rigs. With enough flexibility to cover anything from small, low-budget shoots to full-blown sports events and concerts.

We can supply experienced crews and customized, cost-efficient equipment packages on a step-scale basis. Choose from broadcast-quality Sony ENG/EFP cameras, recorders and monitors, to sophisticated time code and character generators, switchers, intercoms, audio mixers, etc. And for back-up, we offer our extensive inventory of video and film rental equipment: power supplies, lighting and grip equipment, camera prompts, camera support equipment (including Steadicam), etc. All serviced by our own experienced technicians.

So go ahead and rent just what you need. That's all you will be paying for.

Rental • Sales • Service
Film/Video Equipment Service Co.
1875 South Pearl St., Denver, CO 80210 • (303) 778-8616

Be sure to visit our NAB Booth #1153
Circle (108) on Reply Card

---

MCI/Quantel (1831)
Established products

MIRAGE: Free-form digital video manipulation system

PAINT BOX: Digital art, graphic and animation system

DLS 8030: Digital library system with production effects

DLS 8020/8010: Digital library systems

CLL: Central lending library for DLS 8000 Series and Paint Box

DPE 5000/5000SP: Digital production effects systems

DSC 4000: Family of standards converters including 6-field Silk

DFS 1750: Digital framestore, synchronizer and TBC

New products

CYPERH: Free-form character and caption generator with animation capabilities

Circle (722) on Reply Card

3M
See “Three” M

MPCS (1121)
Established services
Rents: Production equipment
Services: Post-production: modification of video cameras/monitors
Distributor: Video equipment
New services
See at booth

Circle (723) on Reply Card

see ad on page 332

MZA Associates (1507)
Established products

MZA-14: Production vehicle
New products
See at booth

Circle (724) on Reply Card

Macrotoe (1702)
See at booth

Circle (725) on Reply Card

Magnasync/Moviola (1147)
Established products

V-1016/35: Videola film-to-tape transfer system

V-500/16-35: Videola film-to-tape transfer system

Edgewriter: Creates edge numbers automatically during transfer process
New products
See at booth

Circle (726) on Reply Card

Magnetic Modia (1310)
Established products

Cost-effective mobile production truck
New products
See at booth

Circle (727) on Reply Card

see ad on page 142

Magnum Towers (119)
Established products

M-Series: Prefielded triangular tower

sections from 18-inch to 42-inch faces

MKD-Series: Knock-down tower sections from 48-inch to 120-inch faces

New products
See at booth

Circle (728) on Reply Card

The Management (627)
Established products

Simple Log, Prolog, New Electric Log
Super Log software packages for automated broadcast stations
New products
Prolog software for the IBM-PC
Circle (729) on Reply Card

Marcom (306)
Established products

518: Marcom audio monitor/switcher
110/112: Rood BAX bandwidth extender
SC-203: Rood FM stereo generator
New products
114: Rood portable BAX bandwidth extender system
Circle (730) on Reply Card

Marconi Electronics (1609)
Established products

MR2B: 1-inch C Format VTR
B4624: VTR monitoring unit
B3410: CCD line array telecine with color corrector computer
2019: Signal generator
2305: Modulation meter
1650: Edystone receiver

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www.americanradiohistory.com
AM Stereo Without Compromise

C-QUAM® AM Stereo System by Delta Electronics, Inc.
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.

C-QUAM is a registered trademark of Motorola, Inc.
Manufactured under license from Motorola, Inc.

See us at NAB Booth 105
Marconi (1609)  
Continued  
Cameras: Studio  
Generators: Blackburst and color bar  
Transmitters: AM/FM/UHF/VHF  
Amps: Pulse and DAs  
TBCs and color correctors  
New products  
See at booth  
Circle (731) on Reply Card

Marconi Instruments  
Established products  
S1000: AWA audio transmission test system  
2305: AM/FM modulation meter  
2914A: Insertion signal analyzer  
2920: TV interval timer  
New products  
6990: Automatic RF power meter  
Circle (732) on Reply Card

Mark Electronics  
(1227)†  
See at booth  
Circle (1488) on Reply Card

Marshall Electronics  
Established products  
Distributor of A/V products, including digital audio effects; delay, reverb; A/V sync delay; time expansion/compression  
New products  
See at booth  
Circle (733) on Reply Card

Marti Electronics  
(501)  
Established products  
RPT2: Hand-carried RPU transmitter  
RPT15: Portable aircraft/mobile RPU transmitter  
RPT25/40: Portable RPU transmitters  
ARS15: Automatic repeater station  
STL10: Full back-up telemetry link  
TSL15: Return telemetry link  
RMG15: Digital remote control  
ATSR15: Automatic transmitter switcher  
New products  
See at booth  
Circle (734) on Reply Card

Matthews  
(1209)  
Established products  
Aluminum and stainless stands, diffusion, lighting control hardware, grip/mounting equipment, dollies, track Cin-Vator  
Crank-O-Vator  
Tulip Crane  
New products  
C-boom clamp, expendable reflectors and brackets, newly designed reflector brak ing  
Stage stands, kit stands, grip heads and overhead frames  
Cam-Remote system  
Circle (735) on Reply Card

McCurdy Radio  
Established products  
AVS-100: Audio/video routing switcher  
SS 8722: Audio console  
SS 8670: Audio console  
VDA-41: Video distribution amplifier  
VDA-42: Video distribution amplifier  
VDA-10: Video distribution amplifier  
VLC-10: Video leader generator  
8720-B: Radio and TV production console  
8808: Edit booth console  
8816: Air console  
8824: Production/air console  
CS 9900: Intercom system  
ARS 5020: Audio routing switcher  
CS 9900: Digital-controlled intercom  
SS 8800: Audio console  
VSG-10: Video signal generator  
OL1903A: Telephone hybrid  
CB1050: Conference bridge  
EQ 1810: Audio equalizer  
EQ 1820: Telephone channel simulator  
Circle (737) on Reply Card  
See ad on inside back cover

McInnis-Skinner  
See Beston

McMartin Industries  
(701)  
Established products  
1000/500 Series: 8- and 5-channel consoles  
TBM Series: FM monitors  
RPU Series: Remote pickup equipment  
BFM-1521R: FM stereo generator  
BFM-2001: SCA generator  
TR Series: SCA receivers  
Accu-Five: 5-channel mixer  
BR-400: 4-channel remote mixer amp  
New products  
Comuni-quick Network: Super-S transmission system for five simultaneous sub-channels from one FM station  
UDC-1: SCA data modem  
TVR-2: SCA receiver for TV  
PS-1K/PS-5K: Power reducers for daytime AM stations  
BF-400: 400W FM transmitter  
BF-30M: 30KW FM transmitter  
TV stereo monitoring system  
FM translator  
Circle (738) on Reply Card

Meadowlands Communications  
(110)†  
See at booth  
Circle (739) on Reply Card

Media General  
(410)  
Established products  
AVS-100: Audio/video routing switcher  
SS 8722: Audio console  
SS 8670: Audio console  
VDA-41: Video distribution amplifier  
VDA-42: Video distribution amplifier  
VDA-10: Video distribution amplifier  
VLC-10: Video leader generator  
8720-B: Radio and TV production console  
8808: Edit booth console  
8816: Air console  
8824: Production/air console  
CS 9900: Intercom system  
ARS 5020: Audio routing switcher  
CS 9900: Digital-controlled intercom  
SS 8800: Audio console  
VSG-10: Video signal generator  
OL1903A: Telephone hybrid  
CB1050: Conference bridge  
EQ 1810: Audio equalizer  
EQ 1820: Telephone channel simulator  
Circle (737) on Reply Card  
See ad on inside back cover

Media Service Concepts  
(622)†  
Established products  
Station automation software including Recall, Electric, Log, Electric Bill and Management  
New products  
See at booth  
Circle (745) on Reply Card

Meret  
(1331A)†  
See at booth  
Circle (741) on Reply Card

Merlin Engineering  
Established products  
258: Ultra-wide band VTR  
238: Extended play kits for 1-inch type C VTRs  
Service: Refurbished 2-inch quad VTRs  
ME-278: Digital audio delay  
ME-288: Standards converter  
ME-298: VDA system  
ME-408: Color film recorder  
Distributor: Apert-Herzog synchronizer, TBC  
New products  
See at booth  
Circle (742) on Reply Card

Micmix Audio  
(106A)  
Established products  
D-28: Dynafex non-encode/decode noise reduction system

Master-Room Products:  
XL-515: Multifunction reverb  
XL-404: Plate synthesizer/reverb  
XL-305: Acoustic chamber synthesizer  
XL-210: Stereo reverb system  
XL-121: Monaural reverb system  
DC-2: Variable decay control for reverb systems  
New products  
DX-2: Dynafex noise reduction system with new exciters circuitry  
Circle (743) on Reply Card

Micro Audio Products  
(1122C)  
Established products  
TX-101: Wireless mic transmitter  
MR-1: Wireless mic receiver  
MDS-1: Mobile diversity receiver  
TRAM: Microphone systems  
New products  
TX-203: Hand-held wireless mic transmitter with interchangeable mic heads  
MDS-3: Mobile diversity receiver  
MDS-2: Modular multichannel space diversity receiver  
CM-1: Camera mount attachment for MR-1 receiver  
Mini-Max: Collapsible microphone booms  
Circle (744) on Reply Card

Micro Communications  
(1014A)  
Established products  
High power UHF inside RS system  
Circular and rectangular waveguide  
LPTV UHF and VHF diplexers  
MDS and ITFS diplexer  
Coaxial switches  
LPTV antennas  
Microwave antennas  
Microwave interferometer  
New products  
MDS/ITFS multichannel combiner  
Combiner with phase shifter  
Diplexer with controllable aural cavities  
Circle (745) on Reply Card

Micro Control  
(104)  
Established products  
PST-10C: Composite STL system  
Continued on page 152

www.americanradiohistory.com
FOR IMMEDIATE ACTION!

Subject: Howe Audio 7512A Stereo Console
Route To: ALL BROADCAST ENGINEERS AND BUYERS

All design and manufacturing features of the Howe Audio 7512A Stereo Console are Top Priority Sound Information. Carefully check all of the features and after comparing the 7512A with any competitive product, we are sure you will be convinced of the outstanding performance claims of the Howe Audio product. **We suggest Immediate Action in ordering your 7512A!**

Howe Audio Productions, Inc.
3085 A Bluff Street
Boulder, Colorado 80301
(303) 444-4603

For more information: (800) 525-7520
HOWE AUDIO 7512A... The

1. PROFESSIONAL- GRADE LINEAR SLIDE FADERS... Custom made to our rigid specifications for years of reliable service.

2. STEREO-CUE SPEAKERS... For accurate starting of selections.

3. VUE-METER DISPLAYS... For left and right "program" plus left and right "audition" "Air" LED meter display.

4. "UP-COUNT" TIMER... Programmable to start from the fader buttons.

5. "REAL-TIME" CLOCK... Easy access to controls.

6. MONITOR SELECTION... For "audition," "program," and "air" with two auxiliary monitor inputs and a headphone assignment control.

7. "UP-COUNT" TIMER... Programmable to start from the fader buttons.

8. "REAL-TIME" CLOCK... Easy access to controls.

9. MONITOR SELECTION... For "audition," "program," and "air" with two auxiliary monitor inputs and a headphone assignment control.

10. MONITOR SELECTION... For "audition," "program," and "air" with two auxiliary monitor inputs and a headphone assignment control.

"I'm a Howe Audio 7512A... See me (plus of
Remote Input Selection... For channels One and Two - six inputs per channel.

Digital Logic Control... For all channels - allowing for remote control of equipment interfaced to the console. Two "talk back" circuits are programmable for your particular needs.

Level Controls... For monitors, headphones, and cue circuits. Stereo/mono monitor switch also provided.

Optional Panel Space... Available for customizing to your station's needs; including A/B switching, etc.

Classic Oak Cabinetry... Lends elegance to the classic console design as it enhances the durable LEXAN® finish of the control surfaces.

Standing attractions at NAB Booth 321!
unrivalled in quality and cost efficiency. Their sleek styling and professional design assure years of dependable operation. All Howe Audio Consoles come complete with a three-year warranty backed by 24-hour-a-day, 7-day-a-week service. Equip your facility with the best... the HOWE AUDIO SOUND SOLUTION!

Join the hundreds of broadcasters such as Larry Irons, K-RENO Operations/Program Director, who have found the HOWE AUDIO products to be unequalled in quality and dependability:

“We are certainly pleased with our Howe Audio 7500 Console. It’s a beautiful board with all the features we need — and at a price that keeps the GM smiling. Thanks for making a quality product such a great value!”

Howe Audio Dealers:

- Mr. Chuck Spencer
  Spencer Broadcast
  P.O. Box 26899
  Phoenix, AZ 85020
  (602) 242-2111
  316 E. El Camino Dr. N.E. 85068

- Mr. Brian Costello
  Punke & Associates
  908 Mainlyn Drive
  Campbell, CA 95008
  (408) 866-0648

- Mr. Barrett Myer
  Meyers & Associates
  800 Grand Ave
  Carlsbad, CA 92008
  (619) 222-4957

- Mr. Ted Tripp
  Marcom
  P.O. Box 66507
  Scotts Valley, CA 95066
  (408) 438-4273

- Mr. Jim Muenster
  Broadcast Wholesale
  Electronics
  219 N. Roscoe Blvd
  Ponycyde Beach, FL 32022
  (904) 285-3778

- Mr. Vern Steele
  Steele Associates
  403 Orange Ave
  Ft. Pierce, FL 33450
  (305) 466-0000

- Mr. Larry Hall
  Hall Electronics
  P.O. Box 5031
  Boise, ID 83705
  (208) 343-3088

- Mr. David Burns
  Allied Broadcast Equipment
  P.O. Box 1457
  Richmond, IN 47374
  (317) 962-8596

- Mr. Bob Silver
  P.T.E.
  1616 Soldiers Field Rd.
  Boston, MA 02135
  (617) 254-2110

- Mr. Bill Emerly
  A/V Systems
  200 E. 26th Street
  Minneapolis, MN 55406
  (612) 726-3805

- Mr. Bob Carthen
  Southen Coastal Marketing
  400 North Polk Street
  Pineville, NC 28134
  (704) 869-4508

- Mr. Jim Lencioni
  Broadcast Service Company
  921 Desert View Lane
  Sparks, NV 89431
  (702) 350-8218

- Mr. Bill Bingham
  Northeast Broadcast Labs
  18 Charles Street
  South Glens Falls, NY 12801
  (518) 793-2181

- Mr. Art White
  Audio Associates
  814 West Broad Street
  Bethlehem, PA 18018
  (215) 495-5013

- Mr. Alan J. Winkler
  Processing Plus
  761 Union Blvd
  Allentown, PA 18103
  (215) 432-0621

- Mr. Bernie Giesler
  Giesler Broadcasting Supply
  5614 Maple
  Houston, TX 77074
  (713) 774-3314

- Mr. Gene Randolph
  Continental Electronics
  P.O. Box 55979
  Dallas, TX 75227
  (214) 381-798

- Mr. Gene Suduth
  The Gene Suduth Co.
  P.O. Box 1116
  Paris, TX 75460
  (214) 785-5764

- Mr. Gene Suduth Jr.
  The Gene Suduth Co.
  P.O. Box 992
  Flint, MI 48502
  (214) 993-4900

- Mr. L. Clark Partridge
  Partridge Sales
  P.O. Box 31226
  Salt Lake City, UT 84121
  (801) 272-3131

- Mr. David Green
  Broadcast Consultants Corp.
  P.O. Box 500
  Leesburg, VA 22075
  (703) 777-8600

- Mr. Bob O'Malley
  Enterprises Broadcast
  181 Executive Drive
  Brookfield, WI 53005
  (414) 782-7996

- Mr. Michael Leader
  Leader Broadcast
  Box 704
  Linwood, WA 98036
  (206) 353-8559

- Mr. Carl Peterson
  ICM Communications
  1041 Home Road
  Bellingham, WA 98226
  (206) 671-3797

- Mr. Tom Schwiegere
  Broadcast Supply West
  701 B 27th Street West
  Tacoma, WA 98406
  (206) 565-3301

- Mr. Michael Beebe
  W. G. Leatham, LTD.
  P.O. Box 1284
  Wellington, New Zealand
  859-406

- Mr. Will Rice
  Conard Communications
  LTD.
  7621 26A Street
  Calgary, Alberta, Canada
  T2C 1E6 (403) 236-380

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HOWE AUDIO 7512A STEREO CONSOLES...

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

Circle (107) on Reply Card
This wideband, six-output amplifier is the latest addition to our comprehensive line of distribution equipment. It features differential input, soft backporch clamping and easily set, continuously variable equalization from zero up to 300 meters (1000 feet) of Belden 8281 or equivalent coaxial cable. Delay trim and common mode hum null controls are also provided. A unique feature of this ultrastable, low power amplifier is a removable sub-module which contains the operational controls for gain and equalization. This allows instant, adjustment-free amplifier substitution.

Here are some prominent **SPECIFICATIONS**

**Input**
- Return loss: $>54$ dB to 5 MHz
- Common mode rejection: $>60$ dB to 1 kHz

**Outputs**
- Return loss: $>40$ dB to 5 MHz
- Output isolation: $>48$ dB
- Signal (3.58 MHz): $<0.05$ dB/load at 10 MHz
- Load: $<0.15$°/load at 3.58 MHz
- Output DC: $<\pm25$ mV at back porch

**Timing**
- Delay: 25.4 ns (32.7° at 3.58 MHz)
- Adjustment range: typically 6° at 3.58 MHz

**Power Requirements**
- Total power dissipation: $<2$ W

**Performance**
- Frequency response: $<\pm0.02$ dB to 5 MHz
- Differential phase: $<0.1$° to 90% APL
- Differential gain: $<0.2$% to 90% APL
- H tilt: $<0.25$°
- V tilt: $<0.25$°
- S/N ratio: $>70$ dB to 20 MHz

**Equalization**
- Range: 0 - 300 m (0 - 1000 ft)
- Response: $<\pm0.05$ dB to 5 MHz
- Belden 8281, Northern Electric 728, or equivalent
- Typically 0.02 dB at 15 MHz
- Typically -0.1 dB at 20 MHz

**Compare price and performance . . . then give us a call.**

Leitch Video of America, Inc.
825k Greenbrier Circle
Chesapeake, VA 23320
Tel: (804) 424-7920
Telex II: 710 882 4342

Leitch Video Limited
10 Dyas Road
Don Mills, Ontario M3B 1V5
Tel: (416) 445-9640
Telex: 06 986 241
Microwave Control (104)
Continued

PTS-10N: Narrowband STL link
RCK-9: Remote control with nine channels
New products
PTS-10CD: 3-channel STL for AM stereo
2002: STL Uniphase exciter
Circle (745) on Reply Card
see ad on page 108

Microdyne (1612)
Established products
PR 10: 3m Ku-Band antenna
PR 12: 3.7m SCPC antenna
1100BD/DCR-12: Ku-Band video receiving system
1100TVRX-24B-2: C-Band video receiver
New products
1100 SCM: SCPC audio modulator
1100 TVE: SCPC upconverter
1100 PCDR: SCPC audio demodulator
PR-12T: Transportable SCPC uplink system
Fully redundant SCPC uplink system
Circle (747) on Reply Card
see ad on page 121

Microtime (1230)
Established products
TZE-120: A/B roll effects system
T-120D: TBC for dynamic tracking and digital effects
T-120: TBC for non-segmented ½-inch and U-matic VCRs
T-100: TBC

S-230: TBC/frame synchronizer
S-130: Frame synchronizer
2100: Video image processor
C-150: Commercial insertion system
Digitrol 2: VTR machine controller
New products
TSE-120: A/B roll effects system, including one T-120D TBC, one S-230D TBC/frame synchronizer and the E-120 effects processor
SZE-120: A/B roll effects system including two S-230D TBC frame synchronizer systems and the E-120 effects processor
S-230D: Infinite window TBC for ½-inch and U-matic heterodyne VTRs with or without capstan servo, as well as in-house or remote signals
Circle (748) on Reply Card
see ads on pages 168 and 169

Microwave Associates
See M/A-COM

Microwave Communications (1004)
New products
MLV-I Series: Transportable microwave link for transmission of video and four audio program channels for outside broadcast or emergency restoration
Circle (749) on Reply Card

Midwest (1710/1710A)
Established products

Minolta (1113)
Established products
Color Analyzer II
Meters: Chroma II; illuminance: luminance
New products
See at booth
Circle (753) on Reply Card
see ad on page 126

Milab
New products
VIP-50: Condenser microphone with rectangular capsul, variable patterns, transformerless and switchable between mic and line levels
Circle (751) on Reply Card

Mini-TP
See at booth
Circle (752) on Reply Card

Turnkey mobile units, broadcast facilities
New products
M40: 45-foot mobile broadcast production vehicles, fully operational with Type C and U-matic recorders with Ikegami studio and hand-held cameras with digital effects
Circle (750) on Reply Card
see ads on pages 16, 17 and 18

HARRIS

The heart of the 632 Series image processing system, a 4:1:1 Component-coded Frame Synchronizer.
If you’re a Decision Maker, here’s an easy one:

<table>
<thead>
<tr>
<th>REQUIREMENTS</th>
<th>YOU COULD PAY</th>
<th>HARRIS 632</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital noise reduction</td>
<td>$9,000</td>
<td>Included</td>
</tr>
<tr>
<td>Digital keying</td>
<td>$7,500</td>
<td>&quot;</td>
</tr>
<tr>
<td>Picture compression/position</td>
<td>$18,000</td>
<td>&quot;</td>
</tr>
<tr>
<td>Frame synchronization</td>
<td>$12,000</td>
<td>&quot;</td>
</tr>
<tr>
<td>Time base correction</td>
<td>$10,000</td>
<td>&quot;</td>
</tr>
<tr>
<td>Remote control</td>
<td>$5,000</td>
<td>&quot;</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$61,500</strong></td>
<td><strong>$27,990</strong></td>
</tr>
</tbody>
</table>

OK, what will it take to get the job done?
The Harris 632 Series image processing system.
It gives you a combination of signal processing capabilities and features that will add versatility to your studio, and imagination to your productions.
And at least half what you could spend on separate pieces of equipment.

So, if you’re trying to get a job done and stay within a budget, the *component-coded* 632 (for NTSC) or 631 (for PAL) may just be the right answer.
Try a 632. Then try to be without it.

For information contact: Harris Studio Division,
Video Systems Operation, 1255 E. Arques Avenue
Sunnyvale, CA 94086 (408) 737-2100
Telex 4992172
**Montage Computer** (1775)
New products
Montage 5000: Digital picture processor
See at booth
Circle (759) on Reply Card

**Moseley Associates** (301)
Established products
MRC-1/MRC-2/MRC-1600: Microprocessor-based remote control systems
PCL-50/5/PCL-606: STLs
RFL-48: Remote pickup link
TRL-1: Telemetry return link
SCG-9/SCD-9: Stereo generator/demodulator
SCG-8/SCD-8: Subcarrier generator/demodulator
TFL-2808: Audio limiter
New products
CRT and auto logging options for the MRC-1600 remote control system
PCL-606/C: STL system for 1.7GHz
See at booth
Circle (760) on Reply Card

**Motorola** (309)
Established products
AM stereo exciter
AM stereo modulation monitor
Communications products
Mobile telephone equipment
New products
See at booth
Circle (761) on Reply Card

**Multi-Track Magnetics** (1712)

---

**avadocraft**

OUR ENHANCER DOES MORE THAN YOU THINK

Before you judge our horizontal and vertical image enhancer solely by its moderate price, consider its features...some of them unusual:

- 4.5 MHz bandwidth, 2H-type vertical enhancement, plus horizontal aperture correction and detail enhancement, optimized for 3/4" & 3/8" formats
- Adjustable coring to suppress overall enhancement noise
- Adjustable enhancement-

suppression to reduce noise in dark areas
- Split-screen mode allows side-by-side comparison of enhanced and unenhanced video.

* Loop-through video input with switchable 75 ohm termination
* Four video outputs
* Unique one line vertical chroma registration switch
* Enhancement signal gating and white/black level clippers to prevent picture tearing or recording level shifts caused by over-enhancement

* Special video output consisting of enhancement signal with 50% setup and sync
* Price: $1295

Also note that the Vidicraft H & V image enhancer is constructed for stand-alone or 1/4" rack-mount use. It is available in 120V or 220V, NTSC or PAL (4.43 MHz)/SECAM versions. For complete information or to order call 800-547-1491.


circle (110) on reply card

[Image of Vidicraft H & V Image Enhancer]

**NEC America** (1415)
Established products
E-FLEX DVE: Video effects with perspective and rotation
SP-3: 3-chip CCD camera
TF-18: Frame synchronizer with TBC option
TVL-600: 7GHz microwave system
Series: UHF/VHF TV transmitters
Series: FM transmitters and excitors
New products
FBN-9000: FM transmitter
AS-18: Audio synchronizer
Circle (769) on Reply Card
See ads on pages 66 and 155

**NTI America** (1014D)
Established products
525A12: Signal generator
New products
MEK-1000: Multi-effect keyer
DSS-11: Frame-store/still-store
Circle (767) on Reply Card
See ad on page 118

**Nady Systems** (1133)
Established products
700/900/mic: VHF wireless mic systems
Nady 49: 49MHz wireless mic system
HM I & II: Nady Headmics
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 7.3 lbs., it's a small wonder.

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

To find out more about the SP3, the most newsworthy camera around, call NEC at 1-800-323-6656. 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 (11) on Reply Card
ONE NEW MONITOR FOR BOTH

Your choice of input displays (A, B, Test or RGB) is only one of many advanced features in the new Conrac 6200 master video monitor. A simple front panel switch lets you use the same monitor to display computer graphic images or live action shots.

The Conrac 6200 is the first in-line monitor with full broadcast features that meets the demanding requirements of Class 1 performance levels. That includes Conrac's best-yet white field and brightness uniformities, consistent Colormatch™ phosphors, switchable comb filter and notch filter chroma separators and status indicator lights that reduce trouble-shooting time to almost nothing.
KINDS OF ACTION.

And all this at prices under $5000 list for a full 19-inch cabinet model, $4675 list for 13-inch CRT models.

With the introduction of the 6200, Conrac continues its 37 year commitment to providing the highest quality professional monitors for technical and artistic evaluation of broadcast picture quality.

For Conrac 6200 Technical Specifications, use the Reader Service number or call Conrac Marketing Communications at (213) 966-3511.

Contact Conrac Division for a full color reproduction of this illustration which is suitable for framing.
Clear-Com Gives You...

In this demanding industry so abundant with incompatible formats, Clear-Com presents TWO barrier-breakers: a 2-channel belt-pack that works on standard mic cable and a Clear-Com to-RTS System Interface!

Our CP-300 Two-Channel Belt-Pack is not only a high-intelligibility Clear-Com Remote Station, but it also provides the same pin-to-pin connections as RTS-type intercoms with better performance.

Ergonomically, the tough, lightweight CP-300 has been designed for camera operators and production people. Dynamic or carbon headset-compatible, it features rocker switches that place Clear-Com’s popular features at your fingertips. Three-pin XLR input and output connectors allow simple, quick set-up.

The CP-300 works with any Clear-Com or RTS System. You decide: do you want one channel or two?

Finally, you can enjoy two channels of communication in an RTS-type or Clear-Com-type* intercom system.

*Two channels when used with Clear-Com TW-12 two-wire interface.

...a Choice!

For more information, call or write:
Clear-Com
intercom systems
1111 17th St., San Francisco, CA 94107
415-861-6666 / TWX: 910-372-1087
EXPORT DIV.: Box 302
Walnut Creek, CA 94596 / 415-932-8134
Telex: 176340 CLEAR-COM WNC

LSM-10: Line selection module for audio selection and editing
Furniture systems for combo, production and newsroom
New products

ABX-18/26/34: Audio production consoles featuring multitrack production facilities
Circle (787) on Reply Card

Panasonic Industrial
(Broadcast Systems)
Established products
AU-300A: M Format studio VCR and editing system
B-100: M Format camera VCR
MVP-100: Multifunction video player
WJ-5800B: 1-piece special effects generator
TU-2000X: Professional NABTS teletext decoder
WX-555/WV-888: 3-tube ENG/EFP prism-optics cameras
AG Series: 1/4-inch VHS VCRs
High performance video monitors
New products
See at booth
Circle (789) on Reply Card

Panavision
See C-11/Panavision

Patch Bay Designation
Established products
Preprinted labeling strips for use on patch panels
New products
Label products for use with illuminated switches
Circle (790) on Reply Card

Peerless Sales
Established products
4005: Camera arm
Desk-, wall- and ceiling-mount security brackets
Single-arm design wall bracket
Yoke design wall bracket
New products
See at booth
Circle (791) on Reply Card

Penny & Giles
Established products
Linear faders using conductive plastic, series 1100, 1500, 1900 and 3000
Rotary faders, mono and stereo, linear and audio tapers, with or without cue detent
IN SATELLITE RADIO EQUIPMENT . . .
MODULATION ASSOCIATES IS THE LEADER

- The SU 10 is the first completely portable SCPC solid state satellite uplink. It allows any earth terminal in a network to become a transmitting station for news collection, for regional program uplinking to the network, or for data transmission.

- The R SAT is the first optimized SCPC satellite receiver specifically designed for state and regional networks. There are more R-SAT's in operation in regional networks than any other system.

- The DATA SAT is the first receiver designed for reliable, low cost point-to-multipoint reception of 56 kbs data over satellite links. It allows affordable high speed data reception of weather, financial, commodity, and other broadcast data information to multiple users from a common originating uplink.

- The MC SAT (Multichannel) can accommodate any combination of wideband or optimized SCPC audio and/or data demodulators along with an extensive line of multiplex and downconverter options. Its expansion capabilities make the MC-SAT the affordable choice of many networks.

MODULATION ASSOCIATES is the pioneer and leader in state-of-the-art satellite technology. Let the satellite network experts help you with your complete satellite package, including:

- Hardware
- Space Segment
- FCC Licensing
- Installation

Contact Terry Sheffield
Executive Vice President
(415) 962-8000

Modulation Associates
897 Independence Avenue
Mountain View, CA 94043
(415) 962-8000

Circle (115) on Reply Card
www.americanradiohistory.com
New products
Joystick
Continued

PEP
Established products
PEP ENG Power Plus: Batteries and chargers
Portable 12Vdc and 30Vdc lighting equipment
PEP On-Cam ¼-inch VCR
New products
PEP XL Super Charge: A new generation of nicad batteries
PEP DAC2: ENG battery conditioner, featuring 2-channel analyzer and charger
PEP ES800: Alternate edit source, allowing direct interface of ¼-inch VHS-C On-Cam VCRs to BVU800 editing control system

Circle (793) on Reply Card

Peter W. Dahl Company
See Dahl, Peter W.

Perrott Engineering
Established products
MP Series: Silver-zinc battery packs
PE Series: Nicad battery packs
Minichargers: Fast, medium-fast and overnight minichargers for nicad and silver-zinc batteries
New products
PE8294-2: Universal-universal multiple fast charger
PE130D: Cellmate discharger/ analyzer

Circle (794) on Reply Card

Philadelphia Resins
Established products
Phillystrand HPTG tower guy material for high power operation
New products
See at booth

Circle (795) on Reply Card

Philips TV Systems
Established products
LDH 6200: Color monitor
LDK-6: Computerized TV camera
LDK-1444: TV cameras
TV transmitters
FM transmitters
Pro digital compact audio disc systems
New products
LDK-614: Portable computerized camera, companion to the LDK-6
LDK-26: Midstudio camera using ¼-inch tubes, computer control, triax and LDK-6 compatible
LDK-54: Video recording camera, using ¼-inch Lineplex tape format with playback and post-production systems
LDK-14RGB: Lightweight production camera
LDH 6220: 20-inch color monitor

LDM 1208: 55kW TV transmitter
FM transmitters from 100W-20kW with modular drive and comprehensive monitoring and control logic
HDTV demonstration
Optical disk mastering demonstration
Circle (796) on Reply Card

see ads on pages 232 and 233

Philips Test & Meas. Instr.
Established products
PM5565: Waveform monitor
PM5567: Vector scope
PM5539: Color analyzer
PM5533: Color signal generator
PM5560: TV demodulator
PM5570: Video test signal generator
PM5560: IF modulator
PM5581/5582: VHF/UHF converter
PM5583: Converter base unit
PM3203X: 100MHz oscilloscope with TV trigger
New products
PM5630: Color generator
PM5631: Multipattern color generator
PM5632: SECAM color generator
PM5645: Teletext test generator
PM5634: Synch test generator
PM5651: Studio VITS generator
PM5669: TV test modulator
PM5671: TV modulator
PM5672/73: TV modulator with dual sound for CATV

Circle (799) on Reply Card

see ad on page 127

Phoenix Systems
Established products
UA120RH/LT: Ultra Arc long-throw follow-spot
UA120RHS/ST: Ultra Arc short-throw follow-spot
UQ120/82: Ultra Quartz fixture
New products
Ultra Arc series II fixtures

Circle (800) on Reply Card

Picture Element
Established products
Automation: Station business, music format and word processing
New products
See at booth

Circle (801) on Reply Card

Piher Electronic
Established products
PM-4600 Series: Color monitors
PM-3600 Series: B/W monitors
IM-4300 Series: Color monitors
HR-3800 Series: B/W monitors
TP-4606B: Color video titler
TR-4700 Series: VHF/UHF transmitters up to 5kW
TT-4700 Series: VHF/UHF transmitters, up to 5kW
New products
CG-4721: Character generator
AC-4700: RF automatic control/switcher
Circle (803) on Reply Card

Precision Echo
Established products

Pinzone
Established products

RCD-100: Diagnostic system for the RCA TCR-100 videotape cart
8250: Satellite receiver
Complete uplink and downlink satellite system
New products
Circle (804) on Reply Card

Polar Research
Established products
Lil Slipper: Communications/monitoring antenna mounts, UHF/VHF
New products
See at booth

Circle (805) on Reply Card

Porta-Brace/K&H Products
Established products
Recorder transportation cases for Sony BVU50, BVU110, VO-4800 and JVC CK4700
Camera cases for Ikegami HL79, JVC KY310, Sony DX3M3 and Sharp XC-800
New products
CC Beta P: Camera case for Sony Betacam system
CC B100 P: Camera case for Panasonic RECAM system

Circle (806) on Reply Card

Potomac Instruments
Established products
AT-51: Audio test system
FIM-43: AM field strength meter
FIM-71: FM-TV field strength meter
SD-31: Synthesized detector
AM-19: Antenna monitors
SMR-11: AM monitor receiver
DAP-11: Data acquisition/logging system
ATS-11: Automatic transmission system
New products
Circle (807) on Reply Card

RC-16+: Automatic remote control system
MPC-11: Automatic modulation and power controller for AM
FIM-72: UHF field strength meter

Circle (808) on Reply Card

Pinkzone
Established products

RCD-100P: Computer printer option to diagnostic system

Circle (809) on Reply Card

Porta-Brace
Established products

See ad on page 54

Prep-X
Established products

www.americanradiohistory.com
EIMAC
1934–1984
Supporting Broadcasting for 50 years

50 years of quality and dependability from Varian EIMAC.

EIMAC's tradition of high quality and dependability was firmly established in 1934 and continues on in 1984. Stringent manufacturing standards and controls, plus EIMAC's exclusive, long-term warranty reduces transmitter downtime and eliminates excessive operating overhead.

EIMAC backs its quality products with the industry's most comprehensive warranty program:

Warranty time for each EIMAC tube type is specified in writing and runs from the industry standard of 1,000 hours or 12 months to as high as 10,000 hours and 24 months.

Specific warranties for some popular tube types are:

- 4CX5000A 10,000 hours/24 months
- 4CX10,000D 10,000 hours/24 months
- 4CX15,000A 10,000 hours/24 months
- 4CX35,000C 10,000 hours/24 months
- 3CX2500A3 5,000 hours/12 months
- 4CX1500A 5,000 hours/12 months
- 5CX3000A 5,000 hours/12 months

Fourteen other EIMAC types have these extended use-time warranties. Specific warranties for each tube type are available from the Varian EIMAC worldwide sales organizations.

In all cases, EIMAC tubes are 100% warranted to be free of manufacturing defects. And, don't forget, EIMAC has a "carr-cass credit" return program for real savings on replacement tubes.

Compare EIMAC's 50-year record of outstanding performance. We guarantee EIMAC products will be here tomorrow for today's applications.

More information is available on EIMAC tubes and warranty program from Varian EIMAC, or any Electron Device Group worldwide sales organization. See your distributor or contact Varian EIMAC today.

Varian EIMAC
301 Industrial Way
San Carlos, California 94070
Telephone: 415-592-1221

Varian EIMAC
1678 S. Pioneer Road
Salt Lake City, Utah 84104
Telephone: 801-972-5000
If You Are Involved in Post Production You Should Visit Us at NAB

Our 1231 Downstream Keyer can give your video switcher all the keying capability you need for today's complex video editing.

4 units are now being used by ABC-TV for their 1984 Olympic coverage.

- Up to 6 Simultaneous Keys
- Post Production Editor Interface
- Analog Type Key Bordering
- Key Masking
- Key Mix In and Out
- Program Fade to Black

Our 612 Post Production Audio Mixer will give you all the capability and flexibility you need to edit audio the same way you now edit video. And in stereo too!

10 units are now being used by ABC-TV for their 1984 Olympic coverage.

- Post Production Editor Interface
- AFV Capability
- 12 Inputs
- Auto Transitions
- Dual Channel

NAB Booth 1227A

Circle (117) on Reply Card
NAB SPECIAL

IT'S THE ONLY GAME IN VEGAS YOU CAN'T LOSE.

WIN $25.

Negotiate your best deal for RCA or EIMAC tubes with any of their authorized dealers in the U.S.A. and if we can't beat their price we'll pay you $25.00!

HOUSE RULES

Quotes must be current and valid throughout the IAB Convention dates.

The tubes offered must be factory new 1983 or 1984, date coded, made by RCA or Eimac.

The quote must be verifiable and at our option may require a copy of dealer's invoice showing Part Number, date of shipment, date codes, serial number and brand.

If you beat our price you win $25.00. If you can't beat our price your tubes cost you less. Either way you win!

SEE US AT BOOTH 125

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All major brands at the lowest prices.

Transmitting, receiving, camera and cathode ray tubes, sockets, chimneys, capacitors and related components in stock for immediate delivery worldwide.

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www.americanradiohistory.com
Let WHUT radio help you pick the right Audio Console... The first time.

The DC-38 series of Audio consoles — the fourth for WHUT/WLHN-FM.

Although Mr. Hood's comments indicate what you can expect with a RAMKO console, there is a lot more to the story. Features, for example, that in many cases can only be found in these truly superb consoles. Here's a short sampling: Mono or stereo — 5, 8 and 10 mixer, dual channel — four inputs per mixer — each input gain selectable — mono mix/phase meter on stereo units — DC control via dbx® voltage controlled amplifiers — all solid state switching — multiswitch programmable CUE, MUTE and on air relay — optional digital clock/production timer — optional plug in remote equipment start/stop — and much, much more. All this and our exclusive 4 year parts and labor warranty.

For the whole story, contact your nearest rep or deal today, or call RAMKO RESEARCH toll free, (800) 821-2545, for your full color, descriptive brochure. Let us help you do it the right first time.

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

Circle (119) on Reply Card

Quickscan (1405B)
Continued
See at booth
Circle (822) on Reply Card

Quickset
Established products
Complete line of camera support equipment, including tripods, pedestals, dollies, fluid heads, cam heads Video switches, CTV equipment Microwave antenna and dish control positioners Remote control studio camera positioners New products
Modular tripods for studio and remote Fluid heads for 10- to 60-pound cameras Fluid-damped cam head Remote controlled positioners with telephone or audio signal control Modified tracking devices Microprocessor-based control and data feedback for microwave Circle (823) on Reply Card

RCA Broadcast Systems
Established products
TK-47B: Automatic studio camera TR-800: 1-inch Type C VTR TH-400: Low cost 1-inch Type C VTR TK-29: Broadcast telecine, multiplexer, film and slide projector TK-290: Broadcast telecine using TK-47 automatics Hawkeye VRG with portable VTR, studio VTR, edit controller and accessories Antennas for VHF and UHF TV Transmitters and filter equipment for VHF and UHF TV New products

R-Columbia Products
Established products
UL-85: Ultralight headphone/ mic UL-85/2: Ultralight stereo headphone CC/1C-85: Ultralight replacement unit as CC/1C headphones 68BT: Compact telephone for IFB and ENG applications Circle (825) on Reply Card see ad on page 244

ROH
Established products
Model 190: Switch/line monitor

Circle (1634) on Reply Card
A DECADE OF PROGRESS...
A DESIGN FOR THE FUTURE

VIDEOTEK

Videotek, in only 10 years, has emerged as an industry leader on the strength of quality products, competitive pricing, and an unprecedented record of delivery and customer service.

The Studio 13 is the latest example of this Progress by Design, incorporating more features and a higher level of quality than any color monitor in its class.

Line Select and 1H-2H Mode highlight the 1984 refinements to the ever-popular TSM-5A Waveform Monitor and VSM-5A Vectorscope.

As we enter our second decade, our commitment to offer the best products, prices, delivery, and service remains an uncompromised goal.

See Us at NAB Booth 1633
Circle (120) on Reply Card

www.americanradiohistory.com
The new S-230D easily interfaces with new or existing Microtime T²E-120 A/B Roll Effects Systems to provide the ultimate in input signal flexibility and freeze effects capability.

The S-230D allows inputs such as in-house camera signals, external ENG, microwave, satellite, network and remote studio feeds, as well as ½" and ¾" heterodyne VTR formats with or without capstan servos. You also have the choice of operating in either standalone heterodyne or 3.58 MHz sub-carrier feedback modes. And by using the S-230D on one or both channels of the E-120 A/B Roll Effects System, you get the additional "effect" of manual or automatic freeze.

Now there are three E-120 A/B Roll Effects configurations: T²E-120. This established configuration consists of two T-120D TBCs capable of DYNAMIC TRACKING* operation with a SONY* BVU-820 U-MATIC* VTR.

T²E-120. This new configuration consists of:
- one T-120D TBC capable of DYNAMIC TRACKING* operation with a SONY* BVU-820 U-MATIC* VTR and
- one S-230D TBC/Synchronizer with freeze and auto mode switching.

S²E-120. This new configuration consists of two S-230D TBC/Synchronizers with freeze and auto mode switching for maximum flexibility in both channels.

*DYNAMIC TRACKING, SONY and U-MATIC are registered trademarks of Sony Corp.
TSE-120 System
Typical A/B Roll Applications with Effects

DT* operation is possible with the T-120D with a single cable interface to the SONY* BVU-820 U-MATIC* VTR.

Visit Us at NAB Booth 1230
ROH (1634)  
Continued  
Series 180: Audio routing switches   
Series 300: Intercom systems  
Series 211: Audio distribution amplifiers  
Series 200: Modular packaging system  
Series 120: Audio distribution amplifiers 
New products  
See at booth  
Circle (826) on Reply Card

RTNDA (1501)  
Association  
Professional association exclusively for broadcast journalists  
Circle (828) on Reply Card  

RTS Systems (1142)  
Established products  
Series 800: Microprocessor-assisted intercom master station  
Series 4000: IFB system  
Series 400: Pro audio amplifiers  
HPM41 mixer: 4x1 mic/line mixer  
TW Intercom system  
New products  
Series 17: Conference line intercom system for single-channel permanent or portable applications  
System 5200: Amplifier system with 1x8 audio DA, 1x6 stereo DA, quad stereo buffer amp, quad line amp with VCAs and tone signal generator  
Circle (629) on Reply Card  
see ad on page 301

Radio Arts (418)†  
Established products  
Syndicated program. radio  
New products  
See at booth  
Circle (830) on Reply Card

Radio Systems (213)  
Established products  
PA-1: Audio Metrics stereo phono preamp  
DA-8/DA-16: Audio DAs  
TM-1: Audio Metrics studio timer  
TR-20: Phase II 20W post-sunset transmitter  
PP-10: Pre-wire patch panel  
New products  
ESA-10: Audio Metrics broadcast console  
TR-70: Phase II 70W post-sunset transmitter  
Circle (831) on Reply Card  
see ad on page 275

Radio-TV News Directors Association  
See RTNDA

Ram Broadcast/Wheatstone (121)†  
See at booth  
Circle (832) on Reply Card

Ramko Research (415)  
Established products  
DC30-10S: 10-mixer, audio console  
PhaseMaster: Record/play and play phase correcting stereo cart machines  
RP-15/P-1S: Primus stereo cart machines  
P-35/6M: 1x3 stereo or 1x6 mono audio DA  
P-85/16M: 1x8 stereo or 1x16 mono audio DA  
P-VG1: Primus single-channel compressor with noise gate  
P-935: Lab standard turntable preamp  
P-21/P-42MX: Mic/line amps, mixers  
New products  
P-4M: Primus 4-channel mixer with metering  
P-4M Portable: Primus 4-channel mixer with intercom and slate cueing  
P-5MX: 5-channel mic/line mixer with send receive  
P-1512: Audio router, modular expandable system  
P-2080: Primus modular 20x80 DA with provisions to mix other audio modules into the same frame  
Circle (833) on Reply Card  
see ad on page 166

RAMSA/Panasonic (437)  
Established products  
WR-130: Portable 8x2 mixer  
WR-500: Remote 8x2 mixer for dc/ac operation  
WR-8112/8118: 12 or 18x4x2x1 mixer for remote and recording applications  
WR-8210A: 10x4 recording mixer

THE SHOCK ABSORBERS...from ANVIL®

ANVIL® produces literally thousands of case designs for the audio/visual, television, and broadcast industries. Whether your professional needs call for a totally operational video system that is permanently installed in an ANVIL® CASE, or a simple transit case to insure against shipping damage, ANVIL® can meet the test. ANVIL® has been assuring safe transit for video producers, sound teams, and engineers for over 30 years.

It takes a lot to build a top quality case worthy of the ANVIL® brand name. ANVIL® utilizes only the finest raw materials which must conform to exacting standards. ANVIL® stocks these materials in huge quantities for its entire line of A1A, Forge II™, Anvilite™, and Fibre cases so even the largest orders can be produced without interruption to ANVIL’s renowned service.

ANVIL CASES, INC., 4128 TEMPLE CITY BLVD., ROSEMEAD, CA 91770 818-575-8614

Please Visit Us at NAB Booth 1112

Circle (122) on Reply Card

Circle (827) on Reply Card

Circle (826) on Reply Card

Circle (827) on Reply Card

Circle (826) on Reply Card

Circle (827) on Reply Card

Circle (827) on Reply Card
High Definition Audio
For the complete picture

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.
RAMSA (437)
Continued

WP-9120: Dual-channel 200W power amp
SP-10MKII/SP-15: Direct-drive phono turntables (Technics)

New products

WR-8516: Post-production and recording mixing console, 16x2x2
Circle (834) on Reply Card
See ads on pages 122, 123 and 223

Rank Cintel Ltd. (1219)

Established products
MK IIIC: Film-to-tape transfer telscene Amigo: Software-based control system for MK IIIC
FeRITT: Separate magnetic sound follower for audio record/replay on 16mm, 17.5mm and 35mm film

New products
ADS 1: 18/35mm solid-state telscene for broadcasting from film, including dirt/scratch concealment, multiplexing of 3 dual-gauge transport mechanisms from one control unit, variable speed and negative/positive operation
Circle (835) on Reply Card

Reach (341)

Established products
Nationwide messageldata distribution service, based on FM subcarrier transmissions

New products
See at booth
Circle (836) on Reply Card

Real World Technologies (1520)

Established products
V-01/P-P02: uniVUer analog VU or PPM bargraph keyed over video on picture monitor
Custom ballistic configurations of uniVUer, compatible with EBU standards
Broadcast facility/systems design and construction
Remote truck design/construction

New products
uniMonSter: uniVUer option for mono-stereo coherency evaluation
MonSter: Stand-alone monostereo coherence evaluator
Circle (837) on Reply Card
see ad on page 290

Recortec (1418)

Established products
VTE-210: 2- and 1-inch combination video tape evaluator/cleaner
VTE-101: Low cost 1-inch videotape evaluator/cleaner
VTT-211: Replacement electronic videotape timer for Ampex 2-inch VTRs
VTT-212: Replacement electronic videotape timer for RCA TR70
VTT-221: Replacement electronic videotape timer for RCA TR60

RMOD: Automated reel servo modification for Ampex and RCA 2-inch VTRs
HBU: High band U-matic VTR
DTG-100: Low cost video date/time character generator
FRU-750: Fast rewinder for ¾-inch U-format cassettes
VCE-500: Measures dropouts and tape quality on ¼-inch VTRs tape

New products
See at booth
Circle (838) on Reply Card

Rees Associates (1727)

Established services
Consultants specializing in planning, architectural design and engineering services. Facilities renovation and 1PTV packages are specialties

New services
See at booth
Circle (839) on Reply Card

Register Data (1228)

Established products
RDS-III-HD: Broadcast computer system
RDS-5000: Hard disk computer system
RDS-8000: Business system

New products
See at booth
Circle (840) on Reply Card

Research Technology (1626)

Established products
TV-120: The total film care system
Data-Film: Computerized timing/reporting system
Cinescan: High-speed 16mm film viewer
¾-inch videocassette evaluator/cleaner
10512: CineSran high speed 16mm film viewer/previewer

TV-2000: Complete film editing system
Data-Film 820: Computerized information reporting system
VT3100: Professional videotape evaluator/cleaner for U-matic
Refl-410: Self drive liquid film cleaner/conditioner
CF series film cleaners
Film storage cans

New products
See at booth
Circle (841) on Reply Card
see ad on page 52

Restoration/Sprague Magnetics (705)

Established products
Replacement tape heads for reel-to-reel, cart, duplicator, film and RIV recorders
Refurbishment of all magnetic tape heads

Alignment tape
Recorder care products

Replacement heads for MCI ¾-inch and ¾-inch 2- to 24-track recorders
Replacement heads for Mincom M-79 recorder
Replacement heads for high-speed duplicators
Replacement audio for video heads
Circle (842) on Reply Card

Richardson Electronics (212)

Established products
Camera and transmitting tubes
RF power amplifiers
RF power transistors

New products
See at booth
Circle (843) on Reply Card

Riviera Broadcast (1784)

Established products

Services: equipment leasing

New products
See at booth
Circle (844) on Reply Card

Rockwell Intl. (1787)

Established products
Microwave video radio: STI for TV
MVR: Systems for common carrier	CARS and government

New products
See at booth
Circle (845) on Reply Card

Rohde & Schwarz (1203)

Established products
UPSP2: Video noise meter
EKF2D: Demodulator
EKF2X: Relay receiver
DZF: TV data distortion meter
LFM2: Group delay measuring set
MUF2: TV transceiver
SPF2: Digital video signal generator
SBTF/SBFU: Test transmitter
UPF: Auto video analyzer

New products
See at booth
Circle (846) on Reply Card

ROHN (1605B)

Established products
ROHN towers
Equipment shelters
Antenna supports for cable and STV
Tower obstruction lighting

New products
See at booth
Circle (847) on Reply Card

Rosco Laboratories (1235)

Established products
Color and diffusion filters for lighting
Gobo patterns
Specialized paints and scenic materials for TV

New products
 Precision chroma key and Ultimatte Paints for coloring muslin for video requirements
Circle (848) on Reply Card

Roscor (1181)

Established products
Rental equipment
Post-production equipment
Engineering/sales
Elite Fleet vehicles

New products
See at booth
Circle (849) on Reply Card

Ross American Logic (1332)

Established products

See at booth
Circle (850) on Reply Card

Ross Video (1110)

Established products
RVS 524: Video production switcher
RVS 508: Video production switcher

New products
Memory system for storing all crosspoint and analog data about a multilevel

www.americanradiohistory.com
THE Broadcast Video Cart System

The heart of KAVCART is our own programmable microcontroller, field proven over five years. KAVCO's "Smart Frame" modules provide machine control interfacing, vertical interval switching, data sensing, etc. These products are designed, manufactured and software-programmed in our own facilities. All KAVCART systems include a separate recording console including cassette label printer, full monitoring and a Sony VO-5850 master recorder.

<table>
<thead>
<tr>
<th>FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple operator entries</td>
</tr>
<tr>
<td>Random access</td>
</tr>
<tr>
<td>Manual or realtime start</td>
</tr>
<tr>
<td>Will sequence three-second spots</td>
</tr>
<tr>
<td>Vertical interval switching</td>
</tr>
<tr>
<td>Automatic cue-up and re-cue</td>
</tr>
<tr>
<td>Runs program-length tapes with automatic break insertions</td>
</tr>
<tr>
<td>Runs back-up spots concurrently</td>
</tr>
<tr>
<td>Uses Sony Type V U-Matic VCR's, the industry standard</td>
</tr>
<tr>
<td>Includes simple-to-use separate tape identification preparation console</td>
</tr>
<tr>
<td>Modular ... plug-in boards ... expandable</td>
</tr>
<tr>
<td>Includes printer with complete program log</td>
</tr>
</tbody>
</table>

SONY

KAVCO INCORPORATED
3931 Image Drive, Dayton, Ohio 45414 • 800-221-1879
(800-221-0449 in Ohio)

See us at NAB Booth 1509B
Circle (124) on Reply Card

www.americanradiohistory.com
Ross Video (1110)
Continued effects unit with serial interface
Circle (851) on Reply Card
see ad on page 89

John B. Rudy (1776)
Established products
Distributor of audio and video wiring/ cabling, microphones, connectors and custom cables.
New products
See at booth
Circle (852) on Reply Card

Rupert Neve
See Neve

What is this man doing?
...he is readjusting his audio processing!

You no longer need to compromise your station's audio quality. Format changes, audience profile variations and cut-to-cut music inconsistencies present problems that no ordinary processor can hope to deal with. That's why Inovonics developed the Programmable Processor.

Our Model 250 behaves just like five independent audio processing chains. The AGC action, compression, equalization and overall limiting of each of these chains can be custom-tailored to any specific audio feed or to any station format. This gives precisely the proper processing to make any program source or format sound its very best. No compromise!

Controlled by station automation, a time clock, or simple manual selection, the 250 provides processing which can change with your station throughout the broadcast day. What's more, our RS-232 Interface Option puts the 250 under continuous computer control with almost endless processing possibilities.

The 250 is a fully L/R correlated stereo unit with slow, gain-riding AGC, a five band compressor, five band equalizer and either a split-spectrum peak limiter for FM or a true matrix, phase-following AM peak limiter. Each of the five preset groups is remotely selected by simple contact closures to ground.

Is the Inovonics 250 ahead of its time, or aren't you keeping up?

Inovonics 250 audio processor

INOVONICS, INC.
503-B Vandelli Way, Campbell, CA 95008
(408) 374-0300

Circle (125) on Reply Card
The best equalizer is no equalizer.

It's Belden fiber optic cable.

Now a video signal can go two miles on a Belden optical cable with 60dB SNR and no hint of high frequency roll-off. That means a cleaner picture without equalizers, and less maintenance than alternative transmission systems—coax or microwave.

For tower installations, Belden’s high-strength, all-dielectric optical cable design doesn’t have the problems generally associated with coax, such as ground loops, lightning and other E.M.I. problems. Plus, it’s rated for full performance from -40°C to +80°C.

Belden optical fiber cable is also thinner and up to 30% lighter than conventional cable. That makes it easier to install on transmission towers, or through underground ducts. A recent installation of Belden cable on a 1500 ft. vertical tower was accomplished in less than one day.

For remote applications, Belden optical cable is much easier to carry around the golf course, or the metropolitan sports arena. Its toughness has been proven in rapid deployment cables designed by Belden for military applications in desert terrain.

Put Belden optical fiber cables and experience to work for you. They’ll put you ahead with cleaner signals, better reliability and total system economy. For information on our fiber optic line and application reports or system design guide, contact your local Belden distributor or write: Belden, Fiber Optics, 2000 S. Batavia Ave., Geneva, IL 60134. Phone: 312-232-8900.

Circle (126) on Reply Card
Established products

Model 7640: Uplink protection switch
Model 7600: Remote control system
Model 8010C: 7m antenna
Model 8840A: Antenna control system
Model 8251: 11m transportable earth station
Satellite TV products
TBC and frame synchronizers
New products

Model 7555: Ku-Band video exciter
Model 8252: Transportable TV earth station
Model 7622: RF matrix switch

Scribe Recorders

New products

Scribe NewsCorder: Newsgathering machine includes custom-designed cassette tape recorder for audio news operation in the field with talk-over capability

Sennheiser Electronic

Established products

Professional microphones and headphones
New products
New line of broadcast microphones, including hand-held and body pack units
HME41: Headset/mic combo using lightweight headphone and Sennheiser MKE-2 ultra-miniature mic

Sescom

Established products

ADA-1/ADA-2: Audio DAs
MB-1: Newsbridge
IC-100/IC-300: Intercom systems
MID-1/2/3: Mic-line drivers
Mic splitters
Field mixers
Various transformers and audio modules
New products
SAT-1: Audio levelers for satellite receivers
MID-2: 2-channel mic/line driver
TST-1: Field test set

Sharp Electronics

Established products

XC-9000: Diode-gun plumbicon TV camera
XC-800: 3-tube Saticon II camera
XC-803TX: Triax camera system
New products
XM-1300: High resolution 13-inch broadcast color monitor

Shintron

Established products

375: Super switcher
374: Super 80 switcher
372: Special effects generator
505: Character generator
641: SMPTE time code generator
644: SMPTE time code reader
350: Encoded chroma-keyer
316: Audio distribution amplifier

336: Video distribution amplifier
515: Character generator
508: Subtitler
Series: Modular distribution amplifiers
390: YIQ switcher
646: Time code reader
647: Time code generator
200 Series: Distribution amplifiers
400: Computer/NTSC interface
New products
See at booth

Circle (865) on Reply Card

Shively Labs

Established products

6814: Super power FM CP antenna
6810: High power FM CP antenna
6813: Medium power FM CP antenna
6811: Low power FM CP antenna
6811NP: Low power, non-pressurized CP FM antenna
6010: Broadcast CP FM panel antenna
CMN-03: 1¾-inch 4-port rotary switch
UTV-01: Broadcast UHF panel antenna
Rigid coax line
New products
2120: AM/UHF and AM/VHF isolation couplers
4420: Reflectometer display and protection system
6813NP: Medium power non-pressurized CP FM antenna

Circle (866) on Reply Card

Shook Electronics

Established products

14-22/E: Mobile TV production system with equipment from Magnetic Media
45-80: Full feature network production trainers
18-27: Full feature mobile TV production system with equipment from Magnetic Media
New products
See at booth

Circle (867) on Reply Card

Shure Brothers

Established products

M267: Microphone mixer
SM632: Omnidirectional dynamic mic
SM62: Line-level condenser mic
SMS2: Unidirectional dynamic mic
New products
SM83-CN: Lavalier mic
FP31: Compact microphone mixer for ENG/EFB applications

Circle (1496) on Reply Card

Sight Electronics

Established products

CSG-365A: Color sync generator
BBG-144: System timing module
System 500: Modular DA equipment
Series 100: Self-Contained DA equipment
New products
GLC-100: Gen-locking computer, character generator and graphics system
VPA-380: Video processing amplifier

Circle (868) on Reply Card

Singer Broadcast

Established products

1kW AM transmitter
FM exciter with phase-locked loop synthesizer, broadband RF amplifier, 30W output
25kW FM transmitter
3kW FM transmitter
5kW AM transmitter
ST20F: Stereo generator
SC30F: SCA generator
New products
See at booth

Circle (869) on Reply Card

Skotek

Established products

PTC-100: Portable time code reader/generator with jam/slave and time of day
New products
TGC-80N: Time code generator with jam/slave on time and/or user data
TCR-80: Time code reader with dub output
DM-1000: Digital metronome with 0.001 frames/beat setting for film and video

Circle (1495) on Reply Card

Society of Motion Picture & Television Engineers

See SMPTE

Solid State Logic

Established products

SL6000E Series: Live and post-production audio console
SL4000E Series: Multitrack recording and OB console
Primary studio computer-mixing automation and audio edit controller
Total Recall: Retains details of console setups
Events Controller: 16 multirepeatable contact closures activated by SMPTE protocol
New products

SL688V: Mix and machine matrix for SL6000E systems
Programmable equalizer with time code control of 3-band parametric EQ
Synchronizer controller for multiple machine control via SSL computer

Circle (871) on Reply Card

see ads on pages 192 and 193

H.A. Solucet

Established products

SOL 6800: Automated broadcasting system
SOL 8200: Co-channel filter
New products
See at booth

Circle (872) on Reply Card

Sono-Mag

Established products

MSP: Automation programmer

www.americanradiohistory.com
To Totally Appreciate A Video, Audio/Visual or Teleconferencing Communications System Created By Avtec, You Have To Take It Apart.

Whether it's a conference room, a training center, a video studio or an audio/visual center, to fully appreciate the thought and care that went into a total communications system created by Avtec, you have to take it apart. And when you do, you'll begin to appreciate why Avtec has been acknowledged as a worldwide leader in total communications systems.

Design
Avtec designers begin a system at the very beginning. They will work with you, your architect and/or your communications consultant during initial planning. They'll study your requirements and provide all of those little details that ultimately lead to a system's successful operation.

Engineering
Avtec's engineering department is comprised of dedicated, talented professionals. Together, they control every facet of every system designed by Avtec. They'll consider the designer's concepts and translate those concepts into the technology a system specifically calls for.

Procurement
Avtec considers every communications system individually. We realize each has a specific purpose. We keep in mind the client's specific requirements, so we select and procure all system components on the basis of the best available technology and technical compatibility.

Fabrication
Avtec procured equipment is tested individually as well as a total system and retested to make certain it meets our client's requirements and Avtec's demanding standards. Enclosures, consoles and alike are fabricated and finished and the system's components are assembled and shipped to the installation site.

Once the system is on site, Avtec personnel test every function. When we're absolutely certain the system is performing as it should, only then will we approve it for operation.

Documentation And Training
We don't consider our job to be over until our clients fully understand how to operate their systems. So we document every piece of hardware and software. Avtec engineers will remain at the installation as long as necessary to train all client personnel and we'll return to the site to repeat training sessions on an as needed basis.

Maintenance
If you appreciate the fact that during the life of any communications system problems sometimes arise, you'll appreciate Avtec's service. Avtec's service group is available virtually anytime, anywhere in the world to solve problems quickly, efficiently and professionally.

AVTEC In Total
Each individual part of any Avtec communications system can be considered a specialty. The fact that Avtec can and does have proven expertise in each of these specialties, has established Avtec as a premier company in video, audio/visual and teleconferencing communications systems.

So if you are considering creating parts of a communications system or a total system, consider Avtec—the total company for total communications systems.

5 Audrey Place, Fairfield, NJ 07006
(201) 882-9460 • Telex: 134421 AVTEC FFLD
Regional Offices: Orlando, Florida; Riyadh, Kingdom of Saudi Arabia

Circle (127) on Reply Card
Sony Corporation (1200)
(Sony (Video Communications)
(Sony Broadcast Products)
Established products
VO-5800 Series: U-matic VCRs
RM-440: Video editing controller
DXCM3: 3-tube MF Saticon camera
SEG-2000A: Special effects generator
WEX, CRK: Chroma-keyer
LPP-1000A: Videodisc players, digitizers

and graphics tablet
PVM/CVM/KX/VPH: Color monitors and TV projectors
SL/SLO Series: Betamax players and recorders
BVI-2500: 1-inch C VTR with animation
Digital video multiprocessing equipment
ENG/EFP cameras
Betacam VRC with playback and editing equipment
Computerized editing controllers
TBCs
Time code reader/generators
New products

DXT120: SMF Trinicon color camera
with 10:1 zoom lens, 1.5-inch
viewfinder, auto white balance and
preset AIO system, featuring versatile
interfacing
SMC-70G: Microcomputer titler, featuring
gen-lock, sync mode select, loop-through
BNC connectors. NTSC output. RGB
superimpose and 3.5-inch micro
floppy disk memory
IP-500: Intelligent remote control
interface box, allowing interconnection of
institutional and broadcast equipment
Beta-format multicassette system
HDTV video production system

Circle (874) on Reply Card
see ads on pages 44, 45, 73, 74,
75, 76 and 77

Sony Professional Audio (605, 1200)
Established products
DASH: Digital audio/video post
production system
Portable and ENG/EFP mixers
UHF wireless mic systems
Wired mics
Broadcast audio production system
Audio lay-back recorder
Audio consoles
Audiotape recorders
New products
WRT/WRR-200: VHF wireless system
with frequency synthesis
AVS/AVP-500: Synchronizer SMPTE/EBU
synchronizer for video, audio and film
special effects
JH800/Opt23: Video editor interface
allowing control of the audio console
CDP/CDS-500: 2-player compact disc
control system for radio broadcasting,
allowing precise index search and
programming capability.

Circle (875) on Reply Card

Soper Sound Music Library (1620B)
Established products
Music library
MusicSelect software for Apple II
New products
Series IX: 2-album series of nine
themes and 54 cuts in contemporary
upbeat tempo
Series X: 2-album series of 10 themes
and 59 cuts. covering various
orchestrations of a medium tempo
Series XI: 3-album series including
12 themes and 60 cuts of electronically
synthesized music beds. all up-tempo.
progressive in nature and New Wave
in style
MusicSelect software: For Apple II.
II+ and III computer for
simplified location of selections
in Soper library

Circle (876) on Reply Card

Soundcraft Electronics (219)
Established products
200: 8-, 16- and 24-channel stereo
mixing consoles
400B: 16- or 24-channel mixing
console
1600: Recording mixer
SCM 780: Multichannel audiotape
recorder
New products
SAC-2: Stereo on-air broadcast console
Series 20: 2-channel master recorder

Circle (877) on Reply Card

NTI America, Inc. (120)
1680 North Vine Street, Los Angeles, California 90028
Phone: (213) 346-9845 Telex: 215488
SEE US AT NAB BOOTH #1014D

Circle (128) on Reply Card
When you need to know anything about low or medium-power TV...

Design
Installation and Check-outs
Field Service
Parts Availability
Microwave
Solid-State Transmitters
Translators
LPTV
MDS
ITFS
OFS
Towers*
1 and 5kw (medium-power) transmitters

EMCEE has been accumulating knowledge and experience for over two decades. Along the way, we’ve recorded a number of singular accomplishments. Like putting the first LPTV station on the air in 1981. And being chosen over all others for the Salt Lake City multi-channel experiment in MDS in 1982. At the same time, we’ve earned a reputation for quick response to any customer need.

You need to know us.

Try us. All it takes is a toll-free phone call to 1-800-233-6193 (in Pennsylvania, call 717-443-9575). If it has to do with low or medium-power TV, EMCEE has already done it. And we’ll be happy to put our unparalleled knowledge and experience to work for you.

Visit our booth, #1621 at NAB convention.

EMCEE BROADCAST PRODUCTS a division of ELECTRONICS, MISSILES & COMMUNICATIONS, INC. White Haven, PA 18661 • 717-443-9575 • 800-233-6193 • TWX 510-655-7088

Circle (129) on Reply Card

April 1984 Broadcast Engineering 179
Sound Ideas (1620C)
Established products
Sound Effects library with more than 3000 stereo effects and more than 30 hours of recorded sounds
New products
See at booth
Circle (878) on Reply Card

New products
DA-1: Digital audio recorder
Circle (862) on Reply Card

Stage Lighting (1128)
Established products
Lighting products: Lyrician line
New products
See at booth
Circle (883) on Reply Card

Stainless (1315)
Established products
Towers for FM and TV broadcast to 2000 feet
AM towers for single and array applications
Microwave towers for stringent deflection specs and environmental conditions
New products
VERDA lightning deterrent unit for protection of any structure from damage
Circle (884) on Reply Card
see ad on page 269

Stanton Magnetics (102)
Established products
Standard phono cartridges, plug-in cartridges and replacement stylus
Stereo headphones, announcer earphones
Phone preamps
Equalizers
Record card products
New products
Stereowafer 45: Lightweight headphone
Dynaphase 60A: Open audio headphone with samarium cobalt high-velocity drivers
SP-98: Headphone amp for signals delivered from low impedance moving magnet cartridges
ARC-5: Antistatic carbon brush employs aerospace quality carbon fiber to clean records
Circle (885) on Reply Card

Stantron (1123)
Established products
VC800 -L: Sloping desk with monitor bridge
VCAS70 -1: Vertical cabinet assemblies
New products
See at booth
Circle (886) on Reply Card

Steenbeck (1424)
Established products
ST1B- Film-to-video transfer unit with counter loop programming and interlock
New products
ST941V: Video sound editing table, contains U-matic videocassette machine mechanically locked with two or three 16mm or 17.5/35mm magnetic film transports and time code accessories
Circle (887) on Reply Card

Storeel (1008)
Established products
Setup trucks
Storage racks for films and tape containers
New products
See at booth
Circle (888) on Reply Card

1020A: AM/FM stereo generator
New products
170: Precision audio filter set
Circle (880) on Reply Card
see ad on page 188

Spectrum Planning (510)
Established products
Engineering services
New products
See at booth
Circle (881) on Reply Card

Spencer Broadcast (406)
Established products
Distributor for Howe Audio 7512 console and Phase Chaser, Audio-Path
Associates audio power amplifiers
EPI electrical filters

Sound Technology (500)
Established products
1510A: Tape recorder/audio test system
1710A: Distortion analyzer

Soundolier (1704)
Established products
See at booth
Circle (879) on Reply Card

Stage Lighting
Lighting products: Lyrician line
New products
See at booth
Circle (883) on Reply Card

Stainless
Established products
Towers for FM and TV broadcast to 2000 feet
AM towers for single and array applications
Microwave towers for stringent deflection specs and environmental conditions
New products
VERDA lightning deterrent unit for protection of any structure from damage
Circle (884) on Reply Card
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VCAS70 -1: Vertical cabinet assemblies
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Steenbeck
Established products
ST1B- Film-to-video transfer unit with counter loop programming and interlock
New products
ST941V: Video sound editing table, contains U-matic videocassette machine mechanically locked with two or three 16mm or 17.5/35mm magnetic film transports and time code accessories
Circle (887) on Reply Card

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Setup trucks
Storage racks for films and tape containers
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180 Broadcast Engineering April 1984

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see ad on page 188

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Established products
1510A: Tape recorder/audio test system
1710A: Distortion analyzer

Soundolier
Established products
See at booth
Circle (879) on Reply Card

SAKIS BERRY RD • EUGENE, OR 97405
(503) 887-8412

PRODUCT DIVERSITY
• NO COMPROMISE QUALITY
• PRICE

audio
digital

Circle (321) on Reply Card

Circle (888) on Reply Card

www.americanradiohistory.com
Precision Echo Presents The Video Compression System With One Feature All Others Lack: Affordability.

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

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

The Squeezer, from Precision Echo, is a programmable video compression and positioning system that compresses an image down to four selectable sizes, places that image anywhere within the screen on command, crops any part of it to any size, and puts a variable-sized border of any color around it on request. It can even flip the image horizontally or freeze the action. Exclusive dual joy stick controls make image manipulation simple. And the utility of its design makes The Squeezer a versatile tool whether rack mounted in a production facility or used in mobile applications.

The Squeezer: An Affordable Alternative.

There's very little that you'll find on The Squeezer that you couldn't find on an ADDA, Vital, or a Quantel system. Except the price tag. Those other systems cost anywhere from $40,000 to $200,000. The Squeezer costs under $20,000. For broadcast programming, news and sports production, cable TV, educational and industrial applications, nothing comes close to the cost efficiency of The Squeezer.

The Squeezer from Precision Echo. High on quality and cost efficiency.
Athena 4500

“The” cost-effective film-to-tape transport

See us at NAB, booth 1602

• Phase-locks to NTSC, PAL or SECAM
• Constant T-V pull-down time of all frame rates.
• 1-2-4-6-8-12-24 FPS stop and single frame
• Capable of computer or programmable control
• Two-year warranty
• Modular design

For more information contact
L-W INTERNATIONAL
9415 Variel Ave.
Woodland Hills, California 91367 U.S.A.
Telephone: (818) 348-8614

Circle (131) on Reply Card

Strand Century
Established products (1418)
Light Palette: TV lighting control system
MiniLight Palette: Lighting control system
Mantrix Memory
Mantrix 25
CD80: Portable dimmer packs
Ianiro portable lighting kits
Ianiro studio lighting fixtures
Ianiro remote and HMI lighting equipment

New products
Solid-state ballast for 575W and 1.2kW
PARLITE: HMI PAR fixture, customer selectable between 575W and 1.2kW

Circle (889) on Reply Card

Studer Revox
Established products (201)
A800: Microprocessor-controlled multitrack recorder
A810: 2-track recorder with center-track SMPTE code
A710/B710MKII: Professional cassette deck
900: Broadcast audio consoles
169/289: Portable audio consoles
TLS2000: SMPTE synchronizer
A80 VU: Multitrack recorders
2708: Studio monitor
A68: Monitor amplifier
B77: 2-track recorder
B77LIS: Broadcast logger
PR99RK: Automation logger

New products

Circle (894) on Reply Card

Swintek Enterprises
Established products (1503)
Hand-held radio microphones
VHF/ULF “wireless headsheets
RF switching diversity antenna systems
Lavalier VHF/UHF wireless microphones
MARK Q: Series of wireless mic operating with all video cameras

New products
See at booth

Circle (890) on Reply Card

See ad at page 255

Switchcraft
Established products (427)
Switches and indicator lamps
Connectors
New products
See at booth

Circle (892) on Reply Card

See ad at page 313

Sylvania GTE
Established products (1401B)
T-H Lamps for studio, theater, TV and video in 5Kw and 10Kw ratings
Brite Arc/Brite Beam HMI lamps

New products

BB200 200W PAR36: Brite Beam metal halide lamp for ENG

Ruggedized versions of T-H lamps
DNV/DNT: T-H versions of incandescent models
Rim-mount lamps for video camera lighting

Design 50: 5000K fluorescent lamp for studio, printing and lithography lighting


Circle (893) on Reply Card

Symix
Established products (618)
T1-101: Telephone interface
511: Single-ended audio noise reduction system
501: Peak-RMS compressor/limiter
CL-150: Fast-RMS compressor/limiter
A-220: Stereo amplifier
SE-400: Stereo parametric equalizer
DCS-18: Remote control system
522: Compressor/limiter/ expander

with gate and ducker

New products

See at booth

Circle (894) on Reply Card

See ad at page 210

Symtec
New products (1522)
PGSIV: Text and graphics generator combination, featuring RS-170A signal output with animation capability, 22 fonts, cut/paste, scaling/rotation, gen-lock, A/D conversion, slide/print production of graphics and RGB outputs

Circle (895) on Reply Card

System Associates
Established products (1331E)
Distributor for a wide variety of equipment for the radio and TV broadcast industry

New products

See at booth

Circle (896) on Reply Card

See ad at page 220

TFT
Established products (109)
8300: Studio transmitter link
701: TV monitor
753/754: AM monitor
763/764/724A/730: FM monitors
7900 Series: Microprocessor remote control system
8100: Transmitter studio link
760: Emergency broadcast system equipment

8020/8010: AM/FM E-alert equipment
New products
840/841: AM stereo exciter/monitor
830: SCA generator for voice and data

Circle (897) on Reply Card

See ad at page 269

See ad at page 200

TV Equipment Associates
Established products (1218)
Mattheys delay lines and low pass video filters
RACAL headphones for broadcast and intercoms
Elcon videotape cleaner profiler for 2-, 1- and ¼-inch formats
VG Zone plate generator

Circle (132) on Reply Card

www.americanradiohistory.com
HERE'S WHY THE KAMAN BROADCAST MANAGEMENT SYSTEM IS THE CHOICE OF THE INDUSTRY.

The KAMAN Broadcast Systems are designed to be the most comprehensive and advanced in the industry. They are truly state of the art.

The KAMAN Broadcast Systems are a "Station Operations" solution designed for today and the future. The interactive data base ties together all the various departments within your station. Information can be put in the systems anywhere...is immediately part of the systems everywhere. Speed is one of its greatest attributes!

The KAMAN Broadcast Systems are totally "in-house," and are available at all times, unlike other systems which have operating hours and days. Timely, decision-producing information is now available at your fingertips anytime. Your sales staff can log spots immediately when a buy is made and avails will be updated. Information ripples through the entire system: to traffic, billing, and even production. The KAMAN Systems are designed for your station's future needs. To produce information, data, and reports in an ever-changing industry.

The KAMAN Broadcast Systems are designed exclusively for the IBM System/38 which can provide uninterrupted, multiterminal access for your entire station. The System/38 has outstanding capacity for data and is backed by IBM's reputation for superior service.

The Broadcast Management System reflects Kaman's in-depth broadcasting background...a background unique among broadcast computing companies. Kaman has a strong commitment to the broadcasting industry and it shows through a solid reputation for service and reliability of its products.

At KAMAN, today's quality is tomorrow's reputation.
KAMAN BROADCAST SYSTEMS
A TOTAL SOLUTION FROM A SINGLE SOURCE

REPORTS TO INCREASE PRODUCTIVITY

AVAILS:
- Multiple formats
- 365 days
- Budgets
- Average pricing
- Constant updating

PROJECTIONS:
- 9 different calendars
- By salesperson, agency or advertiser
- Budgets
- History
- Paces

LOGS:
- Complete pre-logs, engineers logs, final logs

CONTRACT/CONFIRMATIONS

PSA/PROMO LISTS AND AFFIDAVITS

DAILY LOG VALVE

FCC LOG ANALYSIS

COMPLETE PREEMPT/MAKEGOOD HANDLING

TAPE CARTRIDGES:
- Automatic allocation
- Inventory control
- Log lists
- Cartridge labels

BILLING:
- Invoices – airtime/production
- Statements
- Accounts receivable
- Cash receipts
- Co-op reports
- Salesperson journal
- Rep report
- Revenue analysis by:
  - Time, Show, Salesperson, Agency, Advertiser, Product
  - All with history

Standard reports are formatted but may be changed, and other reports can be tailored by the user through the use of the IBM System/38 “Query” function.

FLEXIBILITY

The Broadcast Management System is completely interactive and geared to maximize sales. As a contract is being input, it immediately checks the available

and places every spot according to the station’s priorities; i.e., highest rate, client preference, length of unit, national or local, rate section, personal preference, length of contract. The priorities are set by the station to its sales philosophy. Each time a spot is ordered, the spot is placed according to these steps and according to space availabilities on the log or avails. If space is not available but can be acquired by moving or juggling spots, the system will maximize the area by the station’s logging priorities. The system logs and avails spots automatically in horizontal and vertical rotations following sports programs, specials, etc.

THE IBM SYSTEM/38

The IBM System/38 is engineered to grow as your station work load and business requirements change and grow. It is a system that can adapt easily to the addition of a work station in one of your satellite offices or the addition of a new disk file ... all without major programming changes. The System/38 has integrated many large system features into a single system design ... at an affordable price.

For various station departments, it can provide accurate, timely information where it is needed, when it is needed, and in the desired form, without support from data processing personnel.

The IBM System/38 lends itself to networking with other IBM Systems and multistation operation from a single site. Our programs incorporate the ability for corporate reporting and electronic mail.

Let us show you more about how the Kaman Broadcast Systems can provide you with present and long-term solutions to your problems now. Developing software for broadcasters is our business. Call us at 303-599-1470.

Security is also built into its operation ... users enter their assigned password, and the system determines the information they can use. Your employee files, for example, can be restricted to a select few.

OTHER KAMAN BROADCASTING PRODUCTS

Autoswitching Interface System: passes the log directly to engineering and retrieves following airing for automatic billing.

Accounting: includes capabilities for General Ledger, Payroll, Fixed Assets and Account Payables.

Film System: inventories feature and syndicated films. Amortizes as you prefer. Includes payables to vendors. The system is unique in that it is designed to forecast for your station ... what you have contracted for the future, costs versus cash flow so you know what you can afford to bid. This system is scheduled for release in late 1984.

Interface your Broadcast Management System with your National Reps. Your Reps will be able to have access to whatever you want them to have (and no more) to help them close sales on your hot avails. Currently under research and design.

All new Kaman Systems software modules can be interfaced with all other Kaman Broadcast Systems software, even if added at a later date.

THE KAMAN DIFFERENCE

We pride ourselves on the fact that our training, installation and customer services people are broadcasters. Our systems are designed from the user point of view and in broadcast language. All Systems are easy to learn, operate, and bring up. Our program consists of station personnel being in Colorado Springs for advanced training, and our installation team being at the station for instruction and live conversion. We have Customer Service personnel available thereafter.

At Kaman, today’s quality is tomorrow’s reputation.
Continued

Link audio and video DAs
IRT color monitor comparator, dc-powered
MATEL auto multiplex phone/intercom

New products
RACAL Suregard headset for noise exclusion with noise canceling electret microphone
RACAL emergency field phone for party line operation

Circle (989) on Reply Card

Taber
Established products
409: Tabererase, manual Audio head replacements
New products
1500 Tabererase, automatic

Circle (999) on Reply Card

Tamron Company
Established products
265H 10X: Zoom lens
665H 10X: Zoom lens
466H 14X: Zoom lens
181H 10X: Zoom lens
81H 10X: Zoom lens
468HB 14X: Zoom lens
New products

See at booth
Circle (900) on Reply Card

Tandberg of America
Established products
TDC-910: Cassette recorder
TD-20L: Logging recorder
TDC-621: Duplicator machine
TES: Telephone enhancement system

New products
See at booth
Circle (901) on Reply Card

Tappscan
See at booth
Circle (902) on Reply Card

TASCAM
Established products
M16: 24-input, 16-channel mixer
M30/M35: 8-track mixers
Series 22: Audio recorders
Series 30: 2-, 4- and 8-track recorders
85-16B: 16-track audio recorder
Portastudio 244: 4-track mixer with integral 4-track audiostreamer recorder
122: Stereo cassette recorder
133: 3-channel cassette recorder
Line amps, equalizers, mics
New products
Series 40: +4dBm balanced, 2- and 8-track audio recorders
Series 50: +4dBm balanced, 2- and 8-track recorders
M-526: 20x8x16 modular-construction studio or production mixing console, featuring one chain feed, four side chain systems for processing, prefader cue and stereo solo in place
122S: Balanced input/output stereo cassette recorder
133B: Balanced input/output 3-

Circle (145) on Reply Card

MULTISTANDARD TRANSMISSION OF COMPONENT OR COMPOSITE VIDEO

Component Video
Multistandard sources
Multiple video feeds
All create challenges for the Video Transmission Engineer
Quante’s QLT 1000 Series Digital Fiber Optic Transmission System provides four transparent channels per fiber, ensuring maximum flexibility to meet new standards as they evolve.

- Single fiber for 4 video and up to 56 digital audio channels
- Multistandard transmission with any mix of component or composite channels
- Fully bi-directional
- Reach 11 to 50km with choice of wavelengths
- RS 250 B performance

See us at NAB ’84-booth 1216A

Quante CORPORATION
3350 Scott Boulevard
Building 15
Santa Clara, CA 95051
(408) 727-2077
Norkshäuschen 25
D-5600 Wuppertal 1 (West Germany)
Tel. (0202) 704001-03
Tx. 8591542

Circle (133) on Reply Card
REACH THE WORLD WITH SSTV

High quality programming can be provided to a national audience using Slow-Scan television (SSTV). Both the digital Model 285C and analog Model 290C transmit still video color images over the subcarrier of a satellite transponder—at a fraction of the cost of full-motion satellite delivery.

With the addition of inexpensive earth stations, SSTV can be used to reach specialized audiences, like academic institutions, religious groups, or professional associations.

Slow-Scan television offers rapid "slide-show" programming. Use it for topics such as news, travel, weather, finance, art, real estate or geography.

To learn how specialized programming becomes affordable with SSTV, contact Colorado Video, Inc. Box 928, Boulder, CO 80306 303/444.3972.

See Us at NAB in Booth #1222
Circle (288) on Reply Card

186 Broadcast Engineering April 1984

For simplified phasing

Certifying the SC/H-phasing in a TV facility is not that difficult, but even for an engineer or knowledgeable technician, the process does take time. More than a glance at the waveform monitor or CRT display is needed to set the phase adjustments correctly. For less well-trained personnel, the process could be a major undertaking. As an answer to the task of SC/H phasing the facility, Tektronix will introduce its 1750 series at NAB '84/Las Vegas.

Closely paralleling the design of the TEK 1740, the 1750 waveform monitor/vectorscope includes the capability for measuring and monitoring subcarrier-to-horizontal (SC/H) sync phase. The instrument allows quick determination of proper composition of individual signals and their compliance with NTSC RS-170A, as well as relative color framing of two signals. The phasing display is available at the touch of a front-panel mode select button.

Easily understood front-panel controls allow normal waveform and vector displays, as well as R-Y differential phase and new SC/H mode. Sweeps allow 1H, 2H, 1-field and 2-field displays, along with a magnification mode. DC restore is switched and vertical filtering provides for flat,IRE and chroma selections, just as on the 1450 waveform monitor. Also, line selections from Fields 1 or 3 and Fields 2 or 4 may be made, allowing VIRS, VITS and other vertical interval signals, such as teletext, to be monitored.

In the SC/H-phase monitor mode, the 1750 uses the vectorscope graticule, with the subcarrier reference burst indicated as a vector display. When controls are properly set, the phase error is determined by the position of a spot lying on the outer circle of the vector display. The number...
FM BROADCASTERS, IS YOUR SIGNAL REALLY ON TARGET?

You know your market numbers, and the demographics that tell you where you should have your best signal coverage. That's good, because your competition knows them too. But, are you certain that you're delivering every watt into those numbers? Do your field strength numbers raise a few doubts? And, what about the quality of your station's sound? You've spent all that money on the studio equipment. You've fine-tuned your transmitter. Great. But those improvements really don't count for much if your programming is hitting the open pastures while your competition is zeroing-in on the key demo sectors. This is where a CETEC FM Antenna comes in.

INTRODUCING OUR “HAVE IT YOUR WAY” PROGRAM FOR FM BROADCASTERS

Because your market has changed since your antenna was first put into service, or it's come time to directionlize, it makes good sense to look into the benefits of upgrading with CETEC ANTENNAS. Here's three different ways:

1. Our Pattern Optimization Service;
2. Directionalization on any of our standard antennas;
3. Upgrading to our patented Series JSCP antennas.

With pattern optimization, we can give you more uniform coverage and better signal quality. Typical nulls and peaks can be virtually eliminated. All of our work is done fullscale to eliminate errors too. Parasitic elements are precisely determined on a custom basis for your particular site. When you optimize your signal our way, you optimize your market reach and penetration—your way.

Cetec Antennas meet FCC requirements for directionlizing. With us, FM antennas aren't a sideline. All of our FM's are CP and can be directionlized. From 4KW to 360KW you can go from one bay to large, multiple bay systems, we're one of the largest suppliers to the industry. With a CETEC directional, we can place your signal right where you want it.

When you upgrade with CETEC, you get more than 20 years proven experience in engineering ability that has delivered more than 1,000 JSCP model FM antennas. Other important features you gain when you plan with CETEC are factory tuning on a customer-type structure, and the comfortable feeling of a two-year material and workmanship warranty.

Now that the FCC 80-90 Docket is part of your planning, it makes all the more sense to talk with CETEC ANTENNAS. There's no obligation for complete technical information.

We'll see you in Las Vegas at Booth 509 as well as our suite at the MGM Grand. At the NAB Convention, or all year long at the Sacramento factory, we're ready to serve with speed and a high quality product. Let us show you how we can give you—THE EDGE IN COVERAGE.

Cetec Antennas
The Edge In Coverage!

SEE US AT NAB, LAS VEGAS...BOOTH 509

www.americanradiohistory.com
of degrees of error are read from graticule marks.

Intended for rack-mount or bench use, the new instrument is sized similar to the 1740 and 528A waveform monitors or 1420 vector-scope. The half-rack-width monitor is 18.13 inches deep, weighs 16 pounds and is operable only on ac power. It will sell for approximately $5600 in NTSC. A 1751 PAL version and a PAL-M model, 1752, will follow the NAB introduction. In each case, the cost is slightly more than the combined cost of a 528A/1420 set, or PAL equivalent, in half the space.

Circle (400) on Reply Card

The All-in-One Audio Test System—Model 1510A by Sound Technology

IF... you're involved with production or post-production of audio for video, or on-location taping for television or CATV... your equipment maintenance is an on-going, in-house responsibility... your firm is ultimately concerned with the audio quality of your projects... Then the 1510A Audio Test System belongs in your facility!

WHY?
Sound Technology's 1510A tells you EVERYTHING YOU NEED TO KNOW ABOUT YOUR AUDIO. It insures delivery of a sound product each & every time!

DESIGNED TO GIVE YOU THE COMPLETE PICTURE
The 1510A quickly and precisely evaluates and analyzes audio quality for VTRs. Microprocessor control, differential inputs, electronically-balanced outputs with a clean, low-distortion signal source (typically .005%) from +30 to -70 dBm...all contribute to the 1510A's ability to fulfill ALL your audio requirements.

MORE FOR LESS
Why invest $17K in a collection of test gear when the 1510A can do it all? Call Sound Technology to find out more about THE ONLY ALL-INCLUSIVE, TWO-CHANNEL TEST INSTRUMENT in today's market!

Telemetry
(1202) Established products
7934: A/V routing switcher with computer control option
3710: Broadcast demodulator with tester and synchronous detector
3706: TV sideband analyzer
4501: Precision demod.
4503: Demod tester
4504: Synchronous detector
4500: Off-air demodulator
4400: Modulator
4210: Fiber-optic system
4600: Video signal conditioner
3338: Multifunction test set
5300: Isolation amplifiers

New products
See at booth

Circle (906) on Reply Card

Telescript
(1407) Established products
MPS-1000: Monitor prompting system
Telecom and Telescript transports
New products

DIGIS: Digital prompting system using current manufacture personal- and briefcase-type computers

Telescript
(1607B) Established products
In-station election reporting system with vote computation and on-air display with unlimited number of races
New products

BUZ Series 2000: Comprehensive TV and radio newsroom management/editing system, featuring a local area network, redundant processors and terminal work stations

Telescript
(907) on Reply Card

Television Engineering
(1700) Established products
TV remote vehicle, equipped with state-of-the-art equipment
Professionally designed TV systems
Individual production items
New products
New design in remote vehicles, planned and designed to save on replacement cost

Television Engineering
(908) on Reply Card

Telex Communications
(600/1605A) Established products
Wireless mic systems
Microphones
Closed circuit intercom systems
Headsets
Open reel and cassette ATRs and loggers
Tape duplicators
A/V projection film equipment including front and rear screen combinations with cassette audio and dissolve control

New products
See at booth

Circle (910) on Reply Card

Tennaplex
(1127) Established products
Kathrein broadband dipole panels for FM and TV antennas
Hybrid combiner modules
New products
Kathrein broadband dipole panels suited for arrays of three panels per bay on triangular mast

Circle (912) on Reply Card

Tentel
(1613) Established products
Tentelometers: Tape tension gauges for C. U-matic, Beta, VHIS, M-format and quad VTRs and reel-to-reel audiotape
TUSH: Spindle height gauges for VHIS, Beta and U-matic formats
New products

Tentel
(911) on Reply Card
Many people don’t.

But that’s changing. We’ve committed ourselves to the broadcast industry by offering a full line of custom-designed and standard audio and video cables. We didn’t just get started either. We’ve been manufacturing wire and cable for over 40 years. Today, Chester products are carrying critical signals in network broadcast studios and for field broadcast coverage. They’ve been used to cover the Olympic Games, the U.S. Open in golf and in numerous everyday news and sports coverages.

We gained our knowledge and experience by designing quality wire for use in atomic submarines, jet aircraft and life support systems and diagnostic equipment in the medical field to name just a few. Of more importance to you, we build coaxial and triaxial video cables, shielded multi-pair audio cables and multi-conductor control cables. But, we don’t stop there. We will design a cable for you as well, for that special application that needs something more than the standard designs. So, you can design a cable to fit your project rather than design your project to fit a cable. We also don’t go into slow motion when the word “special” comes up. We understand the needs of the broadcast industry and are ready to react to your timetable demands. So when your next cable requirement comes up, think of Chester. We’ve got what you’re looking for.

Chester Cable
P.O. Drawer D, Chester, New York 10918
(914) 469-2141
A unit of Chester Cablewave Systems Corporation.

Proven reliability.
Theatre Service/Supply (1513)
Established products
Cyclorama backdrop curtains and cyc track systems
Overhead track systems for light fixture support and electrical power distribution
New products
See at booth
Circle (914) on Reply Card

Thermodyne (1637)
Established products
Shok-Stop: Shipping and storage cases
Rack-Pack: Shipping storage and operating cases
Rack-Pack: With new 3-tiered slides
New products
See at booth
Circle (915) on Reply Card

Thomson-CSF Broadcast (1001)
Established products
4101/4111: FM Volumax peak controllers
4300: AM Volumax peak controller
4440A: Audimax level controller
1602: Dual audio DA
5500B: NTSC color corrector
8016: Image enhancer
9010NM/9020NM: Videoplex encoder/decoder
TTV-2705: Color slide scanner
MC-613: 3-tube Betacam with 1/4-inch VTR
Vidifont V: Character generator and graphics system
NABTS teletext system
UHF and VHF TV transmitters
4-program TVRO system
New products
TTV-1525C: Color studio camera
TTV-1633: Automatic 3-tube Betacam Editing suite
TTV-4400: Auto contrast corrector
TTV-5305: Special effects image processor
TTV-8400: Thom. C.A.T. computer-aided test instrumentation
TTV-7650/7660: D/A and A/D converters
2kW VHF TV transmitter
200W, 1kW and 2.5kW FM transmitters
Circle (916) on Reply Card
see ad on page 251

Thomson-CSF Components (1003)
Established products
Klystrons
TH-3591B and TH-3640 TWT amplifier systems for satellite communications
Tetrode for UHF and VHF applications
New products
TH-2417C: 24-channel 3.35kW C-Band klystron for satellite uplinking stations
Circle (916) on Reply Card
see ad on page 251

TH-2426: 2kW Ku-Band klystron for uplink ground stations
TH-2445S: DBS klystron for transmitter amplifiers in the DBS satellite services in the 17.3GHz to 18.1GHz spectrum
TH-547: 1kW UHF tetrode for LPTV service
TH-582: 20kW UHF tetrode, using the Pyroblock grid structure
TH-371: 20kW VHF tetrode with Pyroblock grid structure
Circle (917) on Reply Card

3M Company (1002)
(3M Magnetic Audio/Video Products)
(3M Broadcasting and Related Products)
(3M Optical Recording Project)
Established products
250/226: Audio mastering tape
Cinetrak: Tape cycling
Anti-static treatment of cassettes
Custom mastering/replication of laser videodiscs from 1-inch and U-Matic videotape
New products
480: Master broadcast videotape
D-1000/D-5000: Character generator systems
BPA: Video graphics paint system
210: Sync generator
Additional models of H-Hybrid routing switcher series
EECO converter to provide 150 hours of audio programming from optical video discs
Circle (919) on Reply Card
see ad on page 311

Tiffen (1422)
Established products
Complete line of special effects and standard filters for video and film cameras
New products
See at booth
Circle (920) on Reply Card

Toby Arnold & Associates (107)
Established products
Music program syndication service
New products
See at booth
Circle (921) on Reply Card

Toshiba (1631A)
Established products
PK-43: Computer-controlled camera
PK-6b: ENG/EFP TV camera
WG-V: Wipe pattern generator
CGK: Soft chromakey signal generator
New products
PK-70: Color camera with VTR
PK-81: Portable color TV camera
D-VSW 1000: Digital video switcher
Power amplifiers for transmitters
Circle (822) on Reply Card
see ad on page 239
ONE OF THE INDUSTRY’S BEST KEPT SECRETS

ISC EDITING SYSTEMS ARE CONTROLLING MORE VPR-3’S THAN ALL OF OUR COMPETITORS COMBINED.

SURPRISED?

THEN YOU SHOULD GET TO KNOW US BETTER.

ISC is the only company that can control both the newest Ampex and Sony’s VTR’s through RS422 Direct Control protocol, and simultaneously control a host of other equipment through Calaway and CMX RS232 interfaces.

Visit us at NAB. We will demonstrate the industry’s most flexible interfacing and most sophisticated VTR and switcher control. ISC provides precise, easy to use control permitting you to expand your creativity.

ANOTHER BEST KEPT SECRET...

In fact, our new model 51 is still a secret...until NAB.

See it at NAB booth No. 1167

ISC—the strong, quiet company setting the pace.
Buying an audio post-production system. The long and the short of it.

<table>
<thead>
<tr>
<th>BUY AN AUDIO MIXING CONSOLE</th>
<th>OR BUY AN SL 6000 E SERIES STEREO VIDEO SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add 6 bus mix matrix</td>
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<tr>
<td>Add patchfree routing</td>
<td></td>
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<tr>
<td>system</td>
<td></td>
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<tr>
<td>Add compressors/limiters</td>
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<td>Add noise gate/expanders</td>
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<tr>
<td>Add multitrack track</td>
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<td>remotes</td>
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<td>Add autocator</td>
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<td>Add automated mix</td>
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<td>package</td>
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<td>Add synchroniser controller</td>
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<td>Add master transport</td>
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<td>selector</td>
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<td>Add real-time mix</td>
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<td>system</td>
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<td>Add events controller</td>
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<td>equaliser</td>
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<td>Add video switcher</td>
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<td>Add computerized list</td>
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<td>manager</td>
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<td>Add printer</td>
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<td>Add effects racks</td>
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<tr>
<td>Add automatic dialogue</td>
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<tr>
<td>replacement system</td>
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<tr>
<td>Employ a full-time</td>
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<tr>
<td>software engineer</td>
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</tbody>
</table>
In the competitive world of radio production, providing the highest quality facilities is one of the first requirements for success.

Getting it right can prove difficult, however. Especially in the area of audio post-production.

For people expect the same sophisticated standards of sound that they hear from the recording studio. But they usually expect a fraction of the time.

Which means a post-production studio, if it is to meet these demands, must not only give first-rate stereo sound, it must be streamlined to give it as quickly and efficiently as possible.

Unfortunately, because the video business is still young, much of the equipment on offer is new and unproven. With different suppliers working to differing standards.

And even if you choose the individual components of your system wisely, they won't work together with maximum efficiency. Because they weren't designed to do so.

So, at best, assembling your audio facilities will be complicated, time-consuming and not entirely satisfactory. In the worst, it will be very costly and potentially catastrophic.

Unless of course you choose the Solid State Logic SL 6000 E Stereo Video System. World's first fully integrated audio post-production system.

Designed in consultation with several leading post-production houses and broadcasters, the SL 6000 E series provides outstanding audio quality. Combined with systematic design and practical innovation, aimed specifically at the needs of the video and broadcasting industries.

The Stereo Mix Matrix, for example, contains three stereo mix buses. Allowing the simultaneous creation of separate music, effects and dialogue mixes, and giving the utmost possible flexibility for both stereo and mono post-production.

Master Logic Control enables the console to be reconfigured instantly for track laying, overdubbing or remixing. Ingenious switching on each input/output module gives easy patchfree routing and sub-grouping.

The SSL Primary Studio Computer handles automated mixing, autolocation, and list management. It interfaces with the remarkable Total Recall system and links with the Synchroniser Controller to provide direct control of the entire system via its keyboard and in-built TV monitor.

As a result, an enormous amount of time (and money) is saved. Giving the engineer a new freedom to concentrate on the more creative aspects of his work.

These features, incorporated into the SL 6000 E's cohesive and comprehensive design, are of great benefit to post-production and broadcast studios alike.

And because of the system's modular nature, it can be built up from the basic mainframe as your needs and budget dictate. Making it an affordable proposition for any size of studio.

So if you're in the market for an audio post-production system, you can fall into the trap of trying to assemble one piece by piece.

Or you can drop a line or call Antony David in the UK or Piers Plaskitt in the USA, and find out more about SSL's Stereo Video System.

Solid State Logic

Please send me further information on the SL 6000 E Series Stereo Video System.

Name: ____________________________
Position: __________________________
Company: _________________________
Address: __________________________

Tel: (090) 389 8282. Telex: 837400 SSL OX G. Facsimile: (090) 389 8227.
Solid State Logic, 228 East Main, Milan, Michigan 48160, USA.
Tel: (313) 439 8866. Telex: 230504 SSL MILAN. Facsimile: (313) 439 8516.

Circle (139) on Reply Card
Townsend
Established products
Phaestar: 100W low-power UHF transmitter-antenna system. Plug-in vacuum contactor for klystron beam voltage power supplies.
TMD-100XT: All solid-state mod anode pulser for UHF klystron transmitters.
TA-100TH: 10kW high-band UHF transmitter
PE-250: Pervear klystron beam voltage control system
TM P-3-10: Solid-state pulser
TMC-10-XT: 10W MDS/ITFS transmitter
TA-55TE: 55kW UHF TV transmitter
TA-10A: 10kW VHF TV transmitter
TA-100ASU: 100W UHF TV transmitter
TML-100XT: 100W solid-state MDS/ITFS transmitter

TC-800: 800A vacuum contactor
TA-SATU-M: 5kW UHF TV transmitter
IR-500: Impedance plotter
New products
See at booth
Circle (925) on Reply Card

Transimage Int'l.
Established products
Series 80: Production/recording console
Trimix: Expandable portable/studio console system

And, we mean PORTABLE!
This rugged, solid state Multiburst Generator is designed to go where you go. It's a self contained test package which allows you to check your frequency response—anywhere!
It has 75Ω unbalanced output and 124Ω balanced. The frequency bursts are from 0.5 to 4.2 MHz. Internal sync. blanking and white bar are sine-square filtered to avoid overshoots.
It even has its own rough, tough carrying case for added protection.

Free catalogs are available upon request. Please call or write...

TC-800: 800A vacuum contactor
TA-SATU-M: 5kW UHF TV transmitter
IR-500: Impedance plotter
New products
See at booth
Circle (923) on Reply Card

Trident
Established products
Series 80: Production/recording console
Trimix: Expandable portable/studio console system

Portable Multiburst Generator

For Test & Measurement Equipment

185 Dixon Avenue, Amityville, L.I., New York 11701
(516) 842-2300 TWX 510-227-9850
Eastern Area Office—(914) 279-3231

Circle (1420) on Reply Card

Umcor Equipment
Established products
Series: Patching and patching accessories. coax, twinax and triax BNC-type connectors
J-18: Miniature 700 jacks
TRS: Connector systems
New products
See at booth
Circle (926) on Reply Card

Trompeter
Established products
Series: Patching, and patching accessories, coax, twinax and triax BNC-type connectors
J-18: Miniature 700 jacks
TRS: Connector systems
New products
See at booth
Circle (927) on Reply Card

Tuned Audio
Established products
Service: Specialize in custom-designed systems for radio and TV broadcasting studios
New products
See at booth
Circle (928) on Reply Card

UMC Electronics
Established products
Type 100: A/AA size audio cart machines
Type 200: Audio cart machines
Type 300: Triple-deck audio cart machine
SPE-100: Splice finder with or without eraser
BC-18: Stereo on-air console
Beaucart II: Economy line cart machine
System 8: Operator-assist automatic news recording system
New products
Type 200MA: Motorized azimuth cart machine with built-in white noise generator
See at booth
Circle (929) on Reply Card

UREI
See United Recording Electronics

US Tape & Label
Established products
Pressure sensitive products for broadcast industry promotional use: bumper strips, window labels and concert patches
New products
See at booth
Circle (930) on Reply Card

Ultimate
Established products
Ultimate-6: Video compositing device
Newsmatte: Video compositing system for live broadcast
See at booth
Circle (931) on Reply Card
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 AT835 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 "shotgun" 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.

audio-technica

AUDIO-TECHNICA U.S., INC., 1221 Commerce Dr., Stow, OH 44224 • 216/686-2600

Circle (141) on Reply Card
www.americanradiohistory.com
YOUR RECORDS ARE STILL DIRTY!
The only professionally accepted method of record cleaning employs a powerful fluid, a special brush, and a 100% effective vacuum. Nitty Gritty now offers such a system that is designed to meet the demands of your radio station.
The Nitty Gritty PRO is the only available professional record cleaner that simultaneously washes and vacuums dry both sides of a record. It takes just 60 seconds per disc, $59.99 each.

SEE US AT NAB!
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RECORD CARE PRODUCTS, INC.
4935 ARROW HWY - F4
MONTCLAIR, CA 91763
714/625-5525
Circle (314) on Reply Card

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Circle (209) on Reply Card

20 MINUTE RELOAD
UMATIC VHS & BETA
(Tape only) $3.30 $55c
(Tape & housing) $7.85 $1.70
Your typical costs when you load yourself with our Video Tape Loader/Reloader/Rewind. When re-loading old tape is removed without taking the housings apart.
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L.A. VIDEO SHOW (May 22-24) 638
Audio, inc. 219 Cosen, Elk Grove, II. 60007
Phone 312/640-1030 Telex 4992690 ADCO US
Circle (210) on Reply Card

FREE 32p Catalog & 50 Audio Video Applic.
"FOR REPRINTS USE OUR ORDER FORM"
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1033 N Sycamore Ave LOS ANGELES CA. 90038
Circle (211) on Reply Card

CASES FOR DELICATE EQUIPMENT
PRICE LIST ON REQUEST
818/899-2547
EXCALIBUR INDUSTRIES
10247 Twin Hill Blvd Lake View Terrace, CA 91342
Circle (212) on Reply Card

Want more information on advertised products? Use the Reader Service Card.

Ultimate (1642)
Continued

New products

Ultimate-5: Video compositing system with additional features

Newsmatte-2: Newsmatte system with digital memory
Circle (931) on Reply Card

Union Connector
(1783)
Established products

20PS/60PS: 20A and 60A outlet panels and boxes

2P&G Series: 20A, 30A, 60A, 100A 3-wire plugs connectors, UL-listed, with pin and sleeve

60-820L: 7.2kW portable distribution box

G4100: 4-pole, 5-wire grounding 100A plug, connector, receptacles, inlets. UL-listed

New products

SU-1: Dimmer at the light source, rated 2.4kW, modular, silent without RF interference or control cables

DIGI-I: Digital remote controller for SU-1, allows switch/dimmer control through ac circuitry for up to 256-dimmer capability in a hand-held model.
Circle (932) on Reply Card

see ad on page 287

Utah Scientific
(1114)
Established products

AVS-1: Switching system and various party line control panels.

PLMC-1: Machine control system.

New line of software

MC-802 panel provides three buses while MC-501 provides preset and program buses only.

Station automation system with master control switches

High performance 8-output video and audio distribution amplifiers

ADA-8: Audio distribution amplifier

VDA-8: Video distribution amplifier

New products

See at booth

Circle (1494) on Reply Card

see ad on page 67

Utility Tower
(703)
Established products

18-inch to 4-foot face tower products for AM, FM, TV, microwave, CATV and LPTV installations

Tower lighting equipment

Base insulators

New products

See at booth

Circle (1492) on Reply Card

Valentino
(1231)
Established products

Production music library

Sound effects library

New products

See at booth

Circle (938) on Reply Card

Valley People
(318)
Established products

810 Kejep II: Keyable program expander/noise gate

811 Gain Brain II: Compressor/limiter and voice-over device

812 Maxi-Q: 3-band parametric equalizer with tune mode

813 QLZ: Low impedance transformerless
See us at the NAB Show

We are looking forward to seeing our old friends and making new. Don't miss the unveiling of our new product line. See you April 29th.

CSI ELECTRONICS INC.

18248 EAST ROGERS CIRCLE
BOCA RATON, FLORIDA 33431
PHONE (305) 994-6511  TWX 510-953-7603
Valley People (318)
Continued

quad mic preamp

330 Dyna-Mite: Multifunction dynamics processor

332 Dyna-Mic: Dual transformerless preamp/limiter

610: Dual compressor/expander

HH2X2: Level matching interface

New products

310 Advantage: Audio noise and level meter for verification and specification of audio spectrum data

HH2X2B: Balanced level matching interface

Circle (939) on Reply Card
see ad on page 136

Varian Associates

[Microwave Tube Division]

(EMAC/Salt Lake City)

(EMAC/San Carlos)

[Microphone Equipment Division]

Established products

VCP-7959: Variable visual coupler

VA-860: 30kW UHF TV klystron

4KM150: LAH external cavity UHF TV klystron

VKU-7791J: 2kW Ku-Band klystron

Y834/Y831: Tubes for LPTV transmitters

Y730/Y750: Tubes for LPTV transmitters

3CX800A7: HF 800W power triode

3CX800U7: VHF 800W power triode

8973: Megawatt power tetrode

8974: Megawatt power tetrode

4CV300.000G: 300kW power tetrode

VAW-6700: Klystron test set

VZU-2701G: GEN II klystron high power amplifier

VZ1-2700G: GEN II klystron high power amplifier

VVC-7988: Klystron for 5.925-6.425GHz

VZZ-6993A2: 14-14.5GHz. 500W power combined TWT HPA

New products

VKP-7935S: Super high efficiency UHF TV klystron

VKP-7853: 100kW UHF TV klystron

VKC-7989B12: 3kW C-Band broadband klystron

2CX1200A7: Small ceramic triode for FSB, AM and amateur radio

4-500B: Economical version of 4-500A

4CX3500A: 3.5kW power tetrode

4CX7500A7: 7.5kW power tetrode

4CM25,000G: 25kW multiphase power tetrode

4CM100,000G: 100kW multiphase power tetrode

4CM400,000A: 400kW multiphase power tetrode

4CM40,000G: 40kW power tetrode

Klystrode: VHF power amplifier

Cavities: Six new VHF cavity amplifiers

Circle (940) on Reply Card
see ads on pages 47, 183 and 237

Video Associates Labs (1303)

Established products

Apple computer based products

including:

MicroKey system computer graphics

New products

IBM-PC MicroKey applications for shape manipulation, weather graphics and title generation

Circle (941) on Reply Card

Video Composition (1775)

See at booth

Circle (942) on Reply Card

Video Data Systems (*)

Established products

MPC-II/MPC-2500: Multichannel character generator with file management, 512-page memory and VCR control

New products

VID-STAR: Broadcast-quality display channel

Circle (943) on Reply Card

Video Int'l. (1524)

Established products

STC-2003: PAL/SECAM/NTSC standards converter

New products

STC-1003: PAL/SECAM/NTSC standards converter

Circle (944) on Reply Card

Videomagnetics (1109)

Established products

Quad video head refurbishing services

New products

Random-access videocassette changer

See us at the NAB Booth 1134B

Circle (143) on Reply Card

Dilor Industries Ltd.

"Learning Edge Technology For The Arts"

4150 37th Ave, Squamish B.C. VON 3C0

Telephone: (604) 890-3651 Telex: 1542132

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

Dilor

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 hot pocket and pin, TGL or PSC receptacles. Main power is fed from the rear by cable or optional G4100 connector. Packs can be stacked in any combination and still allow access to all parts and controls.

The DMLS-324 three phase dimmer module has output voltage regulation, a full sized pregrounding pin, digital continuous soft dimming and short circuit protection.

The new 1200 series expandable manual control console has direct or cross fade submaster selection, split up/down crossfader and bump switch buttons.

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

"Our Litepak® is the best equipment investment we've made. It's never let us down."

Marc Raymond, Westsun Media Ltd.

Circle (146) on Reply Card
Testing

1...2...3...4...

Exciting new audio and video products from JVC.

Test them yourself at Booth

1234

NAB

JVC

JVC COMPANY OF AMERICA  
Professional Video Division

41 Slater Drive, Elmwood Park, NJ 07407  Phone 1-800-JVC-5825
This removable Exhibitor Guide form has been designed to help you organize your plans for NAB '84/Las Vegas. The exhibitors have been located on the Convention Center floor plan by an abbreviated name and booth number. Handy alphabetical listings give quick references to exhibitors' booths.

This special section will prove valuable in planning your convention coverage—a convention that promises to be exceptional in terms of exhibits, attendance and sessions showing trends in broadcasting, especially in digital technology.

An attempt has been made at the Las Vegas Convention Center to maintain a consistency in organization of the exhibits by rows and aisles, using a crosshatch pattern. Aisles are easily identified.

Show aids

To locate a specific exhibitor, look it up on the alphabetical listings on the map to get the booth number. Then just “walk” through the map to find it. It's that simple. (Advertisers in this issue are identified in red ink; you can find their ads in the Advertisers' Index near the back of this issue to obtain further details of what they are showing.)

To ascertain what all exhibitors are showing, study the Exhibitor Roundup section elsewhere in this issue. (In that section, Reader Service Numbers are provided and advertisers' positions are designated.)

To make sure that you have thoroughly covered a product line of interest at the convention, use the Product Directory section that collects exhibitors and their booth numbers under selected product categories. If you wish, circle these booths on your map to be sure you don't miss an exhibitor important to your purpose of attending NAB '84.

Final notes

The exhibitor lists given here are up-to-date as of press time, but daily changes are still being made at NAB headquarters. Consequently, BE will print a map update to be distributed at the show that will contain all the latest changes. After you've registered, pick up your copy and also check NAB's notices for any late bulletins and/or revisions.

Map out your plan of attack for NAB '84 now and fine tune it after registration to optimize your time.

Whether you attend NAB '84/Las Vegas or not, look for our June issue for a Convention Wrap-up with its emphasis on new equipment and technology. Our July issue will carry highlights of the technical radio and TV sessions.
# AMEK Televideo

**On-Air Production and Post-Production Mixing Consoles**

---

## Console Configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-01</td>
<td>Portable DC Powered Field/ENG Mixer 4 Buss, 8-16 Inputs</td>
</tr>
<tr>
<td>M-1000</td>
<td>8 Buss, 8, 16, or 24 Monitor 8 to 32 Inputs</td>
</tr>
<tr>
<td>M-1000A</td>
<td>24 Buss, 24 or 48 Monitor 16 to 56 Inputs, opt. VCA Automation</td>
</tr>
<tr>
<td>M-2500TV</td>
<td>24 Buss, 24 or 48 Monitor 24 to 56 Inputs, VCA Automation</td>
</tr>
<tr>
<td>M-3500TV</td>
<td>24 or 48 Buss, 24 or 48 Monitor 24 to 120 Inputs, VCA or optional</td>
</tr>
<tr>
<td></td>
<td>Motorized Fader Automation</td>
</tr>
<tr>
<td>M-5000AIR</td>
<td>24 or 48 Buss, 24 or 48 Monitor 36 to 120 Inputs, VCA or optional</td>
</tr>
<tr>
<td></td>
<td>Motorized Fader Automation</td>
</tr>
</tbody>
</table>

Look to AMEK for on-air, live to tape, or video post-production audio mixers. Amek consistently delivers more matchless transparent sound and user-friendly features than any other console maker.

Since 1970, Amek has designed and built more than 600 consoles for virtually every application in professional audio mixing and recording.

To find out more about Amek Consoles or to arrange a personal demonstration, contact us at (818) 508-9788 for the name of your nearest Amek dealer.
CREATE WITH Q8
from the keyboard:

- roll it - instant readout for roll timing - "elastic" roll
- shade it - pages - insert/delete with auto ripple
- crawl it - 4-quadrant shadow or fine and bold border
- fade it - edging - any color
- key it - continuous compose with horizontal scroll - instant
- change it - insert/delete with no retyping
- call it - built-in downstream fade in and out at selectable
- stamp it - rates
- step it - keyboard selectable upstream/downstream
- store it - operation
- underscore it - no retyping to redefine font characteristics - tuck
- color it - characters horizontally - tuck rows vertically
- size it - rapid sequence recall - any list of pages - page
- italicize it - selectable dwell time
- instant condense/extend
- tuck characters horizontally - tuck rows vertically
- rapid duplication of any row - "cut and paste"
- assign a series of keystrokes to a single key for
- effects and animation
- dual 8" floppy double-density discs - up to 400
- pages per disc
- emphasize with variable weight and underline
- 16 million interactively mixed colors - background,
- edge, characters
- instant keyboard sizing from 16 to 64 scanlines -
- instant condense/extend
- instant italics left and right

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a decade of commitment

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Circle (147) on Reply Card
<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday April 28</td>
<td>9-5</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9-6</td>
<td>Exhibits Closed</td>
</tr>
<tr>
<td>Sunday April 29</td>
<td>8-5</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9-6</td>
<td>Exhibits</td>
</tr>
<tr>
<td>Monday April 30</td>
<td>8-5</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9-6</td>
<td>Exhibits</td>
</tr>
<tr>
<td>Tuesday May 1</td>
<td>9-5</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9-2</td>
<td>Exhibits</td>
</tr>
<tr>
<td>Wednesday May 2</td>
<td>9-Noon</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9-2</td>
<td>Exhibits</td>
</tr>
</tbody>
</table>
Protect your investment with a cannon.

An audio connector by any other name is simply not an ITT Cannon audio connector. Which is precisely why so many audio engineers continue to specify Cannon connectors for use with their audio equipment.

The XLR, the new XLB and XLA series are small, rugged, quick-disconnect connectors designed for use in audio/video and other low-level circuit applications where reliability, quiet operation, elimination of mechanical interference and ease of use are necessary. Four different plug styles are available.

The EP connector is ideally suited to applications where extreme ruggedness and versatility are required. The new AP connector is a popular choice for heavy-duty audio applications and is interchangeable and intermateable with the EP series. Both the EP and AP series may be used where as few as 3, or as many as 18 contacts are required.

Audio Connectors from Cannon

The AP LNE and AX LNE are specifically designed to handle the special needs of mains and other power supply applications.

For more information, please contact Commercial/Industrial Products Marketing Manager, ITT Cannon, a Division of ITT Corporation, 10550 Talbert Avenue, Fountain Valley, CA 92708, (714) 964-7400. For the sales office nearest you, call toll-free (800) 845-7000.

Now available at the following stocking locations:

XLR/XLB at:
- Time Electronics
- Ramtronix

EP/AP at:
- Ritchey Electronics
- Yale Electronics
- Connector Corp.
- Ramtronix

CANNON ITT
The Global Connection

Circle (148) on Reply Card
videomagnetics (1109)  
Continued from page 198  
for Sony U-matic format  
Circle (945) on Reply Card

Videomedia (1308)  
Established products  
Z8000A–E: Video editing systems  
Eagle 1–3: Video editing systems  
Q-Star: Sequencer-station automation system  
VMC–200: Total automation control  
New products  
Version 2 software for DOS systems  
Circle (946) on Reply Card

VideoStar Connections (1122)  
New products  
Ku-Band transportable uplink and downlink equipment  
Satellite networking services  
Circle (947) on Reply Card

Videotek (1633)  
Established products  
VM–13 PRO: 13-inch rack-mount color monitor  
Delphi: 12-cm-powered digital waveform monitor  
VSM–5A: Vectorscope  
RS–10A: 10x1 AFV routing switcher with two audio channels and breakaway  
RS–12: 12x1 video routing switcher  
See ad on page 99

RM–8A: 8-inch ac/dc portable color monitor  
Audio, video, pulse and subcarrier DAs  
Audio program monitors  
Demodulators  
New products  
Studio–13: 13-inch rack-mount color monitor  
TSM–5A: Waveform monitor with switchable line select  
VSG–100: Sync generator with helical scan gen-lock and color bar output  
APM–2RA: Dual input audio program monitor with simultaneous monitoring  
Circle (948) on Reply Card  
see ad on page 167

Viking Cases (1731)  
Established products  
Heavy-duty shipping cases  
Light-duty carrying cases  
Molded cases  
Rack-mount cases  
Custom cases  
New products  
See at booth  
Circle (949) on Reply Card

Vital Industries (1212)  
Established products  
SqueeZoom: Digital effects  
VIX–114–4A1: Production switcher  
VIX–114–2A1: Production switcher  
VIX–114–10A: Production switcher  
VIX–114–16A: Production switcher  
VIX–115: On-air switcher  
250P/N: Production switcher  
SAM: Station Automation System  
SAND: Serial Access Network Data Information  
PSAS: Production Switcher Automation System  
New products  
See at booth  
Circle (950) on Reply Card

WSI Corporation (1104)  
Established products  
Weather graphics/weather-sports data  
SuperSat GOES satellite imagery  
Superadar  
SuperSports scores and standings  
New products  
Meteosat European weather satellite imagery  
New weather graphics software  
Circle (951) on Reply Card

Ward-Beck Systems (1224)  
Established products  
T1202: Transportable audio console  
M1204B: Production audio console  
M2484B: Broadcast/multi-track audio console  
L2042: TV audio console  
R1200: Radio audio console  
MicroCOM: Microprocessor-controlled communications systems  
R1000: Radio audio console  
R2000: Radio audio console

You'll meet your match with our EDITING CONSOLES  
No matter what VTR equipment you use, Winsted offers Editing Consoles to match your requirements! Our designs are based on consultations with professional users like yourself.  
You've chosen your VTR equipment carefully, to meet your specific needs. Now choose the Editing Consoles that fit your equipment—quality consoles from Winsted.  
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TELEX: 910-576-2740

Winsted  
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Minneapolis, MN 55431

Please See Us at NAB Booth 1238  
Circle (149) on Reply Card

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Complete Kits  
New/Improved solid state microwave control for easier maintenance. Many special features, 300mm Beacons • Flashers • Obstruction Lights • Photo Controls • Isolation Transformers • Lamp Failure • Alarm Systems • Meets all FCC/FAA Regulations • Technical Support Provided.

HUGHEY & PHILLIPS  
3050 N. California St., Burbank, CA 91504  
Circle (150) on Reply Card
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 Hz Max Input Level</th>
<th>Typical THD</th>
<th>Frequency Response</th>
<th>Bandwidth</th>
<th>20 kHz Phase Response</th>
<th>Over-Shoot</th>
<th>Noise Figure</th>
<th>Magnetic Shielding</th>
<th>Number of Faraday Shells</th>
<th>Package</th>
<th>PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>JE-16-A</td>
<td>Mic in for 990 opamp</td>
<td>150-600</td>
<td>1:2</td>
<td>+8</td>
<td>0.035/0.003</td>
<td>0.08/-0.05</td>
<td>170</td>
<td>10</td>
<td>&lt;1.75</td>
<td>1.7</td>
<td>30</td>
<td>1</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>JE-13K-7-A</td>
<td>Mic in for 990 or I.C.</td>
<td>150-3750</td>
<td>1:5</td>
<td>+8</td>
<td>0.036/0.003</td>
<td>0.10/-0.22</td>
<td>85</td>
<td>-20</td>
<td>&lt;3</td>
<td>2.3</td>
<td>30</td>
<td>1</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>JE-11SK-8</td>
<td>I.C. opamp</td>
<td>150-15K</td>
<td>1:10</td>
<td>6</td>
<td>0.170/0.010</td>
<td>-0.50/-0.10</td>
<td>115</td>
<td>5</td>
<td>&lt;7</td>
<td>1.5</td>
<td>30</td>
<td>1</td>
<td>3</td>
<td>41.48</td>
</tr>
</tbody>
</table>

LINE INPUT

<table>
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<tr>
<th>Model</th>
<th>Application</th>
<th>Impedance Ratio</th>
<th>Turns Ratio</th>
<th>20 Hz Max Input Level</th>
<th>Typical THD</th>
<th>Frequency Response</th>
<th>Bandwidth</th>
<th>20 kHz Phase Response</th>
<th>Over-Shoot</th>
<th>Noise Figure</th>
<th>Magnetic Shielding</th>
<th>Number of Faraday Shells</th>
<th>Package</th>
<th>PRICES</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>52</td>
<td>28</td>
<td>&lt;3</td>
<td>30</td>
<td>1</td>
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<td>102.86</td>
<td>68.72</td>
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<tr>
<td>JE-11P-1</td>
<td>Line in</td>
<td>15K-15K</td>
<td>1:1</td>
<td>+17</td>
<td>0.045/0.003</td>
<td>0.03/-0.25</td>
<td>88</td>
<td>15</td>
<td>&lt;1</td>
<td>30</td>
<td>3</td>
<td>1</td>
<td>39.53</td>
<td>26.41</td>
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<tr>
<td>JE-611OK-9</td>
<td>Line in bridging</td>
<td>30K-1800</td>
<td>4:1</td>
<td>+24</td>
<td>0.005/0.002</td>
<td>-0.10/-0.30</td>
<td>75</td>
<td>-15</td>
<td>&lt;1</td>
<td>30</td>
<td>1</td>
<td>1</td>
<td>82.31</td>
<td>41.63</td>
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<tr>
<td>JE-100K-C</td>
<td>Line in bridging</td>
<td>30K-1800</td>
<td>4:1</td>
<td>+19</td>
<td>0.033/0.003</td>
<td>-0.11/-0.08</td>
<td>160</td>
<td>-9</td>
<td>&lt;2</td>
<td>30</td>
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<td>40.98</td>
<td>27.37</td>
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<tr>
<td>JE-11SSP-8M</td>
<td>Line in/</td>
<td>600-150</td>
<td>1:1</td>
<td>+22</td>
<td>0.035/0.002</td>
<td>0.03/0.00</td>
<td>120</td>
<td>9</td>
<td>&lt;3.5</td>
<td>30</td>
<td>1</td>
<td>4</td>
<td>151.00</td>
<td>101.47</td>
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<td>JE-11SSP-6M</td>
<td>line in</td>
<td>600-150</td>
<td>1:1</td>
<td>+17</td>
<td>0.050/0.002</td>
<td>-0.10/-1.00</td>
<td>40</td>
<td>-18</td>
<td>&lt;1</td>
<td>30</td>
<td>4</td>
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<td>96.29</td>
<td>64.32</td>
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SPECIAL TYPES

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<tr>
<th>Model</th>
<th>Application</th>
<th>Impedance Ratio</th>
<th>Turns Ratio</th>
<th>20 Hz Max Input Level</th>
<th>Typical THD</th>
<th>Frequency Response</th>
<th>Bandwidth</th>
<th>20 kHz Phase Response</th>
<th>Over-Shoot</th>
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<th>Number of Faraday Shells</th>
<th>Package</th>
<th>PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>JE-6B-C</td>
<td>2-way split</td>
<td>150-150</td>
<td>1:1</td>
<td>2</td>
<td>0.180/0.005</td>
<td>-0.25/-0.20</td>
<td>60</td>
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<td>&lt;3</td>
<td>30</td>
<td>2</td>
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<td>3-way split</td>
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<td>1:1</td>
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<td>12</td>
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<td>59.57</td>
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<td>JE-6B-E</td>
<td>4-way split</td>
<td>150-150</td>
<td>1:1:1:1</td>
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<td>0.050/0.002</td>
<td>-0.10/-1.00</td>
<td>40</td>
<td>-18</td>
<td>&lt;1</td>
<td>30</td>
<td>4</td>
<td>1</td>
<td>96.29</td>
<td>64.32</td>
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<td>JE-6B-F</td>
<td>Direct box for guitar</td>
<td>20K-150</td>
<td>1:1</td>
<td>12</td>
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<td>-0.20/-0.20</td>
<td>80</td>
<td>-18</td>
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<td>30</td>
<td>2</td>
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NICKEL CORE OUTPUT TRANSFORMERS³

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<tr>
<th>Model</th>
<th>Construction</th>
<th>Nominal Impedance</th>
<th>Turns Ratio</th>
<th>20Hz Max Output Level</th>
<th>50% Term. Loss</th>
<th>DC Resistance</th>
<th>Typical THD</th>
<th>Frequency Response</th>
<th>Bandwidth</th>
<th>20 kHz Phase Response</th>
<th>Over-Shoot</th>
<th>Package</th>
<th>PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>JE-123-BMCF</td>
<td>Quadrad</td>
<td>600-600</td>
<td>1:1</td>
<td>26</td>
<td>2</td>
<td>1.1</td>
<td>20</td>
<td>0.002/0.002</td>
<td>-0.02/-0.02</td>
<td>&gt;450 158</td>
<td>2.1</td>
<td>4.1</td>
<td>7</td>
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<td>JE-123-BDMCF</td>
<td>Quadrad</td>
<td>600-600</td>
<td>1:1</td>
<td>21</td>
<td>2</td>
<td>1.0</td>
<td>19</td>
<td>0.004/0.002</td>
<td>-0.02/-0.00</td>
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<td>1.2</td>
<td>2.5</td>
<td>1</td>
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<td>600-150</td>
<td>1:1</td>
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<td>2</td>
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<td>20</td>
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<td>-0.20/-0.01</td>
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<td>1.9</td>
<td>4.0</td>
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<td>Quadrad</td>
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<td>1:1</td>
<td>27</td>
<td>2</td>
<td>1.0</td>
<td>19</td>
<td>0.065/0.003</td>
<td>-0.02/-0.01</td>
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<td>JE-123-SLCF</td>
<td>Quadrad</td>
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<td>1:1</td>
<td>23.5</td>
<td>2</td>
<td>1.1</td>
<td>20</td>
<td>0.088/0.003</td>
<td>-0.33/-0.01</td>
<td>&gt;450 245</td>
<td>1.2</td>
<td>2.8</td>
<td>1</td>
</tr>
<tr>
<td>JE-112-LCF</td>
<td>Quadrad</td>
<td>600-600</td>
<td>1:1</td>
<td>20.4</td>
<td>2</td>
<td>1.6</td>
<td>20</td>
<td>0.144/0.003</td>
<td>-0.03/-0.01</td>
<td>&gt;450 205</td>
<td>1.2</td>
<td>3.2</td>
<td>1</td>
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<tr>
<td>JE-123-ALCF</td>
<td>Quadrad</td>
<td>66-760</td>
<td>1:3</td>
<td>26.5</td>
<td>3</td>
<td>1.3</td>
<td>8</td>
<td>0.125/0.003</td>
<td>0.04/0.006</td>
<td>190</td>
<td>4.6</td>
<td>&lt;6</td>
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<tr>
<td>JE-115-LCF</td>
<td>Biwire</td>
<td>600-600</td>
<td>1:1</td>
<td>10</td>
<td>30</td>
<td>1</td>
<td>1.7</td>
<td>63</td>
<td>0.056/0.002</td>
<td>0.07/0.001</td>
<td>&gt;10MHz 155</td>
<td>1.1</td>
<td>4.1</td>
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</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 ohms (typical mic preamp)
4. Separate lead supplied for case and for each faraday shield
5. Except as noted, above transformers are cased in 809 nickel mu-metal cans with wire leads.

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 (151) on Reply Card

April 1984

www.americanradiohistory.com
Whirlwind  
Established products  
Audio and video cabling for industrial systems and portable equipment  
Bulk connectors, bulk wire, transformer devices, interface panels and services  
New products  
See at booth  
Circle (959) on Reply Card

White Instruments  
Established products  
Audio equalizers  
Real time audio analyzers  
Pink noise generators  
New products  
See at booth  
Circle (959) on Reply Card

Wilk Power & Video  
Established products  
CG-3350: Character generator and production titleer  
CG-3300: Character generator and production titleer  
CG-3330: Production titleer  
CG-3540: Character generator  
CG-3550: Computer-controlled character generator  
VAR-15X10: Audio-follow-video switcher  
VAR 1201: Audio-follow-video switcher  
VAR 0801: Audio-follow-video switcher  
VAR 0802: Audio-follow-video switcher  
New products  
Routing switcher: 10x10 expandable  
Character generator: With full color graphics  
Circle (958) on Reply Card

William Bal Corporation  
See Bal, William

Winsted  
Established products  
E303: Mobile editing console  
D4502: Editing rack  
V8501: 70-inch vertical rack  
U5000: Tape truck for videotape or film  
System/88: Editing/production consoles  
Super density storage cabinets  
New products  
H8520: Oak-trimmed editing console  
System/88: 30-inch-wide consoles for large top loading VTRs  
High capacity tape and film storage cabinets  
Circle (959) on Reply Card

Wireworks  
Established products  
MS/MR Series: Multibox and multitrack input units  
MSB/MSR Series: Transformer-isolated mic splitters  
MK Series: Main and extension cables  
Circle (959) on Reply Card

MT Series: Multitails interface components  
MC Series: Chassis-mount multi-pin connector interfaces  
New products  
MS/MSC Series: Multi-pin input mic splitters  
MPS Series: Phantom power supply components  
MY/MYC Series: Prism components, allowing six, nine, 27 or 36 channels as inputs or outputs to be integrated into one system  
Circle (960) on Reply Card

Wold Communications  
Established products  
Wold Satellite TV Network  
News and sports basic delivery services  
Mobile microwave and uplink services  
SSTS system for radio play-by-play Production services  
Videoconferencing  
New products  
Syndicated programs, including 28 recurring weekly series and news services, motion pictures for TV and 1-time ad-hoc network TV specials  
Circle (961) on Reply Card

Wolf Coach  
Established products  
S-102: Suburban ENG vehicle  
New products  
B-103: Wolf Coach B-series ENG vehicle  
Circle (962) on Reply Card

Frank Woolley & Company  
Established products  
113-16: Motionmaster video animation system, using polarized light for motion illusion Animation system training  
New products  
See at booth  
Circle (963) on Reply Card

World Tower  
Established products  
Towers for TV, AM, FM, CATV, microwave, LPTV and 2-way communications  
New products  
See at booth  
Circle (1490) on Reply Card

Yamaha Int'l.  
Established products  
PC Series: Power amplifiers  
RM Series: Recording mixers  
PM2000: Audio console  
M1500: Audio console  
M Series: Audio consoles  
Producer Series: Audio components with 4-track cassette systm  
MQ Series: Audio consoles  
EMX Series: Powered mixers  
New products  
REV-11: Digital reverberator  
YDD2600: 8-tap digital delay  
R1000: Prest digital reverberator  
Circle (1491) on Reply Card
Introducing "Snapshot" from MCI/Quantel. Only 12¼ inches high by 19 inches—including removable cartridge Winchester disk drive!

Snapshot is not only the smallest of MCI/Quantel's DLS 6000 series units—it's one of the smallest digital still stores in the world.

Snapshot lets you capture pictures from live asynchronous feeds, store up to 400 of them with titles, and replay them on demand. You can prepare and edit sequences or stacks of sequences. And you can search by title.

Need more? You can increase Snapshot's storage to 1,600 pictures. Or you can upgrade it to a DLS 6020 with on-air cuts and dissolves. Or upgrade it further to a DLS 6030, the most powerful still store available with production effects that bring an exciting look to your stills.

If that's not enough, you can integrate up to seven Snapshots—or other DLS 6000 series units—as workstations into our Central Lending Library (CLL). Now you can store over 10,000 stills at each workstation and have simultaneous access to 100,000 more from the CLL. Plus unlimited off-line storage on disc cartridges or videotape.

You can even include MCI/Quantel's Paint Box as one of the workstations. So you can create the finest electronic graphics ever seen in television and have them instantly available for on-air use as well as library storage.

So whether you want a small system or a big system, Snapshot is the place to start.

Call your local MCI/Quantel office for more details. Or get in touch with us directly at 415/856-6226. Micro Consultants, Inc., P.O. Box 50810, Palo Alto, California 94303.
Product directory

This special section provides a directory to the NAB-84/Las Vegas exhibitor products. Each exhibitor was asked to complete a comprehensive checklist of products to be shown. The following section is a compilation of that data. It shows major equipment headings followed by the exhibitor name and booth number (when provided before deadline).

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<table>
<thead>
<tr>
<th>ACOUSTICAL MATERIAL</th>
<th>AMPERES</th>
<th>FREQUENCY</th>
<th>POWER</th>
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<td>1046</td>
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Dimension Five
SystemTwo
by Colortran
A MARKED IMPROVEMENT

See All Our Cards
At NAB Booth 120
Or Write For A Hand
Of Your Own
from Penny & Giles continue a tradition of incomparable performance, matchless quality, total reliability. They'll give you the same level of excellence you've come to expect with Penny & Giles' linear faders.

**Discover a new standard of rotary action.**
Nothing approaches the technology of Penny & Giles' new rotary faders:
- Ultra-smooth rotary action
- Mono or stereo (optional)
- Maintenance-free
- Fully sealed construction
- Up to eight outputs per fader
- Audio, linear or pan pot taper
- Detents and switches (optional)

For the complete story on Penny & Giles' new rotary fader, call or write:

Penny & Giles
1640 Fifth Street, Santa Monica, CA 90401 • Phone: (213) 393-0014 • Telex: 652337

Circle (154) on Reply Card

---

**Talk Isn't Cheap**

On the other hand, a really good telephone interface doesn't have to be expensive. Our Model TI-101 Telephone Interface isolates your send and receive signals and performs level and impedance matching to help you get the best possible audio quality from your phone lines. The TI-101 features send limiting, adjustable caller EQ, caller compression and expansion, and true hybrid (two way) operation. If telephones are an important part of your operation then you know talk isn’t cheap. So don’t let yourself down. Call Symetrix or your favorite broadcast equipment supplier to get complete details and specifications on the Model TI-101 Telephone Interface.

Symetrix, Inc.
109 Bell Street
Seattle, WA. 98121, USA
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Telex: 32-0281 GLOBECEN SEA

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Continued

Leader Instruments (1349)
Marconi Instruments (1615)
Minolta (1113)
Phillips Test (1408A)
Potomac Instruments (100)
Rohde & Schwarz (1203)
Sound Technology (900)
System Associates (1331E)
Tektronix (1601)
Thomson-CSF (1001)
UREI/BL (615)
White Instruments (1318A)

**ANIMATION/ELECTRONIC GRAPHICS**

Accu-Weather (1134C)
Alden Electronics (1336)
Aurora Systems (1312)
Beston/McInnis-Skinner (1020)
Robert Bosch (1603)
Chyron (1610)
Colorgraphics Systems (1116)
Computer Graphics Lab (1143)
Convergence (1430)
Dubner Computer Systems (1630)
Forox (1620D)
GEC McMichael (1514)
Interactive Motion Control
Interand (1018)
Logica (1405E)
Lyon Lamb (1632A)
MCI/Quintel (1631)
Precision Echo (1617)
Sony (1200)
System Associates (1331E)
Thomson-CSF (1001)
Video Associates Labs (1303)
Frank Woolley (1405C)

**ANTENNAS**

AVC Systems (331)
Aries Antenna Services (1770)
Antenna Technology (1737)
Andrew (1201A)
Bogner Broadcast Equipment (1319)
Broadcast Microwave Services (1749)
Broadcast Supply West (112A)
CSI (507)
Cablewave Systems (108)
Cellwave RF (202)
Celtec Antennas (509)
Comark Comm (1217)
Continental Electronics (101)
Dielectric Communications (455)
Fort Worth Tower (1010)
GEC McMichael Ltd. (1514)
Harris (401)
Holzberg (*)
Lang Video Systems (1780)
Larcan (1626A)
LeBlanc & Dick (1149)
Marconi (1809)
Marti (501)
M/A-COM (1004)
Microdyne (1612)
Micro Communications Inc. (1014)
Nurad (1428)
RCA (1000)
Scientific-Atlanta (1017)
Shively (623)
Tennaplex (1127)
Townsend Assoc. (1420)
Wilkinson Electric/TTC (305)

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Aphex Systems (513)
How Boston took advantage of us.

Boston is the home of a wealth of history: Paul Revere, the Boston Tea Party, and Harvard University. But respect for all that tradition didn’t stop WNEV-TV from seeking equipment from other than the traditional suppliers.

After a thorough examination of the transmitters available today by the station’s Engineering group led by Karl Renwanz, Vice President of Engineering and Operations, WNEV-TV decided to take advantage of the sophisticated simplicity of Larcan’s Model “F” transmitter. They chose a pair of 30 kW TTC30000FH transmitters in parallel, backed up by a single TTC30000FH.

In today’s competitive environment, a station such as WNEV-TV needs the performance and reliability that is designed into every Larcan transmitter. It also needs the back up and commitment to the business which Larcan, a company that specializes in RF, can provide.

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Broadcast Studio Console

<table>
<thead>
<tr>
<th>PERFECTIONIST</th>
<th>Audi. 200</th>
<th>BMX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max THD</td>
<td>&lt;.1%</td>
<td>&lt;.15%</td>
</tr>
<tr>
<td>Inputs/</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>mix channel</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fader Type</td>
<td>rotary</td>
<td>slide only</td>
</tr>
<tr>
<td></td>
<td>or slide</td>
<td>only</td>
</tr>
<tr>
<td>Connectors</td>
<td>remote</td>
<td>internal</td>
</tr>
<tr>
<td></td>
<td>punch blocks</td>
<td>plugs</td>
</tr>
<tr>
<td></td>
<td>hall-effect</td>
<td>hall-effect</td>
</tr>
<tr>
<td>Switches</td>
<td>hall-effect</td>
<td>1 year</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years</td>
<td>much more</td>
</tr>
<tr>
<td>Price</td>
<td>$10,000</td>
<td></td>
</tr>
</tbody>
</table>

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Electro-Voice (1159)
HEDCO (1225)
Omicron (1748)
Penny & Giles (*)
Sescom (1816)
Shure (1401A)
Valley People (318)

ATS & EQUIPMENT
Camera Mart (1018)
Continental Electronics (101)
Delta Electronics (105)
Hallikainen & Friends (208)
Moseley (301)
Potomac (100)
QEI (307)
TFT (109)

AUDI0 BANDWIDTH EXTENSION
EQUIPMENT
Comrex (400)
Kahn Communications (625)
Marcom (306)
McCurdy (207)
Spencer Broadcast (406)
Valley People (318)
Ward-Beck (1224)

AUDI0 CONSOLES
ADM Technology (1223)

AMEK (1620)
AVC Systems (331)
Allied Broadcast (639, 641)
Arrakis Systems (213)
Audio Developments (1743)
Audio + Design (402)
Audio-Technica (1141)
Auditionics (506)
Autogram (120)
Broadcast Audio (319)
Broadcast Electronics (303)
Broadcast Supply West (112A)
Broadcast Technology (1701)
Clyde Electronics (204)
Comprehensive Video Supply (1145)
Comrex (400)
Connectronics (608)
Continental Electronics (101)
Datatronix (1504)
Elcom Bauer (412)
Electro-Voice (1159)
Electronics Systems Labs (406-A)
Fostex (1765)
Gotham Audio (509A)
Graham-Patten (1227A)
Gray Communications (1618A)
David Green (417)
Hallikainen & Friends (208)
Harris (401)
Harrison Systems (1324)
Holzberg (*)
Kove Audio Productions (321)
Interactive Systems (1167/1132)
Interface Electronics (1405-A)
LPB (405)
LTM (1518)
Laumic (1771)
Logitek (619)
McCurdy Radio (207)
McMartin Industries (701)
Microtime (1230)
Micro Trak (*)
Neve (1410)
Pacific Recorders (113)
Quad-Eight/Vestrex (1630)
Quantum Audio Labs (509A)
RTS Systems (1142)
Radio Systems (213)
Ramko Research (415)
RAMSA/Panasonic (437)
Sescom (1616)
Solid State Logic (1723)
Sony (1200, 605)
Soundcraft Electronics (219)
Spencer Broadcast (406)
Studer/Revos (201)
TASCAM (1304)
UMC Electronics (114)
URE (615)
Valley People (318)
Ward-Beck (1224A)
Yamaha International (1340)

AUDI0 LEVEL INDICATORS
AMEK (1620)
ATT (420)
Auditionics (505)
AVC Systems (331)
BSM (637)
Broadcast Supply West (112A)
Broadcast Technology (1701)
Clyde Electronics (204-A)
Camera Mart (1018)
Dorrough Electronics (312)
ESE (116, 1757)
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And now, Panasonic is introducing a line of quality compact sound amplification/paging units that offer some of the most advanced features available today.

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LTM (1516)
McMartin (701)
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PEP (1408)
Perrott (1729)
Sony (1200)

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Harris (401)
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Lang Video (1760)
Nalpak Video Sales (1722)
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Stanton (1213)
Storeel (1008)
Viking Cases (1731)
Winsted (1238)

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Andrew (1201A)
BIW Cable Systems (1405)
Belden Communications (1628)
Broadcast Supply West (112A)
Calvert (125)
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Canare (1732)
Cablewave (108)
Celwave RF (202)
Chester Cable (1320A)
Comprehensive Video Supply (1145)
Continental Electronics (101)
Connectronics (608)
Electronic Systems (406A)
Gotham Audio Corp (509A)
Harris (401)
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Micro Communications (1014)
Nalpak Video Sales (1722)
Whirlwind (329)
Wireworks (1014C)

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Angenieux (1201)
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Robert Bosch (1603)
Camera Mart (1018)
Canon (1012)
CeCo (1010A)
Century Precision (1781)
Film/Video Equipment (1153)
Fujinon (1411)
Harris (401)
JVC (1234)
Minolta (1113)
Schneider (1403)
Tamron (1640)
Tiffen (1422)

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Amplex (1400)
Robert Bosch (1603)
Camera Mart (1018)
CeCo (1010A)
Forox (1620D)
Frezzolini (1107)
Gray Communications (1618A)
Hitachi Dunshi (1402)
Ikegami (1011/1013)
Keylite Production (1220)
LTM (1516)
McMartin (701)
Nalpak Video Sales (1722)
PEP (1408)
Perrott (1729)
Sony (1200)

BROADCAST LOGGERS
Delta Electronics (105)
Harris (401)
QSI (1325)
Studer (201)
Telex (600/1605A)

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Harris (401)
Industrial Acoustics (322)
Rohn (1605B)

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William Bal (1614)
Bogen Photo (1705)
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Broadcast Supply West (112A)
Broadcast Systems (1500)
Calzone Case (1179)
Camera Mart (1018)
Centro (1101)
Excalibur Industries (1106)
Gray Communications (1618A)
Harris (401)
Kangaroo Video Products (1151)
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Nalpak Video Sales (1722)
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In adaptability, state-of-the-art technology, and price the Hotronic AD 51 leaves other TBC/frame synchronizers in a blur.

The AD 51 series gives you a full range of options to fit your budget. Start with a TBC with a full 525 line correction window. Or the TBC + freeze field-freeze frame. Or the TBC + frame synchronizer. Or the complete TBC + frame synchronizer + freeze field-freeze frame. But, for real adaptability, you can pick any configuration which fits your current needs and budget, and upgrade later all the way to the top of the line. Incidentally, all upgrades are done by your technician at your facility.

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And now, to add to this impressive menu, Hotronic offers a pixel by pixel DOC which corrects both luminance and chrominance signals every 70 nanoseconds. Correction can be performed by sampling the RF envelope or detecting drop-outs in the digital words. In addition, a full function remote control unit is available to operate your AD 51 up to 100 feet from the TBC/frame synchronizer.

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Chyron (1610)
Dream Data (1728)
Dubner (1630)
FOR-A (1306)
Gray Communications (1818A)
Knox Video (1511)
Laird Telemedia (1721)
Laumic (1771)
Listec (1406)
MCI/Quantel (1631)
Merrilywest (1710)
NTI (1014D)
Panasonic (1019)
QSI Systems (1325)
Quanta (1432)
Sigma (1333)
Syntec (1352)
System Associates (1331E)
3M (1002)
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Video Associates Labs (1303)
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COMPONENTS; CAPACITORS/INDUCTORS
EEV (1335)
Richardson Electronics (212)
Thomson-CSF/Tubes (1003)

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Andrew Corporation (1201A)
BASYS (1129)
Robert Bosch (1603)
CAT Systems (1014B)
Colorographics Systems (1116)
Columbine Systems (1323 and 118)
Computer Concepts (404)
Computer Graphics Labs (1116)
Data Communications (1014)
Dream Data (1728)
Dubner Computer Systems (1830)
Dynamic Technology (1719)
EEC Enterprises (1155)
Environmental Satellite Data (1509A)
Eventide (323)
IBM (1607C)
Interactive Systems (1167/1132)
Interand (1016)
Quanta (1432)
Sigma Electronics (1333)
Solid State Logic (1723)
Sony (1200)
Telesource (1014B)
United Press International (430)

COMPUTER SOFTWARE
Audio Kinetics (1173)
BASYS (1129)
Robert Bosch (1603)
CAT Systems (1014B)
Century 21 (204)
Colorographics Systems (1116)
Columbine Systems (1323/118)
Comprehensive Video Supply (1145)
Computer Concepts (404)
Computer Graphics Labs (1143)
Data Communications (1014)
Digital Services (1302)
Dream Data (1728)
Dubner Computer Systems (1830)
EEC Enterprises (1155)
Eventide (323)
Generic Computer Systems (308)
IBM (1607C)
Interactive Systems (1167/1132)
Interand (1016)
Kaman Sciences (1607)
The Management (627)
Quanta (1432)
Sigma Electronics (1333)
Solid State Logic (1723)
Sony (1200)
Telesource (1017B)
UPI (430)

DELAY SYSTEMS (AUDIO)
AVC Systems (331)
Advanced Music Systems (1330)
Broadcast Electronics (303)
Electronic Systems Labs (406A)
Fostex (1765)
Gotham Audio (509A)
Lexicon (1139)
Orban Associates (607)
Pacific Recorders (113)
Sony (605, 1200)
Spencer (408)
TASCAM (1304)
Yamaha (1340)

DELAY SYSTEMS (VIDEO/PULSE)
Allen Avionics (1627)
Broadcast Video Systems (1326)
Di-Tech (1301)
GEC McMichael (1514)
Gray Communications (1618A)
HEDCO (1225)
Leitch (1021)
Lenco (1419)
TV Equipment (1216)

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AVC Systems (331)
Adams Smith (1724)
Amplex (1400)
BTX (1124)
Robert Bosch (1603)
Broadcast Systems (1500)
CMX/Orrox (1639)
Camera Mart (1018)
Control Video (1157)
Convergence (1430)
EECO (1314)
Ferrox (1620D)
Gray Communications (1618A)
Harris Video Systems (401)
Interactive Systems (1167/1132)
JVC (12134)
Laumic (1771)
Micron Video (1748)
Paltek (Datatron) (1005)
Panasonic (1019)
RCA (1000)
Solid State Logic (1723)
Sony (1200, 605)
System Associates (1331E)
United Media (1300)
Videomedia (1308)
Quanta (1432)

EDITORS, FILM
Arriflex (1421)
Robert Bosch (1603)
Camera Mart (1018)
Cinema Products (1221)
Control Video (1157)
Steenbeck (1424)

ENG MICROWAVE EQUIPMENT
Andrew (1201A)
Broadcast Microwave (1749)
GEC McMichael (1514)
Gray Communications (1618A)
Harris (401)
Ikegami (1101/1013)
Lang Video (1780)

M/A-COM (1004)
Martini Electronics (501)
Micro Communications (1014A)
NEC (1415)
System Associates (1331E)

ENCODER, COLOR VIDEO (& DECODER)
Asaca (1226)
Robert Bosch (1603)
Broadcast Video Systems (1326)
Camera Mart (1018)
Datun (1708)
FOR-A (1306)
GEC McMichael (1514)
Gray Communications (1618A)
Lenco (1419)
NTI (1014D)
QSI (1325)
System Associates (1331E)
Telemet (1202)
Thomson-CSF (1001)
Video International (1524)

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David Green (417)
Holzberg (*)
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Sescom (1616)
TFT (109)
UMC Electronics (114)

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B-W Lighting (1753)
Bowen (1770)
CAT Systems (1014B)
Centro (1101)
Compucor (1405D)
Datatronix (1504)
Dubner Computer Systems (1830)
Electronic Systems Labs (406A)
Gray Communications (1618A)
Jenel Consultants (*)
Kahn Communications (625)
Laumic (1771)
Micro Communications (1014A)
Perrott Engineering Labs (1729)
Real World Technologies (1520)
Spectrum Planning (510)
Tennaplex (1127)

ENGINEERING & DESIGN SERVICES
AF Associates (1611)
B-W Lighting (1753)
Bowen (1770)
Broadcast Systems (1500)
CAT Systems (1014B)
Centro (1101)
Comark (1217)
Compucor (1405D)
Comsearch (1136)
Dubner (1630)
Graham-Patten (1227A)
Gray Communications (1618A)
Harris (401)
IGM Communications (403)
Jenel Consultants (*)
Laumic (1771)
Micro Communications (1014A)
Midwest (1710)
RCA (1000)
Real World Technologies Group (1520)
Spectrum Planning (510)
Tennaplex (1127)
Valley People (318)

Continued on page 234
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<table>
<thead>
<tr>
<th>Inquiry no.</th>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>LDK6 cameras</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>LDK614 cameras</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>LDH6200 Color monitors</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>UHF Television transmitters</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Television systems</td>
<td></td>
</tr>
</tbody>
</table>

BE 3·4·84
ENHANCERS, VIDEO IMAGE
Asaca (1226)
Robert Bosch (1603)
Digivision (1507)
Fortel (1409B)
Gray Communications (1618A)
Microtime (1230)
Sony (1200)
System Associates (1331E)
Telemet (1202)
Thomson-CSF (1001)

EXCITERS (AM, FM, TV)
AVC Systems (331)
Bayly (124)
Broadcast Electronics (303)
Broadcast Supply West (112A)
Comark (1217)
Continental Electronics (101)
Delta Electronics (105)
David Green (417)
Harris (401)
Holzberg (*)
LPB (405)
McMartin (701)
Micro Control (104)
Microdyne (1612)
Motorola (309)
NEC (1415)
QEI (307)
Scientific-Atlanta (1017)
Spencer Broadcast (406)
Townsend Associates (1420)

FIBER-OPTICS
Artel (1163)
Camera Mart (1018)
Grass Valley Group (1207)
LTM (1518)
Landy Associates (1747A)
Telemet (1202)

FILM CHAIN/TELECINE
AF Associates (1611)
Robert Bosch (1603)
Camera Mart (1018)
Dubner (1630)
GEC McMichael Ltd. (1514)
Gray Communications (1618A)
Ikegami (1011/1013)
Laird Telemedia (1721)
MagnaSync/Moviola (1147)
Rank Cintel (1219)
Steenbeck (1424)
System Associates (1331E)

FILTERS (ELECTRICAL/ELECTRONIC)
Audio + Design/Calrec (402)
Bird Electronic (1825)
Datatronix (1504)
Dielectric (455)
Gotham Audio (509A)
Micro Communications (1014A)
White Instruments (1318A)

FRAME SYNCHRONIZERS
ADDA (1100)
Apert-Herzog (1703)
Robert Bosch (1603)
Camera Mart (1018)
Digital Video Systems (1017)
Fortel (1409-B)
GEC McMichael Ltd. (1514)
Gray Communications (1618A)
Harris (401)
Holzberg (*)
Leitch Video (1021)
MCI/Quintel (1631)
Microtime (1230)
Midwest (1710)
NEC (1415)

GENERATOR (SCA, STEREO)
Asaca (1226)
Robert Bosch (1603)
Camera Mart (1018)
Central Dynamics (1409)
Grass Valley Group (1207)
Gray Communications (1618A)
Grumman (1631B)
ISC (1132/1167)
ISI (1232)
Lang Video (1780)
Laumic (1771)
Leitch Video (1021)
Lensa (1159)
Midwest (1710)
NTI (1014D)
Omicron Video (1748)
Phillips/Test (1408A)
Porta-Pattern (1427)
Rohde & Schwarz (1203)
Sigma (1333)
Sony (1200)
System Associates (1331E)
Tektronix (1601)
Telemet (1202)
United Media (1300)
Videotek (1653)
Vital (1212)

GENERATORS (VIDEO, PATTERN, SYNC)
Asaca (1226)
Robert Bosch (1603)
Camera Mart (1018)
Central Dynamics (1409)
Grass Valley Group (1207)
Gray Communications (1618A)
Grumman (1631B)
ISC (1132/1167)
ISI (1232)
Lang Video (1780)
Laumic (1771)
Leitch Video (1021)
Lensa (1159)
Midwest (1710)
NTI (1014D)
Omicron Video (1748)
Phillips/Test (1408A)
Porta-Pattern (1427)
Rohde & Schwarz (1203)
Sigma (1333)
Sony (1200)
System Associates (1331E)
Tektronix (1601)
Telemet (1202)
United Media (1300)
Videotek (1653)
Vital (1212)

HEAD & REFURBISHING SERVICES
Amplex (1400)
CMC Technologies (1425)
Gray Communications (1618A)
Restoration/Sprague Magnetics (705)
Saki Magnetics (416)
System Associates (1331E)
Taber (711)
United Research Labs (604)
Videomagnetics (1109)

HEADPHONES
AVC Systems (331)
Advanced Video (*)
Audio-Technica (1141)
Beyer Dynamics (426)
Broadcast Supply West (112A)
Camera Mart (1018)
Continental Electronics (101)
Fostex (1765)
Gray Communications (1618A)
Midwest (1710)
Nalpak Video Sales (1722)
R-Columbia (1111)
Sennheiser (1137)
Sony (605, 1200)
Stanton Magnetics (102)
Telex (600/1605A)
TV Equipment (1216)

HELICOPTER, SALES & RENTAL
Broadcast Microwave (1749)

INTERCOMS, WIRED
AVC Systems (331)
Anchor Systems (1618C)
Camera Mart (1018)
Clear-Com Systems (1502)
Datatronix (1504)
Farrtronics (1709)
Gray Communications (1618A)
HM Electronics (1130)
McCurdy Radio (207)
Midwest (1710)
Nalpak Video Sales (1722)
Neve (1410)
Olesen (1307)
Pacific Recorders (113)
R-Columbia (1111)
RTS Systems (1142)
Swintex (1503)
Telex (600/1605A)
Theatre Services & Supply (1513)
Ward-Beck (1224)

LIGHTING DIMMERS & CONTROLLERS
B&W Lighting (1753)
Camera Mart (1018)
Colortron (1205)
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Continued

- Electro Controls [1631C]
- Electronic Systems Labs [406A]
- Gray Communications [1618A]
- Great American Market [1108]

- Keylite Production [1220]
- Mole-Richardson [1006]
- Oleson [1307]
- Strand-Century [1418]
- Theatre Service & Supply [1513]
- Union Connector [1783]

LIGHTING GELS, FILTERS, GOBOS, EFFECTS

- Camera Mart [1018]
- Cinemills [1140]
- Colortran [1205]
- Desisti Americas [1131]
- Great American Market [1108]
- Keylite Production Services [1220]
- Mole Richardson [1006]
- Oleson [1307]
- Rosco Laboratories [1235]
- Theatre Service & Supply [1513]
- Tiffen [1422]

LIGHTS, PORTABLE & STUDIO

- Anton/Bauer [1337]
- Arriflex [1421]
- B&W Lighting [1753]
- Bogen Photo [1705]
- Broadcast Supply West [112A]
- Camera Mart [1018]
- Cine 60 [1423]
- Cinema Products [1221]
- CineMills [1140]
- Colortran [1205]
- Comprehensive Video [1145]
- Cool Light [1329]
- Desisti Americas [1131]
- Electro Control [1631C]
- Frezzolini [1107]
- General Electric [1007]
- Gray Communications [1618A]
- Great American Market [1108]
- Keylite Production [1220]
- Klage Brothers [1604]
- LTM [1518]
- Mole-Richardson [1006]
- Oleson [1307]
- Perrott [1729]
- Phoebus [1331C]
- Strand-Century [1418]
- Sylvania GTE [1401B]
- Theatre Supply & Services [1513]

LIGHTNING PROTECTION/POWER CONDITIONING

- Peter Dahl [612]
- Gray Communications [1618A]
- Lightning Elimination [302]
- Mole-Richardson [1006]

MACHINE SYNCHRONIZERS (ATR & VTR)

- AVC Systems [331]
- Adams-Smith [1724]
- Audio Kinetics [1173]
- BTX [1124]
- Robert Bosch [1603]
- Interactive Systems [1132/1167]
- Omicron [1748]
- Sony [865, 1200]
- System Associates [1331E]

METERS (ALL TYPES)

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dbx (107A)
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Harrison Systems (1324)
Inovonics (304)
Keylite Production Services (1220)
Pacific Recorders (113)
Radio Systems [213]
Ramko Research (415)
Real World Technologies (1520)
Rohde & Schwarz (1203)
Tentel (1613)

MICROPHONES, MIXERS, ACCESSORIES
AYC Systems (331)

Accurate Sound(*)
Allied Broadcast Equipment (639, 641)
Anchor Systems (1616C)
Audio + Design (402)
Audio-Technica (1141)
Beyer Dynamics (426)
Broadcast Supply West (112A)
Camera Mart (1018)
Comprehensive Video Service (1145)
Continental Electronics Mfg. (101)
Countryman Associates (1720)
Electro-Voice (1199)
Electronic Systems Labs (406A)
Fostex (1765)
Gotham Audio (509A)
Gray Communications (1618A)
David Green (417)
Harris (401)
Holzberg (*)
LTM (1518)
Marti Electronics (501)
Micron Audio (1122C)
Midwest (1710)
Milab (Camera Mart) (1018)
Nady Systems (1133)
Nalpak Video Sales (1722)
Sennheiser Electronic (1137)
Shure Brothers (1401A)
Sony (1200, 605)
Spencer Broadcast (406)
Swintek (1503)
Telex (600/1605A)
Valley People (318)

MICROPHONE SYSTEMS (MDS, ITFS)
Andrew (1201A)
Broadcast Microwave Service (1749)
GEC-McMichael (1514)
Harris (401)
Information Trans. Systems (1734A)
Lang Video Systems (1780)
M/A-COM (1004)
Micro Communications (1014)
Micro Controls (104)
System Associates (1331E)
Varian Associates (1605)

MONITORS (AUDIO)
AYC Systems (331)
Asaca (1226)
Allied Broadcast Equipment (639, 641)
Anchor Systems (1616C)
Audio Technologies (420)
Broadcast Supply West (112A)
Broadcast Technology (1701)
Camera Mart (1018)
Continental Electronics (101)
Electro-Voice (1159)
Fostex (1765)
Gray Communications (1618A)

David Green (417)
Harris (401)
Holzberg (*)
Interactive Systems (1132/1167)
JBL (615)
Laumic (1771)
Logitek (613)
Marcom (306)
McMartin Industries (701)
Midwest Corporation (1710)
MODULAR AUDIO PRODUCTS (325)
Ramko Research (415)
Sescom (1616)
Sony (1200, 605)
Spencer Broadcast (406)
Studer Revox America (201)
TFT (109)
Telemet (1202)
UMC Electronics (114)
Videotek (1633)
Yamaha International (1340)

METER (TEST EQUIPMENT/ METERS)

Bird Electronics (1625)
Broadcast Video Systems (1326)
Camera Mart (1018)
CeCo (1010A)
Delta Electronics (105)
Gray Communications (1618A)
Laumic (1771)
Leader Instruments (1349)
M/A-COM (1004)
McMartin Industries (701)
Motorola (309)
Rohde & Schwarz (1203)
System Associates (1331E)
TV Engineering (1700)
TV Equipment (1216)
Valley People (318)
Videotek (1633)

MONITORS (VIDEO/PICTURE)

Asaca (1226)
Robert Bosch (1603)
Broadcast Systems (1500)
Camera Mart (1018)
CeCo (1010A)
Conrac (1401)
Elector/Band (*)
Electrohome Limited (1744)
GEC McMichael (1514)
Gray Communications (1618A)
Harris (401)
Ikegami (1011/1013)
Interactive Systems (1167/1132)
JVC (1234)
Landy Associates (1747A)
Laumic (1771)
Lenco (1419)
Midwest (1710)
Panasonic (1019)
Philips/Test (1408A)
Rohde & Schwarz (1203)
Sharp (1102)
Sony (1200)
System Associates (1331E)
Tektronix (1601)
TV Equipment (1216)
Videotek (1633)

MULTIPLEXING SYSTEMS, AUDIO/VIDEO

BTX (1124)
Bayly (124)
Camera Mart (1018)
Datatronix (1504)
Gray Communications (1618A)
L-W International (1602)
McMartin (701)
NEC (1415)
Sescom (1616)
Spencer Broadcast (406)
System Associates (1331E)
Thomson-CSF (1001)
Wegener Communications (1782)
Whirlwind (329)

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Soper Sound (1620B)
Sound Ideas (1620C)
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Camera Mart (1018)
Connectronics (608)
dbx (107A)
Dolby Laboratories (1311)
Fostex (1765)
Gotham Audio (509A)
Gray Communications (1618A)
Inovonics (304)
McMartin (701)
Micmrex (106A)
Midwest (1710)
Ramko (415)
Symetrix (616)
Valley People (318)
Wegener Communications (1782)

NOISE REDUCTION SYSTEMS (VIDEO)

Camera Mart (1018)
Digivision (1507)
Fortel (1409B)
Gray Communications (1618A)
Harris (401)
ICM Video (1766)
Midwest (1710)
Philips TV Systems (1500A)
Sony (1200)
Thomson-CSF (1001)

PATCH PANELS, JACKS, PLUGS

ADC Magnetic Controls (1320)
ADM Technology (1223)
AF Associates (1611)
B-W Lighting (1753)
Broadcast Systems (1500)
Broadcast Supply West (112A)
Celwave RF (202)
Comark (1217)
Comprehensive Video Supply (1145)
Connectronics (608)
Electronic Systems Labs (406A)
Farrtronics (1709)
Fostex (1765)
Gentner Engineering (636)
Gray Communications (1618A)
Harris (401)
Kings Electronics (1623)
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Camera Mart (1018)
Continental Electronics (101)
Fostex (1765)
Gotham Audio Corp (509A)
Gray Communications (1618A)
David Green (417)
Harris (401)
Interactive Systems (1167/1132)
ITC/3M (311)
Midwest (1710)
Nagra (1213)
Orari (801)
Pacific Recorders (113)
Ramko (415)
Scribe Recorders (214)
Sonomag – SMC (707)
Soundcraft (219)
Sony (605. 1200)
Spencer (406)
TASCAM (1304)
Telex (600)
UMC Electronics (114)
United Research (604)

RECORDER (DIGITAL AUDIO)
AVC Systems (331)
Broadcast Supply West (112A)
dbx (107A)
JVC (1234)
Sony (1200, 605)
Spencer Broadcast (406)
Studer (201)

RECORDER (VIDEODISC, SLOW MOTION REPLAY)
Camera Mart (1018)
Forox (1620D)
Gray Communications (1618A)
Midwest (1710)
Panasonic (1019)
System Associates (1331E)
3M Optical (1002)

RECORDER (VIDEOTAPE)
AF Associates (1611)
AmpeX (1400)
Robert Bosch (1603)
Camera Mart (1018)
Forox (1620D)
Frezzolini (1107)
Gray Communications (1618A)
ISC (1132/1167)
Ikemagi (1011/1013)
Hitachi Denshi (1402)
JVC (1234)
Lake Systems (1165)
Launici (1771)
Midwest Corporation (1710)
NEC (1415)
PEP (1408)
Panasonic (1019)
RCA (1000)
Sony (1200)
System Associates (1331E)
3M (1002)
Thomson-CSF (1001)

REMOTE-CONTROL SYSTEMS
Andrew (1201A)
Anton/Bauer (1337)
BTX (1124)
Robert Bosch (1603)
Bowen Broadcast (1770)
Broadcast Supply West (112A)
CAT Systems (1014B)
Camera Mart (1018)
Continental Electronics (101)
Delta Electronics (105)
Dynair (1404)
Graham-Patten (1227A)
David Green (417)
Grumman (1831B)
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Hallikainen & Friends (208)
IGM (403)
Listec (1406)
McMartin (701)
Marti (501)
Micro Control (104)
Moseley (301)
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Symetrix (616)
TFT (109)
UMC Electronics (114)

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Avantek (1742)
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Marti Electronics (501)
Micro Communications (1014A)
Micro Control (104)
Modulation Associates (1737)
NEC (1415)
Spencer Broadcast (406)
System Associates (1331E)
TFT (109)
Thomson-CSF (1001)

STANDARDS CONVERTERS
AF Associates (1611)
GEC McMichael Ltd. (1514)
MCI/Quantel (1631)
Marconi (1609)
OKI Electric (1505)
System Associates (1331E)
Video International (1524)

STILL/FRAME STORE EQUIPMENT
Abeeka Video Systems (1620A)
ADDA (1100)
AmpeX (1400)
Robert Bosch (1603)
Camera Mart (1018)
Colorado Video (1222)
Colorographics (1116)
Dubner (1630)
FOR-A (1306)
Fortel (1409B)
Harris (401)
MCI/Quantel (1631)
Midwest (1710)
NTI (1012A)
Precision Echo (1617)
System Associates (1331E)
Video International (1524)

STUDIO FIXTURES
B-W Lighting (1753)
CineMills (1140)
Desisti Americas (1131)
Keylite Production Services (1220)
Mole-Richardson (1006)
Olesen (1307)
Peerless Sales (1618B)
Theatre Services & Supply (1513)

SPEAKERS & ENCLOSURES
AVC Systems (331)
Anchor Systems (1618C)
Broadcast Supply West (112A)
Continental Electronics (101)
Electro-Voice (1159)
Fostex (1765)
Gotham Audio (509A)
David Green (417)
Holzberg (*)
JBL (615)
Logitek (613)
Midwest (1710)
Studer Revox (201)
United Research Labs (604)
Yamaha International (1340)

STL EQUIPMENT
AVC Systems (331)
Andrew (1201A)
Broadcast Microwave Services (1749)
Continental Electronics (101)
Cablewave (108)
David Green (417)
Harris (401)
Holzberg (*)
Lang Video Systems (1780)
M/A-COM (1004)
Marti Electronics (501)
Micro Communications (1014A)
Micro Control (104)
Modulation Associates (1737)
NEC (1415)
Spencer Broadcast (406)
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Utah Scientific (1114)  
Videotek (1833)

TBCs
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Ampex (1400)  
Apert-Herzog (1703)  
Digital Video Systems (1017)  
FOR-A (1308)  
Fortel (1409B)  
GEC McMichael (1514)  
Gray Communications (1618A)  
Harris (403)  
Holzberg (*)  
Hotronics (1331B)  
Launica (1771)  
MCJ/Quantel (1631)  
Microtime (1230)  
Midwest (1710)  
NEC (1415)  
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Video International (1524)

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Otari (601)  
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April 1984

Continued

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Gray Communications (1618A)
David Green (417)
Restoration/Sprague Magnetics (705)
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System Associates (1331E)
Taber (711)
UMC Electronics (114)
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Asaca (1226)
Chyron (1610)
Gray Communications (1618A)
RTI (1626)
System Associates (1331E)
TV Equipment (1216)
Tentel (1613)

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Amplex (1400)
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Broadcast Supply West (112A)
Camera Mart (1018)
Continental Electronics (101)
Fidelipac (411)
Fostex (1765)
Gray Communications (1618A)
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Midwest (1710)
Nagra (1213)
Restoration/Sprague Magnetics (705)
Sescom (1616)
Sony (1200, 605)
Spencer Broadcast (406)
3M Magnetic (1002)
UMC Electronics (114)
United Research Labs (604)

TAPE, RECORDING (VIDEO)

Amplex (1400)
AGFA (1608)
BASF
Camera Mart (1018)
Fuji (1413)
GE/McMichael Ltd. (1514)
Gray Communications (1618A)
JVC (1234)
Pam Lontos (120A)
Maxell (1624)
Midwest (1710)
Panasonic (1019)
Restoration/Sprague Magnetics (705)
Sony (1200)
Spencer Broadcast (406)
System Associates (1331E)
3M Magnetic (1002)
United Research Lab (604)

TELEPHONE INTERFACES

AVC Systems (331)
Broadcast Technologies (1701)
Comrex (400)
Datatronix (1504)
ESE (116, 1757)

Electronic Systems Labs (406A)
Gentner Engineering (636)
David Green (417)
RTS Systems (1142)
Spencer Broadcast (406)
Studer (201)

TELEMETRY EQUIPMENT

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Continental Electronics (101)
Datum (1708)
Hallkainen (208)
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Spencer Broadcast (406)

TELETEXT & CAPTIONING EQUIPMENT

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Datum (1708)
EEG (1155)
Harris (401)
Logica (1405E)
Thomson-CSF (1001)
Wegener Communications (1782)

TEST PATTERNS, CHARTS

Camera Mart (1018)
Gray Communications (1618A)
Nalpav Video Sales (1722)
Porta-Pattern (1427)
SMPT-E (1632)
Sigma Electronics (1333)

TEST EQUIPMENT MONITORS & METERS (AUDIO)

Asaca (1226)
Amber Electro (422)
Broadcast Cartridge Service (611)
Broadcast Supply West (112A)
Camera Mart (1018)
Continental Electronics (101)
Electronic Systems Labs (406A)
Electro-Voice (1159)
Eventide (323)
Inovonics (304)
Marcon (306)
Marconi Instruments (1615)
McMartin (701)
Potomac Instruments (100)
Real World Technologies Group (1520)
Sescom (1616)
Shively (632)
Sound Technology (500)
Tentel (1613)
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TELEVISION EQUIPMENT

Anchor Systems (1618C)
Anton Bauer (1337)
Asaca (1226)
Audio Technologies (420)
Broadcast Video Systems (1326)
Camera Mart (1018)
EEV (1335)
Gray Communications (1618A)
HEOBO (1225)
Hitachi (1402)
Inovonics (304)
Lang Video Systems (1780)
Laumin (1771)
Leader Instruments (1349)
Marconi Instruments (1615)
Midwest (1710,1710A)
Phillips/Test (1408A)
Rohde & Schwarz (1205)
Tektronix (1601)

TEST EQUIPMENT (RF)

Asaca (1226)
Bird Electronic (1625)
Broadcast Supply West (112A)
Camera Mart (1018)
Comark (1217)
Continental Electronics (101)
Delta Electronics (105)
Electro Impulse (117)
Gray Communications (1618A)
Holaday Industries (206A)
Marconi Instruments (1615)
Potomac Instruments (100)
Rohde & Schwarz (1203)
Shively (623)
Sound Technology (500)
System Associates (1331E)
Tentel (1601)

TIME CODE EQUIPMENT

AVC Systems (331)
Adams-Smith (1724)
Amtel Systems (1745)
Arriflex (1421)
Audio Design (402)
BTX (1124)
Robert Bosch (1603)
Camera Mart (1018)
Control Video (1157)
Datum (1708)
ESE (116, 1757)
Ewert (1945)
For-A (1306)
Gray Engineering (1755)
Gray Communications (1618A)
Interactive Systems (1167/1132)
JVC (1234)
Kinematics (115)
Launic (1771)
Paltex (1005)
QSI Systems (1325)
Skelton (1126)
Sony (1200)
System Associates (1331E)
United Media (1300)

TIMERS & CLOCKS (PROGRAM)

AVC Systems (331)
Amtel Systems (1745)
Broadcast Supply West (112A)
Camera Mart (1018)
Continental Electronics (101)
Datum (1708)
ESE (116, 1757)
Feldmar Watch (1777)
FOR-A (1306)
GEC-McMichael (1514)
Gray Communications (1618A)
David Green (417)
Kinematics/True time (115)
Leith Video Systems (1021)
Midwest (1710)
Pacific Recorders (113)
Radio Systems (213)
Spencer Broadcast (406)

TOOLS

Broadcast Supply West (112A)
Jensen Tools (1747B)
Tentel (1613)

 Continued on page 250
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Magnetics (705)

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Aries Tower Services (1770)
Cetec Antennas (509)
Comark (1217)
Continental Electronics (101)
EG & G (1327)
Fort Worth Tower (1010)
Harris (401)
Magnum Towers (119)
Philadelphia Resins (126)
Rohn Towers (1605B)
Stainless (1315)
Utility Tower (703)
World Towers (519)

TRANSFORMERS (ALL TYPES)
Calvert Electronics (125)
Peter Dahl Company (612)
Fostex (1765)
Gotham Audio (509A)
Mole Richardson (1006)

TRANSISTORS, ICs, SOLID-STATE DEVICES
Calvert Electronics (125)
CeCo Electronics (1010A)
Gray Communications (1618A)
Valley People (318)

TRANSMISSION LINE PRESSURIZATION EQUIPMENT
Andrew Corporation (1201A)
Cablewave (108)
Celwave RF (202)
Cetec Antennas (509)
Continental Electronics (101)
Dielectric (455)
David Green (417)
Harris (401)
Micro Communications (1014)
Microdyne (1612)

TRANSMISSION LINE, WAVEGUIDE, GONIOMETER SWITCHES
AVC Systems (331)
Andrew Corporation (1201A)
Bird Electronic (1625)
Cablewave (108)
Celwave RF (202)
Cetec Antennas (509)
Comark (1217)
Continental Electronics (101)
Dielectric (455)
David Green (417)
Harris (401)
Marti Electronics (501)
Micro Communications (1014)
Microdyne (1612)
Pinzone Communications (1615A)
Scientific-Atlanta (1017)
Shively (623)
Sigma (1333)

TRANSmitters (AM & FM)
AVC Systems (331)
Bayly (124)
Broadcast Electronics (303)
Continental Electronics (101)
Elcom-Bauer (412)
David Green (417)
Harris (401)
Holzberg (*)
LPB (405)
Larcan Communications (1626A)
McMartin (701)
NEC (1415)
QEI (307)
RCA (1000)
Radio Systems (213)
Rhode & Schwarz (1203)
Spencer Broadcast (408)
Thomson-CSF (1001)
Wilkinson-TTC (305)

TRANSMITTER (TV & TRANSLATOR)
Acrodyne (1228)
Comark (1217)
EMCEE (1621)
Gray Communications (1618A)
Harris (401)
Information Transmission Systems (1734A)
Larcan Communications (1626A)
M/A-Com (1004)
McMartin (701)
NEC (1415)
RCA (1000)
Rhode & Schwarz (1203)
Thomson-CSF (1001)

TURNtables, TONEARMS & PHono CARTRIDGES
AVC Systems (331)
Audio-Technica (1141)
Broadcast Electronics (303)
Broadcast Supply West (112A)
Continental Electronics (101)
Gotham Audio (509A)
David Green (417)
Harris (401)
LPB (405)
Ramko Research (415)
RAMSA (437)
Spencer Broadcast (406)
Stanton (102)

VACUUM TUBES (CRTs, RECEIVING)
Calvert (125)
CeCo (1010A)
EEV (1335)
Gray Communications (1618A)
Richardson Electronics (212)
Thomson-CSF Tubes (1003)
Varian Associates (1605)

VACUUM TUBES (CAMERA)
Amperex (1412)
Calvert (125)
CeCo (1010A)
EEV (1335)
Gray Communications (1618A)
Hitachi (1402)
RCA (1000)
Richardson Electronics (212)
Thomson-CSF (1003)

VACUUM TUBES (TRANSMITTING AND CAVITIES)
Amperex (1412)
Calvert (125)
Camera Mart (1018)
CeCo (1010A)
Comark (1217)
Continental Electronics (101)
EEV (1335)
Econco Broadcast Service (1759)
Richardson Electronics (212)
Thomson-CSF (1003)
Varian Associates (1605)

VANS & ACCESSORIES
AF Associates (1611)
Camera Mart (1018)

Centro Corporation (1101)
GEC McMichael (1514)
Gerstenslager (1347)
Gray Communications (1618A)
Magnetic Media/Book (1310)
Midwest Corporation (1710)
Mole Richardson (1006)
Shook Electronic Enterprises (1310)
System Associates (1331E)
Television Equipment (1216)
Whirlwind (329)
Wolf Coach (1317)

VIDEO SWITCHERS, PRODUCTION
American Data (1409)
Amplex Corporation (1400)
Asaca (1226)
Beaveronics (1313)
Robert Bosch (1603)
CeCo (1010A)
Camera Mart (1018)
Comprehensive Video (1145)
Crosspoint Latch (1321)
Echolab (1510)
Gray Communications (1618A)
Grass Valley Group (1207)
ISI (1232)
ISC (1167/1132)
JVC (1234)
Laumic (1771)
NTI (1014D)
Panasonic (1019)
Ross Video (1110)
Sony (1200)
System Associates (1331E)
Toshiba (1631A)
TV Equipment (1216)

WEATHER SYSTEMS
Alden Electronics (1336)
Bostom/McInnis Skinner (1020)
Broadcast Supply West (112A)
Colorgraphics Systems (1116)
Dubner Computer Systems (1630)
Environmental Satellite Data (1509A)
Kavouras (1635)
Richardson Electronics (212)
Thomson-CSF (1001)
Video Assoc Labs (1303)
WSI (1104)

WIRELESS MICROPHONES, INTERCOMS, REMOTE PICKUP SYSTEMS
AVC Systems (331)
Broadcast Supply West (112A)
Camera Mart (1018)
Cetec Vega (1410A)
Clear-Com Systems (1502)
Comrex (400)
Countryman Associates (1720)
Gray Communications (1618A)
David Green (417)
Harris (401)
HM Electronics (1130)
McMartin (701)
Marti Electronics (501)
Micron Audio (1122C)
Nady Systems (1133)
R-Columbia (1111)
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AM stereo
Continued from page 14
and, therefore, be suitable for station
give-away promotions. The company
said orders placed to date for the
Kahn adapter have been contingent
on sales of minimum quantities of
Motorola-only car receivers in each
station's market.

The decoding of all the systems ex-
cept Motorola is automatic on the
converter. When the listener wants to
hear a C-QUAM signal, a button must
be pushed. Kahn Communications
president Leonard Kahn said the
switching arrangement was not de-
signed to embarrass Motorola, but in-
stead had a good engineering
base.

Group W selects Motorola
Westinghouse Broadcasting has
selected the Motorola AM stereo sys-
tem for use at its AM music stations.
According to Harrison Klein, Group
W director of radio engineering, the
selection follows more than a year of
tests of various AM stereo systems at
WBZ, the company's AM radio outlet
in Boston. The Motorola C-QUAM
equipment currently is installed at
WBZ and will be installed in the near
future at KDKA, Pittsburgh. All other
AM stations in the Group W chain use
news/talk formats, and will not be
converted to stereo operation at this
time.

Klein said he thinks the emergence
of a single AM stereo system would
best serve the long-term interests of
the industry. However, he said he
has no objections at this point to the
multi-
mode receiver concept. "The more
AM stereo receivers (single- or multi-
mode) we get out in the field, the
better," he said. 1{-23}]]

Satellite update
Continued from page 16
works that will transmit two or three
TV channels per transponder, reduc-
ing the network's annual transmission
costs significantly. For example, a
6-transponder hotel network would reduce
its transponder lease costs by $5
million to $6 million a year if two TV
channels were transmitted per trans-
ponder instead of the normal single
channel. The savings over an 8-year
period would be far greater than the
total added cost of larger receiving
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The next decade in satellite TV
broadcasting promises to bring a wide
variety of transmission techniques, a
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the case to this point.

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The SMX-40 is a fully frequency synthe-
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- Harmonic Filter in Output for Stand Alone
  Transmitter

PARAMETER: SPECIFICATION:
  FM Signal/To-Noise........ 70 db below 100%, mod
  Ratio........................ at 400 Hz (75 db typical)
  Composite
  Intermodulation............. 2% or less (.09% typical)
  Distortion.................. 0.2% dB, 30 Hz-100 kHz
  Composite Audio
  Response...................... 12 Vus/n symmetrical
  Composite Slew Rate........ 300 Hz 0° to 50°C, Direct FM
  Frequency Stability........ 300 Hz 0° to 50°C, Direct FM

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and complete Specifications

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btI is proud to be a supplier of IFB equipment to ABC for the 1984 Summer Games.

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After the 1983 fall SMPTE meeting in Los Angeles, Carl Bentz, BE television editor, toured the United Media facilities in Anaheim, CA, and interviewed president Bob Ricci. The discussion focused on trends in videotape editing, Ricci’s corporate philosophy and his plans for NAB-'84/Las Vegas. This report, which combines elements of the interview and plant tour, results from that meeting.

Q: How old is United Media?
A: I founded the company in 1976 to be a systems house. People could come in and state their needs, and we would develop a system to meet those requirements. I handled several lines of products from which the systems would be built.

Q: What was your background for such work?
A: Before forming United Media, I worked for Datatron. There I gained a good understanding of what was required in a reliable editing system. I also was involved in developing the Tempo system, which the company manufactured.

Q: When did United Media become a manufacturer, rather than a systems assembler?
A: Our first product, the Commander I, went on the market in 1979, and the first unit was sold in June.

Q: Do you remember the first sale?
A: Very well. The contract, from a Canadian post-production house, included a clause requiring the system to pass certain engineering tests before it would be accepted. Needless to say, I was pleased when, within three days of the equipment’s arrival, the editing controller had passed acceptance and payment was on its way.

Q: Was the Commander I a successful product?
A: Yes. Its shortcoming was that it was not an upgradable system, as is the Commander II. There are a number of them still in the field and in use in facilities that do 2-machine editing jobs.

Q: What about the Commander II?
A: We introduced the Commander II at NAB-'80/Las Vegas. From the beginning, it was conceived as modular. The system could be configured in various ways, from a 2-machine system up to an 8-VTR operation, with integrated time code readers and generators. Any combination of VTR formats, quad, 1-inch or U-matic were possible, along with a switcher interface.

We stressed the upgradability factor at NAB-'82/Dallas. The buyer could
Introducing the A810 stereo recorder with center track SMPTE code...from Studer, the world leader in audio recording equipment.

Stereo+ SMPTE Code on 1/4" Tape

This is the one recorder made to meet your demand for better quality stereo audio for video productions. With a Studer A810 you can produce state-of-the-art audio tracks, then use any SMPTE-based synchronizing/editing system to lock the A810 to your VTR's.

You don't need a 4-track recorder. You don't need 1/2" tape. And you don't have to program offsets into your synchronizer.

It's all possible because the A810's optional center-track SMPTE code system uses a separate set of code heads, working in conjunction with a microprocessor controlled digital delay. The separate heads assure code-to-audio crosstalk rejection of better than 90 dB. And the digital delay automatically compensates for the tape travel time between code and audio heads at all four tape speeds.

Total Microprocessor Control

The on-board CPU controls all A810 transport functions, all audio status switching, and all audio parameter settings. Design flexibility lets you program the A810 to do what you want it to do. A zero locate and one autolocate position are fixed, but three additional "soft keys" may be programmed for a variety of functions, including up to three more locate positions and two different edit modes. All audio parameters (bias, level, EQ) are set digitally and stored in memory, with memory storage for two different formulations at all four speeds. After initial set-up, you can switch to your alternate tape simply by pushing a button.

External Computer Control

With the optional serial interface, you can control all transport and audio functions with your personal computer (RS232) or with any device conforming to the forthcoming EBU/SMPTE standard (RS422 modified).

Studer Performance and Reliability

Using all-new electronics with advanced phase compensation circuits, the A810 delivers audio performance that is compared to most other recorders — just short of phenomenal. And, as with all Studer products, the A810 is made from solid components and assembled with Swiss precision.

Get your production room ready for tomorrow's stereo audio. Call today for the location of your nearest Studer dealer.
start with the basic 2-machine system and build up to the full 8-machine configuration. From basic to expanded, the Commander II included almost every editing feature that the industry has requested. Obsolescence was avoided.

Q: How well was the second generation system accepted?
A: There are more than 100 Commander II systems installed in facilities around the world. They involve various grades of expansion, and have proved to be quite reliable.

Q: In talking with people experienced with United Media systems, each has stressed reliability. Why?
A: When an editor sits down to do a project, he has enough things to think about besides his equipment. The design should include every possible way to reduce failures. But electronic equipment will fail. So in major sections such as the power supply, for example, we use heavier duty components than normally needed. In case of a power outage, batteries protect the 500-event internal memory.

Q: I have also been told that your systems generally are lower priced than equivalent ones. How do you keep the price down?
A: Our products, which all are editing-related, use several basic common modules so that we can save on design costs, and, for product support, on the cost of storing an inventory of spares.

Q: What products are included in the line now?
A: All our products are involved in editing. Besides edit controllers, we have time code systems, an audio router/dissolver and automatic dialogue replacement equipment.

Q: When I talk to people in the industry, many are not acquainted with United Media. Why?
A: Our marketing efforts have been at a rather low-profile level to date. In fact, our best promotion has been word-of-mouth. It’s slower, perhaps, than splashy advertisements, but effective.

Q: Will you be showing new items at NAB-'84?
A: The major new product will be the new Mini-Comm edit controller. It is a compact A/B roll, full-featured system for up to three VTRs or ATRs. It is upgradeable with SMPTE time code, list management and switcher interfacing.

We also will show a model 500 sequencer, or digital electronic programmer, and a user-definable key enhancement for the Commander II. Each of two keys may recall a sequence of 120 keyboard entries for often-used routines.

Q: What about the redefinable keys others are stressing? Why haven’t you gone to that concept?
A: I do not think that redefining or reassigning keys gains anything. Once an operator is oriented to a particular system, why would he want or need to change it, to have to reorient himself? There are arguments that reassignment is of value for right- or lefthanded and multiple operator situations, but I have not been convinced.

The same situation is true of other features that have been introduced in the last couple of years. For example, the touch-sensitive screen concept is interesting, but, in my opinion, somewhat of a restraint to the user. I find the touch screen approach to be slower, because it requires me to reorient myself all of the time.

Q: What about voice actuation and recognition systems?
A: They also are interesting. We looked at that approach several years ago. At the present time, I don’t think that it is practical.

Q: How practical are large editing systems, such as your Commander II, fully implemented with the maximum number of VTRs, switcher and mixer interfacing, etc.?
A: In the editing business, time is money. Let’s suppose that you purchase eight 1-inch VTRs to go with your edit controller, each with a TBC, for an investment of approximately $800,000. The majority of editing projects will only involve one or two source machines at a time with one recording VTR. In addition, the editing systems usually are limited to a single mix/effects amp control. With that in mind, most large systems simply are not cost-effective.

Q: Could you state your concept of the ideal editor control system?
A: I instruct my design group to think in terms of the complete system. The purchaser should be able to take the equipment out of the box, plug it in, connect the various record and source units to the assigned plugs and jacks, turn the equipment on and begin editing. As such, the controller should be a black box, designed and constructed in a manner that leaves the operator’s concern to focus on the editing task. His technical staff should only need to worry about the sources, the recorders and other equipment attached to the black box.

Then, with the system operating, product support becomes important. We have developed a system, for example, in which users that call for help before 3 p.m. and need replacement parts to get their systems operating will have the parts on their way by 10 a.m. the next day.

It is my opinion that systems design, backed by a good customer service program, is what has made United Media successful.
But more and more broadcasters are getting to know us every day! There's good reason why we've grown so fast. We call it "station orientation" . . . the basic philosophy of George Townsend, whose background is station engineering. Now it's practiced by all our design engineers, most of whom have had hands-on broadcasting experience.

We know staying on the air is everything.

We've been there when things go to black. We know the pressure to correct the problem fast. Who needs ulcers! You don't. We don't. So we design maximum redundancy into all our equipment.

But when servicing becomes necessary, we've made it so you can get to the trouble fast — and have room to work. It would be so easy to make smaller cabinets for our equipment. But we haven't forgotten that normal size hands do the service work.

Maybe you too should get to know us.

As so many broadcasters have lately, perhaps you should get to know us, too. Write for a catalog. But if you're in a hurry or have a technical question, call one of our executive group. At Townsend, you won't have trouble getting through to the top.

Please See Us at NAB Booth 1420

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TOWNSEND T.V. TRANSMITTERS
Our record of station installations in just the last 2 years:

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Howard G. McQuire  
Vice President; General Manager
Robert J. Anderman  
Director of Sales and Marketing
Andrew V. Juettner  
Director of Engineering
George R. Townsend  
President

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www.americanradiohistory.com
The Antenna Division of Cetec Corporation, with sales and manufacturing facilities located in Sacramento, CA, specializes in transmitting antennas for TV and FM broadcasting. The company is one of 11 divisions of Cetec, based in El Monte, CA.

Cetec Antennas has a long and distinguished record of accomplishments in FM and TV antenna technology. The company began more than 25 years ago as the Jampro Antenna Company, manufacturing a line of FM and TV transmitting antennas. The company introduced its patented JSCP Penetrator series of FM circularly polarized (CP) antennas in 1967. The design has served broadcasters around the world, with more than 1000 sold to date. The company began testing CPTV antennas in 1974 and, once authorized by the FCC, began selling its patented spiral antenna in 1977.

Cetec's spiral CPTV antenna is lowered into position on top of the Sears Tower in Chicago. The antenna was manufactured for WLS-TV.
Rodney Kobayakawa uses SONEX a little differently...

and so do thousands of others.

Just Listen — 1. You might even say that Rodney Kobayakawa’s use is off-the-wall. He lines the ceiling of KGMB-TV’s remote video truck with SONEX. “Controls the high ambient noise...Close speaker mounting caused problems with sound orientation...and they look so nice! White audition tiles match the chrome look of our equipment.” He’s the Audio Engineer at KGMB, Honolulu.


4. “Delighted with SONEX’s effectiveness...pleasing aesthetics... audio professionals notice reduced standing waves...increased soundproofing.” Sherrie Thomas, Producer, recording studio for the General Conference of Seventh-day Adventists, Washington, D.C.

5. “Good!...in radio station’s master control and production room.” Craig Falkenstine, WJCF, Morgantown, WV.

Pictures do speak louder than words.

When we asked our customers to show us how they used SONEX, we weren’t surprised to hear that SONEX did the job. We knew that SONEX’s special acoustical foam — with its sculptured anechoic design — absorbs sound successfully. What really amazed us was the number of different SONEX applications they showed us.

See (and hear) for yourself: Wherever sound is the problem, SONEX is the solution.

SONEX is manufactured by Illbruck/usa and distributed exclusively to the pro sound and A/V industries by Alpha Audio.

Get all the facts by calling or writing:

SUBMITTED BY FIRST GROUP OF SONEX PHOTO CONTEST WINNERS

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The Cetec facility is impressive to the visitor in that virtually all machining and manufacturing work necessary to construct an antenna is done on-site. Raw stock goes in one side of the building and finished antennas come out the other side. Some specialized procedures, such as galvanizing and custom-order Teflon coating, are done by an outside company under contract to Cetec.

An important part of the company’s 17-acre manufacturing facility is a sophisticated turntable measurement assembly used to conduct performance tests on antennas of various designs. The assembly allows engineers to check the radiation patterns and VSWR performance of full-scale production antennas with great accuracy.

The company currently is concentrating its efforts on multistation (or community) FM transmission systems and CPTV antennas. Cetec has installed spiral CPTV antennas at stations in several major cities in the United States. The spiral design gives viewers better reception, including reduced ghosting and less critical frontend tuning.

The FCC’s 80-90 decision has forced many FM stations to consider improving their facilities to avoid reclassification at a lower level. The requirement for minimum height above average terrain often can be met by a community arrangement in which a single broadband transmitting antenna, located on a tall tower, is shared by several stations. Such cooperation results in better coverage for all stations participating in the project, and helps defer the costs of constructing the new facilities. Cetec offers several products aimed at meeting this need.

Building an antenna

Although each antenna manufactured at the Sacramento facility is unique, all follow a similar route through the construction process, as follows.

The company maintains a large supply of copper, brass and Teflon stock. As needed, the hardware is cut and machined into components that make up an antenna. The parts store also contains cast mechanical components, O-rings, brackets of various sizes, deicing elements and stainless steel hardware.

Machining is a critical stage in constructing an antenna. It is often necessary for parts to be cut to tight tolerances for low VSWR, as well as a proper fit. Some components machined at this stage carry the entire power load for portions of an antenna system.
"WHY USE WELLFLEX"

Optimum Design

Cablewave Systems offers Wellflex Transmission Lines designed to meet your most stringent electrical and mechanical requirements.

Highly reliable, the unique Wellflex construction provides a combination of strength and flexibility with optimum performance.

Outstanding electrical parameters include extremely low RF loss, smooth impedance coefficient, and conservatively rated power handling capability.

Wellflex is available with either air or foam dielectric with copper corrugated outer conductor, solid and corrugated inner conductor (depending on size), and with a tough, durable, corrosion resistance polyethylene jacket suitable for burial and prolonged life.

Air Dielectric Wellflex in smaller diameters, (½" and ¾") offer a field proven, fixed helix design called Spirafil II - a single, continuous extrusion which locks the center conductor coaxially within the outer conductor, resulting in a near perfect impedance coefficient throughout the entire length of line.

RF transmission lines with welded and corrugated conductors are also manufactured by our associated companies in West Germany and Brazil.

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Radio Frequency Systems Division
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3000 Hannover
West Germany

KAP
Cabos Especiais e Sistemas Ltda
Caixa Postal 7 163
Sao Paulo SP, Brasil

Larger Diameter Air Dielectric Wellflex Cables, (1¾", 3", 3½" and 4½") feature a unique vertebra helix design to achieve optimum crush and tension strength. Its "pillar effect" using less volume of dielectric, provides lower loss and higher power handling capability due to the more rapid dissipation of heat from the center conductor.

Wellflex has it all: low loss, low VSWR, higher power handling, smoother impedance coefficient, and rugged, long dependable life.

Cablewave System's Wellflex is type accepted for sampling systems in accordance to FCC Part 73.68.

Cablewave Systems, Inc., 60 Dodge Ave., North Haven, Conn. 06473, Phone (203) 239-3311

In Canada: LeBlanc & Royle Communications Towers Ltd., 514 Chartwell Rd., Oakville, Ontario, Canada L6J 5C5, Phone (416) 844-1242.

Antenna/Transmission Line Systems Catalog
Complete in every detail, total information needed to plan, specify and purchase a complete system or component, plus complete engineering data and more!

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See us at NAB Show
CPI Booth 102

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A spiral CPTV antenna, similar to the antenna installed on the Sears Tower, is checked at the field measurement test site.

Shown is part of the supply of raw stock used in constructing an antenna.

The machine shop at the Sacramento plant is shown here.

The antenna begins to take shape in the plant's welding area. The radiating elements and line sections are cut to size and formed in this stage. The tungsten inert gas (TIG) process, also known as heliarc, is used to give a good electrical and mechanical bond to the members. All welders are state-certified, an important factor in assuring mechanical quality.

Radiating elements for FM antennas are assembled in individual bays, while the transmission line used for support and power distribution is constructed in another area of the plant. The inside surfaces of all power-carrying members are polished during production to assure maximum efficiency. Power loss can result from contaminants on the inside surfaces of antenna elements and power-carrying hardware.

TV antennas are built in sections of varying lengths, depending on the gain required and the frequency of operation.

Once assembled, the antenna elements are hot-dip galvanized to protect against corrosion.

If requested, Cetec will supply FM antennas with a baked-on Teflon coating, as an alternative to deicing elements or radomes. Field reports indicate that Teflon-coated elements shed ice more rapidly than those with the conventional finish.

Once the antenna has been built, one or more elements is fine-tuned on a support tower identical to the tower used by the station placing the order. Any antenna irregularities then can be tuned out, and adjustments made for minimum VSWR. Directional antennas, when desired by the station, are created by adding parasitic elements. Cetec produces a large number of directional FM antennas each year. Pattern measurements required for FCC approval are done on the company's test range.

Pattern optimization work also is done on the Cetec test range. Often, simply changing the antenna mounting slightly will benefit the pattern requirements. Parasitic elements sometimes are added to correct radiation pattern problems. This service does not directionize an antenna, but seeks to optimize radiation in a desired direction by removing any nulls found in the pattern.

Shipping containers are constructed at the Sacramento facility and all FM antennas are shipped disassembled (unless specially ordered), because of the finished product's large size. A complete set of drawings and instruc-
We go to any heights to put you on the air!

In 1984 U.S. broadcasters have an inspired new company to call upon for their tower and antenna needs. From roots that stretch sky high we have pulled together the resources of LeBlanc & Royle and Alan Dick to form LeBlanc & Dick Communications Inc., based near Washington, D.C.

By drawing upon the expertise of these two world class companies we are able to bring broadcasters the team that provided antennas for the world’s tallest building, the Sears Tower in Chicago, and the world’s tallest free-standing structure, the CN Tower in Toronto.

While our main activities include the design and construction of communications towers and antenna systems for broadcasters all over the world, our unique reputation has been built on mastering the really big challenges.

LDC is geared to provide complete turnkey systems. You’ll find us at NAB Booth 1149. Be sure to come by and see how we can build a part of your future.

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Beyer provides typical condenser accuracy

At Beyer, we maintain the singular notion that a condenser mic can combine typical precision and sensitivity with a smooth, natural sound. Beyer Condenser Microphones give you the accuracy and higher output of a condenser without a "hyped," larger-than-life sound. Beyer condensers offer the high-performance specs required by digital recording without reinforcing the occasionally clinical aspect of this process.

More Options – More Versatility

The Beyer MCM Condenser System's comprehensive selection of interchangeable mic capsules means total applications versatility in the most logical and cost-effective format. A choice of mics with cardioid, lobe, omni or figure-8 patterns and the option of integral shock-mounting is instantly available for use in the studio and out in the field.

New Super High Performance Mics

The ongoing technical evolution of Beyer condensers has produced several newly designed mics offering matchless performance and long-term reliability. The new MC 737 long shotgun (lobe pattern) and MC 736 short shotgun (cardioid/lobe) utilize a built-in switchable bass rolloff to effectively suppress low end noise and rumble below 200 Hz and provide increased intelligibility for optimum speech and music recording. A 12 dB attenuator prevents high sound pressure levels from overloading the mic's internal electronics without coloration. These mics also feature an extended frequency...
response of 40 Hz to 20 kHz (± 2.5 dB) and an excellent signal-to-noise ratio of 74 dB.

The new MC 734 is the only "studio" condenser mic that delivers the highest standards of performance in any recording or live concert situation. An extremely flat frequency response from 20 Hz to 18 kHz (± 2.5 dB) insures total accuracy while a 3-step filter compensates for proximity effect in close-miking situations. To maximize the MC 734's performance onstage, a unique stage resonance filter which reduces rumble and extraneous noise is combined with the mic's ability to withstand sound pressure levels of 138 dB (1 kHz ≤ 0.5% THD).

Condenser System Accessories
For added back-up flexibility, the Beyer Condenser System includes a full complement of accessories including windscreens, power supplies, pistol grips, suspension mounts and our one-of-a-kind MZA 716 telescoping "fishpole" boom with an adjustable tilt variable from 0 to 360°.

Beyer Dynamic has firmly established itself as a leading force in moving-coil and ribbon microphone technology, but don't let our name mislead you. Instead, consider the uniquely natural sound, applications versatility and wide variety of accessories that make up the Beyer Condenser System.

Visit one of our select professional dealers for a complete demonstration. To obtain a Beyer Condenser Dealer List, please write to: Beyer Dynamic, Inc., 5-05 Burns Avenue, Hicksville, New York 11801 or call us at (516) 935-8000.

April 1984  Broadcast Engineering  265
A welding turntable is used when working with line sections to ensure an even bond.

A production run of JSCP model FM antennas is readied for final assembly and testing.

Antenna system maintenance
Cetec estimates that a well-built antenna will provide about 20 years of service, if properly maintained. The company recommends the following measures to guarantee long life:

- The transmission line and antenna should be pressurized with nitrogen gas. Not only will pressurization keep contaminants out of the system, but also will provide a means to monitor the integrity of the line and antenna. Pressure loss should be charted, and any increase in loss values should be investigated.

- The antenna system's VSWR should be measured regularly and charted to determine whether any long-term changes are occurring in the system. Likewise, the incidental AM (also known as synchronous AM) should be measured regularly and charted. An increase in either of these two parameters may indicate antenna or transmission line problems.

- A visual inspection should be made every year by an experienced tower worker of the transmission line and antenna system. Deicer cables should be checked and a determination made that each heater element is working properly. Particular attention should be given to the individual antenna bays. Any bent elements or other physical damage should be repaired as soon as possible.
Flexibility....
on the move

with Gerstenslager

Mobile studios designed for quick setup and strike so you can get all the action, all the time. Proven capabilities. State-of-the-art communications technology. Meeting the changing demands of on-location, whether at the concert hall or the sports arena.

Tell us your needs. We'll custom design to your exact specifications. Install the equipment you want — where you want it. And we'll deliver when you want it. A mobile unit that's as dependable as your home base.

Talk to us! About our transit bus, expandable semi-trailer, modular and semi-trailer style units. For a complete planning kit, write or call collect: Earl Daye (216) 262-2015; TWX 810-433-9242.

The Gerstenslager Company
1425 E. Bowman Street, P.O. Box 390
Wooster, Ohio 44691
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www.americanradiohistory.com
A JSCP FM antenna undergoes final testing and adjustment at the field measurement range.

Introducing the ultimate FM Exciter!

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

- Modulation performance of this new exciter exceeds all currently known or marketed FM exciters.
- No tuning adjustments are required other than selecting the operating frequency.
- Power output is 50 watts into a 50 ohm load at all FM frequencies.
- The exciter may be used as a low power transmitter.
- Special circuits protect amplifier from mismatched loads. Automatic power control maintains output at preset levels from 5 watts up to the maximum level.
- The Type 802A FM Exciter accepts composite baseband signal from a stereo generator, STL system or monaural and SCA programming.
- A digitally-programmed, dual-speed, phase-locked frequency synthesis system generates exciter frequency.
- Case design is very clean: front panel analog or digital meters and LED readouts give clear, accurate indications of system status and performance. A digital LED display shows true peak level of modulating signal in 5% increments with an accuracy of better than ±2%.
- Modular subassemblies may be removed from the exciter without removing the exciter from the transmitter. The exciter moves on slides for easy access from front of transmitter.
- Call us for specs and prices.

See Us At The NAB Show, Booth 101

Continental Electronics
Continental Electronics Mfg. Co. Box 270879 Dallas, Texas 75227 (214) 361-7161

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www.americanradiohistory.com
TFT 8300 STL
Clearly Above The Crowd
In Price and Performance

The 8300 STL outperforms any other STL, even in the densest RF environment. Yet, it's priced way below the nearest competitor.

The 8300's superiority is clear in its overall performance. Like a 75 db SNR and stereo separation of 50 db, or better.

The transmitter features IF modulation for low distortion and high stereo performance, a technique pioneered by TFT, which has been further refined in the 8300.

In the receiver, too, the TFT 8300 stands above the rest, with a sensitivity of 30 μV or less for a 60 db SNR; front panel selection of wide or narrow I.F. bandwidth; and a Surface Acoustics Wave (SAW) filter to ensure outstanding selectivity.

Additionally, the 8300 receiver features continuous, independent display of signal strength and a bargraph display of modulation.

The 8300 is also ready for AM stereo. An optional, plug-in demodulator provides both R and L channel without any external devices.

So, be selective about your STL and specify TFT to put your station clearly above the crowd. Call or write today.

Exclusive Two Year Warranty
The TFT 8300 carries a full two year warranty, which is backed by around-the-clock factory service.

* Free computer STL path analysis at NAB Booth 109.
The British Are Coming!

The British are here!

Coles 4038, the ribbon microphone par excellence of the BBC, is now available exclusively through Audio Engineering Associates. The Coles 4038 produces that warm ribbon sound without sacrificing highs. It features high output, low self-noise, excellent hum shielding, smooth frequency response, and uniform polar patterns.

Call AEA for details.

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User list available upon request. Dealer inquiries welcome.

New products

Cetec currently is working on several new antenna designs, including a spiral FM panel radiator. The antenna is a broadband CP design intended for multistation use. It will handle about 30kW per panel, and mounts on each face of the support tower. (See Figure 1.)

Dr. Ray DuHamel, a consultant to the company on antenna design, is directing research and development on the project. DuHamel also designed Cetec's spiral CPTV broadcast antenna.
WITH SIMULSAT, WE CAN PICK UP 5 SATELLITES AT ONCE.

SIMULSAT, the multi-beam antenna from Antenna Technology Corporation, that can simultaneously see all domestic satellites at once with consistent broadcast quality performance. It is being heralded as a major breakthrough by broadcast and cable operators everywhere.

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Call or write Antenna Technology Corporation for a full-color brochure, and information on turn-key installation and two-year warranty for 3m, 5m and 7m SIMULSAT. SIMULSAT sees all C-Band satellites simultaneously and has K-Band capabilities.

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The carpentry shop is where shipping containers are made for the antennas and other Cetec products.

Figure 1. The design of Cetec's new FM CP spiral panel antenna, which is being developed at the Sacramento plant. The spiral arms form the radiating elements, which sit in front of a reflector screen.

The main benefits of the new design are its true circular polarization and mechanical simplicity. The reduced number of machined parts and feed lines should make the new spiral FM CP antenna more reliable in the field and less expensive to manufacture. Tests to date on the antenna show that it has outstanding broadband characteristics, easily covering the FM broadcast band.

In addition to FM and TV antennas, Cetec also manufactures transmitter combiners and notch filters of various designs.
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BROADCAST engineering

Corrections

- In the February 1984 issue of BE, clarification should be made on a few points in the article, "Stages of SCA." Under the subheading "SCA for Data Transmission" (page 68), it is said that error rates for SCA delivery of data can be as much as five orders of magnitude higher than standard telephone data lines. This should be corrected to state that SCA delivery provides data error rates less (that is to say, better) than telco circuits. A similar discrepancy occurs at the bottom of page 70. The corrected paragraph should read as follows:

"Error rates (for SCA data transmission) are less than one in 10 million (1:10^7), as opposed to the telephone company typical figure of one in 100,000 (1:10^5), or higher in some cases."

- Environmental Satellite Data (ESD) was not included in "Electronic Videographics Systems: An Update" (February 1984 BE). ESD provides the PMT-100 Professional Model Terminal for access, storage, analysis and display of color weather information via the GOES East and West weather satellites. Sixteen-bit computer technology includes 128kbyte RAM, 10Mbyte hard disk and floppy disk storage with RS-232C interfacing, repeating image loop sequences and a graphics tablet for the artist's input. CP/M-86 allows data processing and business applications of the system as well. For more information, circle (1497) on the Reply Card.

- The manufacturer name for the Emph-a-sizer audio processor on page 27 of the 1983 Spec Book issue should have read ATI/Audio Technologies Inc. For those having used Reader Service Numbers, your requests have been properly directed to the Horsham, PA, company.

BE staff
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### Radio Systems ESA-10

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<th>Feature</th>
<th>Pacific Recorders BMX-10</th>
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Q: Can you discuss the design of the Sony exhibit in detail?
A: We received several competitive submissions by exhibit houses and selected the one by Lynch Exhibits to create a unique triad complex comprised of two circular space stations and the Sony Vision Theater, covering one-third of an acre.

We also designed a different treatment for housing equipment on the floor. We call it space frames. It makes the equipment seem to just be there without the customary walls and counters.

The larger space unit was 58 feet in diameter with an 18-foot engineering core at its center. Like slices of a large pie, five interlocking areas around the central hub offered displays of the Betacam 1/2-inch camera/recorder system, including the BVV-40 recorder/editor, the BVW-20 portable field player and all accessories for the BVP-3 Betacam recording system; three editing suites (which combined 1-inch U-matic VTR and Beta); and a complete MIDI/Sony multi-track studio. A combination of TV monitors, overhead projectors and a small sound system enabled people on the periphery of the editing suites to observe the activities without obstruction. Editing generally is a one-on-one type of demonstration.

Completing the configuration of the larger space center, two finger-like space frames extended from the sides of the structure: one displayed 1-inch equipment arranged in ascending levels of sophistication; and the second finger was devoted to U-matic hardware.

The sister space unit, the smaller of the two, was 42 feet in diameter, divided into four sections, with a 10-foot engineering core at its center. One section displayed additional Betacam accessories; two sections were camera stages for ENG and EFP operations and applications; and the fourth module introduced our new BHV-2500 animation machine. The

The larger space center was 58 feet in diameter, and included a complete BVE-5000 editing suite (shown here). Note the tape machines behind the glass doors to the right.

In July 1983, Vander Dussen was appointed president of Sony Consumer Products company. William C. Connolly currently is president of Sony Broadcast Products Company.
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entire exhibit had a staff of sales engineers on hand to interact with visitors and explain special features and operation of all equipment.

The third part of the exhibit was the Sony Vision Theater, a separate entity from the two space stations. Traditionally, we have an audio-visual presentation that gives a brief overview of our entire product line. In 1983, the show included an on-stage performer and video segment, and was capped by a dramatic demonstration of HDTV. People lined up for tickets and even returned for performances later in the day. Showings were continuous from 9:30 a.m.-5:30 p.m.; 3800 NAB attendees saw the show.

Q: Mounting such an ambitious exhibit must have required a tremendous amount of coordination. A: Pre-show activity always involves a great deal of pressure. Traditionally, NAB opens on a Sunday. However, Sony has a special preview of the exhibit a day before for the press and members of International Sony Broadcast Companies (Canada, England, Japan, Australia and South America), cutting our time by one-half day to prepare. We also use this time to familiarize our own personnel who run the show with the intricacies of the exhibit.

The structure was so complex that, until the actual setup date, we never knew how long it would take to assemble. Working with teams of 10-18 people, it took approximately 1800 man-hours to erect it. We began construction a full 1½ weeks before NAB opened. Working 24 hours a day in two shifts, it took four days to prepare the exhibit for the arrival of more than $6 million worth of equipment. We ran about 35 miles of cable. Last-minute problems were worked out and we counted down to the opening.

As a sidenote, our assembly procedure was so well-coordinated that we actually were ahead of schedule. More than once we completed a section and had to wait for the next truck to unload. We only had to redrill one hole in our entire steel structure.

Q: Were there any unexpected problems? A: Of course. Our one shortcoming was that we did not adequately design the reception/check-out area to handle the large numbers of people. It was an unanticipated bottleneck. Another thing we learned, once the exhibit opened, was that the traffic patterns of booth visitors were far greater than anticipated, and created some minor traffic jams. At one point, we estimated that more than 2000 people were in the booth at the show’s peak.

Q: Was Sony pleased with the results? A: Everyone was extremely pleased. Our goal was to emphasize the company’s position as a leader in the industry by showcasing our line of products and future technology in the most efficient and original way possible for our customers to learn the most about our products. Lynch Exhibits helped us dramatically demonstrate how an innovative display can serve those ends. We expect that our space center will influence the design of major exhibitors at NAB and other shows for many years to come.

Q: How do you top such an exhibit? A: We hope you’ll come to NAB ‘84 and see!

Editor’s note:
This is how Sony prepared for its NAB ‘83/Las Vegas convention spectacular. But remember, many exhibitors can relate similar stories. This year, when you see something you like at the convention in Las Vegas, let the exhibitor know. Much effort has gone into making your show the best in the world, and your words of acknowledgement will be appreciated.

Have a good show!

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The HL-79E, Ikegami's crowning technological achievement, continues to run ahead of all other cameras in its class. That's why more and more top-of-the-line EFP camera buyers are getting behind the winner. Only by seeing this remarkable camera in action can it be fully appreciated.

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The HL-79E is part of the great and proud family of Ikegami products serving many satisfied users worldwide. For a complete demonstration of Ikegami Cameras and Monitors, contact your local dealer.

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This year at the NAB convention in Las Vegas, several editing systems manufacturers may show videodisc-based editing systems. However, based on my research, the big splash for disc-based systems will occur at next year's NAB show.

Without a doubt, the most time-consuming part of videotape editing is finding and locating material. Many 1/4-inch VTRs used in editing take more than 12 minutes to go from one end of a 1-hour tape to the other. Even the most sophisticated of these machines will take more than two minutes to perform the same task.

Currently, 1-inch broadcast VTRs will search at speeds of 50X play speed or greater, but the majority of editing time still is devoted to threading VTRs or searching back and forth until the desired material is located. Even at 50X play speed, it takes more than a minute to go from one end of a 1-inch tape to the other.

If one were to analyze the various functions of the editing process, locating the material to edit takes most of the time and making decisions takes the rest of the time. Finding the right reel or cassette, winding down to the desired material and rewinding each reel consume much time during the so-called creative period of editing.

Most decision-making occurs or should occur during the work-print stage, using low cost editing controllers and VTRs. For obvious reasons, the cost of off-line or work-print editing generally is about one-quarter that of mastering or on-line editing.

What if you were to dramatically reduce the editing time by virtually eliminating search time? This presumes that adequate notes would be taken during production to allow production people to tell the editor to go to a specific take based on time code information or slate identification.

Let's assume that a point of reference has been selected. If a mass storage medium such as an optical laser videodisc were interfaced with the appropriate edit controller, access to this spot would take only a fraction of a second, instead of more than a minute with today's fastest VTR. Wouldn't it be great to be able to access material 60-600 times faster than with present-day VTRs? Think of the time and money saved in editing.

You can quickly see the tremendous advances possible with such a system. Decision-making will be improved immeasurably, and I predict an immediate improvement in the aesthetic quality of the product because the creative juices would not be lost waiting for tape machines to find the material.

Science fiction you say? That is not so. Believe it or not, in 1971 CMX announced such a system, the CMX-600. Although its specifications were not quite what I have described, it did work and was in a class by itself. In fact, it could locate any frame of information within its videodisc storage banks in one-seventieth of a second (twice as fast as the human eye blinks).

For all practical purposes, it allowed instantaneous retrieval of picture and sound information. You may ask why it is no longer around. There are a number of reasons. First, its initial price tag was close to $500,000. Second, its high maintenance costs limited its sale to only a few facilities that had the resources to keep it running. Third, the 600 only produced pictures in black-and-white. And, finally, it had a capacity of only about 27 minutes, limiting the amount of raw material the editor had to work with. This meant that you had to carefully select only the takes with which you planned to work.

The CMX-600 was designed for one particular purpose: to edit commercials and other short segments. It was an amazing device, but producers, seeing the potential for editing programs, wanted to use it for more sophisticated editing.

I was pleased to be among the first users of this system. Once I had learned to operate the system, I was able to edit the first cut of a 1-hour program in one 8-hour day. It took me only another four hours to refine it. Today, that same process takes about five days to complete. Although no longer in production, there is one CMX-600 disc system still operating at One Pass Video in San Francisco.

CMX plans to show additional videodisc interfaces to its 3400 editing system at NAB '84. Last year, CMX was the first to introduce a videodisc interface for its editing system.

Because of the tremendous technological advances in electronics and related fields, mass storage, quality and capacity have been improved greatly. To date, there are 17 announced manufacturers of videodiscs and related components. Not all of them, however, are building videodisc units for editing systems. Some of them are for industrial use in interactive applications and others are strictly consumer-oriented.

At the editors' show this year, film and tape editor would like to see included in a videodisc-based editor are light pen control with plain English editing commands, no visible time code so that the user may call up material by scene or take number, and the capability for editing at 24fps, allowing conversion back to film edge numbers.

Features needed for video editing applications include a videodisc player that has a minimum capacity of 30 minutes per side, preferably 2-sided. The capability for scanning the video and audio at any rate selected by the user: for freezing a clean usable field or frame indefinitely, and for making edits from disc to disc or within the same disc in real time are some other features required by such an editing system. Another required feature is instant random access of any material recorded on any disc within the system. It also must be easy to use and reliable. The industry does not need another piece of hardware that takes a staff of engineers to maintain it.

Thirteen years ago, when the CMX-600 was introduced, the picture quality was mediocre, black-and-white and of limited capacity. Today, the laser disc is its own system. For example, disc storage now is up to an hour per side. Color with resolution of 4.5MHz or more is available. Disc players are less complex than a VTR. Even the slowest disc access time now is only a few seconds.

There are some limitations to the current crop of videodisc units. The most obvious one is the inability to get a videodisc made within a short time, such as overnight. You cannot use a videodisc as a source in post-production if the turnaround time is not within the constraints of the show's time schedule. Access time is the second limitation. The 70ms access time of the CMX-600 is not yet available for the video laser disc, although I am sure that eventually will be achieved. A third problem is that of cost. Some disc mastering costs more than $2000 per disc, out of the range of most TV editing budgets.

During my recent research on this subject, I contacted a number of com-
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When you examine the quality of the Ikegami ITC-730A and then hear the price, you’ll probably ask to hear it again. The new ITC-730A is a truly low-cost, lightweight ENG/EFP camera that’s designed to give you exceptional performance and value. Video gain has been boosted to +9dB/+18dB for a maximum sensitivity of 4-foot candles when using an f/1.4 lens, while signal-to-noise ratio has been improved to -57dB. Center horizontal resolution now exceeds 650 TV lines, with corners optimized by dynamic focus. Dynamic range has also been expanded—without sacrificing resolution or S/N ratio in low-light image areas—through highlight compression circuitry. In addition, the ITC-730A generates Split Field Color Bars in accordance with EIA RS-189A and sync waveform meets the SC-H criteria of RS-170A. And for multi-camera setups an adjustable color video matrix permits accurate color matching between cameras.

Yet the ITC-730A still incorporates features that made the ITC-730 the ENG/EFP camera for budget-conscious, high-quality ENG and production. Features that give you the edge, such as Saticon II® pickup tubes, dynamic beam stretch, a 2-H vertical detail corrector, and a host of automatics. In addition, the ITC-730A CCU lets you operate up to 1000 feet away through a flexible 13 mm cable in AC mode and up to 300 ft. away using DC at the camera head or CCU. And its well-balanced, lightweight design lets you work comfortably in the field.

The ITC-730A: Great value never looked so good. The standard of excellence goes on at Ikegami. For a complete demonstration of Ikegami Cameras and Monitors, contact us or visit your local Ikegami dealer.
companies designing and building videodisc interfaces for their editing controllers. As of this writing, the following information on companies, many of whom will be at NAB’84/Las Vegas, that are building systems.

One of the companies working on a videodisc editing system is Spectra Image. Gary Matz, executive vice president, said that the company is building an interactive and catalog-type disc-based system. This will include equipment to provide motion control and capability for handling up to 30,000 individual slides. Another service to be offered will be disc-based presentations. The company is building videodisc-based editing systems that will be leased to users. Input from industry film and tape editors helped this company develop a user-friendly system. According to Spectra Image, the TV industry is moving so fast that the company periodically will have to update its systems to be competitive.

Spectra Image plans to provide mastering to videodisc on a 1-shot basis with overnight turnaround for a cost per half-hour disc of $150. By 1985, it expects to lower that price to $100. According to Matz, Spectra Image may show its system at NAB’84.

One of the most well-kept secrets in this industry to be unveiled at this year’s NAB show is the Edroid videodisc-based editing system. This joint venture between LucasFilm and Convergence, if nothing else, should have people lined up at the booth to get a look. I have asked for information describing the system, but Convergence, as well as all other editing systems manufacturers, is not furnishing it.

According to Deborah Harter of Convergence, the Edroid editing system will be manufactured and distributed by Convergence. The system has been designed by George Lucas and his engineers and is aimed primarily at the film editor. There is no keyboard or light pen for input to the system. However, Harter said that the input device is mechanical. The number of disc players seems to be virtually unlimited. The system also will interface with existing VTRs. Although the Edroid seems to be designed for film editors, it also will be compatible with SMPTE time code and will allow the editing of TV programs on videotape.

The Control Video Corporation (CVC) has announced that it will introduce a new disc-based editing system, the Competitor. It is a high level editing system with the capability for interfacing up to 30 videodisc players, using an enhanced CVC editing controller.

At this time, CVC is interfacing to the Panasonic direct read after write (DRAW) videodisc recorder/player, which has a capacity of 13.8 minutes of material in real time. Some of the announced features include an interface to four videodisc players, real time playback, multiple record capability and variable speed playback in either direction. It also will allow film-to-video to film editing with the 24- to 30-frame conversion software included in the base price of the system, which is expected to be from $50,000 to $55,000. Another feature will be the transfer function, allowing auto duping of material to another disc for dissolves or for editing between disc players in real time.

The CVC Competitor also includes complete edit list management capabilities. This includes finding an edit by anything stored in the list from edit number to names stored as a note. Data is put into the system by the Lightfinger screen or an optional keyboard.

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"Quality Is No Accident"
NEC’s new 3-chip CCD color camera

By Masao Mitsui, director of engineering, NEC America, Elk Grove Village, IL

Shown is one of the new NEC interline CCD chips used in the SP-3 video color camera. The registration of the three CCD imaging chips is permanently set in the factory.

Since they were introduced in the late 1970s, video cameras using solid-state charge-coupled device (CCD) image sensors have generated a great deal of excitement in the broadcast industry. With their mechanically locked registration, CCD cameras seemed particularly suitable for electronic news gathering, in which camera operators often are required to carry out tough ENG assignments in difficult circumstances with little or no time to set up.

Furthermore, CCD cameras promised to be considerably more rugged and reliable in operation, as well as lighter in weight and lower in power consumption, effectively easing the load of equipment ENG camera operators need carry with them.

Video cameras using solid-state CCD image sensors were expected to provide performance superior to that available from most conventional 1/2-inch pickup tubes. However, until recently, their use was confined mostly to industrial applications because their resolution was still inferior to that of Vidicon-type pickup tubes. One of the problems that needed an immediate solution was the blooming phenomenon. The application of an overflow drain and barrier positioned beside the photosensitive area has made it possible to suppress the blooming phenomenon in CCD image sensors. However, this method was found to sacrifice photosensitivity and dynamic range.

To produce its first broadcast-quality CCD color camera, the SP-3, NEC has developed a totally new interline CCD chip, in which the contents of the multiple solid-state data registers are read out during the video picture's vertical interval. The NEC interline CCD chip features a vertical...
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overflow drain (VOD) positioned under, rather than beside, the photo diode, thus effectively increasing the cell area that can be used for photo electron generation and storage. Three of these interline VOD CCD image sensors are used in the SP-3 ENG color camera: two for the green channel alone, and one for the combined red/blue (RB) channels. This dual green system, which can only be realized with a mechanically locked registration system, provides much higher resolution and sensitivity than can be obtained from a conventionally structured RGB system.

The CCD image sensor

Figure 1 shows the basic composition of the new interline CCD image sensor used in the SP-3 camera.

The sensor features a photoelectronic conversion system that consists of an array of 490(V) x 384(H) photo diodes, a transfer gate region (TG) controlled with a vertical transfer pulse, a buried channel vertical register (V-CCD), a horizontal register (H-CCD) and a gated charge detector for the output signal.

The photogenerated signal charges are transferred to the corresponding V-CCD through the TG region during the vertical blanking period. There are two ways to accomplish the transfer: One is the field mode, which transfers all photogenerated signal charges at the field rate; and the second is the frame mode, which transfers half of the photogenerated signal charges during the first field period and the remaining half of the signal charges during the second field period. The signal charges transferred to the V-CCD register subsequently are transferred to the horizontal register at the horizontal line rate and sent out to the output stage at the clock rate of the horizontal register.

A unit cell (indicated by the dotted line) consists of a photo diode, a half-stage V-CCD register and a VOD in which all of the photogenerated excess charges are drained into the substrate without flowing into the V-CCD. By means of the vertical overflow drain, the cell area can now be used effectively for photo electron generation and storage, and increased photo-sensitivity and dynamic range can be maintained. In effect, this technique eliminates the blooming phenomenon.

A dual green image pickup system

In a conventional 3-tube elements camera, each of the elements is assigned to the RGB channels respectively. However, this method of one channel/element assignment is not effective if applied to the 3-chip CCD camera, yielding resolution problems, as well as signal aliasing problems, which are created by the use of solid-state chips as the image pickup elements. Aliasing occurs in the CCD image sensor when the spatial fre-
Designed as a broadcast-quality stand-alone ENG camera, the SP-3 (shown here with Sony Betacam ⅛-inch recorder) offers universal interface to all videotape formats: ⅛-inch Beta or VHS, ¼-inch U-matic, as well as ¼-inch VCRs. Solid-state operational characteristics feature accurate and permanent registration that is free from geometric distortion.

The dual green system attempts to approximate the performance of the human eye as it perceives color, taking into account the following: The light value ratio of green to red/blue is approximately 1.5:2; and in the NTSC color system, the bandwidth ratio of the luminance channel to the chrominance channels is about 4:1. Conse-
quently, in spite of the limitations inherent in having only 384 pixels for the horizontal picture elements (per CCD chip), with the dual green system it was possible to obtain a horizontal resolution of more than 500 TV lines.

The optical system

Refer to Figure 3 for the composition of the optical system employed to split the incoming light beam by prism. In front of the prism there is a series of filters: an ND filter (to help increase the camera's dynamic range), an IR cut filter and an optical low-pass filter (LPF).

The optical low-pass filter is used to minimize the aliasing problem, which is mainly caused by green light. In effect, the optical low-pass filter suppresses the spatial frequency of the image that causes aliasing on the CCD image sensor.

Because the dual green system is employed, the SP-3 camera uses a unique prism-optics block to split the incoming light beam into three beams: two greens for the G1 and G2 CCD image sensors and one magenta for the RB CCD image sensor. One-half of all incoming green light is reflected at the first dichroic surface, and the remaining one-half of the green light is reflected at the second dichroic surface. Only magenta light passes straight through the prism without any reflection. In this system, two green lights are reflected to precisely opposite directions against the light axis, thus minimizing achromatic effects that may occur when the image is out of focus and the iris is wide open.

Past the prism, another low-pass filter is inserted in the red/blue optical path to prevent aliasing and ghosting from the RB CCD image sensor. This is done because the bandwidth of the red or blue channel is effectively only one-quarter of the green channel bandwidth.

The CCD imaging chips are mounted directly on the optical assembly. The registration of the imaging chips is permanently set in the factory. No adjustment is ever needed.

Signal processing circuits
- Combining the G signals and splitting the RB signal—Refer to Figure 3 for a block diagram of the SP-3 camera. Because the horizontal shift registers of the CCD image sensors for G1 and G2 are driven by the two clock pulses (7.16MHz) with 180° phase shift, a 1H delayed signal and a 2H delayed signal for G1 and G2 can be obtained just through two 1H CCD-type delay lines without requiring a special delay line for phase matching respectively.

The non-delayed original signal, the 1H delayed signal and the 2H delayed signal for G1 and G2 are all combined, respectively, by three sample-and-hold (S.H) blocks, each consisting of two sample circuits and one hold circuit. Therefore, the data rate of the output signal from each of the sample-and-hold blocks is twice the rate of the output signal from each of the green CCD image sensors.

On the other hand, because the output signal from the red/blue CCD image sensor consists of alternating red and blue pictures at a rate of 7.16MHz, the red and blue signals can be easily split by using two sampling
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pulses (3.58MHz) with a 180° phase shift.

- **Image sharpener circuit**—The camera features a 2H-line type image sharpener by means of a high performance CCD delay line (DL) which has a 400% dynamic range and a 62dB signal-to-noise ratio.

The CCD delay line and the green image sensors are driven in parallel with the same clock signal to maintain proper timing between the signal coming from the green CCD image sensors and the delayed signal through the CCD delay lines. The output of the three sets of sample-and-hold blocks (non-delayed, 1H delayed and 2H delayed video) is then fed to a comb filter and image sharpener to peak the high frequency components of the green channel signal and to generate edge component signals. In this system, the high frequency component of the green channel is also used to feed the red and blue channel signals to enhance their frequency content.

- **Output signals**—The camera provides the following output signals:
  - Y, R – Y and B – Y signal for component VTR;
  - composite video signal with SP-1AD adapter; and
  - direct RGB output signal with SP-2AD adapter.

An NTSC composite signal is also available as monitor for the built-in VTR system in camera/recorder combinations.

**Camera functions**

The SP-3 camera incorporates auto and preset white balance, auto black balance, black stretch and auto iris.

**The camera system**

The CCD color camera is designed to be used as a broadcast-quality ENG stand-alone camera, as well as in camera/recorder combined systems using on-board component VTRs for ENG applications.

Enhancing the versatility of the camera, available camera adapter attachments interface to external conventional portable VTRs, as well as to RGB image processing systems as a special application.

The SP-1AD camera adapter attachment is used to generate composite video signal output for conventional VTR recording. The SP-2AD camera adapter provides direct RGB output for use as a document camera or for image processing applications.

Because the SP-1AD camera adapter contains gen-lock and IQ type encoder modules, it will generate a burst signal and a color frame pulse that will meet the RS-170A standard, as well as NTSC color signal requirements.

Remote-control functions are available for gain, pedestal, iris, SC and horizontal phase control, etc.

**Features**

Compared with conventional 3-tube video cameras, the CCD camera offers several distinct advantages:

- Solid-state operational characteristics feature accurate and permanent registration that is totally free from geometric distortion. In normal operation, no CCD chip ever requires replacement or adjustment.
- Disturbances such as electrical circuit deviations or the earth's magnetism that can affect registration and cause geometric distortion in conventional magnetically deflected cameras are totally ignored by the SP-3 camera.
- Furthermore, the CCD camera is completely free from burn-in, sticking and comet-tail that may occur in conventional pickup tube cameras when high intensity objects are viewed. Even if you were to shoot directly at the sun, no damage would be incurred to the elements.\(^1\)

The SP-3 offers a complete freedom of choice in videotape interface. Its compact size, light weight, and outstanding resistance to shock and vibration make it an extremely durable and versatile system that can be employed effectively in ENG applications as well as other applications where conventional 3-tube video cameras cannot perform adequately.

With its high resolution and quality color reproduction, NEC's new CCD camera represents a big step forward in available broadcast-quality cameras, and points the way for the next generation of broadcast camera technology.

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\(^[1]\) As noted, under normal operation, the CCD chips of the SP-3 camera should never need replacement. If, for any reason, such replacement should ever become necessary, the camera should be returned to NEC for inspection and service. Although such service seems unlikely, BE explored the possibilities with NEC. The company said that individual chip replacement is possible. If the camera has been seriously mistreated, the entire optical block and all its CCDs can be replaced. In this worst-case situation, the cost would be approximately what you would expect for replacing the optics in a traditional tube-type camera.

\(^[2]\) Aiming your expensive video camera at the sun, or at its reflection from a shiny surface, is not a recommended practice. However, according to NEC experts, such action, accidental or deliberate, does not have any apparent adverse effect on the immediate or long-term performance of the SP3 camera. It is our understanding that NHK in Japan set up a CCD camera to tape an eclipse of the sun. A segment of the resulting tape was subsequently broadcast so that the public could view the event. BE is researching this work and will report details when they become available.

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**Editor's note:**

This article on the SP-3 CCD camera was provided courtesy of NEC America and excerpted from the NEC Synchrovision, Volume 2, No. 1, Winter 1984. A production version of the SP-3 camera was introduced at the SMPTE 133rd Los Angeles Convention, Oct. 30-Nov. 4, 1983. The camera is available now from NEC, essentially from stock, for approximately $15,000 (without lens). For a quotation, contact the Broadcast Equipment Division, NEC America, 130 Martin Lane, Elk Grove Village, IL 60007.

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294 Broadcast Engineering April 1984

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Audio crosspoint switching: A design example

By Bob Zavrel, applications engineer, Siliconix, Santa Clara, CA

The audio crosspoint switching system described here can be used not only for recording studio and broadcast mixer applications, but also in a diverse range of circuits requiring low switch cost and small size. Such applications include audio-follow switches for video systems, audio synthesizers, high quality multiplexers and home entertainment systems.

Recent advances in analog switch integrated circuits have resulted in devices that can deliver superior audio performance for the most demanding applications. A high quality audio frequency switch should have a reasonable cost, unity or variable gain, low harmonic distortion (less than 0.01%) and flat response (from dc.

Figure 1. Basic analog switch design for the 8x2 stereo crosspoint matrix. Circuit input impedance is determined by $R_L$ and output impedance is determined by $R_D$.

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*Via Zephyr Weather Transmission Service

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A magnified view of the circuit pattern for the SD5002 quad analog switch chip.

to greater than 1MHz). Low cross-talk, high off-state isolation, excellent phase linearity and high switching speed (less than 1ns) also are desirable characteristics. Finally, the switch should be free of popping, directly controllable by digital gates and use dc coupling only.

The size of a complex audio switching array can be reduced greatly by using integrated circuit (IC) technology. The analog array described here is an 8x2 stereo crosspoint switch mounted on a 4"x7" printed circuit board (PCB). Other switch configurations may be fabricated with little effect on the switch characteristics. This single board can replace a score of rotary switches and the bundles of audio cables often found in audio mixers. Furthermore, eliminating long cable runs often will reduce ground-loop problems.

The switching system
SD5002 switching elements are used in this application because of their low on-resistance, low switch capacitance and fast switching characteristics. The LF-347 quad op-amp is used as a buffer and output amplifier.

Figure 1 shows how a single SD5002 is configured as a 2x1 stereo switch. The LF-347 functions as a summing and output amplifier for each stage. The analog switches are held normally open by biasing the control gates to ground potential through 10kΩ resistors. For any configuration, the appropriate switches are closed by biasing their gates to the positive voltage supply.

In this circuit, pairs of switches are operated together to control the left and right channels of a stereo input simultaneously. This is accomplished by tying the applicable switch gates together and using a common bias resistor. The capability for directly interfacing the SD5002 gates to digital integrated circuits presents multiple design options for switch control.

Figure 2 shows how the basic circuit...
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can be expanded into a switch matrix. Eight SD5002s are required to construct the 8x2 stereo matrix array.

How it works

Each channel input requires resistor \( R_s \) for termination and a second resistor \( R_s \) to feed the signal from the inputs to the various switches. The junction of these resistors forms an input bus.

The SD5002 drains are connected to the summing nodes located at the inverting inputs of the summing amplifiers. As array size increases, system performance normally would suffer from longer lead lengths and increased circuit capacitance. However, the SD5002 allows large matrices to be designed with little performance compromise because of the low switch capacitance.

The value of \( R_s \), which should reflect the value of the source impedance, influences cross-talk and off-state isolation between channels. Both specifications improve with lower values of \( R_s \). The feedback resistor for the output amplifier stage, \( R_s \), can be adjusted to give a wide range of system gain values. Unity gain is achieved when \( R_s \) is equal to 150kΩ. Resistor \( R_s \) in the output circuit determines the value of the output impedance. If the switch feeds a high impedance load, \( R_s \) is necessary to maintain good system performance.

Electrolytic and mica capacitors are suggested for use on the circuit board to provide power supply bypassing functions. This reduces low frequency and supersonic noise, and helps to stabilize the system. The entire circuit should be well-shielded, particularly if it is exposed to strong RF or powerline fields. Conductors carrying high currents should be isolated from the card, and a double-sided PC board should be used to create a ground plane on the component side for added protection.

Table I shows the measured switch performance of the 8x2 crosspoint configuration. For test purposes, the value of \( R_s \) was 10kΩ, matching the high impedance to the test oscillator output. Regulated power supply voltages of ±9-15V may be used with this design. Peak-to-peak signal voltages at the input should be less than 3.5V for optimum switch performance.

A variety of other switching arrangements can be devised for the SD5002. This example can serve as a circuit guideline for other requirements a station might have.
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In 1984, frequency coordination will play a key role in three US events that will receive worldwide attention. Never before have there been this many events of global interest, so dependent on back-stage Part 74 2-way and microwave transmission, taken place. New ideas, along with methods used since the dawn of ENG, will be tested literally before the eyes of the world.

The 1984 Olympics
Olympic coverage and frequency coordination for the event are the responsibility of the American Broadcasting Companies (ABC), which bought exclusive broadcast rights. Along with the responsibility of getting the Olympics on the air from Los Angeles (the country's RF congestion capital), ABC will host broadcasters from the rest of the world who will provide electronic coverage for their respective countries. The word has gone out that anyone planning to bring wireless broadcast equipment into Los Angeles, even so much as a hand-held transceiver, must contact ABC's Olympics RF coordinator, Michael LoCollo.

LoCollo has been busy for more than a year planning ABC's Part 74 coverage. Because the Olympics will take place in the backyard of the Southern California Frequency Coordinating Committee (SCFCC), he has worked closely with that organization at key stages in the planning process. A prerequisite for the coordination planning was that Olympic coverage should have minimal impact on day-to-day operations in the Southern California area.

With more than 14 regular users of the 10 2GHz channels in the Los Angeles region, and more than 70 licensees in the two 1MHz slices of the 450MHz remote pickup unit (RPU) bands, you must resort to special measures to accommodate Olympic needs. With this in mind, the FCC has granted a special temporary authority (STA) to ABC for temporary use of frequencies not included in the Part 74 channels. The STA allows ABC to use a vacant UHF TV channel for voice communications related to its broadcast coverage. Protection for licensees in the 2GHz, 7GHz and 13GHz bands will be provided by close coordination with Los Angeles area TV licensees and other non-broadcast microwave users.

The FCC has formally recognized ABC as the principal coordinating body for Olympic activity by announcing that it will waive the 30-Day Rule (Part 74.24). This means that any broadcaster from outside the Los Angeles area will be required to perform prior coordination with ABC. The SCFCC will support this waiver fully. ABC has worked closely with the regional coordinating body to guarantee that coverage of the Olympics will mesh smoothly with local broadcast activity, and ABC will continue to do so. LoCollo, a member of the Society of Broadcast Engineers' National Frequency Coordinating Committee (NPFCC), has worked closely with the SBE group on coordination planning.

The political conventions
The three networks traditionally have shared the frequency coordinating chairmanship for political conventions, since the need for prior planning was recognized some years ago. This year, Richard Harvey of CBS has an immense task. Olympic in its own right, Harvey will be responsible for making sure that coverage in two different cities, each experiencing RF saturation, goes off without a hitch.

Both Dallas/Fort Worth, scene of the Republican convention, and San Francisco, where the Democrats will meet, have local frequency coordinating committees. Gerry Dalton of KKDA-FM has organized the Dallas/Fort Worth database, which makes coordination information available from any computer terminal equipped with the proper modem. Joe Berrini of KRON-TV in San Francisco is the Northern California Frequency Coordinating Committee chairman. These local organization efforts are important to the upcoming political convention activity. They have proved that local broadcasters in both regions can work together.

Harvey has held meetings of his National Political Frequency Coordinating Committee (NPFCC) in both convention cities. He has reassured local broadcasters that his group's coordination plan will affect daily operations as little as possible. STAs for unused UHF TV channels have
been approved by the FCC for both convention cities. The NPFCC will be responsible for coordination of these STA's. Unlike the STA that ABC obtained for the Olympics, the San Francisco and Dallas/Fort Worth STA stipulate that all broadcasters needing extra channels for their coverage are eligible.

The 30-Day Rule also will be waived during the conventions in Dallas/Fort Worth and San Francisco, making the NPFCC the official coordinating body for these two events in the eyes of the FCC.

**Sharing the spectrum**

There is growing recognition that frequency coordination's time has come. The First Report and Order on Docket 82-334, which, at SHE urging, protected 2GHz and 7GHz microwave users from potentially disastrous requirements to share their channels with other users, is a milestone. Another milestone is FCC approval of a 450MHz channel split plan administered by the SCFCC that increased the number of users that could be accommodated in the UHF RPU band. An indication of the commission's interest in and support of industry-run frequency coordination efforts came at a January meeting of the NPFCC. Among the persons attending was Jim Durst, broadcast analyst for the FCC. He was there at the direction of James McKinney, chief of the commission's Mass Media Bureau.

**Notice to the industry**

Any organization that intends to cover the 1984 political conventions in Dallas/Fort Worth or San Francisco using RF transmitters or wireless microphones of any type, power or frequency, should contact Richard Harvey, chairman of the National Political Frequency Coordinating Committee, at CBS, 555 W. 57th St., New York, NY 10019.

Any group that plans to cover the Los Angeles Olympics using RF transmission gear should contact Michael LoCollo, chairman of the World Broadcasters RF Committee at ABC-TV, 1313 N. Vine St., Hollywood, CA 90028.

Harvey has developed a set of guidelines for operation during the two conventions. Carrying the blessings of the SBE's NPFCC, these guidelines incorporate many ideas that all Part 74 licensees should take to heart. A complete list of these guidelines is available. Requirements of special interest include a power restriction that all parties must observe within the convention centers, and a promise that everyone operating a microwave link outside the halls will use a visual identifier when the link is up but programming is not being transmitted.

Although prior coordination has been used on major events in the past, never have such events taken place where the level of radio and television activity, plus satellite transmission, will be as high as we will see later this year. It will be a test of the technical competence of all broadcasters involved, the patience of the frequency coordinators and the trust of local broadcasters who are working closely with frequency coordinators for the events.

With hard work, good will and the proven elements of regional coordination, all participants in the sporting and political dramas of 1984 should see their efforts on the air with a minimum of problems—to themselves and others.

Editor's note:
The author is chairman of the National Frequency Coordinating Committee, under the auspices of the Society of Broadcast Engineers. He has also joined the BE masthead as spectrum management consultant.

---

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Circle (233) on Reply Card

April 1984 Broadcast Engineering 305
Today's increasing cost of energy has forced power tube designers to incorporate energy-saving features into their newest designs and re-evaluate the merits of older models. In their search for a way to improve UHF TV transmitting tubes, the authors—who without knowing it—resurrected an idea that had remained dormant for more than 40 years. Called the Klystrode, the result of their efforts is seen as a promising source of energy-efficient power that already has generated more than 30kW (CW) at 775MHz, and conceivably could deliver hundreds of kilowatts in the UHF range.

The Klystrode, which combines the features of a tetrode and a klystron, consists of a magnetically focused electron beam bunched by an RF cavity-driven grid, an output cavity and a collector.

The device can be operated as a Class B linear amplifier, similar to a tetrode, but with the reliability and high power-handling capability of a klystron. Power gain is in the range of 18-25dB, depending on the input RF circuitry, and efficiency at full drive power is in the range of 50% to 63%.

For example, at an operating frequency of 775MHz and an RF drive power of 150W, the new tube delivers an RF output power of 30kW. This represents a power gain of 23dB. The conversion efficiency is 58% minimum. In pulsed operation, output power has been measured at 45kW, with a peak RF drive power of 225W, representing a power gain of 23dB. Conversion efficiency is 60%.

Best of both worlds
Recent testing of the Klystrode has indicated that it is well-suited to UHF TV service as an aural or visual channel amplifier. In aural FM service, the high power gain and efficiency, as well as long life expectancy, make it especially attractive. The fact that the tube operates with a high voltage (HV) power supply having the positive end grounded makes it particularly suitable for use with a klystron visual amplifier, which uses a similar positive-ground configuration. The Klystrode can operate at the same beam voltage as the associated visual klystron, thus a common beam power supply may be used, further reducing cost.

In visual service, the Klystrode offers the possibility of greater overall efficiency than conventional tetrodes or even the most advanced klystrons. Compared with the tetrode, its efficiency and power gain at all signal levels and peak of sync is measurably higher. Because of its lower emission density (resulting from high voltage/low current operation), and the absence of a heavily stressed screen grid and anode (caused by high dissipation of energy due to current interception), the Klystrode also is expected to have a much longer life expectancy, and may prove to be as durable as the klystron.

Compared with a klystron, which has an input beam current that stays constant and high at all picture levels, the Klystrode—like the tetrode—has a dc power input that varies with the level of the video signal (lower at white, higher at black). Thus, even though the klystron has much higher power gain, long life expectancy, more-than-sufficient bandwidth and far more power output than necessary for today's TV needs, its operating cost is increased drastically by its relatively low average picture efficiency.

Initially, the Klystrode's cost seems to fall somewhere between the less-expensive tetrode and the more-expensive klystron. The Klystrode also is shorter than a klystron, an advantage in some applications.

By Merrald B. Shrader and Donald H. Priest, Varian Associates, EIMAC Division, Palo Alto, CA

The Klystrode amplifier tube offers UHF TV users greater efficiency than the klystron or conventional tetrode. Long life also is expected from the Klystrode.

*The Klystrode is a trademark of Varian's EIMAC Division.
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EIMAC offers a low power, external-cavity series of Klystrodes rated for FM sound at levels up to 7.5kW (25kV beam voltage), and a medium power series, also external-cavity-type, for power levels up to 27kW (25kV maximum). A series of Klystrodes rated at up to 30kW power output at 32kV beam voltage is being developed for production. In all, two tubes and cavities are required to cover the UHF TV band (470-600MHz and 600-806MHz).

With the growing interest in the potentially lucrative UHF TV market, there is a realization that any source of high power must be efficient, therefore cost-effective, to be a viable competitor with the firmly established VHF TV base. The broadcasting industry may have found such a contender in the Klystrode.

**How it works**

Developed by Varian Associates' EIMAC Division, the Klystrode actually is a pentode (five elements) that has a round-disc cathode, planar grid and apertured anode. [See Figure 1.] A re-entrant cavity has been placed between the anode and the next electrode, called the tail pipe. Insulated from this is the final electrode or collector. A solenoid or permanent magnet then is used to immerse the tube in a uniform magnetic field. At first glance, then, the tube is similar to a conventional tetrode, except the spent electrons are dissipated separately from the output resonant circuit.

In operation, an alternating RF voltage is applied between the cathode and grid, using one of several possible circuit arrangements. The resulting bunched, or density-modulated, electron beam then is accelerated toward the apertured anode at high potential, passing through it without being intercepted. Continuing through a field-free region at constant velocity, the beam next passes through an output gap in the resonant cavity as the electric field induced by its passing is decelerating.

![Diagram of Klystrode structure](attachment:image)

*Figure 1. The structure of the Klystrode, which combines the features of a klystron and a tetrode.*

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HQAS: High Quality Animation System gives the operator tools for enhancing previously created animations by adding glows, sparkling effects and streaking capabilities. Also, texture mapping and multiple, moveable light sources will be included.

Paint: Also available at this year's NAB is a Basic paint system. By using the stylus and the system's tablet, the operator may paint with all the FGS-4000's 16 million colors, change brush size or shape, air brush or blend. This is an expandable package with more features to be introduced.

Single Framing Editor: Single frame machine control allows automatic control of VTR's via the FGS-4000. This gives the operator the ability to record frame-by-frame and then play them back in real time.

Things You Should Know

Ease of operation: Bosch enlisted the talents of professional graphic artists to help design the operational functions of the FGS-4000, thus making this graphic system as easy to operate as a pencil and paper.

Image quality: Images of the FGS-4000 are indistinguishable from actual video. No aliasing, stair stepping, breaking up or tearing of edges when scaling, positioning, or rotating objects.

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www.americanradiohistory.com
The history of the Klystrode

During the 1930s, the state of the art in transmitting and receiving tubes had attained a maturity and cost-effectiveness that served most needs of contemporary radio communications. At that time, attention began to turn to higher frequencies, which offered advantages that later culminated in the development of such now-commonplace industries as television and radar. As frequencies became higher, conventional transmitting tubes became necessarily smaller, with resulting lower power outputs. Some designers began to look for newer approaches, turning away from the classical gridded density-modulated tube. Two innovators who continued to do research on gridded tubes, however, were A.V. Haeff and L. Nergaard, who then were working for RCA in Harrison, N.J.

What they discovered was that a major output limitation involved wasted power dissipation by the grids and anodes of then present-day tubes. They perceived that if non-intercepting electrodes (apertures, for example) could replace wire grids, and the electron beam could be contained by a coaxial magnetic field, more-efficient, higher level power could be produced.

Similar to the developers of the klystron, they saw that power could be removed from a bunched electron beam by passing it through a resonant cavity in which the kinetic energy of the high velocity electron beam could be transformed to electromagnetic energy, without having to collect the electrons on the walls of the cavity.

Invented by Haeff, the inductive output tube (IOT)—precursor of the Klystrode—was first described by him in 1939 (Electronics) and again, with Nergaard, in 1940 (Proceedings IRE). When built, the tube delivered 100W (CW) at 450MHz, with a 10dB power gain and 35% efficiency, remarkable performance for its time.

Unfortunately for the IOT, during World War II, VHF triodes and microwave cavity magnetrons became popular, followed by increasing interest in velocity-modulation (V-M) tubes. The IOT remained forgotten until Shrader and Priest, searching for new ways to improve UHF TV transmission, independently resurrected the tube. It was only after reading Haeff's published papers that they realized their creation (the Klystrode) was none other than the basic IOT embellished by more sophisticated tube and materials technology.

Finally, the beam passes through a second field-free region (the tail pipe), again with minimal interception, and then crosses the gap between tail pipe and collector.

The differences between the Klystrode and a conventional tetrode can be demonstrated graphically in a comparison of their potential, electric field and electron velocity. (See Figure 2.) Observe that the Klystrode acts similar to a klystron between the anode and collector, but closely resembles a tetrode between the cathode and anode. Six important differences should be elaborated on:

- The Klystrode's anode potential is higher than the tetrode's screen grid potential.
- There is a strong decelerating field in the output gap of the Klystrode compared with an almost zero field associated with the tetrode at the time of maximum current flow.

These different profiles for the potential and field (potential gradient) reveal fundamental differences in operation. Think of the tetrode as a switch that cycles every half cycle, allowing current to flow from the power supply through the resonant load. By taking advantage of the energy storage properties of the resonant circuit, the dc energy is converted to RF energy in the circuit.

In contrast, the Klystrode (and the klystron) changes the kinetic energy of the high velocity electrons directly to electromagnetic energy in the output gap. Also, although the tetrode conversion efficiency is maximized at low frequencies, efficiency is decreased markedly at higher frequencies, when the screen-grid voltage must be made high enough to supply sufficient electron beam velocity.

An important result of the different potential profiles is the Klystrode's much larger average electron velocity, which makes the use of a relatively long beam possible.

Another difference between the two devices is the presence of the field-free regions before and after the
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Klystrode output gap. These ensure that the output interaction space is isolated from the input space (grid-anode), as well as the collector. In practice, this isolation is important because, without it, input circuits could be affected adversely by variations in tuning or loading of the output circuit.

- The Klystrode tail pipe essentially is non-intercepting as compared with the tetrode's anode, which also functions as a collector. Therefore, the Klystrode's collector can be made large (unlike the anode of the tetrode) and, therefore, can operate at lower power density and greater power output.

- With the Klystrode, there is no need for a blocking or bypass capacitor, because there is no dc voltage across the output gap. The fact that the high voltage dc and rf fields are separated means that the gradient in each gap is about half the gradient in the output space of a conventional tetrode. This coupled with the fact that no blocking capacitor is needed to carry the rf circulating current in the output cavity (which can be at ground potential), is an advantageous operational feature of the Klystrode.

- Unlike the tetrode, the Klystrode uses a magnetic field. Although the Klystrode would perform well without such a field (look at the electrostatically focused klystron, for example), the advantages of a magnetic field are considerable.

For one, the natural tendency of the beam to spread is curtailed, especially in the output gap, where the exit electron velocity is low and the space-charge forces are high. Without such focusing, the tail pipe would have to be much larger in diameter to avoid its interception with the beam, which could generate secondary electrons that would cross the gap in a direction opposite that of the main beam, thus peaked from the main load. The larger tail pipe also would increase the output gap capacitance and decrease bandwidth. Finally, the beam-to-gap-coupling coefficient between the beam and cavity fields would be reduced, decreasing conversion efficiency.

A bright future
Experimental results conducted at Varian EIMAG have proved the viability of the Klystrode tube as an excellent source of high power and efficiency for the broadcast industry, especially UHF TV. With the development of more powerful units, there is reason to expect that other applications requiring the performance and efficiency capabilities of this high frequency power source will emerge.
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April 1984  Broadcast Engineering  313
New technology and tougher-than-ever competition are causing station managers and engineers to look closely at their technical plants for ways to improve the performance and reliability of their systems. With the FCC's Docket 80-90 decision and the expected increase in subsidiary communication authorizations (SCAs), FM transmission systems that were acceptable in the past may no longer be adequate.

One of the potential bottlenecks to high quality, wideband transmission overlooked many times is the antenna. Unless presented with a serious an-
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A wide variety of antennas is available for use in the FM broadcast band. Although these antennas differ from one manufacturer to another, some generalizations can be made that apply to any FM antenna.

Circular polarization (CP) of the transmitted signal almost universally is employed for FM broadcasting. CP results from equal electric fields in the vertical and horizontal planes of radiation that are out-of-phase by 90° and rotating a full 360° in one wavelength of the operating frequency. The rotation can be clockwise or counterclockwise, depending on the antenna system design. This continuously rotating field gives the CP signal good penetration capabilities, because it can be received by an antenna of any random orientation.

Propagation of RF energy in the FM band is governed by many different factors, such as free-space loss, vegetation, soil conductivity, the Brewster angle and Fresnel zone, multipath and type of terrain. These concerns must be considered when choosing a transmitting site or antenna type.

The need for careful planning of an FM transmitting facility cannot be overstated. Mistakes in site selection or antenna gain design can be costly to correct after construction has been completed. This word of caution applies especially to stations trying to increase their antenna height or effective radiated power (ERP) to avoid classification at a B1, C1 or C2 level, because of the FCC's 80-90 ruling.

The solution to a low ERP is not necessarily additional bays on the transmitting antenna. Likewise, the solution to a low height above average terrain (HAAT) is not necessarily additional sections on the present tower. Although these two actions may avoid classification of the station at a lower level, the end result may be disappointing (or even disastrous) when coverage patterns are considered. Safety factors also must be taken into account, such as the capability of the present tower for supporting additional antenna bays. Extending the height of an existing tower is a project that should not be entered into lightly. Unless the structure was designed for...

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additional height, a careful engineering study should be conducted to determine how much higher the tower can go, and what reinforcing would be needed to preserve the present mechanical strength.

Antenna gain

The ideal combination of antenna gain and transmitter power for a particular installation is something few engineers or consultants ever agree on. A variety of different pairings can be made, and predicting which one would be best is a difficult proposition. Because the trial-and-error method is expensive in this case, broadcasters must make an educated guess on the right combination, based on the recommendation of a qualified consultant and the present coverage patterns of other broadcasters in the same market (preferably transmitting from the same general area).

If the presence of the ground could be disregarded, there would be virtually no difference between any combination of antenna gain and transmitter power that yielded the same effective radiated power. This, however, is not the case.

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FM classifications simplified

By Bob Weirather, Harris Corporation, Quincy, IL

FCC Docket 80-90 has caused much confusion among FM operators regarding new station class designations. The commission's order requires FM stations to meet certain minimum antenna height and effective radiated power (ERP) requirements or be permanently declassified at a lower level. Stations have, in the past, had the option of beginning operation with facilities below the full licensed power and height allowed by FCC rules and, when economics permitted, improving their plant to the licensed level. Docket 80-90, however, places a time limit on updating facilities for stations currently operating at less than full capacity.

Docket 80-90 gave FM broadcasting three new classifications: B1, C1 and C2. Figure 1 and Figure 2 graphically show the new divisions. (For a more complete understanding of the implications and requirements of 80-90, see the docket itself.)

Stations located in Zone 1 and Zone 1A should use Figure 1, and Zone 2 stations should use Figure 2. The respective charts show the minimum and maximum facilities for each classification. Mark your antenna height above average terrain (HAAT) on the vertical axis and ERP on the horizontal axis of the proper zone chart. Plot the intersect point and read your current classification. Further examination of the chart will show the minimum facilities that must be met to avoid being permanently placed in the lower position.

Note that to be a Class C station, you must have 100kW ERP from an elevation of at least 300 meters (984 feet).
and the lowest antenna gain needed to give the licensed ERP. This is not necessarily true, however, as demonstrated in Figure 1(a) and Figure 1(b).

The lower the antenna gain, the broader the radiation pattern. This is a requirement for the situation shown in Figure 1(a), but it is a waste of money and power for the example shown in Figure 1(b). A good share of the energy from the transmitter to city B would be radiated above the horizon if a low gain antenna were used. A high gain antenna, which will narrow the beam, should instead be paired with the transmitter serving city B. If the same high gain antenna were used at location A, however, the chances are fairly good that acceptable performance would not be available to the city of license because the majority of the transmitter energy would skim over the top of the city.

For greatest efficiency, electrical beam tilt can be designed into a high gain antenna. A standard antenna radiates more than half its energy above the horizon, thus losing it for practical purposes. Electrical beam tilt, caused by delaying the current to the lower elements of the antenna, can be used to provide more useful power to the service area.

Mechanical beam tilt sometimes is used by a station in a particularly difficult mountainous location. In this arrangement, the antenna itself is mounted at an angle from the tower. Any attempt at substantial mechanical beam tilt should be closely examined by a structural engineer.

Another method used occasionally to increase the field strength over the primary service area is to employ a directional antenna with a radiation pattern specifically designed for the particular location. This is accomplished by special construction of the antenna using radiating and reflecting parasitic elements. Figure 2 shows a typical directional pattern available from one antenna supplier, Harris Corporation. The antenna consists of two driven horizontal elements, one horizontal parasitic reflector and one driven vertical element. In certain applications, vertical parasitic elements can be added to further shape the vertically polarized component.

Pattern correction
Another method to maximize radiation to the service area is pattern optimization. The characteristics of the transmitting antenna are affected, sometimes greatly, by the presence of the tower, if side-mounted, or by nearby tall obstructions (such as another transmitting tower) if top-mounted. Unless the antenna was tuned at the factory on a tower identical to the one it finally would be mounted on, the presence of the supporting structure can severely distort the radiation pattern. The tower causes reflections of

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the transmitted wave and, in the case of circular polarization, opposite sense rotation, which further distorts the pattern.

Antenna manufacturers that offer a pattern optimization service use various methods to tune out pattern distortions. These methods generally involve changing the orientation of the radiators with respect to the test tower, and adding parasitic elements. Figure 3 shows a typical pattern before and after correction.

Such pattern correction techniques also may be used to develop directional antennas without the complexity of phased elements and multiple-feed systems.

Some antennas have provisions for fine tuning once the unit is mounted in its operating position. Generally, however, this is unnecessary if the transmitting tower was duplicated accurately by the manufacturer during factory pattern optimization. Spacing of the radiating elements from the tower face is important for proper operation, so tower riggers should be sure to mount the antenna according to the manufacturer's recommendations.

Community antennas
One of the effects of the commission's 80-90 decision has been to make the concept of community, or shared, transmitting antennas more appealing. In many areas of the country, high elevation transmitting sites are difficult (if not impossible) to find. The only alternative, then, is a tall tower, which is expensive to construct. Adding to the cost of such a project are difficulties that may arise when trying to clear local zoning requirements and FAA flight path restrictions.

If, on the other hand, a number of stations in a particular market join to construct a tower and mount a broadband transmitting antenna used (through combiner equipment) by all participating FM stations, the project may become feasible. The cost of such an effort can be substantial, but in many markets there is no other way to achieve the desired performance.

Small-scale community transmitting towers (2-3 stations or less) probably are best served by individual antennas on the common structure. Larger facilities most likely will find the shared antenna system to be the more cost-effective approach. These estimates take into account costs for transmission system hardware, not the tower structure. Special considerations at a particular site may make the break-even point for a shared antenna slightly different than that presented here.

Editor's note:
For more information on items presented in this article, refer to the following literature:

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Field report:

Shown are one of the A-810 tape tension sensor elements and its associated electronics circuit card (in the foreground). The deck headblock assembly also can be seen. Note the shielding used on the playback head audio cable.

Studer A-810 tape recorder

By David Smith, chief project engineer, audio, Editel, New York, NY

The audio post-production room at Editel is an audio-for-video facility based on Studer tape machines, so it came as no surprise when Studer Revox America offered our company an in-house demonstration of Studer's new 2-track unit, the A-810. I had heard repeatedly that although this new machine's transport was microprocessor-controlled (as in previous Studer models), the audio setup also was under the supervision of the microprocessor. In other words, there were no screwdriver adjustments. I have been carrying a tweaker around for some 11 years, and I am a great believer in techniques such as non-standard equalizations, underbiasing and generally playing the tape deck as a musical instrument. The idea of a self-aligning machine left me skeptical and somewhat apprehensive.

The day the A-810 arrived, I saw it aligned for record and playback with the push of several buttons. The alignment procedure demonstrated a heretofore unseen synthesis of tape recorder and computer that was fully programmed to converse with inhabitants of the real world, human and electronic. The level of software development immediately quashed my fears about automated alignment. The machine is managed entirely by microcomputer, including the establishment of audio parameters. Operational settings are dictated by the user. The computer's primary purpose is to execute instructions and store them in memory for later access.
**SMPTE time code feature**

The main reason for demonstrating the A-810 at Editel was to spotlight an optional feature of the unit that uniquely suits it to video post-production, where SMPTE time code is employed universally for synchronization. This is the first production machine that uses biphasic recording to place time code signals between stereo audio tracks on ¼-inch tape. The technique allows the code to be recorded without the cross-talk usually associated with time code. So successful was the A-810 in this respect that within two weeks of installing the demonstration model, the machine had become indispensable.

The Studer system records the SMPTE time code on a center track 0.33mm wide, using specially designed combination heads placed on either side of the audio record and reproduce heads. As shown in Figure 1, the combi-head to the left side of the headblock (when facing the recorder) performs the time code reproduce and audio erase functions. The combi-head on the right side functions as the time code erase and subsequent record device. It also performs code reading functions when the transport is in the shuttle mode, allowing rapid access to a particular section of tape. Because the time code and audio

![Figure 1. The Studer coincident center channel SMPTE code system used in the A-810 tape recorder. According to the company, this arrangement keeps code-channel-to-audio-channel cross-talk at less than 90dB.](image-url)
heads are separate, the Studer system is capable of maintaining cross-talk rejection (between audio channels and the time code channel) greater than 90dB, according to company specifications.

Figure 1 also shows the delay line system used to compensate for the tape travel time between the audio and time code heads. This compensation is automatic at all speeds, even in the variable speed mode. The time code system used in the A-810 also allows tape splicing in the normal manner without fear of cutting off the corresponding time code information.

Machine design
The A-810 is a compact, rack-mountable tape machine constructed around a light alloy transport casting that holds three motors, a precision-machined mount for interchangeable head blocks, a tape-tension servo system, stabilizer and tachometer rollers, and various power supplies. The capstan operates at all four professional tape speeds (3.75ips, 7.5ips, 15ips and 30ips) and is servo-controlled by a phase-locked loop (PLL) with a natural frequency of 9.6kHz. The spooling motors form servo loops with their associated tension arms. Supply and takeup reel motor torque are controlled by individual switching power supplies (a first for Studer), allowing more precise tension adjustment and reduced heat dissipation. An air-damped pinch roller gives the tape deck the silent start feature required in on-air control rooms.

Attached to the transport casting is a card cage of motherboard-backplane construction containing all analog and digital electronics. This assembly is protected by a hinged cover, which also contains the transport operating keys and various displays. Large back-lit VU meters are standard on the A-810, and their ballistics can be switched electronically to European Broadcasting Union (EBU) peak program characteristics, if desired. The machine can be ordered as a free-standing portable, console or rack-mounted unit. The console configuration has lockable casters and an adjustable deck position feature, which allows the transport to be operated within a 90° arc from full horizontal to full vertical. The console model includes an overhead meter bridge that holds the audio controls at a fixed operating angle independent of the transport. All models of the A-810 include a switchable amplifier and loudspeaker, allowing local moni-

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Figure 2. The block diagram of the microprocessor-controlled functions of the Studer tape transport and audio electronics. Note the use of data bus connections between the various circuit cards.
electronic drift, rendering this machine more stable and resettable than any other I have dealt with. Record and playback level, equalization and bias are set by pressing raise or lower buttons corresponding to the chosen parameter. These settings then are stored in non-volatile memory for later recall.

While electrical adjustments are being made, the LCD display reads out the setting values, allowing the user to compile a handwritten log that can be used to realign manually the tape deck without having to put tape on it. The A-810 stores parameters for two types of tape at all four speeds with NAB equalization and also for two types of tape with CCI-25 equalization at 7.5ips and 15ips, giving a total of 12 alignment registers. In the event that the deck's registers contain no settings (due to failure of the operator or the machine), the factory has placed a full set of Agfa PER-525 parameters into the operating program. These values automatically will be downloaded into the alignment registers at powerup.

An optional 5-frequency (60Hz, 125Hz, 1kHz, 10kHz and 16kHz) tone generator is available for audio system alignment and routine performance tests. A special feature automatically adjusts the generator output and playback amplifier gain for operation with increased electronics and tape headroom, if desired.

The audio system

The audio circuits in the A-810 are analog, and have been perfected to give superb sonic performance. Specifications for major parameters are shown in a sidebar. Tests conducted at Editel indicate that the A-810 easily meets its published specifications. I found the head assembly to be stable and not subject to loss of alignment caused by vibration encountered in normal use. I also have found that there is ample headroom in the electronics portion of the playback system. Levels normally used with the machine leave 18dB or more headroom in the output section. Gain control of the amplifiers contained in the A-810 is accomplished through use of a variable element in the feedback loop of the particular stage, rather than a passive attenuator network. This arrangement preserves maximum headroom throughout the amplifier chains. All electronic circuits in the A-810 are phase-compensated. Gapless timed recording in and out can be programmed by the computer, further increasing the system's flexibility.

The audio input and output stages can be supplied in transformer or active-balanced configurations, depending on the user's preference.

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For broadcast applications in which RF is present, I recommend using transformers on the inputs and outputs to minimize interface problems and ground loop possibilities. For most other applications, I suggest using the active-balanced configuration, which gives slightly better sonic performance.

**Maintenance considerations**

This tape machine seems to be easy to service, with all electronic assemblies on plug-in cards using plug-in integrated circuits (ICs). As of this writing, I have not received a complete instruction and maintenance manual, but I am told one is forthcoming. A detailed set of operational instructions was supplied with the deck. However, schematic diagrams for the system and troubleshooting procedures had not been completed.

Most electronic parts used in the A-810 appear to be common types that can be obtained from local supply houses. Some of the ICs are somewhat specialized, though, and would have to be ordered from a major semiconductor distributor. Most mechanical parts and transformers used in the machine must be obtained from Studer. Troubleshooting the microcomputer system in the field is not practical because of the system's com-

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**Manufacturer's specifications:**

**Studer A-810**

| Tape speeds: | Crystal controlled \( \pm 0.2\% \) |
| Reel type: | 3, 7, 5, 15, 30 ips |
| Tape width: | \( 1/4'' \times (6.35 \text{ mm}) \) |
| Peak weighted according to DIN 45507 | 30ips 15ips 7.5ips 3.75ips |
| Wow & flutter: | \( \pm 0.5\% \) indicating hours, minutes and seconds real time for all speeds approx. 100 seconds for 2500 ft reel |

**Costs:**

- **Phase:**
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**Specifications:**

- **Frequency response:**
  - \( 17.5 \pm 0.5 \text{ dB} \) for 1kHz
  - \( 17.5 \pm 0.6 \text{ dB} \) for 10kHz

- **Distortion:**
  - \( 12\text{%} \pm 1\text{%} \) at 1kHz

- **Crosstalk rejection:**
  - Stereo: \( 35\text{%} \pm 1\text{%} \)

- **Erase and Bias Frequency:**
  - \( 153.0 \text{ kHz} \)

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The control panel of the A-810 is shown in the portable configuration. Some of the transport buttons are soft and can be programmed to perform various functions.

Complexity. Repair of that section is a replace-the-card proposition.

The keyboard command switches are non-contacting Hall elements for long life and reliable performance. They appear to be relatively coffee-proof. However, I am somewhat concerned that the electronics bay (which sits below the command buttons) could be subject to damage from coffee spills when the machine is ordered in the console configuration. Operators of this deck should put their coffee cup somewhere else.

The A-810 contains a large amount of electronic hardware, and the heat generation from the system is substantial for a 2-truck deck. The company has assumed that this is normal. It does seem somewhat unusual, however.

Editing

Editing is an important subject for broadcasters and production facility personnel, and the Studer A-810 offers an array of features to ease the burden of an editor working with time code or razor blades.

Spooling through a section of tape can be done in either direction at any of four speeds (10m/s, 7m/s, 4m/s and 1m/s). With practice, tape can be moved along one word at a time with the toggled spooling feature, a microprocessor routine that exerts precise control over the reel motors. Tape lifters prevent excessive wear of the heads while the machine is in the shuttle mode. The lifters can be defeated for cutting purposes, if desired. A 4-position autolocator system helps the operator find fixed points in the tape reel.

The tape deck comes with a splicing block. However, the position leaves something to be desired.

Limitations

Although the A-810 is an excellent machine, it is not without its limitations. The transport will not handle 14-inch-diameter reels, making it difficult to produce long music shows recorded at high tape speeds. Also, at this time no pilot tone 60Hz synchronizer is available for the machine, requiring the use of an alternate deck for this task. TV facilities increasingly are subject to film-type synchronization procedures, as film-to-tape transfers proliferate. Other problems with the tape machine include the LCD readout, which is not illuminated and therefore cannot be read in low light environments. An extra in-

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April 1984 Broadcast Engineering 329
indicator lamp also would be helpful to indicate the presence of a time code signal.

There has been much discussion at Editel regarding the soft key arrangement. Broadcasters might prefer a simpler arrangement with fewer keys.

The A-810 shown is installed in one of Editel’s studios. The machine (here in the console configuration) also is available in portable and rack-mount models.

whereas video and recording houses might want all functions soft. Studer could address this problem by offering different optional control panels (or additional control panels) that would be fitted into the blank areas of the electronics cover when the machine is ordered in the console form.

Overall impression

In conclusion, the Studer A-810 is a machine that is unparalleled in performance and versatility. I think that the unit’s innovative design points the way to the future for audio recording.

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 opinion on good features and serious limitations—if any.

In essence, these field reports are prepared by the industry 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.

The tape deck reviewed in this report was purchased by Editel for use in its New York City facilities. After this field report was completed, Studer Revox answered two questions brought out in the author’s examination of the A-810. Thomas Minner, director of Studer products in the United States, says an optional LED will be available in the near future to indicate the presence of time code signals. He also said that the digital readout display will be available soon in an LED format, instead of the present LCD, if desired.

For more information on the Studer A-810 tape recorder, contact: Studer Revox America, 1425 Elm Hill Pkwy, Nashville, TN 37210.

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Being able to display only the blue channel has advantages in setting up videotape equipment. Blue, being most susceptible to noise, simplifies optimizing adjustments of the VTR, particularly in matching head settings of quadruplex machines. Unfortunately, the blue-gun-only mode is not available in many monitors that otherwise are well-suited to many areas of a TV facility.

A simple modification may be made to the Sony PVM-1900. The components are inexpensive (about $35), and the procedure requires less than an hour to complete. The result allows a PVM-1900 or CVM-1900 with tuner to be used in the studio with a blue-gun-only display mode.

The added circuitry removes the red and green signals from the CRT by breaking the circuit paths and inserting equivalent circuit conditions in place of the signals. This leaves only the blue signal to reach the CRT screen.

Only one component, a diode found on the main printed circuit board (PCB) of the monitor, is replaced in the modification. Of the additional parts, the most expensive are two relays. Potter and Brumfield HP11D relays were chosen at $16 each, because their small size allows easy attachment to the CRT PCB.

The modification has been made on seven PVM-1900 monitors at WNEV-TV. These monitors, used in the 1/2-inch YIQ format edit suites, have been in continuous 24-hour operation for more than six months. To date they have been trouble-free.

Modification procedures are performed as follows:

- Remove the back cover (five screws). Two screws at the rear of the chassis must also be removed to allow the chassis to slide out of the cabinet.
- Sufficient slack is provided in chassis cabling to allow the chassis to be
pulled out far enough to perform the modification.

- Disconnect a black ground wire between the chassis and CRT housing at the CRT end.

- Release the following cables from their plastic guides: a red high voltage cable leaving the flyback transformer (two guides); all wires going from the main PCB to the CRT yoke and to the CRT socket PCB (three guides); and all cables running along the bottom of the CRT housing (five guides).

- Lift the plastic chassis locking tab at the right of the chassis and carefully slide the chassis out of the cabinet about 10 inches.

- Remove six control knobs from the front of the set (V Hold, Sharp, Hue, Color, Bright, Picture); then completely loosen the five screws that hold the control chassis to the front of the set. (See Figure 1.) The screws are captive to the circuit board. The board may be carefully pulled back, with the right end being moved out of the way to expose the portion of the case where the blue-gun-only switch will be mounted.

- Drill a ½-inch hole about three-quarters of an inch above the center of the panel. Viewed from the front, it will be to the left of the Auto color switch and at about an 11 o'clock position from the Subvolume control. Viewed from inside the set, the position is at the center of a ½-inch circle that appears slightly indented into the plastic. Alternative to drilling, a round-tipped soldering iron may be used to melt a hole through the plastic, working from the inside. Remove any burrs from around the hole.

- Solder a 30-inch and an 18-inch length of wire to the toggle switch that

Figure 3. Schematic for the blue-gun-only modification addition to the CRT (C) PCB. Dotted lines indicate where components attach to relay coils for a ground connection.

Figure 4. Layout of the C PCB, showing placement of the relays and ground foil.

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The completed blue-gun-only circuit mounted on the CRT PCB.

**Figure 5.** Partial schematic of the CRT PCB indicates where the red and green signal wires are severed for attachment to added relays.

will be installed in the hole. Loosely twist the wires together before mounting the switch in the hole.

*Remount the front-control-panel PCB and tighten all five screws. Replace the control knobs.

*Replace diode D349 on the main PCB with a 1N4003, keeping the same polarity. (See Figure 2.)

*Slide the main chassis toward the front of the set, leaving it out about three inches to give working room. Reinsert the cables from the bottom of the CRT housing into their respective cable guides and tighten the guides.

*Solder the free end of the 18-inch wire to TP92, and 15Vdc source on the main PCB. (See Figure 2).

*Cut the 30-inch wire near the TP92 location. Slide a short section of heat-shrink tubing over one end and attach the cut ends of the wire to the ends of a 390, ½W resistor. Solder the connections and shrink the tubing over the resistor and wire junctions.

**CRT PCB preparation and wiring**

*Install a 1N4003 diode and 1.2kΩ resistor (in series) from one normally open (NO) terminal of each of the relays. (Note the polarity of the diode in Figure 3.) Install a 1.2kΩ resistor from the other NO terminal of each relay. Use one of the relay-coil terminals as the ground connections for the components.

*Use a short section of insulated wire to connect the normally closed (NC) terminals on each relay, as indicated in Figure 3.

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April 1984 Broadcast Engineering 333
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**Simple remote-control tally drivers**

Robert Ramsaur
Engineer
KBYU-TV
Provo, UT

Most modern-day broadcasting equipment is designed to be remote controlled. You usually can find a connector on the rear panel labeled Remote. If your equipment has this feature, you should be able to connect switches to the appropriate pins and operate the device from some distant location. If you are fortunate, the remote connector also will provide tally information to indicate what operation the machine currently is performing.

Unfortunately, not all equipment you wish to control will have fully remote control and tally lines. To add remote control to a particular device, you may only need to add a remote switch that parallels a local switch. If, however, that switch does not cause a tally lamp to light, you have no ready source for a remote tally.

We encountered this problem and designed a $5 circuit to solve it. Figure 1 shows a basic circuit for latching command information and driving tally lamps. If we push the Play pushbutton (S1), the flip-flop is set and Q goes high turning Q1 on, lighting the Play lamp. If the Stop button (S2) is pushed, the flip-flop is reset and Q goes low, which turns off Q1 and the Play lamp goes out. At the same time, Q goes high, turning on Q2 and lighting the Stop lamp. Resistors R1 and R2 limit the base-emitter current. This basic circuit can be adapted to many remote-control applications.

In the case of our Sony 2800/2850 VCRs, the remote connector had full remote-control lines and partial tallies. Tallies for Play, Stop, and Rewind were missing. The machines were easy to remote control because the VCR used momentary switches for all commands. We connected the remote switches directly to the remote...
Figure 2 shows the basic flip-flop and driver circuit modified to serve the VCR's remote-control needs. IC-1 forms two flip-flops, one for Play/stop and one for Rewind/stop. Q1-Q3 are used to drive the Stop, Play and Rewind lamps. IC-2 sets the circuit logic so that it follows the VCR's logic. If you are in Play, you must push Stop before you can go to Rewind. The tally circuit indicates what mode the VCR is in, whether the command was issued at the machine or at the remote-control location. This happens because the remote switches parallel the local control switches and either can set or reset the flip-flops.

The basic circuit shown in Figure 1 can be used to generate tally logic and lamp drivers for many remote-control applications found in broadcasting. The circuits are simple to construct and easily can be modified for special applications. They draw little energy and usually can be powered from the equipment they are tallying.
CORPORATE DATA

Audio & Design Recording Ltd. and Calrec Audio Ltd. have concluded an agreement in which Calrec acquired a substantial stake in the US subsidiary Audio + Design Recording, based in Seattle. Nigel Branwell, formerly vice president of the US corporation, becomes president. To reflect the Calrec involvement, the name has changed to Audio + Design Calrec.

A new company, Knudson & Benson Associates, specializing in the design and specification of TV studios, performing arts facilities and places of public assembly, has been formed. Knudson, a registered architect, was formerly the associate director of plant facilities planning for CBS Television Network in New York, and is a graduate of the Yale University Theater Engineering Program. Benson is a professional lighting designer, author and teacher, with 20 years' experience in studio lighting control system design and specification. He was president of Skipan Lighting Systems before establishing this practice with Knudson. The company is located at 3002 89th Place SE, Mercer Island, WA 98040; telephone 206-232-2273.

A special license from the US Department of Treasury enabled World Communications to proceed with live telecasts from Reno, NV, to Emretelcuba, Cuba's international telecommunications carrier. Boxing matches between amateur teams of the United States and Cuba were featured in the 4-hour telecast from Lawler Event Center in Reno. The transmission plan used a domestic satellite (Telstar 301) from the West Coast to Miami, then terrestrial microwave for the 90-mile Caribbean Sea link to Havana. Normally, TV from the United States to Cuba is routed through international satellite, but Intelsat was unable to provide the four hours required by Emretelcuba.

RCA's Broadcast Systems Division and Rank Cintel Ltd. have announced an agreement that gives RCA's Broadcast Systems Division non-exclusive rights to market NTSC, PAL and SECAM versions of Rank Cintel's solid-state broadcast telecine worldwide as the RCA TKS-100. RCA will sell the unit through its sales representatives and will then provide warranty coverage, installation, servicing, spare parts and training. Rank Cintel also will market the telecine as the ADS 1 through its own outlets worldwide, including Rank Precision Industries in the United States.

Innovative Concepts Int'l. has been appointed to represent EECO time code products in the 13 Western states. ICI also represents Anton/Bauer, Audiotronics, Video Aids of Colorado, Knox Video Products, Nova Systems and Zie-Mark.

ADDA Corporation has agreed in principle to acquire Control Video Corporation, Campbell, CA. Control Video will continue to operate under the direction of Wayne J. Lee, president, and founder Larry Seehorn, as vice president.

RCA and Ampex have announced an OEM agreement that will allow RCA to begin worldwide marketing of the Ampex VPR-89 1-inch helical-scan videocassette recorder. RCA's Broadcast Systems Division also will provide servicing, warranty coverage, installation assistance, training and spare parts for the recorder, which RCA will market as the TH-400. The TH-400 will be available in NTSC, PAL and SECAM standards.

EQUIPMENT SALES

Under an agreement announced by CBS, Scientific-Atlanta will provide satellite earth stations to CBS and some of its affiliated stations. The earth stations will be installed at various CBS locations and at CBS Television Network affiliated stations across the country as part of a plan to convert the network distribution system from the existing terrestrial network to a satellite-based system. The network conversion plan was initiated in the fall of 1983 and will continue with a roll-out plan that will be completed in 1986. A number of stations in strategic locations across the country also will be equipped with occasional transmission capability. The first 10 installations in the United States were scheduled to be completed and operational early this year, and other installations will proceed at the rate of about 20 per quarter.

Spar Aerospace Ltd. of Ste. Anne de Bellevue, Quebec and Toronto, has reached agreements worth more than $20 million for the sale of 28 satellite earth stations and the transfer of related technology to the People's Republic of China. The earth stations will form a major part of China's planned satellite communications system.

Comtech Antenna Corporation of St. Cloud, FL, has delivered 3.8m and 5m transportable audio uplink antenna systems to the IDB Communications Group of Los Angeles, CA. Both transportable systems were used to uplink SCPC audio for a number of the major college bowl football games this past season.

Microdyne has announced a $300,000 order from Anixter UK Ltd. for satellite TV receiving equipment to be used in Great Britain. Anixter UK was to take delivery of 70 11000DC-12 block downconverters and 90 11000DCT-12 receivers in the first months of this year. The equipment ultimately will be used in Britain for distributing TV programming via Intelsat V and ECS satellites.

Comark Communications, of Southwick, MA, and Colmar, PA, has announced the receipt of a major contract award from JP Communications for the manufacture and installation of a 30kW UHF TV transmitting facility to serve KPOL-TV/Channel 40 in Tucson, AZ.

Arch Communications Corporation, Hartford, CT, has placed an order valued at more than $3 million for UHF TV transmission and control equipment with the Broadcast Transmission Division of Harris Corporation. The equipment will be used at Arch's new TV station, WETG-TV/Channel 61, Hartford. The equipment package includes the first two omnidirectional pattern Wavestar antennas. Also included in the order are a Harris 220kW UHF TV transmitter, which is equipped with multichannel (stereo) sound capabilities; a Harris 9100 facilities control system for intelligent remote control of the transmitter; and a Harris fully protected hot standby STL/TSL microwave system. Harris will install all the equipment except the antennas.

Recent orders of Bogner high power TV broadcast antennas include: Channel 23. Decatur, IL; Channel 51. Ocala.
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FL; Channel 28, Columbus, OH; Channel 28, Corkville, TN; Channel 43, Bridgeport, CT; and Channel 52, Oklahoma City.

Microdyne has announced an agreement to supply a new $1 million, 2-channel satellite radio distribution system for Florida Network. The initial agreement calls for a permanent single-channel-per-carrier (SCPC) uplink to be installed at WKIS in Orlando, FL, and for approximately 50 downlinks to be installed statewide at the network’s various affiliates. Microdyne also will supply a transportable audio-only uplink for the network’s second channel.

Toyo Recording Company Ltd. in Tokyo has installed a complete Ampex post-production system valued at more than $1.1 million in its new editing suite. The suite features five Ampex VPR-3 1-inch helical-scan videotape recorders, a 2-channel Ampex Digital Optics (ADO) system, an AVE-33 production switcher and ATR-102/ATR-104 and MM-1200 audio recorders.

NEW ADDRESSES, DIVISIONS

Atlanta-based VideoStar Connections has expanded its staff and opened a Midwest regional office just outside of Chicago. Johan Praats, VideoStar’s Midwest region sales manager, will be in charge of the new office. The new address is Suite 400, 999 Plaza Drive, Schaumburg, IL 60195. Telephone number is 312-843-7323.

Comprehensive Video Supply Corporation has opened a West Coast distribution center. The new facility is located at 14731 Franklin Ave., Tustin, CA 92680; 714-669-1138.

Fortel has moved to a new, larger facility at 2985 Gateway Drive, Norcross, GA 30071. The phone number is 404-449-4343. The new facility has more than twice the floor space than the old location.

Digital Entertainment Corporation has announced the opening of its latest sales and service facility located at 2200 Hillsboro Road, Nashville, TN 37212. The phone number is 615-298-6613.

News

Continued from page 4

ITFS to see increased activity

Agreements between Microband Corporation of America and a number of educational institutions soon may result in additional TV programming for US viewers. Following regulatory changes in the Instructional Television Fixed Service (ITFS) allowing ITFS licensees to lease their excess channel capabilities to other organizations, Microband already has made arrangements with institutions in at least 24 US cities to transmit the new signals before the end of this year.

The ITFS spectrum, authorized by the FCC in 1963, set 2500-2690 MHz aside as a supplemental band for educational TV broadcasting services. License holders have been limited to educational, institutional, governmental and non-profit organizations, and programming has been held to instructional and cultural materials. The new regulations and arrangements will allow Microband’s Urbanet, a wireless CATV service, to transmit "the Pay TV programs consumers want, as well as the instructional programming America needs," according to Mark Foster,
Microband board chairman.
The program fare to be provided by Urbanet will be a combination of satellite-relayed premium programming and instructional material produced by the institutions to which the licenses are assigned. Because each licensee holds more than one 6MHz channel, simultaneous multichannel operation is possible, with as many as 12-18 specialized program services being provided to a community.

Working with Microband in the venture are such educational institutions as the Network of Instructional Television (NITV), Harvard University, the University of California, the Pennsylvania Hospital Television Network, the Hispanic Information and Telecommunications Network, and a number of public schools and community colleges. Some of the cooperating organizations previously have operated limited power ITFS systems during the 20 years of the service's existence.

The 1983 re-regulation of the ITFS concept by the commission may bring to an end a running battle that has waged between Microband and other multipoint distribution service (MDS) operators and ITFS proponents. Not only has MDS been given eight of the originally available 31 channels in the 2GHz band, but now the commercial operation will use from 1-4 additional channels of what was strictly non-commercial spectra.

Waivers also have been given to ITFS operators to use non-standard transmission modes on the channels. These include a SECAM/60 color system in the Anaheim City School District of the Los Angeles area, and non-NTSC-compatible formats for specialized needs in transmission of medical programs. In the commission's re-regulation of ITFS, a relaxation of technical standards allows licensees the choice of standards and corresponding equipment appropriate to individual instructional goals involved.

Because the service operates between 2.5-2.69GHz, special receiving equipment is needed. Subscribers to this service must use a special microwave receiving antenna that generally will be roof-mounted to receive the strictly line-of-sight signals. A downconverter will change the signals to an unused VHF channel and feed a set-top converter. Through a 2-way telephone link, pay-per-view and other transactional programs may be delivered live or to a subscriber's VCR for delayed use.

Downtown teleport to be built

The world's first downtown satellite communications teleport — to be constructed on top of the National Press Building in Washington, DC — was announced recently in a news conference at the National Press Club.

The new satellite communications complex, called The National Teleport, will provide direct access to US and Canadian satellites from the heart of the nation's capital. For the first time, domestic and international broadcasters, news organizations, corporations, associations and government agencies will have a convenient and low cost means to transmit video, voice and data to and from Washington.

The National Teleport will be the first teleport located in a downtown area. Such facilities usually are situated in outlying, suburban locations to escape other telecommunications interference. But, because The National Teleport will use state-of-the-art Ku-Band technology, its satellite earth stations can operate in a congested metropolitan area interference-free.

Initial plans call for installing two 5m Ku-Band transmit/receive earth stations with multiple interconnections via fiber-optics, coaxial cables and microwave to locations throughout the greater Washington area. There will be expansion space for as many as six additional earth stations.

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randomly selected radio stations will be contacted.

No previous studies have sought to measure comprehensively the amount and manner of use stations make of technologies that support routine program and signal transmission essential to providing service. The use of spectrum and non-spectrum-based applications will be measured. Spectrum applications refer to telecommunications that occur in an open system and make use of the electromagnetic spectrum, such as the broadcast auxiliary services and satellites. Non-spectrum applications include telephone, fiber-optics and coaxial cable.

Applications relating primarily to broadcast signals to the public, as well as those of secondary uses such as data communication, energy management and other new services, will be measured. In each area, present and planned usage levels, satisfaction with technical quality and cost variables will be considered.

Component analog tests conducted

Tests of a new time division multiplexed component analog video signal were conducted by the Working Group on Component Analog Video Standards of the SMPTE. The tests were held in a studio of the Canadian Broadcasting Corporation in Montreal during the week preceding the 18th SMPTE Television Conference.

The working group is developing a series of interface standards for parallel and serial interconnections at the studio level and for parallel interconnections of cameras and recorders in the field. The tests were designed to validate choices the group has recommended regarding the form of the signal to be used for single-cable, serial interconnections in the studio, and the waveform to be used to carry that signal.

A special, parallel-component system was assembled to support the tests of the serial component analog video (CAV) signal and waveform. Incorporated were several picture sources, including two cameras, a slide scanner, a character generator and two small format videotape machines for playback of pre-recorded tapes with live action. Also available were a number of test signal generators, including zone plate, a component production switcher and a color matting device.

A specially built multiplexer and demultiplexer were used to convert the parallel component signals to a serial Y, C_r, C_b signal having an 11MHz bandwidth. The resulting CAV signal then was passed through an environment that included reduced bandwidths (using filters with various corner frequencies and shapes), severe amplitude and phase non-linearities, and a variety of interferences such as hum, noise, line and field rate tilt.

Regarding the test results, Weiss said, "A majority of observers was startled by the robustness of the signal, even under severe distortions in the CAV environment. Distortions which would have destroyed NTSC signals had very little effect upon the CAV signal, aside from the expected reduction in resolution when the bandwidth was reduced."

The group will next proceed to tests of the stability of

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the synchronizing waveform proposed to carry the CAV signal. The tests will include compatibility with existing TV facilities.

Inclusion of NAB Programming Conference with NRBA Convention approved

"In recognition of the fact that NRBA has always supported any move that solidifies and unifies the radio industry, the NRBA board of directors invites the NAB's Radio Programming Conference to stage a joint all-radio convention at the NRBA's previously scheduled convention in Los Angeles, with instructions to our Executive Committee to negotiate any agreement which is sensitive to the financial needs of NRBA."

So read the NRBA board of director's resolution unanimously approving the joint effort, at the board's semiannual meeting in February. The board empowered president Bernie Mann and the NRBA staff to work out details with NAB on the matter. The music industry also will be invited to participate in the convention, according to another resolution.

Radio sales university to be created

NRBA will work to establish a radio sales university in a first-ever program of its kind to train those interested in radio sales. "This will be a sales university on a professional level taught by professionals in the industry," according to the NRBA board of directors.

Specific points remain to be developed for the program. It is expected that the university courses will be taught on a regional basis on college and university campuses within each region.

Translator action sought

NRBA has petitioned the FCC to begin a rulemaking proceeding to prohibit the assignment of FM translator facilities to communities that already receive primary service from two or more commercial FM stations and to clarify commission rules on the non-commercial nature of FM translators to make it clear that the use of such facilities for commercial profit is prohibited.

In light of the deluge of FM translator applications—650 in October and November—many for markets well-served by full-service stations, NRBA said it believes that without action by the FCC, a new low-power FM broadcast service will develop and that the effects of the service could be harmful to the radio broadcasting industry.

NRBA also has asked the FCC to look at some 400 applications that have been filed by one entity using three applicant names.

Broadcast Engineering's "Help Wanted" ads are well-read. Call today to place your low-cost ad.
Chuck Pope has been named product manager, 1/2-inch videotape, by Ampex Corporation. In his new position, Pope will be responsible for the VHS and Beta product lines.

Daniel Antonellis has joined Videotek as national sales manager. He will direct all sales efforts for Videotek's color monitor, test equipment and terminal equipment product lines. Also, Antonellis will work directly with Videotek's dealers in metropolitan New York, New Jersey, Eastern Pennsylvania, Maryland and Washington, DC.

Ronald L. Arendall has been named president of Dynavid Corporation, Indianapolis, IN. Arendall will be responsible for system design, application engineering, marketing and sales for the Broadcast and Industrial Divisions of DVC. Arendall, a registered professional engineer, had been director of engineering at WTHR-TV, Indianapolis, since 1976. He is immediate past president of the Society of Broadcast Engineers.

Joseph C. Volpe has been appointed division vice president and general manager of the RCA Broadcast Systems Division. Volpe succeeds Joseph B. Howe, who has been named staff vice president and chief engineer of RCA group vice president John D. Rittenhouse's staff. Volpe had been division vice president, operations, Broadcast Systems Division, since October 1983. Before heading the Broadcast Systems Division, Howe served as division vice president and general manager of the RCA Commercial Communications Systems Division since 1981.

Sony Broadcast Ltd. has announced the appointment of Jeff Meadows as managing director designate. Early in 1977, Meadows joined NBC News and, based in London, was in charge of its operations throughout Europe, Africa and the Middle East. Returning to New York in 1979 to manage all ENG operations for NBC News, he was appointed managing director of news operations in 1980, with additional responsibilities for studio operations, graphics and news archives. During 1982, he became vice president of engineering and technical services, responsible for development, design and installation of technical facilities for the NBC network generally and the electronic maintenance of its New York facilities. He vacated this post to join Sony Broadcast.

ADM Technology has promoted Murray Shields to the new position of vice president of corporate sales. Shields has been with ADM for 11 years and most recently was vice president of sales. Larry Mandziuk, who has been with ADM eight years, has been promoted to the new position of staff vice president of advanced programs. Mandziuk was formerly manager of systems engineering.

William Keely has joined ADM in the new position of vice president of engineering. Most recently, he held several engineering management positions in the electronics group of the Advanced Development Center of National Water Lift in Kalamazoo, MI.

New Media Graphics Corporation has announced the appointment of James A. Frantzreb as Northeast sales manager. Before joining the company, Frantzreb held senior sales management positions with Pioneer Video, Unicom, MP Video and Crimson.

The appointment of Stuart Rauch as national sales manager was announced by the company. Rauch has been with New Media Graphics for the past year.
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Surge-Master Heavy Duty Power Line Protectors give complete protection against all transients.

All audio and video transmission equipment is vulnerable to transients on AC power lines caused by heavy motors starting up (even elevators or testing your auxiliary power system), power company load adjustments — and of course, lightning. Even if your equipment operates from batteries charged by a UPS, you’re not safe. If lightning knocks out your UPS, how long could you keep going?

The MCG Surge-Master offers two stage protection. The first reacts in nanoseconds to absorb lesser transients and the leading edges of major ones. The second stage absorbs the big ones, and has three modules on each line. So, in the unlikely event that one module should be knocked out, there are still two protecting you. And a system of indicator lights tells you not only when a fault has occurred, but exactly where it is. Modular construction (and the fact that Surge-Master is connected in parallel) makes replacement of damaged modules quick and easy. Initial installation requires minimal power interruption.

Available with capabilities from 100 to 3000 amps; for 120, 240 and 480 VAC; and for single, 3-phase, wye and delta power systems. MCG also manufactures smaller units for protecting individual pieces of equipment. To learn more, contact Department 31020 at 516/586-5133 or at the address below.

Protecting industry since 1967

MCG ELECTRONICS, INC.
12 Burt Drive
Deer Park, N.Y. 11729

One SPIKE Can Cost DOWNTIME!

Beverly McGill and Stephen Dunwoody have joined Mycro-Tek as representatives for the company’s Mycro-Vision video display information system. McGill will be based in Dallas. Her sales territory includes Texas, Arkansas, Oklahoma and New Mexico. Dunwoody will be based in Indianapolis and will cover Indiana, Michigan, Ohio, Kentucky, Tennessee and the metropolitan Chicago area.

Jon Bart, national marketing manager of Listec TV Equipment Corporation, Plainview, NY, will join the broadcast equipment staff at Listec (West) Corporation, Culver City, CA. Bart will be responsible for consulting and sales for Vinten camera mounting equipment and Listec visual prompting systems.

EECO has announced the appointment of Eloy Chairez to product specialist, video products marketing, Video Products Division. Chairez’s primary responsibilities involve new product planning, market research/analysis, and sales and technical support. Before joining EECO, Chairez was associated with Fernshe.

Joseph M. Bradley has been appointed vice president of marketing for Varian Associates’ Electron Device Group (EDG). Bradley will manage the EDG central marketing organization, which includes a network of field marketing and sales offices in the United States and Europe. He also will be responsible for coordinating divisional marketing activities among the nine operating divisions of the group.

Acrodyne Industries has appointed Stephen Wozniak as electrical design supervisor. Wozniak will be responsible for the design of Acrodyne’s low power and medium power TV broadcast equipment.

Harris Corporation, Broadcast Group, has announced the appointment of John F. Delissio as vice president of systems and service operation. In his new position, Delissio will have general management responsibilities for the operation. Delissio comes to Harris after serving 18 months as vice president/general manager of the Broadcast Division of M/A-COM Video Systems.

Attila C. Bitto has been appointed editing products manager for Sony Broadcast Products Company. Bitto’s responsibilities will include management of Sony’s broadcast editing system, time code products and broadcast audio products. Jerry Cohen has been named product manager for cameras by the company. Cohen will be responsible for all marketing aspects of cameras, from interfacing with development and design engineers to supporting the activities of Sony sales engineers.

Ampex Corporation has announced the appointment of Morgan Rees as product manager of 3/4-inch videotape. His promotion follows three years of service with Ampex as sales representative for magnetic tape in Florida.

Leitch Video of America has announced the appointment of Gary Becknell to the position of marketing manager for the United States. Becknell brings with him 10 years of experience in all phases of TV broadcast engineering.

Glenn P. Wolk has been named national sales manager of the Visual Products Division, Hitachi Denshi America Ltd. Wolk joined the company more than a year ago as Eastern regional sales manager for the Visual Products Division.
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ADC Magnetic Controls ..................................................... 51,138-139
ADM Technology, Inc .................................................. IFC
ADDA Corp ................................................................. 296-297
AEG Telefunken ............................................................. 303
A.F. Associates .............................................................. 58-59
AMCO Engineering Co ................................................... 285
ANT Telecommunications ................................................ 329
Acrodynie Industries ..................................................... 157
Agfa-Geveart ............................................................... ANT
AMCO ................................................................. Audio
AEG ................................................................. Audio
ADC ................................................................. Audio
Celwave ................................................................. 248-249
Centro Corp ................................................................. 277
Cetec Antennas ............................................................ 187
Cetec Vega ................................................................. 84
Chester Cable ............................................................... 169
Chromal Digital Systems ................................................. 115
Chyron Telesystems ...................................................... 143
Cipher Digital ............................................................... 260
Clear Com Intercom Systems ........................................... 160
Colorado Video ............................................................. 186
Colorographics Systems .................................................. 83
Colortran, Inc ............................................................... 219
Comark ............................................................... Audio
Comex Corp ................................................................. 333
Comrex Corp ............................................................... 64,66
Comtech Antenna Corp ................................................... 63
Conrac Corp ................................................................. 158-159
Continental Electronics .................................................. 268
Control Video Corp ....................................................... 82
Corporate Communication ............................................... 100
Crosspoint Latch Corp ................................................... 352
Datatron ................................................................. 295
Datum Inc ................................................................. 318
Delta Electronics ........................................................... 145
Dictaphone Corp ........................................................... 225
Dilor Industries Ltd ......................................................... 198
Dubner Computer Systems .............................................. 109
Victor Duncan, Inc ......................................................... 343
Dynair Electronics Inc ................................................... 119
ECD Industries, Inc ......................................................... 335
EMCEE Broadcast Products ............................................ 179
EEC ................................................................. 107
EEV, Inc ................................................................. 96-97
ESE ................................................................. 339
Eagle Hill Electronics ..................................................... 196
Eastman Kodak ............................................................ 102-103
Electrex ............................................................... 236
Electrohome Ltd ........................................................... 298
Electro-Voice Inc .......................................................... 317
Emcor Products ............................................................ 131
Environmental Satellite Data ............................................ 300
Eventide, Inc ............................................................... 14
Evertz Microsystems Inc ................................................ 104
Executive Communications ............................................. 134
Farrtronics Ltd ............................................................ 316
Fidelipac Corp ............................................................. 80-81
Film Video Equipment .................................................. 144
For-A Corp ................................................................. 299
Frezzolini Electronics ..................................................... 270
Fuji Photo Film U.S.A., Inc ............................................. 53
Gamma Industries ........................................................... 29
Gerstenlager Co ............................................................ 267
Graham-Pattren Systems, Inc ............................................ 164
Grass Valley Group ....................................................... 7,337
Gray Engineering Laboratories ........................................ 330
Great American Market .................................................. 54,196,200
Grumman Aerospace Corp ............................................. 245
Clifford B. Hany & Sons ................................................ 190
Harris Broadcast Microwave ............................................ 95
Harris Corp ................................................................. 86-87,291
Harris Video Systems .................................................... 152-153,132-133
Hipotronics ................................................................. 62
Hotronics, Inc ............................................................. 229
Howe Audio ................................................................. 147-150
Hughes and Phillips ....................................................... 214
IBC 84 ................................................................. 307
ICM Video ................................................................. 322
ITC/3M ................................................................. 69
ITT Cannon ................................................................. 213
Ikegami Electronics (USA) Inc ......................................... 57,279,261,283
Image Video Ltd ........................................................... 293
Inovonics, Inc .............................................................. 174
Interactive Motion Control .............................................. 243
Interactive Systems Co ................................................... 191
JBL, Inc ................................................................. 31
JVC Corp ................................................................. 199
Jensen Tools, Inc ........................................................... 333
Jensen Transformers ....................................................... 215
K & H Products Ltd ......................................................... 94
Kaman Sciences Corp ..................................................... 183-184
Kavco Inc ................................................................. 173
Kay Industries, Inc ........................................................ 328
LEA, Inc ................................................................. 140
L.W. International ........................................................ 182
Larcan Communications Equipment Inc ................................ 221
Leader Instruments ........................................................ 5
LeBlanc and Dick Communications, Inc ................................ 263
Leitch Video Ltd ............................................................ 151
Lemo USA Inc ............................................................. 91
Lerro Corp ................................................................. 48-49,79
Lexicon, Inc ............................................................... 65,71
Peter-Lisand Machine Corp ............................................ 224
Listec Television Equipment Co ........................................ 341
Logitek Electronics Systems, Inc ...................................... 222
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M Professional Audio/Visual</td>
<td>311</td>
</tr>
<tr>
<td>MCG Electronics, Inc.</td>
<td>344</td>
</tr>
<tr>
<td>MCI/Quantel</td>
<td>217</td>
</tr>
<tr>
<td>MCL, Inc.</td>
<td>305</td>
</tr>
<tr>
<td>McCurdy Radio Industries, IBC</td>
<td>142</td>
</tr>
<tr>
<td>MPV Video Industries, Inc.</td>
<td>22</td>
</tr>
<tr>
<td>Magna Tech Electronics Co., Inc.</td>
<td>332</td>
</tr>
<tr>
<td>Magnetic Media</td>
<td>323</td>
</tr>
<tr>
<td>Maxell Corp. of America 226-227</td>
<td>108</td>
</tr>
<tr>
<td>Micro Controls</td>
<td>121</td>
</tr>
<tr>
<td>Microdyne Corp.</td>
<td>168-169</td>
</tr>
<tr>
<td>Mid-America Automation Corp.</td>
<td>136</td>
</tr>
<tr>
<td>Midwest Corp.</td>
<td>1,8-9</td>
</tr>
<tr>
<td>Minolta Corp.</td>
<td>112</td>
</tr>
<tr>
<td>Modular Audio</td>
<td>342</td>
</tr>
<tr>
<td>Modulation Associates</td>
<td>161</td>
</tr>
<tr>
<td>Keith Monks Audio (USA) Inc.</td>
<td>252</td>
</tr>
<tr>
<td>Monroe Electronics, Inc.</td>
<td>92</td>
</tr>
<tr>
<td>R.K. Morrison</td>
<td>240</td>
</tr>
<tr>
<td>Motorola, Inc.</td>
<td>141</td>
</tr>
<tr>
<td>NEC America, Inc.</td>
<td>66,155</td>
</tr>
<tr>
<td>NTI America, Inc.</td>
<td>178</td>
</tr>
<tr>
<td>Nagra Magnetics Recorders, Inc.</td>
<td>98</td>
</tr>
<tr>
<td>Rupert Neve</td>
<td>12,13</td>
</tr>
<tr>
<td>Nitty Gritty Record Care Products, Inc.</td>
<td>196</td>
</tr>
<tr>
<td>Omicon Video</td>
<td>312</td>
</tr>
<tr>
<td>Opamp Labs</td>
<td>196</td>
</tr>
<tr>
<td>Orban Associates Inc.</td>
<td>50,137</td>
</tr>
<tr>
<td>Otari Corp.</td>
<td>340</td>
</tr>
<tr>
<td>PTSI</td>
<td>232-233</td>
</tr>
<tr>
<td>Pacific Recorders and Engineering</td>
<td>93</td>
</tr>
<tr>
<td>Panasonic</td>
<td>24-25,32-40,122-123,223</td>
</tr>
<tr>
<td>Penny &amp; Giles</td>
<td>220</td>
</tr>
<tr>
<td>Perrott Engineering Labs</td>
<td>332</td>
</tr>
<tr>
<td>Philadelphia Resins Corp.</td>
<td>68</td>
</tr>
<tr>
<td>Phillips Test and Measuring Instruments</td>
<td>127</td>
</tr>
<tr>
<td>Polyline Corp.</td>
<td>320</td>
</tr>
<tr>
<td>Potomac Instruments</td>
<td>64</td>
</tr>
<tr>
<td>PowerPak Systems</td>
<td>252</td>
</tr>
<tr>
<td>Precision Echo</td>
<td>181</td>
</tr>
<tr>
<td>Q.E.I.</td>
<td>88,235</td>
</tr>
<tr>
<td>Quad Eight/Westrex</td>
<td>231</td>
</tr>
<tr>
<td>Quanta Corp.</td>
<td>210-211</td>
</tr>
<tr>
<td>Quante</td>
<td>185</td>
</tr>
<tr>
<td>RCA Camera Tube Marketing</td>
<td>55</td>
</tr>
<tr>
<td>RCI Engineered Audio Systems</td>
<td>182,334</td>
</tr>
<tr>
<td>RF Technology</td>
<td>321</td>
</tr>
<tr>
<td>RTI Video Products Co.</td>
<td>52</td>
</tr>
<tr>
<td>RTS Systems</td>
<td>301</td>
</tr>
<tr>
<td>R-Columbia Products Co.</td>
<td>244</td>
</tr>
<tr>
<td>Radio Systems</td>
<td>275</td>
</tr>
<tr>
<td>Ramko Research</td>
<td>166</td>
</tr>
<tr>
<td>Real World Technologies</td>
<td>290</td>
</tr>
<tr>
<td>Ross Video Ltd.</td>
<td>89</td>
</tr>
<tr>
<td>Sachs</td>
<td>101</td>
</tr>
<tr>
<td>L.J. Scully Mfg. Co.</td>
<td>56,320</td>
</tr>
<tr>
<td>Jos. Schneider Optische Werk Kreuznach</td>
<td>274</td>
</tr>
<tr>
<td>Sennheiser Electronics Corp.</td>
<td>236</td>
</tr>
<tr>
<td>Shallco, Inc.</td>
<td>312</td>
</tr>
<tr>
<td>Shintron Co. Inc.</td>
<td>70</td>
</tr>
<tr>
<td>Shiveley Labs</td>
<td>323</td>
</tr>
<tr>
<td>Shure Brothers</td>
<td>61</td>
</tr>
<tr>
<td>Solid State Logic</td>
<td>192-193</td>
</tr>
<tr>
<td>Sony Corp.</td>
<td>44-45,73-77</td>
</tr>
<tr>
<td>Sound Technology</td>
<td>188</td>
</tr>
<tr>
<td>Stainless, Inc.</td>
<td>289</td>
</tr>
<tr>
<td>Standard Tape Lab</td>
<td>240</td>
</tr>
<tr>
<td>Studer ReVox</td>
<td>255</td>
</tr>
<tr>
<td>Surcom</td>
<td>334</td>
</tr>
<tr>
<td>Swintek Enterprises Inc.</td>
<td>118</td>
</tr>
<tr>
<td>Switchcraft</td>
<td>313</td>
</tr>
<tr>
<td>Symmetrix</td>
<td>220</td>
</tr>
<tr>
<td>TFT Inc.</td>
<td>269</td>
</tr>
<tr>
<td>TTC/Ampro Scully</td>
<td>316</td>
</tr>
<tr>
<td>TTC/Wilkinson</td>
<td>273</td>
</tr>
<tr>
<td>Tascam div TEAC Corp.</td>
<td>27,315</td>
</tr>
<tr>
<td>Tech Labs</td>
<td>252</td>
</tr>
<tr>
<td>Tektronix, Inc.</td>
<td>17-21</td>
</tr>
<tr>
<td>Teledyne Energy Systems</td>
<td>328</td>
</tr>
<tr>
<td>Temel</td>
<td>194</td>
</tr>
<tr>
<td>Temtron</td>
<td>200</td>
</tr>
<tr>
<td>Tentel</td>
<td>240</td>
</tr>
<tr>
<td>Texscan Corp.</td>
<td>247</td>
</tr>
<tr>
<td>Thomson CSF Broadcast Inc.</td>
<td>251</td>
</tr>
<tr>
<td>Toshiba Corp.</td>
<td>239</td>
</tr>
<tr>
<td>Townsend Associates Inc.</td>
<td>257</td>
</tr>
<tr>
<td>UMC Electronics</td>
<td>327</td>
</tr>
<tr>
<td>Union Connector Co., Inc.</td>
<td>287</td>
</tr>
<tr>
<td>Utah Scientific</td>
<td>67</td>
</tr>
<tr>
<td>VSC Corp.</td>
<td>284</td>
</tr>
<tr>
<td>Valley People, Inc.</td>
<td>136</td>
</tr>
<tr>
<td>Varian EIMAC</td>
<td>47,163,237</td>
</tr>
<tr>
<td>Video Aids of Colorado</td>
<td>326</td>
</tr>
<tr>
<td>Videomedia</td>
<td>99</td>
</tr>
<tr>
<td>Videotek, Inc.</td>
<td>167</td>
</tr>
<tr>
<td>Vidicraft</td>
<td>154</td>
</tr>
<tr>
<td>Ward-Beck Systems Ltd.</td>
<td>106</td>
</tr>
<tr>
<td>Will-Burt Co.</td>
<td>214</td>
</tr>
<tr>
<td>Winsted Corp.</td>
<td>129,130</td>
</tr>
<tr>
<td>Yamaha</td>
<td>129,130</td>
</tr>
</tbody>
</table>

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April 1984 Broadcast Engineering 347
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SURPLUS EQUIPMENT: SCA-EQUIPMENT. Monitors: TPT206, Baler SCM-1; Receivers: McMartin, TR5-000, (Tuned to 107.3 MHz). Misc. Equipment: FM, RF-Amp; Baler Model RFA-1; Stereo Phone Preamp; Audio Metrics PA-1; Compressor Chipper; Modulation Scanners MD-1. Will take best reasonable offers. List price for above items. Contact Dave Good, KKRD-FM, 905 N. Halstead, Chicago, Illinois 60622.

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And take the technology with you. GVG is a high-tech company located in the beauty of the Sierra foothills, about 60 miles northeast of Sacramento. Clean air, affordable housing and the charm of the Gold Country create an ideal lifestyle for your family.

GVG offers outstanding benefits, in addition to challenging career opportunities, growth, security and a scenic, rural setting. We are celebrating our 25th anniversary at NAB. Come see our booth and meet our people. We'll be at NAB in a big way. Interested and qualified applicants may ask for Sylvia Shelton who will take time to explore career opportunities with them. Or send your resume to her at The Grass Valley Group, Inc., P.O. Box 1114, Dept. AA56, Grass Valley, CA 95945. An equal opportunity employer M/F/H/V.
U.S. INFORMATION AGENCY, WASHINGTON D.C. TV BROADCAST TECHNICIANS—HELP US BUILD A WORLDWIDE TELEVISION SATELLITE NETWORK. Apply now for an opportunity to work in international television broadcasting. If you are a technician with experience in computerized videotape editing, you may be eligible to work at the USA's broadcast TV production facility in Washington D.C. Six years experience in broadcasting or as a broadcast quality production facility required. Work hours: 8 A.M. to 4:30 P.M. with periodic overtime. Starting salary: $30,402. Indicate announcement PDP-29043. Interested applicants are requested to send a standard U.S. Government application form SF-171 to USA, Attn: MPDD, Room 510, 301 4th Street, S.W., Washington, D.C. 20547. Moving expenses to Washington, D.C. must be provided by selected applicant. USA is an Equal Opportunity Employer.

MAINTENANCE TECHNICIAN Knowledgeable with analog and digital circuitry. Maintenance experience with all tape formats, switchers and cameras. UHF transmitter experience and FCC license preferred. Contact Director of Engineering, KSEE TV, P.O. Box 24000, Fresno, CA 93779. (209) 237-2424, EOE, M/F.

POST-PRODUCTION MAINTENANCE ENGINEER. Established NYC facility seeks responsible individual preferably familiar with Sony 1 VTRs, CBL Switchers, CMX, Chyron, Quantel, and ADO. Excellent salary and benefits. Reply to Dept. 607, Broadcast Engineering, P.O. Box 10901, Overland Park, KS 66212.

EXPERIENCED TRANSMITTER SUPERVISOR. Transmitter supervisor for VHF Television Transmitter. First General Class FCC License required. Experience in tuning TV Transmitters is essential. Top 100 Station. Midwest/South Dakota. Contact Donald Sturzenbecher at (605) 995-9751. E.E.O.


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