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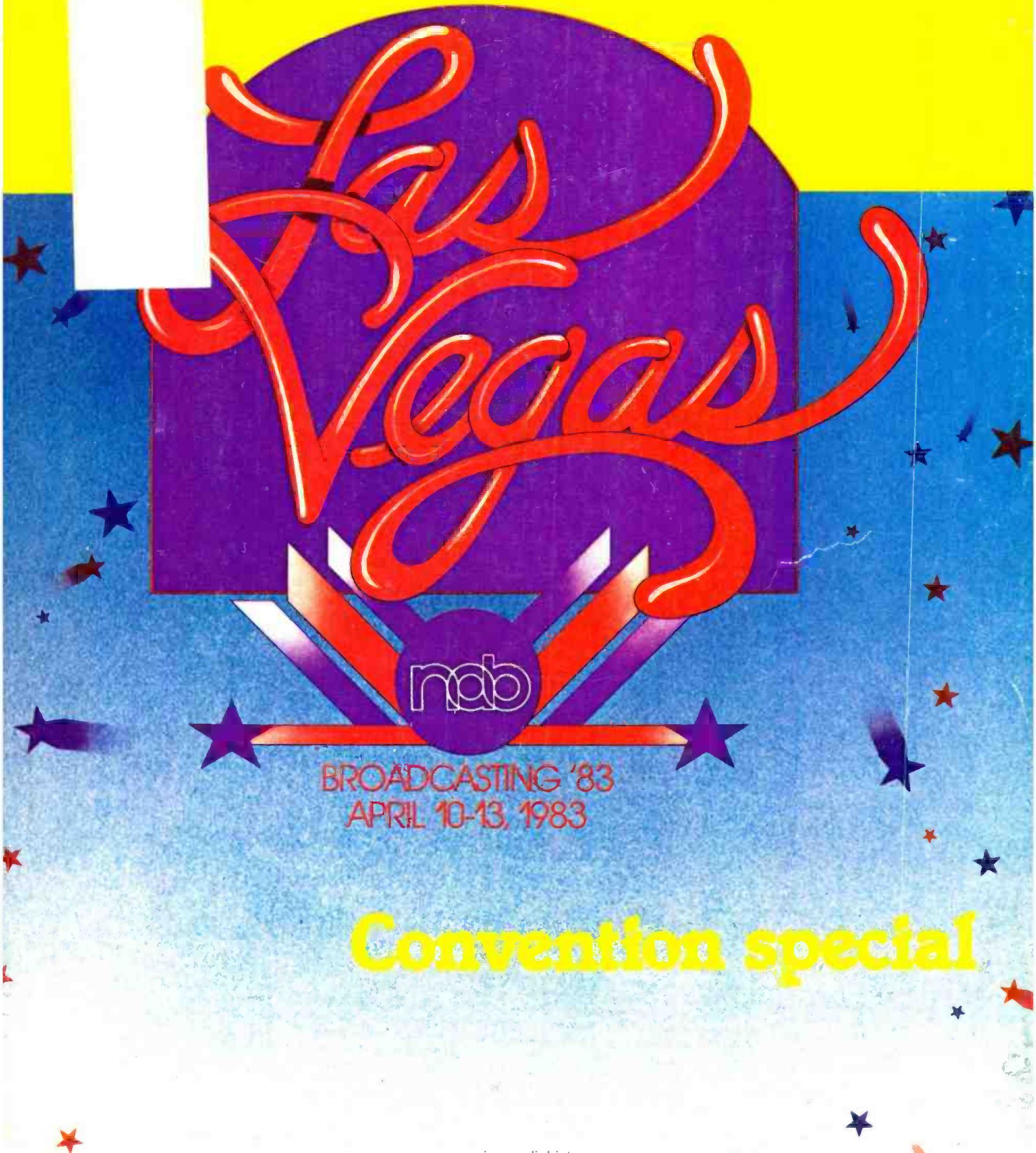

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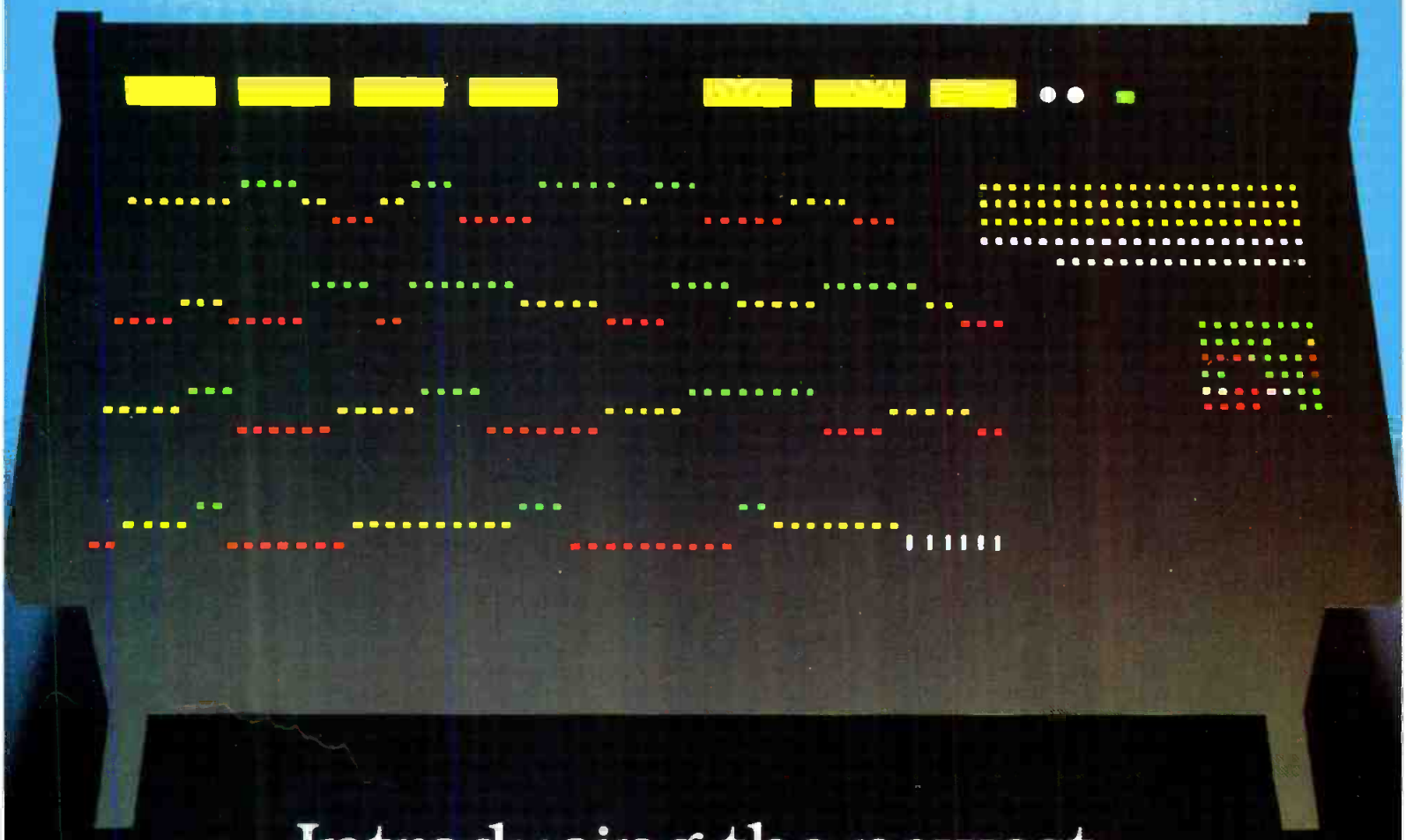

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BROADCAST engineering

The journal of broadcast technology

March 1983 • Volume 25 • No. 3

1983 NAB CONVENTION SPECIAL

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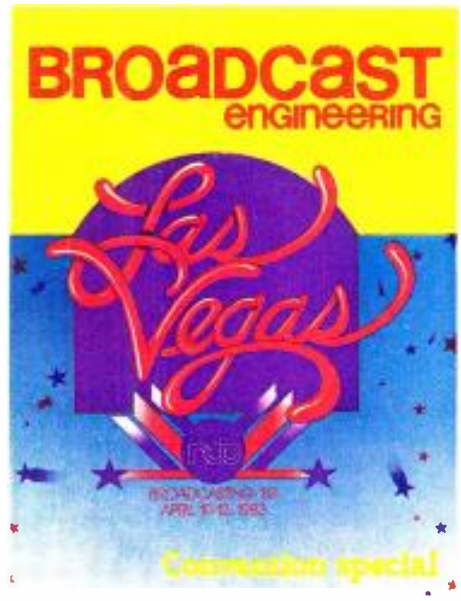

THE COVER this month is adapted from NAB brochures promoting the organization's 61st Annual Convention and International Exposition. The convention's theme is *Productivity: Let's Work Together.* NAB-'83 will help broadcasters make the transition as new developments in technology and changes in regulations reshape the traditional roles of managers and engineers in broadcast stations.

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NAB-'83/Las Vegas

- April 10-13
- Las Vegas Convention Center

NAB CONVENTION GUIDE – Most of this issue is devoted to preshow coverage of NAB-'83/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 at **BE's** extensive wrapup in our June issue.

NEXT MONTH our issue will include the following:

- AM/FM transmitter roundup
- Broadcast studio design
- Test equipment update
- SMPTE replay

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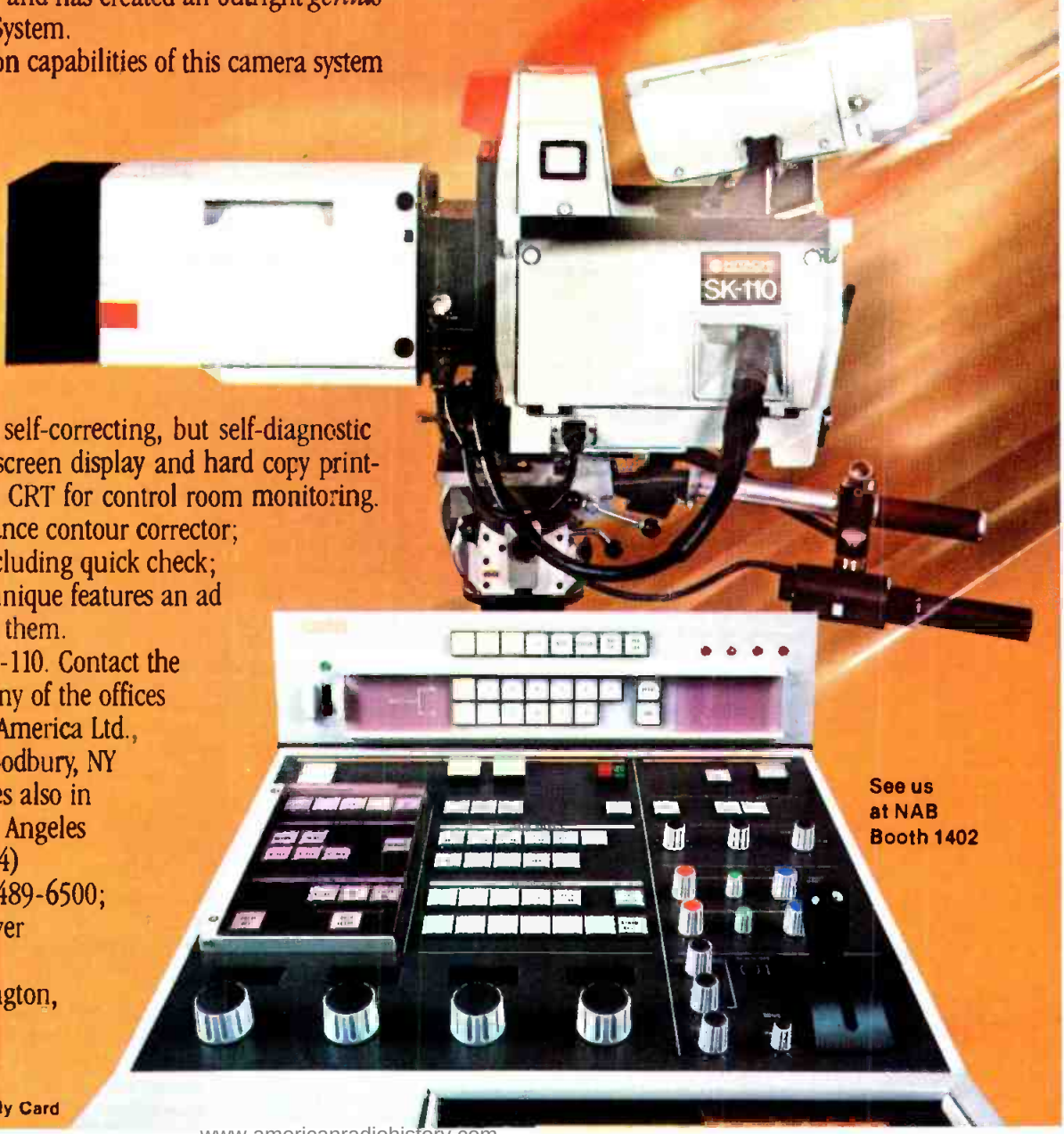

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FCC update

March 1983

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

Certification of compliance with engineering rules

The FCC is considering a plan to change its current application forms for FM and TV authorizations to permit applicants to certify to their compliance with FCC technical rules. Such certifications would replace detailed engineering exhibits demonstrating rule compliance.

In an effort to speed up the authorization process, the commission changed its forms last year to permit certification as to financial qualifications. Previously, applicants were required to file balance sheets, bank loan commitment letters and letters of credit to demonstrate their financial qualifications. The planned engineering certification is intended to similarly simplify and speed up the authorization process.

This is a highly controversial proposal within the commission, expected to generate considerable interest once a comment date is set. It will affect consulting engineers in terms of the extent of technical data needed for FCC applications and will change the FCC's role as a record keeper for the industry. It also will make it easier and cheaper to apply for new stations.

Existing stations will be affected too. If the certification proposal is implemented, it will be incumbent upon them to initially determine if a particular application would have an adverse technical impact. The commission's staff would have only a minimal role in reviewing technical proposals, because only minimal technical information would be on file.

Although the proposal now on the drawing boards involves only FM and television, if it proves to be successful it would most likely be extended to AM, non-commercial FM and LPTV processing as well.

The switch-over would be facilitated through increased use of computer technology to check for compliance with interference standards. At the present time, the commission's computers check every FM and TV application for such compliance. With the advent of standard antenna patterns for AM, computer analysis also has become the backbone of the commission's AM application review process. Computers soon will be employed for LPTV applications as well. The certification plan is designed to take maximum advantage of computer processing in terms of reducing the time and paperwork involved in application review.

Equipment authorizations simplified

The commission has established a new procedure for equipment authorization, known as *notification*, which is designed to shorten and simplify the process of authorizing the marketing of communications equipment. Further, the commission has proposed specific categories of equipment to be authorized under its new notification procedure and under a planned liberalization of its current equipment *verification* procedure.

Under the notification procedure, an applicant for an equipment authorization will not be routinely required to submit test results or other detailed information. Applicants will be required to submit only basic information, a statement that the equipment has been tested and is in compliance with FCC standards, and a statement of its intended use. More detailed information or samples will be requested only in special circumstances.

The commission also proposes expansion of its existing verification procedure under which no information is submitted to the FCC unless specifically requested and no specific authorization is issued.

The commission stressed that adoption of the notification procedure and expansion of the use of verification do not signal a lessening of its responsibility to ensure that equipment complies with the rules. Testing requirements remain unchanged and still must be complied with. And, equipment subject to the new notification procedure still must be granted a specific authorization. However, the amount of paperwork that must be filed will be substantially reduced. Greater use of sampling, instead of

Continued on page 319

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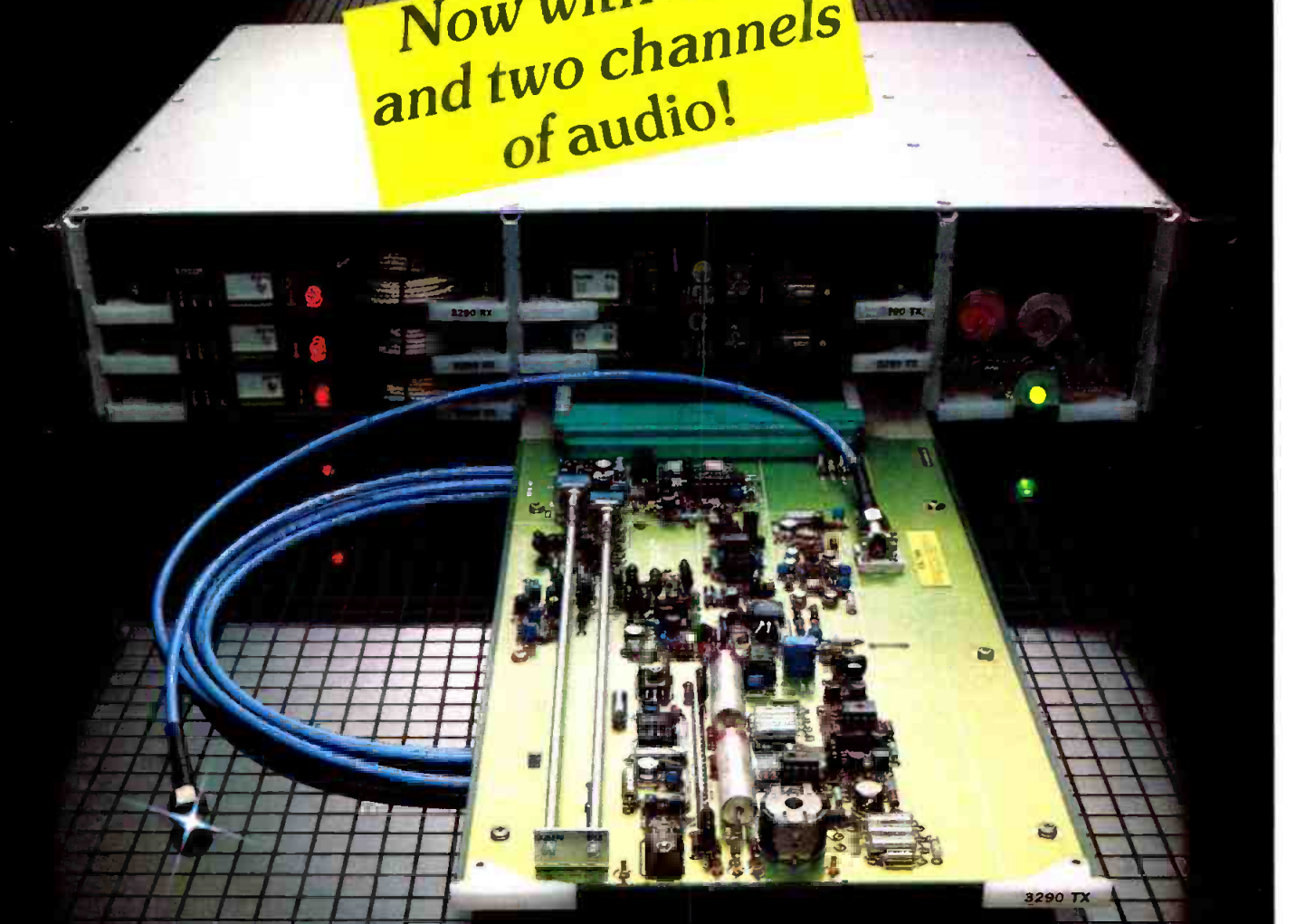

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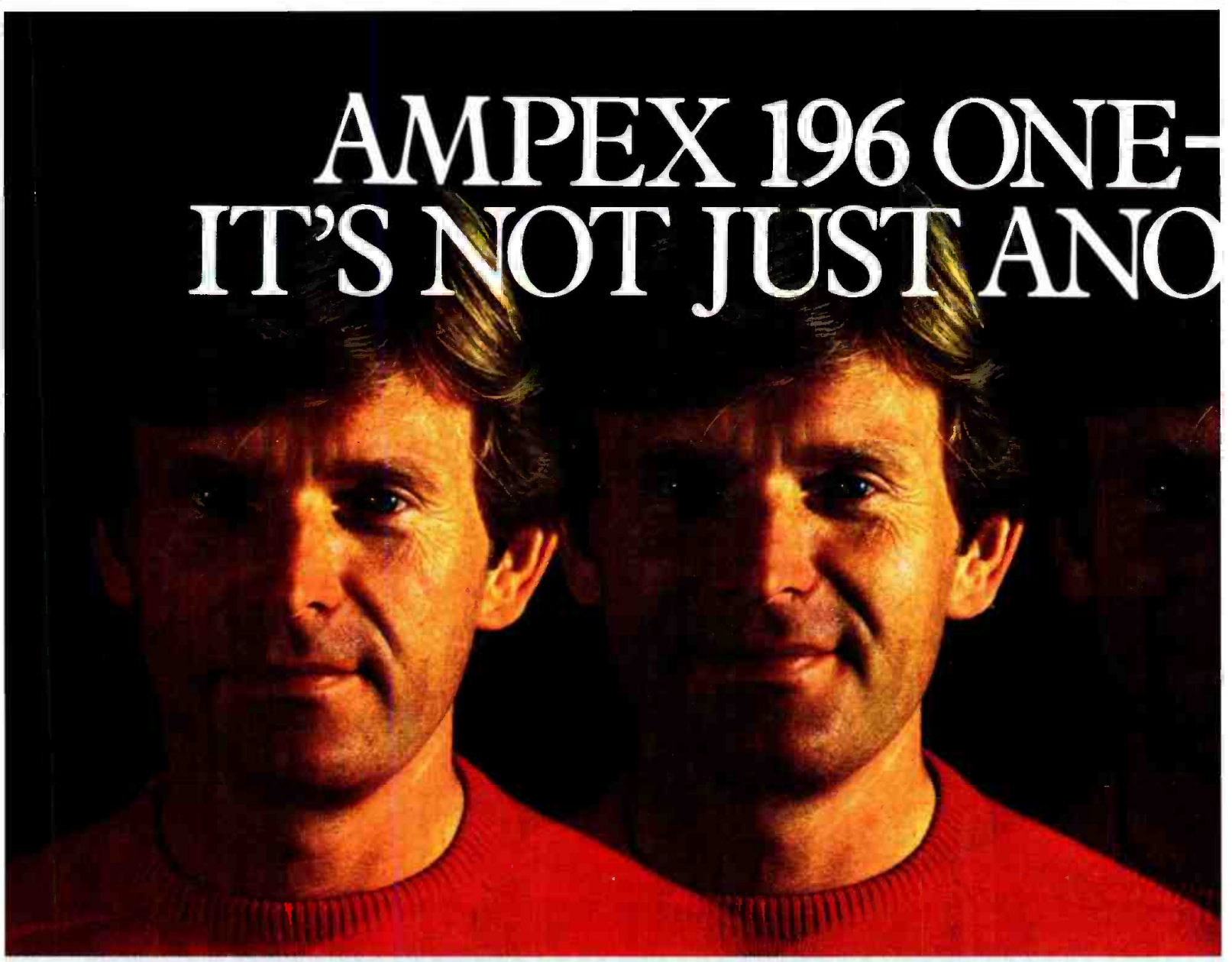

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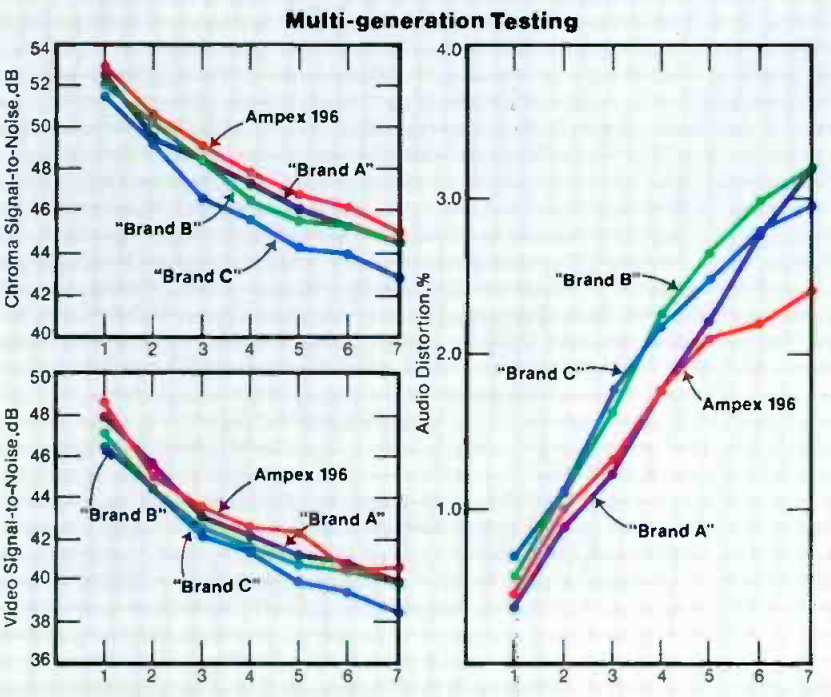

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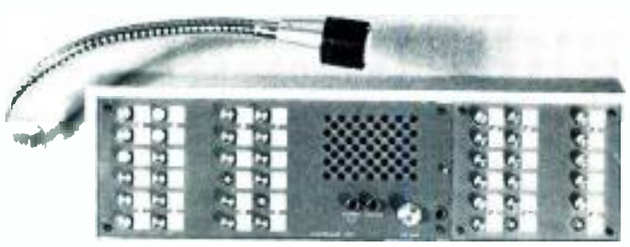

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feedback

SCPC and Mutual corrections

I want to point out two minor errors in my article, "Selecting a Satellite Receive Terminal System" (November 1982, page 50). One is a typo regarding SCPC (single carrier per channel). This type of service uses a dedicated carrier for each audio channel and should thus read: single channel per carrier.

In reference to the audio companding used on the Mutual Satellite Network, I stated that the system employed a 2:1 companding ratio. This is in error; Mutual employs a 3:1 ratio. The error was a result of my failure to update my notes concerning the technical standards originally proposed for that system.

Hugh R. Paul
Broadcasting and Communications
Engineering Consultant
Walnut, CA

Companding

I read with interest the article in your November 1982 issue by Hugh R. Paul on selection of a satellite receive terminal system (page 50). Although I found it most interesting and enlightening overall, I must take some exception with the technical information regarding the companding ratio on the Mutual Broadcasting System.

Back in 1977, Wayne Hettrick of NPR and our staff held what we referred to then as "the great compandor bakeoff." Technical staff members from National Public Radio and Mutual assembled in Studio A at MBS, and with the help of technicians from Western Union, we had the luxury of comparing systems during an entire afternoon of subjective listening tests. We evaluated a variety of units—banded and unbanded, 1.5:1, 2:1, 3:1, etc., including dbx, Telefunken and Kar Kar.

When the voting was completed and all the information was tallied, we determined that the 3-to-1 ratio of audio compander was the best system for both NPR and Mutual to achieve the noise figures in the mid-70s that both systems enjoy today. In fact, the only system differences that exist in the formats between NPR and MBS are in the emphasis. NPR uses no emphasis in its system, while MBS uses 25μs pre-emphasis and de-emphasis to achieve an additional 5.55dB improvement in signal-to-noise.

Although Mutual chose to use smaller dishes on the ground, the addition of the emphasis network greatly improved the overall performance of our terminals, such that the two systems today are virtually equal in performance. Moreover, Mutual has filed its position on decreased satellite spacing with the FCC, and has advocated a phase-in period for any new spacing scheme that may be employed. Mutual has also promised its affiliated stations that acceptable technical solutions will be undertaken to provide the highest quality SERT service no matter what satellite spacing system is ultimately employed.

The author is correct in noting that a 2-to-1 companding ratio (as used by other SCPC analog radio networks) will not yield the same high quality signal-to-noise as found in the NPR and Mutual systems. His only mistake was in assuming that Mutual was just any other radio network.

William J. Wisniewski
Vice President
Network Operations
Mutual Broadcasting System

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Studer Re-States the Art

With the new A810, Studer makes a quantum leap forward in audio recorder technology. Quite simply, it re-states the art of analog audio recording.

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That's only the beginning. The A810 also provides three "soft keys" which may be user programmed for a variety of operating features. It's your choice. Three more locate positions. Start locate. Pause. Fader start. Tape dump. Remote ready. Time code enable. You can program your A810 for one specialized application, then re-program it later for another use.

There's more. Electronic alignment of audio parameters (bias, level, EQ) is accomplished via digital pad networks. (Trimpots have been eliminated.) After programming alignments into the A810's memory, you simply push a button to re-align when switching tape formulations.

The A810 also introduces a new generation of audio electronics, with your choice of either transformerless or transformer-balanced in/out cards. Both offer advanced phase compensation circuits for unprecedented phase linearity. The new transport control servo system responds quickly, runs cool, and offers four spooling speeds.

Everything so far is standard. As an option, the A810 offers time-coincident SMPTE code on a center track between stereo audio channels. Separate time code heads ensure audio/code crosstalk rejection of better than 90 dB, while an internal digital delay automatically compensates for the time offset at all speeds. Code and audio always come out together, just like on your 4-track. Except you only pay for ¼" tape.

If you'd like computer control of all these functions, simply order the optional serial interface. It's compatible with RS232, RS422, and RS422-modified busses.

More features, standard and optional, are available. We suggest you contact your Studer representative for details. Granted, we've packed a lot into one small package, but ultimately you'll find that the Studer A810 is the most versatile, most practical, most u*seable* ATR you can buy.

The Swiss wouldn't have it any other way.

STUDER REVOX

PRECISION FROM SWITZERLAND

Studer Revox America, Inc. • 1425 Elm Hill Pike, Nashville, TN 37210 (615) 254-5651
Offices: Los Angeles (213) 780-4234 • New York (212) 255-4462 • Dallas (214) 760-8647 • Canada: Studer Revox Canada, Ltd.

Circle (11) on Reply Card

www.americanradiohistory.com

TEK 110-S FRAME SYNCHRONIZER

A frame synchronizer from Tektronix that sets a new standard of comparison.

Now. Authentic reproduction from any signal source. The Tek 110-S is the frame synchronizer with 10-bit resolution and accuracy. Performance that's every bit Tektronix! You get highest signal quality with correct SCH phase from any source. Resulting in the least signal degradation of any frame synchronizer on the market today.

Ten-bit digital circuitry offers digital signal processing with negligible quantizing errors. This 10-bit capability lets you cascade multiple units and depend on the 110-S for unexcelled performance. With four passes through the 110-S your signal is still better than with one pass through an 8-bit synchronizer. *Including quantizing effects*, the 110-S has the following specifications:

- 1% Diff Gain
- 1° Diff Phase
- 60dB Signal-to-Noise
- 1% Freq Response
- 0.5% 2T K-Factor

Compare these values to other frame synchronizers which omit quantizing effects from their specifications.

Noise performance unmatched. Signals can be tracked to low signal/noise ratios, such as those encountered during ENG Microwave fades. Or the operator can select field freeze or black. Adaptive clamping prevents streaking while quickly responding to hot switches.

Accurate color framing. With the adaptive decoder or optional four-field memory, field 1 to field 3 conversions can be accomplished without introducing 140 nanosecond picture shifts. With four-field memory (one complete color frame), accurate color framing can be obtained without decoder artifacts.

Accurate RS-170A timing. With the 110-S's 10-bit digitizer and full memory, your original sync and burst can be passed with the signal. Or you may choose to insert a new digitally generated sync and burst with RS-170A timing.

Front loaded interchangeable boards. Internal diagnostics allow you to quickly identify any impending problems. Circuit boards are calibrated individually so you can change boards quickly, minimizing downtime.

Processing amplifier with remote control provides adjustments for signal level, set-up, chroma gain and hue. Other controls such as field/frame freeze are also provided on the remote control.

The 110-S is built in our tradition of reliability, excellence and long-term value. And backed by a worldwide service network and proven technical support.

Call your nearest Tektronix Field Office (listed in major-city directories) for more information. Or call 1-800-547-1512 for descriptive literature. (In Oregon, 1-800-452-1877).

Tektronix, Inc., P.O. Box 1700, Beaverton, OR 97075. In Europe: Tektronix Europe B.V. Postbox 827, 1180 AV Amstelveen, The Netherlands.

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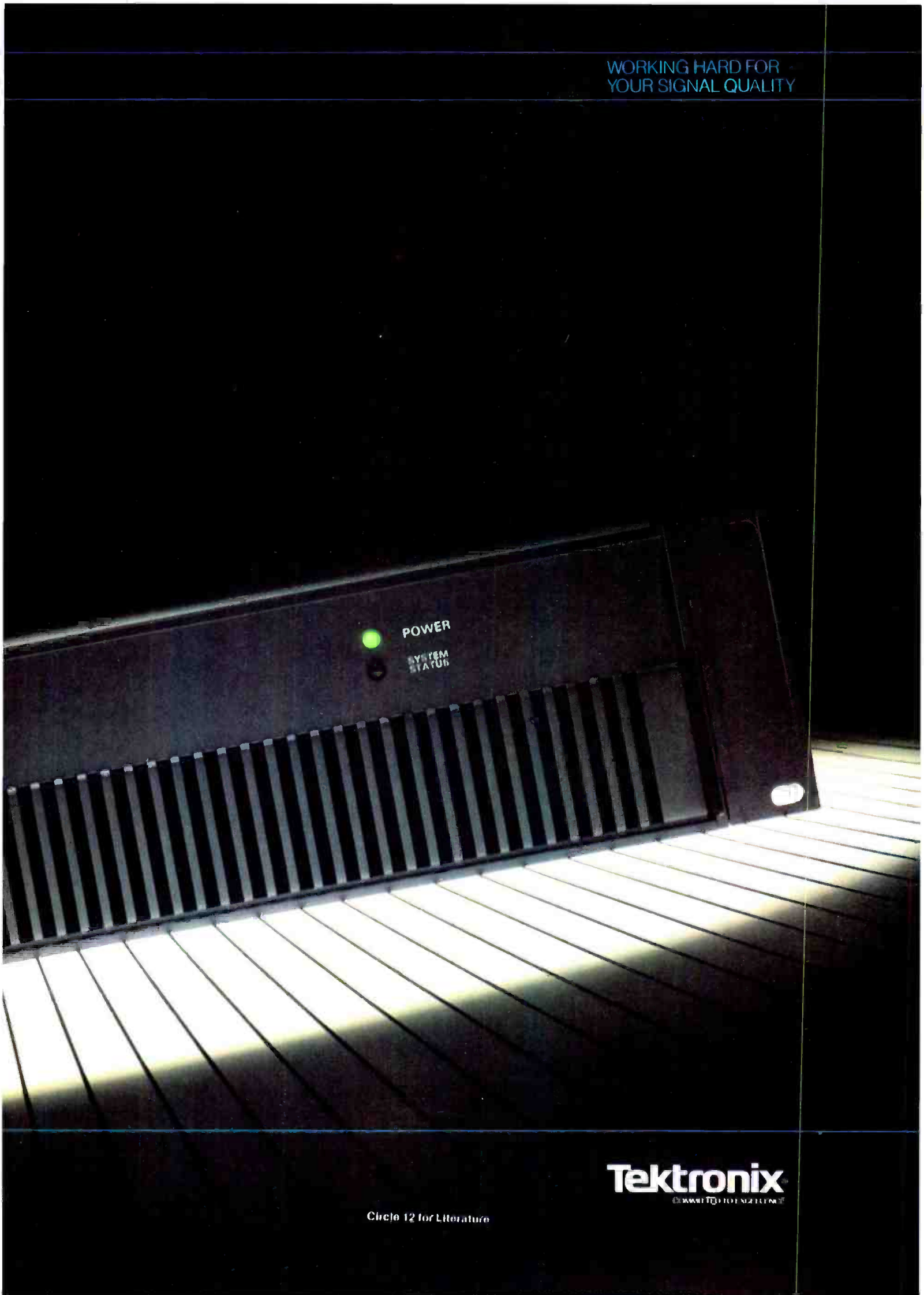
WORKING HARD FOR
YOUR SIGNAL QUALITY



Tektronix

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Circle 12 for Literature

www.americanradiohistory.com

When the going gets tough...

The adage, "When the going gets tough, the tough get going," has born remarkable fruit in recent months. As the nation has had to face the harsh realities of winter and economic recession, the electronic and print media have found themselves rising to the occasion with new vigor to help ease the nation's burdens. Never before in peacetime have we seen the power of communications being used so forcefully in combined programs to help people in time of need.

It is to this exceptional effort of the media to resolve local and national problems that we address this month's column. Let us focus on just two of the issues that have received special attention from the media: rising unemployment and home heating.

Responding to the needs for employment in the Kansas City area, station WDAF, Channel 4, embarked on a joint program with the *Kansas City Times/Star* newspapers to help those in need. Both media undertook a massive effort to link up job openings with situations wanted, and this may be the nation's first combined-media effort of this type. The results were encouraging. The paper listed more than 5000 situations wanted and more than 400 job openings by its deadline. By late news time, WDAF had added substantially to these totals, including another 200-plus new job openings. Some 80% of the applicants were sent for interviews, and more than 250 people were hired.

As the nation's midsection felt the crushing blow of winter, tales emerged about the needy people suffering without adequate heat, food and clothing. Again the local media in Kansas City responded, but with print and electronic media working separately in this instance. The *Times/Star* organization sponsored its Project Warmth, which may be the nation's first program of its type. Since its kickoff, Thanksgiving week, 1982, the program has generated $96,958; 1200 blankets; 6 tons of clothing; and 4.5 tons of food. In a separate program, KCMO, Channel 5, sponsored its Heat for Life program that has generated more than $411,000 to provide heat for those in need.

As experimental programs to help the local economy, the Kansas City efforts have been a resounding success and progress continues. Our congratulations go to the *Star*, WDAF and KCMO organizations for having the courage and foresight to undertake such programs.

Other cities might well follow the Kansas City media examples to aid their regions. For those who have already done so, we would like to report on your success. Readers are asked to submit us short notes on local programs and their results; we'll compile/report them in future issues of **BE.** Send your inputs to The Editor, **Broadcast Engineering,** P.O. Box 12901, Overland Park, KS 66212.

Your opinions on our editorial, on other critical issues facing broadcasters, or on the views of our authors is welcome. Address comments to The Editor, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

Coming events

March 17-22
National Association of Television Programming Executives (NATPE) 20th Annual Conference, Las Vegas Hilton, Las Vegas, NV

April 10-13
NAB 61st Annual Convention, Las Vegas Convention Center, Las Vegas, NV

April 17-21
Public Radio Conference, Hyatt Regency, Minneapolis, MN

May 28-June 2
13th Int'l TV Symposium and Technical Exposition, Montreux, Switzerland

May 30
American Women in Radio and Television 32nd Annual Convention, Royal York, Toronto, Canada

June 12-15
National Cable Television Association (NCTA) Annual Convention, Houston, TX

June 22-26
Broadcasters Promotion Association (BPA) 26th Annual Seminar and Broadcast Association, Fairmont Hotel, New Orleans, LA

Aug. 28-31
NAB Radio Programming Conference, Amfac Hotel, Dallas, TX

Sept. 21-23
IEEE Third Annual Broadcast Symposium, Washington Hotel, Washington, DC

Sept. 22-24
Radio Television News Directors Association (RTNDA) International Conference, Las Vegas, NV

Sept. 25-28
Broadcast Financial Management Association (BFMA) 23rd Annual Conference, Hotel Regency, Riviera Hotel, Orlando, FL

Oct. 2-5
NRBA Annual Convention, New Orleans, LA

Oct. 4-6
LPTV East, Sheraton, Washington, DC

Oct. 5-9
CIRT, Mexico City, Mexico

Oct. 9-12
AES 74th Technical Meeting & Exhibits, New York Hilton, New York, NY

Oct. 23-26
CCBA Convention, Toronto, Canada

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TEK 1910 DIGITAL TEST SIGNAL GENERATOR/INSERTER

WORKING HARD FOR YOUR SIGNAL QUALITY

The new digital generator that lets you access and configure the vertical interval any way you want it.

Now. Four external VITS inputs. Non-volatile memory. And 39 test signals. All wrapped up in one test signal generator with all-digital family features. The new 1910 from Tektronix gives you the most access offered to the vertical interval—for inserting and configuring the location of test signals, Teletext, closed captioning, source ID and more. No other generator gives you that kind of capability.

Plus, the proven performance of the leading family of digital test signal generators. With the 1910, Tektronix has combined its 1900 Series Transmitter, NTC7 and Studio Test Sets in one highly capable unit. You get a full signal complement, with the accuracy and stability of 10-bit digital signal generation. The digital code for each signal is stored in replaceable PROMs so your 1910 won't become obsolete.

Its RS232 control port adds even more versatility to the 1910 by providing a means for automatic control from such devices as the Tektronix 1980 ANSWER Automatic Video Measurement Set, with added flexibility for programming VITS and VIRS in either field on lines 10 through 20, signal matrixing, VITS sequencing, redefining signal selection in the front panel or remote control unit—and more.

Solid support completes the package. The 1910 comes with a worldwide service network and proven technical support, plus the Tektronix reputation for reliability, excellence and long-term value.

Contact your nearest Tektronix Field Office (listed in major city directories) for more information. Or call 1-800-547-1512 for descriptive literature. (In Oregon, 1-800-452-1877.)

Tektronix, Inc., P.O. Box 1700, Beaverton, OR 97075. In Europe: Tektronix Europe B.V., Postbox 827, 1180 AV Amstelveen, The Netherlands.

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(Product available at NAB.)

Circle 13 for Literature

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Satellite update

By John Kinik, satellite correspondent

The satellite programming line-up

1983 will bring a quantum jump in the number of active satellite channels. The launching of Hughes' Galaxy 1 satellite into an orbital position adjacent to RCA's Satcom 3R will increase the number of prime channels of television available to cable or broadcasting users from 24 to 48. Elsewhere in the sky, approximately 25 channels will be in operation on various other satellites, bringing the total to more than 70 channels, an 80% increase over the current total.

1984 will see a second quantum jump occur in satellite signals. We can expect to see corresponding jumps in the use of signals by cable systems and by existing broadcasters. The increasingly attractive *shopping list* of programming will also provide incentive for new entrepreneurs to establish low power broadcasting stations, primarily in rural areas where cable systems are not cost-effective. Also there will be a continuing increase in the number of private satellite earth terminals installed for personal use (homes, ranches and farms) and for group use (resorts, apartments and condominiums).

When the new Direct Broadcast Satellites (DBS) are launched in the 1985-1987 time period, a third quantum jump in programming will occur. This time however, most of the new DBS channels will be aimed directly at the home, rather than at cable or broadcasters. But the DBS channels will also stimulate additional programming via conventional satellites, as broadcasters and the cable industry strive to meet the new competitive challenge with their more cost-effective, in-place delivery systems.

It is difficult to forecast the growth of satellite programming in more accurate terms than those described previously. The actual number of channels in the sky in 1987, and their allocation to the various market segments now evolving (cable, broadcast, SMATV, DBS) will be determined by a number of factors, such as the market demand for a wide selection in programming, the availability of programming, the growth rate of conventional satellite delivery systems during the 1983-1987 period and the competition from physical distribution of programming via cassettes and discs. The purpose of this month's column is to provide a base line for following the growth of programming over the next four years by identifying the channels committed to satellites to date, and to making some reasonable estimates of probable future growth.

1983 programming

By year's end, the following satellite channels will be in operation:

Satcom 3R (RCA)
1-Nickelodeon/ARTS
2-PTL
3-WGN
4-Spotlight
5-The Movie Channel
6-WTBS
7-ESPN
8-CBN
9-USA Cable Network
10-Showtime(West)
11-Music TV
12-Showtime(East)
13-HBO(West)
14-Cable News Network
15-Cable News Network 2
16-HTN Plus/ASCN/NJT
17-Cable Health Network
18-EWTN/Reuters
The Alternate View Network
19-C-Span
20-Cinemax(East)
21-The Weather Channel
22-MSN/Daytime/HBO
23-Cinemax(West)
24-HBO(East)

Galaxy 1 (Hughes)
1-Time
2-Westinghouse Broadcasting
3-Time
4-(Not assigned)
5-Times Mirror
6-Spanish Int'l Network
7-Turner Broadcasting
8-Westinghouse Broadcasting
9-(Not assigned)
10-Times Mirror
11-(Not assigned)
12-Westinghouse Broadcasting
13-(Not assigned)
14-Viacom Int'l
15-Spanish Int'l Network
16-Viacom Int'l
17-Time
18-Turner Broadcasting
19-Time
20-(Not assigned)
21-Time
22-Westinghouse Broadcasting
23-HBO
24-(Not assigned)

Satcom 4(RCA)
1-Spanish Int'l Network
2-SPN
3-Bravo
4-Playboy Channel/NCN
5-Entertainment Channel
6-Biznet
7-TBN
8-Galavision
(16 more available)

Westar 4 (Western Union)
1-Financial News Network
2-SelecTV
3-Eros
(21 available)

Westar 5 (Western Union)
1-WOR TV
2-UTV Cable Network
3-Satellite News Channel
4-Black Entertainment Network
(20 available)

Other satellites
Satcom 1R(RCA) – up to six channels estimated
Satcom 2R(RCA) – up to 12 channels available
Galaxy 2(Hughes) – up to 24 channels available
Telstar 301(AT&T) – up to 12 channels available
Anik C-2(USTV) – four channels
Anik B – three channels (Canada only)
Anik D-1 – four channels (Canada only)

As indicated previously, some 70 channels are definite, with more than 100 additional channels available for possible use.

1984 programming

Two additional satellites will bring a minimum of 30 new channels of programming into the marketplace, with up to 44 additional channels available on three other new satellites, as follows:

- Spacenet 1 (SP Communications)—20 channels estimated;
- Spacenet 2 (SP Communications)—10 channels estimated;
- Telstar 302 & 303 (AT&T)—up to 24 channels available; and
- G-Star 1 & 2 (GTE)—up to 20 channels available.

The total number of channels will exceed 100, with an additional total of 144 channels available for possible use.

1985-1987 programming

The eight DBS systems authorized

Continued on page 319

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TEK TELEVISION PRODUCTS

WORKING HARD FOR YOUR SIGNAL QUALITY

A completely automated audio analyzer package and advanced portable scopes to simplify your job.

Now. Four new products from Tektronix deliver more capability and performance than ever before.

SG 5010 Programmable 160 kHz Oscillator/AA5001 Programmable Distortion Analyzer. Two new members in our TM 5000 family of modular, IEEE-488 compatible instruments. The SG 5010 is the first oscillator to offer both GPIB programmability benefits and less than 0.001% (100 dB) total harmonic distortion. Plus all the standard IMD test signals and high level, fully balanced, fully floating output. Together, the SG 5010 and AA 5001 make a completely automated audio analysis system with the highest performance available today. Fully automatic even when the oscillator and analyzer are separated, by yards or by miles.

2236 100 MHz Portable Oscilloscope. Measurements that had taken three or four instruments can now be done with one: the 2236 with integrated counter/timer/digital multimeter. It's a whole measurement system packed in a portable scope that's lightweight, versatile and easy to use. Priced-right performance for tasks from circuit continuity testing to gated frequency, time and event counting. Standard features include TV field and TV line triggering.

2445 150 MHz Portable Oscilloscope. The new industry standard with more performance for the dollar than you've ever seen before. Four-channel capability. Auto level "hands-off" triggering. Standard Δ time and delay sweep. 1 ns/div sweep speed. Overdrive aberration of only 0.5%. Extensive CRT readout. Plus more. And state-of-the-art microprocessor design keeps the 2445 simple to operate. It's everything that a portable scope should be and the only one that is.

Contact your nearest Tektronix Field Office (listed in major city directories) for more information. Or call 1-800-547-1512 for descriptive literature. (In Oregon, 1-800-452-1877.)

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Tektronix

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Circle 14 for Literature for TM 5000
Circle 15 for Literature for Portables

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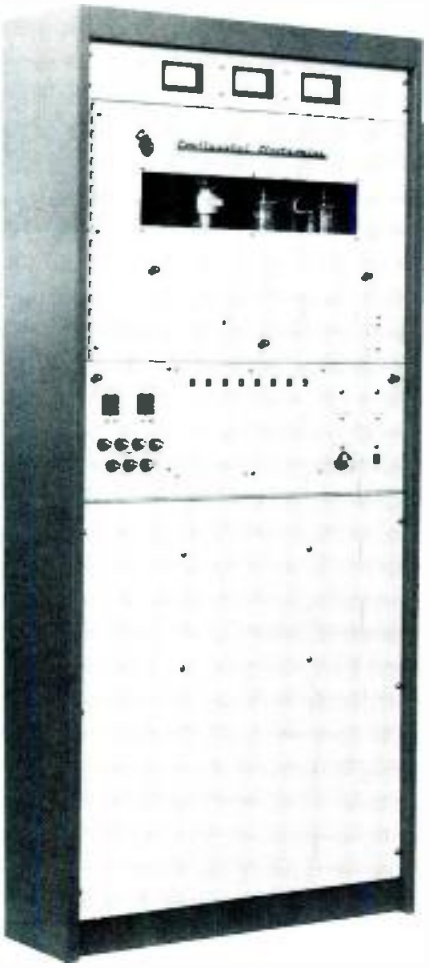

Continental's 1 kW AM Power Rock: a sound winner that's ready for AM stereo.

Tough market or not, the Power Rock is designed to give you the best signal around. Listen to the loud, clear signal, and you know you have a winner. The Power Rock is ready for AM Stereo and accepts sophisticated audio. Conservatively-rated components give you an extra margin of safety for steady and reliable on-air performance.

For information, call 214 381-7161
Continental Electronics Mfg. Co.
Box 270879 Dallas, TX 75227

Continental Electronics

Send me 1 kW AM Power Rock brochure
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Station _____
Address _____
City _____
State Zip _____
Phone (___) _____
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Circle (16) on Reply Card

news

ABC initiates digital audio via satellite

ABC Radio Network affiliate radio stations WTKN-AM and WWSW-FM in Pittsburgh, PA, have become the first stations in the United States to receive network programming via the new, state-of-the-art digital satellite transmission system.

The two stations, affiliated with ABC's Talkradio and Contemporary Network, respectively, will now receive network programming originating from both Los Angeles and New York. The announcement was made jointly by Edward F. McLaughlin, president of the ABC Radio Networks; and Diane Sutter, vice president/station manager of WTKN/WWSW.

Programming will be sent to the stations via the RCA Satcom I satellite in digitally encoded form, allowing for an audio quality and flexibility previously unavailable by other methods. ABC will convert to the RCA Satcom I-R satellite later this year. ABC began program tests on the satellite in late December, delivering both regular network programs and ABC Talkradio to WTKN and WWSW. The uplink is provided by RCA from Vernon Valley, NJ.

WTKN/WWSW are the first of the more than 3000 radio network affiliates in the United States that will switch to this digital system in the next 18 months. Other major radio networks—NBC, CBS and RKO—are joining ABC in converting to this method of program distribution.

The receiving equipment installed at the WTKN transmitter site was specially designed and manufactured by Scientific-Atlanta to specifications supplied by the ABC Radio Networks. This equipment consists of a 2.8m dish, which receives the signal from the satellite, and special electronics which convert the digital signals back into high quality audio.

ABC will provide 19 program audio channels of 15kHz each and one data channel. Programming on the system will include four time zone feeds of ABC's six networks (Contemporary, Direction, Entertainment, FM, Information and Rock) and several stereo pairs for special music program distribution, along with an expanded news and special events channel to provide stations with more news actualities and features.

NASA semiconductor project spurs solid-state electronics

NASA's Lewis Research Center has spearheaded creation of a new generation of high performance transistors and diodes that provide more power at higher voltages in smaller, less expensive packages.

"Our program has led to an assortment of solid-state power devices capable of switching 50kW of power and more at system voltages in the range of 300 to 1200V without sacrificing switching speed, efficiency and ease of control," Gale R. Sundberg, Lewis project manager, said. Most transistors today limit power levels to less than 5kW at voltage ranges up to 300V.

Value of such technology to the space program is significant. But consumer products, tools for medical diagnosis and treatment, military hardware and industrial operations may also be expected to benefit from these developments.

"To illustrate, high power transistors, used for inverters, regulators and power controllers for motors and other loads, could produce savings of a billion dollars per year or more in electric power costs. Typical applications would be induction heaters, programmable controllers, very low-frequency transmitters, amplifiers and ac motor drives."

The new power transistors have superior power switching characteristics that significantly broaden the spectrum of transistor application. Functioning primarily as solid-state switching devices for controlling high power, they result in direct reductions in the size, weight and number of components needed in various electrical circuits. Also, the use of these transistors can bring about the replacement of cumbersome hydraulic actuator systems with lightweight, efficient motor-driven actuators. This will be possible in industrial as well as aerospace applications.

Lewis Research Center is also upgrading diode technology in accelerating semiconductor improvement. Diodes used in electrical circuits to protect transistors and other circuit components from power surges and to reduce electrical stress during turn-on and turn-off also serve to reduce the size and number of other components needed in the circuit.

The key advantage of the fast recovery, high voltage power diode is its capability of recovering high voltage blocking capability within 400ns when switched from full-rated current. It can handle peak reverse voltage of 900-1200V at 50A and peak surge currents of 1000A.

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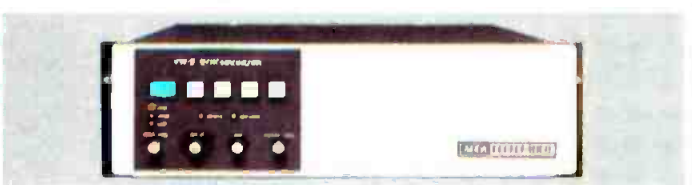
ADDA CORPORATION

Every Station Needs TBC's That Meet RS 170A

One of the reasons ADDA's VW Series Time Base Corrector/Frame Synchronizer is not only a network standard, but is becoming the TBC to own in medium and smaller market stations, is absolute technical superiority.

For instance, the VW series is built to meet RS 170A specifications, always a critical factor in evaluating the merits of a broadcast TBC.



There are two models in the VW Series: The VW-1 (for ¾" VTR's) and the VW-2 (for ¾" and 1" VTR's).

In addition to its RS 170A capabilities the VW Series also offers:

- ☐ Unequaled reliability
- ☐ Infinite correction window
- ☐ Full-bandwidth electronic freeze frame
- ☐ Frame synchronization (The VW can take raw external feeds and let you switch them synchronously with studio material.)

The best way to understand the difference between the VW and everything else is to watch a side-by-side comparison on your own premises. Call us for a demo. We'll be happy to show you why the VW is a TBC for everybody's market.

Affordable Excellence

ADDA CORPORATION
130 Knowles Drive
Los Gatos, California 95030

Call the ADDA 1500 number: Corporate Offices, Los Gatos, Calif. (408) 379-1500; Sales Offices: Atlanta (404) 953-1500; Baltimore (301) 974-1500; Dallas (214) 373-1500; Detroit (313) 332-1500; Kansas City, Mo. (913) 631-1500; Los Angeles (213) 489-1500; Miami (305) 759-1500; New York City (212) 398-1500; Wausau, Wisc. (715) 362-1500.

See the VW Series at Booth 1100, NAB

Circle (17) on Reply Card

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WE JUST BROUGHT SMPTE CONTROLLED AUDIO EDITING UP TO SPEED.

End slow audio interlock with our Series 50 compact recorder/reproducers. They're designed for demanding production applications like SMPTE control. Built smarter and stronger, with better electronics to make interlock and editing faster.

All three motors—the strongest we've ever put into a compact unit—are included in the microprocessor-controlled servo system for faster and smoother tape handling. Input from five independent photo interrupters and multiple tachs provide a more accurate detection of tension, tape speed and direction, improving external computer control. A single connector delivers all status and remote signals for editor/synchronizer interface and eliminates complicated wiring.

For non-sync recording, two built-in auto locators find critical cues with a single command. Tape location is presented in minutes and seconds, positive or negative.

For easy maintenance and service, all electrical and mechanical adjustments are made from the front and each audio channel is built on its own glass epoxy PCB.

The Series 50 recorder/reproducers are tougher and work harder than any compact machines we've ever produced. Tough enough to bring your audio editing up to speed.

For more information see your TASCAM dealer or write us at 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

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TASCAM
TEAC Production Products

DESIGNED BY POPULAR COMPLAINT.

Circle (18) on Reply Card

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NAB-'83/Las Vegas

By Bill Rhodes, editorial director; and Rhonda L. Wickham, managing editor

Broadcasters are getting ready to flood Las Vegas in April for the industry's most prestigious convention: NAB-'83/Las Vegas, the 61st Annual Convention and International Exposition. Exhibitors from around the world are working feverishly on booth displays and special surprises to make this year's show better than ever, with many companies taking additional booth space because the convention center has more space available.

This year's convention theme is *Productivity: Let's Work Together* for radio, television, engineering and broadcast technology. In our opening article, "NAB's 61st Annual Convention and International Exposition," 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-'83.

Our coverage includes:

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

Details of the NAB-'83/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 exciting convention.

- April 10-13
- The Convention Center Las Vegas, NV
- Most comprehensive exhibit for broadcast equipment
- More than 320,000 square feet of exhibit space
- Luncheon addresses by Mark Fowler, FCC chairman; and Howard Baker (R-TN), Senate majority leader
- Entertainment by Bill Cosby and the Oak Ridge Boys

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

Earth stations should be a common sight in the outside exhibits.

Our NAB preshow coverage...

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By Michael C. Rau, staff engineer, NAB, Washington, DC

NEC's award-winning exhibit 32
By Jeffrey White, NEC America, Elk Grove Village, IL

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The Las Vegas Convention Center, an outstanding facility.

NAB's 61st Annual Convention & International Exposition

By Michael C. Rau, staff engineer, NAB, Washington, DC

Las Vegas, NV, is the site of NAB's 61st Annual Convention and International Exposition. And this year, the convention will be bigger than ever. According to NAB's exhibit historians, the attendance figures for the convention increase substantially every year. Guaranteeing another annual attendance boost is certification of the convention by the US Department of Commerce as an *International Trade Fair*. At least 10,000 brochures have been printed (each in five different languages including English) and distributed to international consulates throughout the world to promote the convention and to offer an invitation to visit.

Attendance is not the only means by which the convention has grown. This year, exhibits foreshadow a record occupancy—approximately 320,000 square feet, nearly seven acres—a significant increase in space over previous years. Bring comfortable shoes!

The sessions

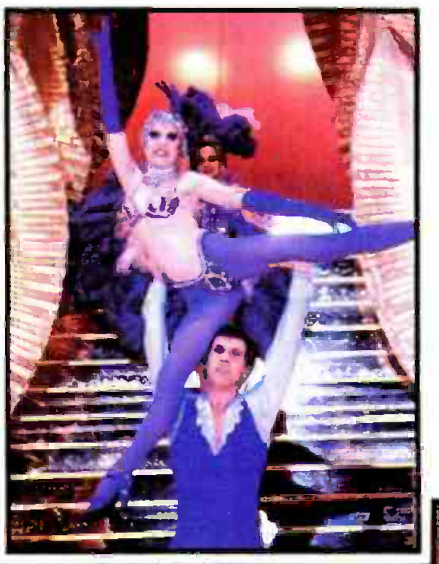
In some respects, the convention is almost too large to comprehend. Besides the magnificent array of exhibits and people, there will be comprehensive technical sessions supplying all levels of information to attending engineers. On Monday, April 11, radio engineers will be treated to a series of technical papers on recent developments in AM/FM allocations, including a technical report on Docket 80-90; an analysis of FM SCA adjacent channel interference; and potential use of *diurnal curves* to expand AM daytimers' operating hours. Monday morning's schedule includes papers on the following topics: design criteria for multistation combining systems; methods of improving AM coverage; use of aerobeacon transmitter technology for AM broadcast transmitters; and synthetic guying for broadcast towers.

The TV side includes a comprehensive session on UHF transmission systems, with papers on reducing operating costs in older UHF transmitters; new developments in high efficiency, high power TV klystrons; dual-frequency square waveguides; and dual-frequency circular waveguides. Also to be presented will be several papers on satellite transmission and distribution systems.

On Monday afternoon, radio engineers will be free to roam the exhibit hall with their management, inspecting the latest in new technology, comparing performance specs for similar equipment or just showing their GMs around. Meanwhile, TV engineers can attend a session on TV multichannel sound. Included will be a report on the recent multichannel standardization committee activities in Chicago and a technical report on the causes of intercarrier buzz in TV receivers. Papers will be presented on the following topics: CATV system problems with multichannel sound; transmitter performance criteria; exciter design; and loudness controllers from the FCC and NAB. Also, a special session on non-ionizing radiation is explored: the effect of FM and TV broadcasting on human biology.

Tuesday morning, for radio engineers, offers sessions on new technologies: an idea for a stereo remote pickup unit; new uses for FM subsidiary communications authorizations (SCAs); a proposal for an improved FM transmission system; digital audio; and satellite distribu-

Continued on page 26



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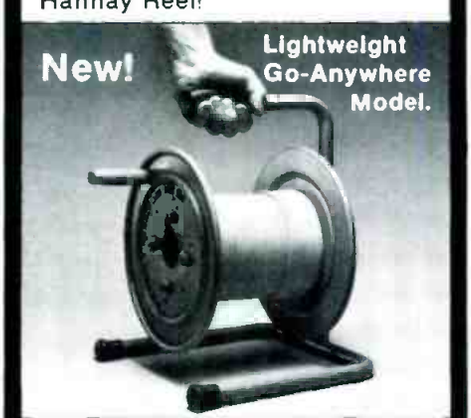

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Continued from page 22

tion. TV engineers will be treated to a morning of advanced TV systems, including a tentative tutorial on bandwidth reduction; a report from the newly formed Advanced Television Systems Committee; discussions on how to enhance a 525-line transmission system; discussions on design considerations for a component TV signal format; and an examination of ways to ensure that HDTV will be

Wasilewski to receive Distinguished Service Award

Vincent T. Wasilewski, a partner with Dow, Lohnes & Albertson, Washington, DC, and former NAB president, has been named recipient of NAB's 1983 Distinguished Service Award—the industry's highest honor. Presentation of the award will be made April 10 at the opening session of NAB-'83/Las Vegas.

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

The selection was made by NAB's 1983 Convention Committee during the association's semiannual board of directors meeting.

Wasilewski, who retired from the NAB presidency in October 1982, joined the association's legal staff directly from the University of Illinois law school in October 1949. Three years later, in February 1953, he was named chief counsel of the association. He became manager of Government Relations in August 1955; vice president of Government Affairs in June 1960; and executive vice president in August 1961 when the post was created.

Wasilewski is a member of the Illinois Bar and the District of Columbia Bar. An honorary Doctor of Humane Letters degree was conferred upon him in April 1967 by the Detroit College of Law. Wasilewski is a member of Sigma Phi Epsilon, Phi Alpha Delta (legal fraternity), Phi Kappa Phi (honorary), Order of the Coif (honorary) and the Knights of Malta. He also holds several awards from state broadcaster associations.

He is a member of the American Bar Association and the Federal Communications Bar Association. He is also chairman of the Religious Educators Foundation and a Trustee of the Museum of Broadcasting.

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compatible with NTSC.

Tuesday afternoon features an AM stereo report. Although the specific format and speakers had not been determined at press time, this session, as in the past, promises to be lively and interesting. A special session on Tuesday afternoon will examine the timely issue of FM interference to TV Channel 6. The status of industry and FCC lab, field and computer studies will be presented, including a tentative report on studies of receivers performed by the Electronic Industries Association. TV engineers are free to spend the entire afternoon touring the exhibit floor with their managers.

Finally, on Wednesday, we'll have a radio/TV combined session on a topic essential to the future of our industry: *spectrum management*. Specific issues include effects of FCC deregulation, the upcoming 1983 international spectrum conference, and an analysis of the current efforts of the land-mobile communications industry to obtain more access to UHF TV spectrum.

Other activities

Besides a plethora of technical papers, NAB-'83/Las Vegas will again have a Ham Radio Reception on Monday evening at 6 p.m. NAB has asked Chris Imlay, the ARRL Washington counsel, to give a short talk on recent rule changes and other developments, such as the recently proposed *no-code* ham license, which affects hams in general. Also there will be the usual complement of door prizes. It will be a fine occasion for an *eyeball* QSO.

Luncheons

The Engineering Luncheon will be held at noon on Tuesday. It will feature the presentation of the 1983 Engineering Achievement Award to Joseph Flaherty, vice president, Engineering and Development, CBS TV Broadcast Group. Flaherty's leadership role in the engineering and development of broadcasting uniquely qualifies him for this honor.

The luncheon speaker will be Dr. George H. Brown, former executive vice president for patents and licensing, RCA Laboratories, Princeton, NJ. While at RCA, Brown was active in research and development work on the compatible color TV broadcast system that the FCC ultimately adopted. Besides publishing original engineering on directional antennas in AM broadcast systems, Brown recently published his recollections as a research engineer in his book, *And Part of Which I Was*, tracing his involvement with the development of radio and TV broadcast engineering.

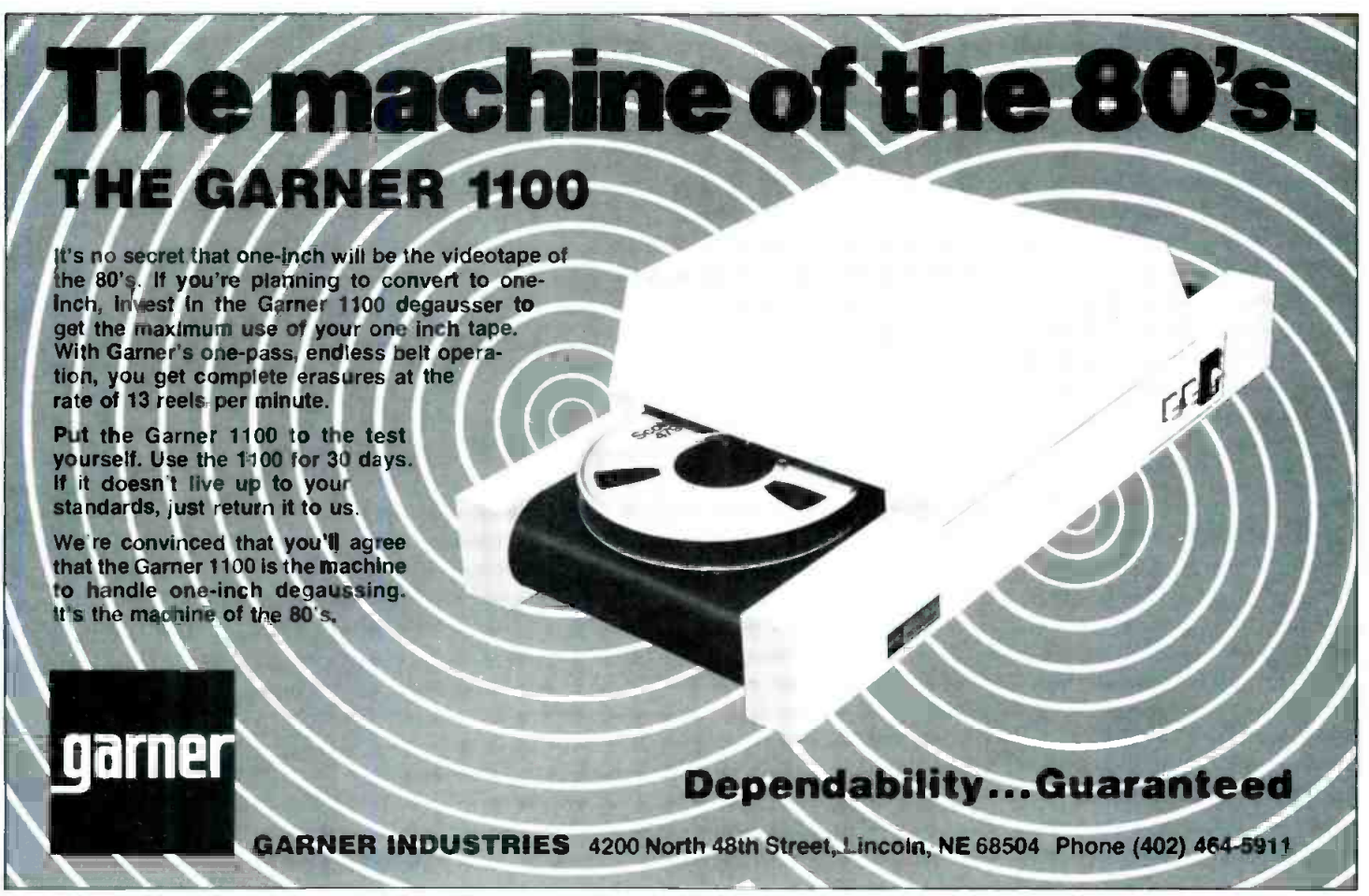
Registration

Registration for the convention is $150 for members, $385 for nonmembers. There will be a $25 surcharge for on-site registration, so be sure to pre-register by contacting Convention Registration, NAB, 1771 N Street, NW, Washington, DC 20036. Registration fees include luncheons. This year, the Las Vegas Hilton has been designated as the radio hotel, and the MGM Grand Hotel has been designated for television. Single rooms in Las Vegas range from $65 to $125 per night.

Engineers are eligible to attend the convention at the discount member rate if they are station or network members or associate members of NAB; work for educational stations; are delegates from foreign countries or work for the military. Hotel acknowledgement serves as registration confirmation.

Times

Convention activities begin at 2 p.m. on Sunday April 10 with a State-of-the-Industry address, given by Edward O. Fritts, NAB president. Following Fritts' address will be the presentation of the Distinguished Service Award to Vincent T. Wasilewski, former president of NAB. Then NAB will proudly present the Oak Ridge



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Engineering Award to Flaherty

Joseph A. Flaherty, vice president, Engineering and Development, CBS/Broadcast Group, New York City, will receive the NAB 1983 Engineering Award. The award will be presented at the Engineering Luncheon April 12.

Flaherty joined the CBS TV Network in 1957 and was involved in designing TV network systems and plants. He previously had been an engineer at NBC-TV, New York. In 1959 he became director, Technical Facilities Planning. In 1967 he was promoted to general manager and subsequently was named to his present position. He is responsible for all TV engineering and development activities for the CBS/Broadcast Group, including planning and coordinating the development of new equipment, and the installation of technical facilities throughout the network.

He is a Fellow of SMPTE, and has held various SMPTE offices. He also is a member of the French Society, Societe Des Electriciens, Des Electroniciens, Et Des Radioelectriciens (SEE); and a member of the German Society, Fernseh-und Kinotechnische Gasellschaft e.V. (FKTG).

He has published many technical articles on various aspects of TV broadcasting and has received numerous awards including an Emmy Award Citation for the CBS Minicam color camera in 1969. He was the 1974 recipient of the David Sarnoff Gold Medal for progress in TV engineering. He also received the 1975 Technical Emmy Award for electronic newsgathering and the 1979 Montreux International Achievement Gold Medal. He also was made a Fellow of IEE and the Royal Television Society, both of the United Kingdom, and is a member of the Montreux International TV Symposium's executive committee.

Flaherty received his degree in physics from the University of Rockhurst, Kansas City, MO, in 1952, and began his TV career at WDAF-TV in that city. He served with the US Army Signal Corps during 1953-1954.

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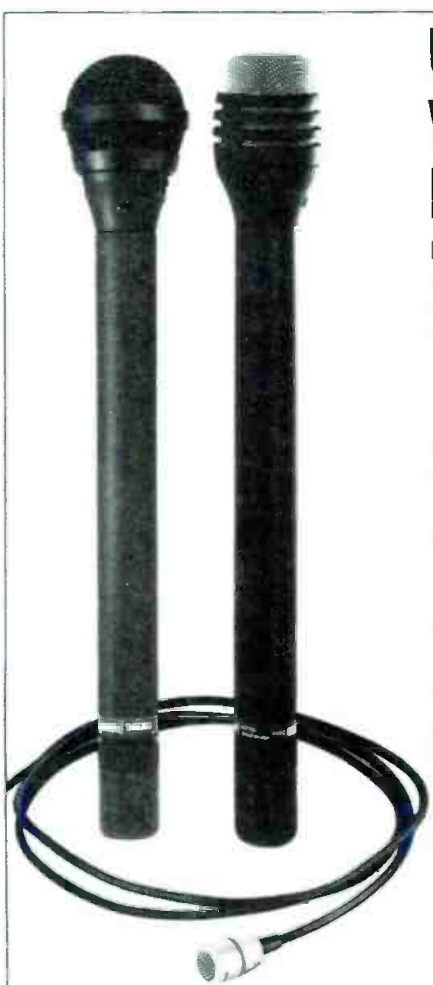
The convention closes on Wednesday with an FCC question-and-answer session moderated by John B. Summers, NAB's executive vice president. You can expect candid answers to his questions and yours about the workings of the FCC. *Will the present deregulation mood continue? Is there any further deregulation in store and what might be accomplished? What are the problem areas?* These questions, and more, will be addressed at this popular give-and-take session with members of the FCC.

For the grand finale, NAB presents Bill Cosby, the man who closed our convention four years ago in a blaze of glory and laughter. Cosby will be on hand to send you home smiling.

This is *your* convention—a chance to view new technology, compare state-of-the-art equipment, see old friends, learn about new engineering and look into your future. The NAB convention is the broadcast industry's crystal ball.

Make your plans early. We at NAB are very excited, and hope that you are too. In Las Vegas, be sure to stop by the NAB offices to say hello. See you there!



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Prospects were greeted at the qualifier desk upon entering the exhibit, and NEC buttons signifying their product interests were attached to their jackets or lapels.

NEC's award-winning exhibit

By Jeffrey White, NEC America, Elk Grove Village, IL

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

Each year we will 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 NEC display, and we asked NEC to tell us about efforts to develop its exhibit. We share this story with you so that you can grasp the thinking behind such a creation. As an interesting aside, NEC won industry recognition for its exhibit.

The Broadcast Equipment Division of NEC America, in association with the KITZING trade show marketing agency, received the Exhibit Focus Grand Award for NEC's exhibit at NAB-'82/Dallas. This award is sponsored by the National Trade Show Exhibitors Association to recognize outstanding achievement in the trade show marketing medium.

Broadcast equipment manufacturers use the NAB show schedule as a target date for having their latest equipment and technology ready to present to the thousands of top-level broadcast management, engineering and video production professionals who come from all over the world. Manufacturers know that exhibiting at the NAB convention is one of the most effective and cost-efficient ways to reach these key people who make buying decisions.

The challenge faced by all exhibitors is how to make an impact within the highly competitive, highly charged atmosphere of a huge trade show such as the NAB. Another consideration for the exhibitor is, of course, how to make buyers feel comfortable and receptive to the new lines of equipment being offered.

Months before the NAB show dates, all exhibitors start planning and developing their strategy for the show, each with basically the same goals in mind: to enhance their reputation as a prominent broadcast equipment supplier; to meet realistic sales goals for this form of marketing; to develop new and prospective customer contacts; and to provide incentives to maintain existing customers by continuing to offer the highest quality equipment.

Enormous amounts of time, money and planning go into deciding what equipment is to be unveiled and how it is to be demonstrated.

The NEC plan

For NAB-'82/Dallas, the staff of NEC America's Broadcast Equipment Division, led by Richard Dienhart, Midwest region sales manager (who also was responsible for the show booth), was charged with the task of

Continued on page 36

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A spacious sales environment was achieved with a skeletal superstructure with high recognition headers. The placement of *satellite* product stations allowed open viewing for various sizes of groups.

introducing and demonstrating NEC's new Digital Video Effects (DVE) E-FLEX system and the DV-10 dual-channel video transmission system. along with other major broadcast technology innovations from the company.

The E-FLEX system was clearly intended to be the focus of the company's exhibit. Based on NEC's Emmy Award-winning breakthroughs in digital technology, E-FLEX is a system that introduces a new level of video manipulative techniques using a combination of smooth processing techniques, new visual effects and a control system designed for operator ease of use. The system has extensive applications for many areas of broadcasting.

The E-FLEX offers expanded creative capabilities and maximum reliability at a minimum cost. It provides new options for on-line news, sports, features and documentary programming. It also has unique, artistic capabilities for post-production work.

Among the new capabilities provided by the E-FLEX is a trajectory system that programs non-linear curved paths of movement from one screen location to another. When used in combination with speed changes and loaded into multiple memory registers, extremely complex non-linear effects may be achieved. E-FLEX also offers a unique optional bubble memory that allows users to create, program and store effect sequences for future use.

NEC's problem was simply formulated: how to plan ahead for introducing and demonstrating a system so advanced and so new that no one knew the limits of what it could do. This was, indeed, an unusual challenge.

Pre-show activity

In association with the KITZING trade show marketing agency, the NEC staff developed a comprehensive marketing campaign specifically designed for NAB-'82/Dallas. The success of this campaign can be attributed to three major departures from routine trade show strategy. First, NEC and KITZING undertook an extensive amount of pre-show activity. Based on a pre-show *target audience survey*, they determined what prospects *did* and *did not* want from exhibitors at the NAB show.

Fifty top-level executives and chief engineers from among the company's key prospects from telecasting stations nationwide were contacted. The research probed attitudes and perceptions that would motivate a prospect to enter or discourage a prospect from entering an exhibit during a show. The

Continued from page 32

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ART BIGGS ON MASTER CONTROL AUTOMATION.

In the 1950's, two broadcasting engineers in Tulsa built a small, crude, mechanical device to automate station breaks. One of those engineers, Art Biggs, is now Vice President, Engineering, Corinthian Broadcasting—and his interest in master control automation remains strong. The respected, 34-year veteran of the industry works with the engineering staffs of all six Corinthian stations, of which two—WISH-TV, Indianapolis, and KXTV, Sacramento—are now using BIAS Master Control Automation.

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The presentation control center was used to coordinate scheduled demonstrations by professional narrators.

results of the research indicated that prospects wanted three main things: a large amount of product information; *hands-on* experience with the product being exhibited; and a knowledgeable exhibit staff.

On the other hand, three reasons that might make prospects leave or skip an exhibit entirely were an overcrowded area; inattentive personnel; and a lack of product and technical information or demonstration.

In the second major dramatic departure from previous shows, NEC broke from its tradition of keeping new products to be introduced a complete

Continued on page 42

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One of several *satellite* product demonstration stations in the NEC booth.

Continued from page 38

secret before the show. The company heavily promoted its new E-FLEX and DV-10 (and other new products) well in advance of the show through advertising and publicity. NEC also sent 1400 invitations to prospects inviting them to schedule an appointment for the formal product demonstrations to

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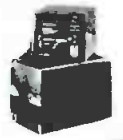

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be conducted at the show. The confirmation follow-up card gave clear directions to the NEC exhibit, which was located in a less-visible spot than in previous years.

A select group of 110 key prospects were contacted by telephone and personally invited to make an appointment for individual presentations. Among the 110 key prospects, 90% responded positively.

Besides the personal contact, a preshow newsletter was distributed to prospects, and the company's product line to be featured at the NAB exhibit was advertised in various trade publications.

Satisfying the third requirement shown by the survey (a knowledgeable staff), a special trade show sales seminar was conducted for 30 NEC sales and technical personnel one month before the show. It was considered essential to train the NEC personnel for maximum awareness and performance. Objectives and product information were reviewed and, through role-playing sessions, the exhibit staff members practiced their skills of approaching, qualifying and selling the prospective buyers.

To prepare for the E-FLEX demonstration, Video Post & Transfer, Dallas—which was to be the first company in the United States to accept delivery on the E-FLEX System after the convention—agreed to provide six skilled technicians to become part of the NEC exhibit staff and demonstrate the E-FLEX System.

Success: The result of planning

According to Dienhart, the 1982 NAB convention was the most successful to date for NEC America's Broadcast Equipment Division. Having an award-winning exhibit doesn't mean that everything ran smoothly, however. There are always circumstances over which the exhibitor has no control—such as the poor location of the booth, in this instance. Booth location sometimes can make the difference between unfulfilled expectations and successful results. However, NEC overcame the disadvantage of a less-than-desirable location on the lower level of the Dallas Convention Center, writing a record number of sales commitments compared to any previous year at an NAB show.

To demonstrate the E-FLEX effectively, an entirely new show booth was designed. The design of the exhibit itself was based on survey responses indicating that the most significant reason for avoiding or leaving an exhibition is *overcrowding*.

The spacious NEC booth was constructed within a 40' x 70' space with a qualifier desk, *satellite* product demonstration stations, a presentation control center, a main presentation stage, conference areas and a technical control center.

The presentation control center was used to coordinate scheduled demonstrations by professional narrators. Prospects were greeted at the qualifier desk upon entering the exhibit, their product interests were determined, and NEC buttons were attached to their jackets or lapels to signify their product interests to the exhibit sales staff.

Prospects then were directed to the main presentation stage for a scheduled presentation lasting about 15 minutes. Based on their specific interests, they were then guided to satellite product areas, where demonstrations were conducted by NEC and Video Post & Transfer personnel. Private conference areas were available for further consultations after presentations. Sales leads were recorded on a 3-part form and coded for future action by sales representatives.

For those who showed a specific interest in the new DVE system, Video Post & Transfer technicians demonstrated the many capabilities of the E-FLEX. Bill Lintner, one of the operators, did some interesting experiments with a tape previously edited without the use of the E-FLEX, proceeding to integrate a number of special effects that demonstrated the versatility of the E-FLEX system. This was an extremely effective and impressive part of the show presentation, and probably weighed heavily in the judging of exhibits.

The E-FLEX DVE system and DV-10 dual-channel video transmission system (which accommodates two full video signals on each video path) were the highlights of the exhibit. Also presented were prototypes of the first professional 3-chip CCD color camera and a completely digital 1-inch VTR, as well as other sophisticated broadcast equipment from the company.

NEC achieved its goals and objectives for NAB-'82/Dallas and its trade show marketing program generated outstanding sales results, in great measure due to pre-show research of target audience interests and attitudes in determining a productive plan of action for the trade show medium.

Editor's note:
This is how NEC prepared for its NAB'-82/Dallas convention spectacular. But remember, many exhibitors can relate similar stories. This year, when you see something you like at NAB-'83/Las Vegas, let the exhibitor know. A lot of effort has gone into making *your* show the best in the world, and your words of acknowledgement will be appreciatd.
Have a good show!

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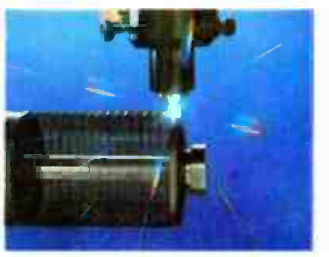

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NAB-'83/Las Vegas

Product directory

This special section provides a directory to the NAB-'83/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 the data provided. It shows major equipment headings followed by the exhibitor name and booth number (when provided by deadline).

This special section will be an aid in finding the equipment of special interest at the show. But a word of caution: As **Broadcast Engineering** goes to press, there are still changes being made daily in the exhibitor sign-ups, equipment being displayed and booth assignments. So, although every attempt has been made for accuracy in this section, double-check the final program at NAB-'83 to organize your show coverage/visits.

For those not attending NAB-'83/Las Vegas, the June issue of **BE** will provide a convention replay and will cover sessions and new products.

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LENCO (1419)
McCURDY (207)
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PACIFIC RECORDERS & ENG. (113)
RADIO SYSTEMS (341)
SHINTRON (1421)
SHURE BROTHERS (1602)
SIGMA ELECTRONICS (1125)
STRAIGHT WIRE AUDIO (130)
STUDER REVOX AMERICA (201)
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TELEMET (1003)
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TELEX COMMUNICATIONS (600)
TIFFEN (1422)
UREI (513)
UNITED RESEARCH LABS (406A)
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WARD-BECK SYSTEMS (1224)

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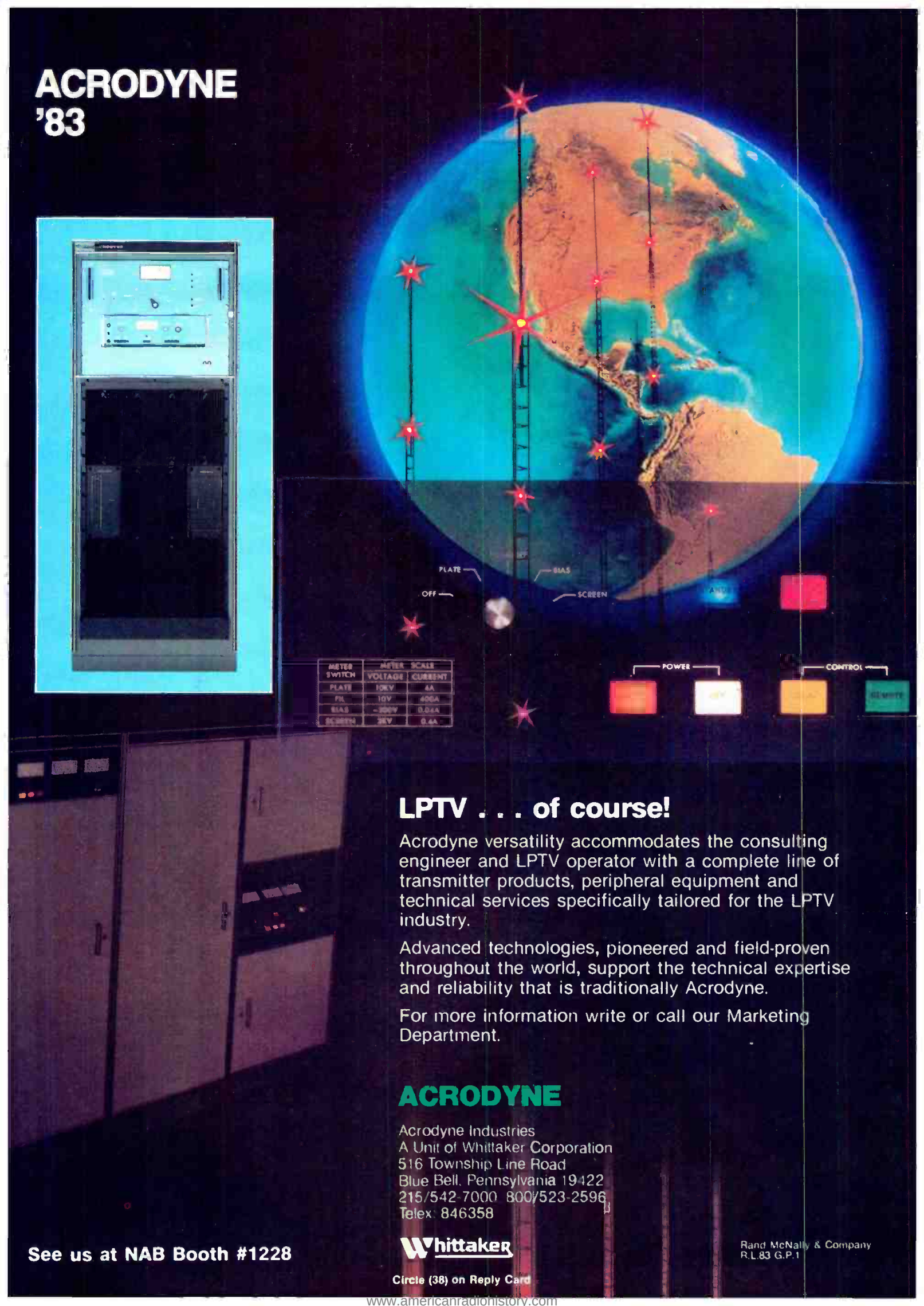

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CONTINENTAL ELECTRONICS (101)
DBX (621)
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McCURDY (207)
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SOUND TECHNOLOGY (502)
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AUDIO CONSOLES & MIXERS
ADM TECHNOLOGY (1223)
ACCURATE SOUND
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AUDIO DEVELOPMENTS (1709)
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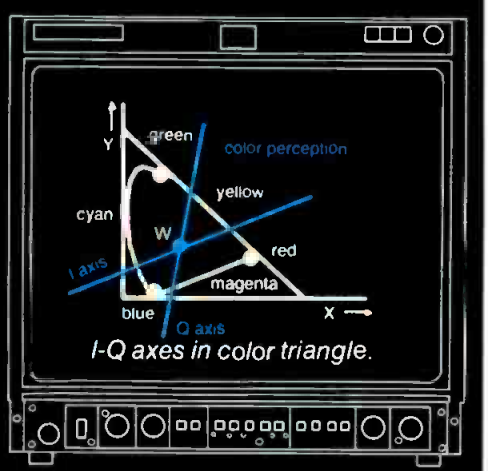
The Asaca/Shibasoku monitor like the human eye resolves certain colors best; reds, oranges, yellows, and flesh tones. The I-Q decoding system enables the monitor to display these colors at a higher resolution using wide band demodulation of 1.3 MHz rather than 0.5 MHz as in R-Y, B-Y systems.

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.

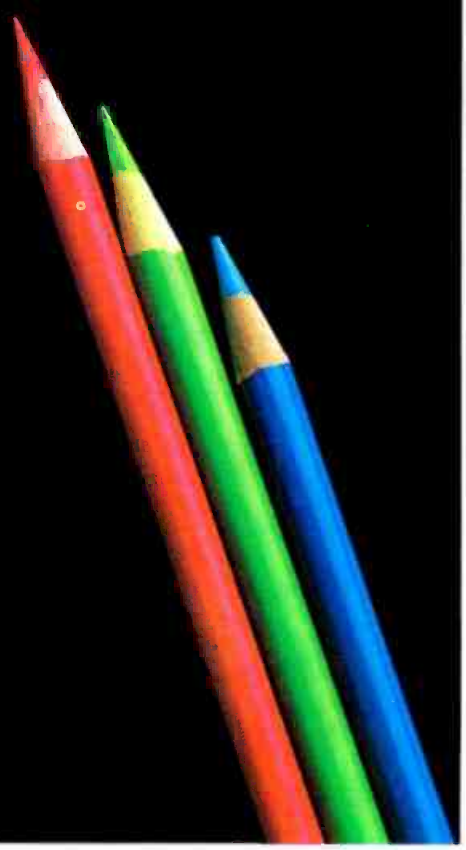
SMART

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.



I-Q axes in color triangle.

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.
- OPTIONS...Built-in color bar or cross hatch patterns. Built-in safe title marker generator. Multi-standards. RGB inputs.
- TWO YEAR WARRANTY ON ALL PARTS AND LABOR INCLUDING THE CRT.

ASACA ASACA ASACA

ASACA/SHIBASOKU CORP. OF AMERICA

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LTM (1516)
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FIDELIPAC (103)
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GOTHAM AUDIO (503)
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IGM COMMUNICATIONS (403)
IMAGE VIDEO LTD. (1341)
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MICRO-TRAK (104)
RUPERT NEVE (1410)
OTARI (601)
QUAD-EIGHT (1636)
SOLID STATE LOGIC (1723)
SONO-MAG (202)
SOUNDCRAFT (1724)
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UNITED MEDIA (1300)
UMC (114)
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ASACA/SHIBASOKU (1226)
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BOSCH-FERNSEH (1207)
CENTRAL DYNAMICS (1409)
COMPACT VIDEO (1142)
CONTROL VIDEO (1157)
DATA COMMUNICATIONS-BIAS (1014)
GENERIC COMPUTER SYSTEMS (308)
GRASS VALLEY (1207)
HARRIS BROADCAST (401)
IMAGE VIDEO LTD. (1341)
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RECORTEC (1209)
ROSS VIDEO (1110)
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TEKTRONIX (1601)
3M (1002)
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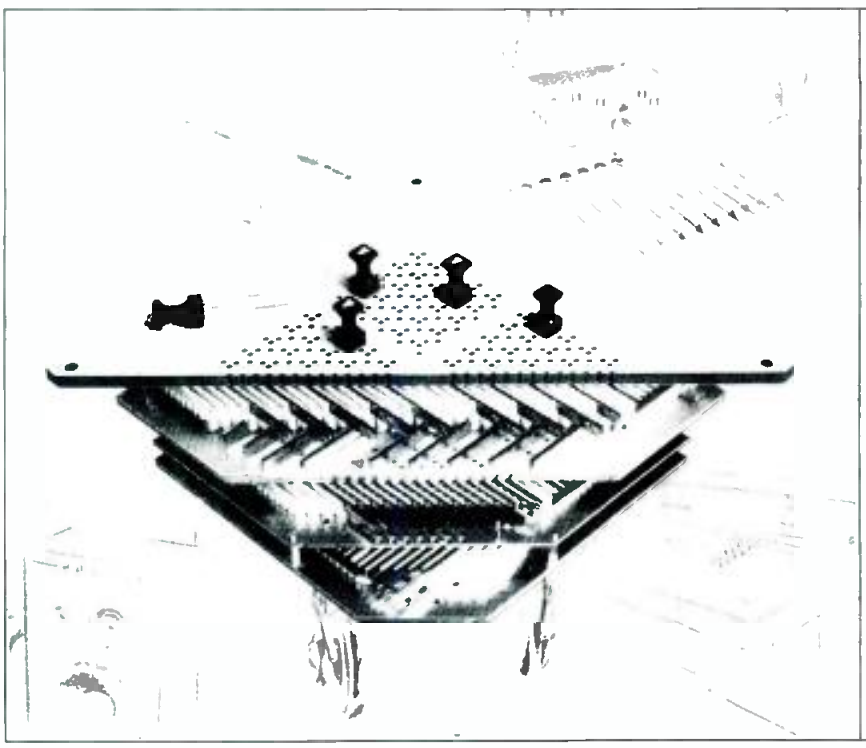
BASYS (1503)

Audio-Matrix Program Board



Quick Cross Connection
Clear Distribution
Interference-Free Switching

With the Audio-Matrix Program Board by Ghielmetti, low voltage - LF lines can be switched. The various possibilities of shielding guarantee a high crosstalk attenuation.

Mono and Stereo applications as well as the use in 100 V-installations make the Audio-Matrix Board versatile.

Please contact us for additional information and documentation.

GHIELMETTI

Ghielmetti Inc., Switches and data devices, 6290 Sunset Blvd., Suite 1126, Los Angeles CA 90028, (213) 463-5111, TWX 910 321 2903

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New Harris Wavestar™...

The most reliable UHF slot antenna ever designed... because it's waveguide!

The new Harris Wavestar is the only slotted waveguide UHF antenna now available...the ultimate in design simplicity. No center conductor. No couplers. No insulators. Fewer parts mean fewer problems. And that means less off-air time and lower maintenance costs.

Additional advantages of waveguide over coax antennas include higher power handling capabilities and greatly increased safety margins to prevent arcing.

The Wavestar pattern performance is excellent by any standard. Cardioid and peanut directional patterns are currently available, and a highly circular omnidirectional pattern will follow soon. All of these Wavestar configurations provide the smooth elevation patterns necessary for high signal strength and minimum ghosting over the entire coverage area.

The Wavestar is a low windload design for tower top or side mounting. High mechanical strength and rigidity minimize picture variations caused by wind sway.

Every Harris antenna is completely assembled and tested at the Harris antenna test range...the largest, most comprehensive facility of its kind.

The range is located in an area far from the pattern-distorting clutter of urban development. Situated atop a 230-foot bluff, with test transmitters located up to 3 miles away on flat, unobstructed bottom lands, the range offers ideal conditions for testing, approaching the "free space" situation of an installed antenna.

Here, theoretical azimuth and elevation patterns are verified with the most accurate and sophisticated test instruments available—translating the theory of a calculated pattern into the reality of actual antenna performance.

You can depend on Wavestar for top reliability. And you can be confident that your Wavestar antenna will be thoroughly tested by Harris to meet your exact pattern requirements.

Contact Harris Corporation, Broadcast Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217/222-8200.

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HARRIS

Visit Harris at the 1983 NAB, Las Vegas, in the North Hall.

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KING OF T

IKEGAMI'S NEW HL-79E THE HEIR TO THE THRONE

Ikegami's latest technological triumph, the HL-79E, heralds a new generation of hand-held broadcast camera excellence.

Engineered to surpass the most rigorous standards of performance and introducing features that are masterpieces of innovative thinking, the HL-79E's picture quality even exceeds that of other manufacturers' top-of-the-line studio cameras.

In the fiercely competitive video market where others hope to be as good as the HL-79D, Ikegami is the unquestioned leader. And the HL-79E will soon ascend to a loftier throne as King of the Jungle. Only by seeing this remarkable camera in action can it be fully appreciated.

How great a camera is it? To begin with, it is smaller and lighter than the world's standard for comparison, the Ikegami HL-79D Series. And it has features as yet unknown to even sophisticated camera users: Dynamic Detail Correction, Chroma Aperture Correction, Highlight Aperture Correction and Auto Contrast Compression. Plus the HL-79E offers improvements in contrast range, S/N ratio, registration, accuracy, resolution viewfinder performance and more.

Optional accessories include the ADC-79E Auto Set-Up Digital Control, the RDC-79E Remote Digital Control and the VF 45-3 Large Viewfinder. The HL-79E is compatible for use with existing HL-79A and HL-79D lenses, power supplies, VTR cables, and other accessories. Plus, it can be adapted to the MA-79 Multicore Base Station and TA-79/79C Triax Base Station.

ADC-79E Auto Set-Up Digital Control

The HL-79E is part of the great and proud family of Ikegami cameras and monitors serving many satisfied users worldwide. For a complete demonstration of Ikegami Cameras and Monitors, contact your local dealer or call Ikegami Electronics.

Ikegami® HL-79E

Ikegami Electronics (USA) Inc. 37 Brook Avenue, Maywood, NJ 07607

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SOLUTEC
TELESOURCE COMM. (1616A)
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TIFFEN (1422)
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ANDREW (1202)
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FM WIRELESS INTERCOM

Superb, interference free, intercom up to ¼ mile! FCC certified and license free. 5 channels available. Interface capability with "hard-wired" systems. The TR-50 Wireless Intercom comes in single or double ear models, and is also available in a hard hat style. A VOX accessory is available for "hands-free" operation. R-Columbia model TR-50 *(Less VOX)* is **$297**. Request bulletin 4V for TR-50 and other FM wireless model details.

- TV & Film cameramen, producers, directors.
- Football coaches, assistants, spotters.
- Manufacturing personnel.
- Security personnel.
- Theatre crews.
- Language translators.
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HANDS-FREE TELEPHONE

A Telephone Headphone. Converts any standard modular telephone to "Hands-Free" operation without installation. The R-Columbia model 52/TM is plug-in compatible with standard telephone handsets and provides superbly comfortable "Hands-Free" telephone use for long hours. Complete adjustability for individual custom fit. Price of the R-Columbia *TELE*HEADPHONES,™ model 52/TM single ear model is **$99.75**. Double ear model 52/TMM is **$145.00**. Request bulletin 1W for complete details.

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Ikegami ITC-730 expands your ENG coverage, tightens your budget.

When Ikegami designed the ITC-730 ENG camera, we set out to create the world's finest modestly-priced, hand-held TV camera. And we succeeded.

Look at what the ITC-730 ENG gives you for under $10,000* (less lens). A lightweight, 3-tube prism optics camera featuring advanced Saticon II** tubes, a 2H detail corrector, noise-free contrast compression circuitry, and a character generator in the viewfinder that indicates filter selection, gain selection, auto-white balance, VTR start/stop, gen-lock, and battery test.

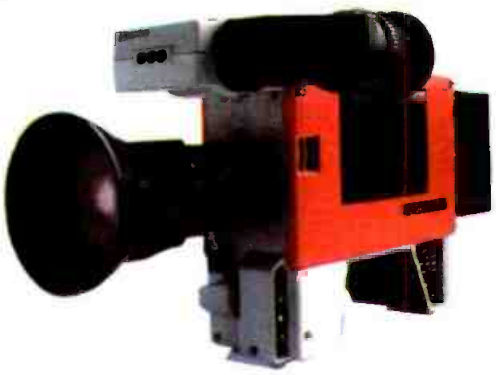
The f/1.4 RGB prism beam-splitter delivers low-light performance (a standard sensitivity of 2000 lux at f/4), and a consistent 54 dB S/N ratio from the preamp.

And when you're out there shooting, you get even more. You can go farther and last longer because the ITC-730's unique circuitry makes it a miser on power consumption. Shoot up to three hours on one fully charged Nicad battery.

The ITC-730 is easy to handle. It has an excellent weight/balance ratio for smooth shooting from the shoulder. And its low profile makes it as easy to see over as it is to handle. A rugged magnesium alloy, die-cast housing takes the inevitable bumps in stride.

Equipped for EFP, the ITC-730 expands the limits of field production. It can be remotely operated up to 1000 feet from the CCU on AC; up to 300 feet on battery power from the camera.

ENG or EFP, you'll never have to accept anything less than an Ikegami again. Contact us for details.



Ikegami ITC-730

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607.
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SONY (1200)
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TOSHIBA AMERICA

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RTI (1626)

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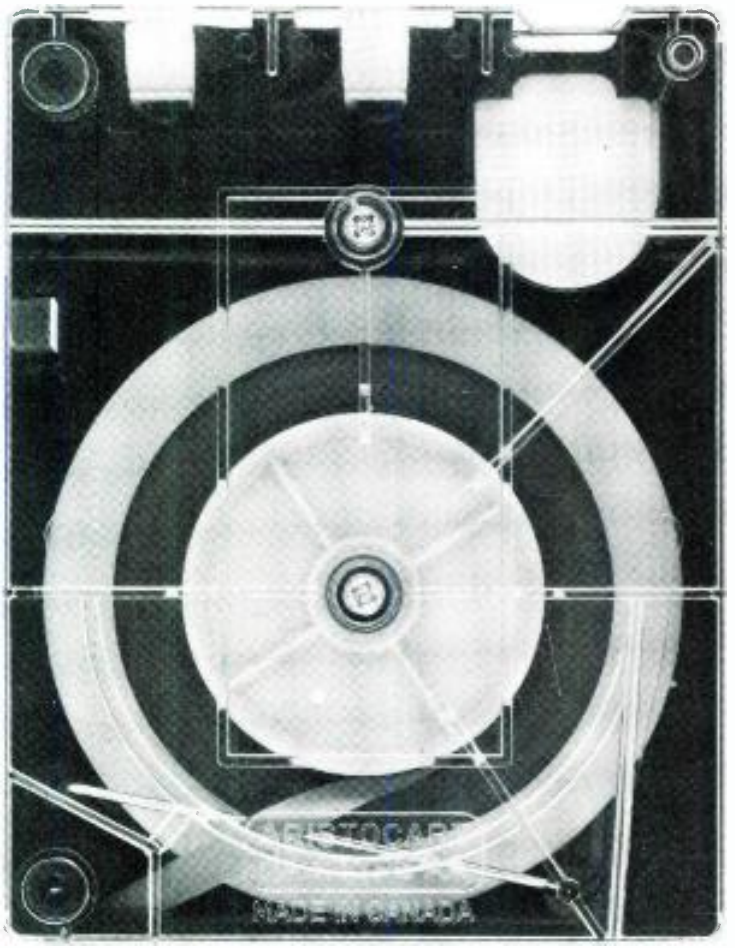

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no other NAB cartridge meets these exacting standards

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.

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Ikegami ITC-730 takes you farther in EFP, and costs you less.

The ITC-730 is probably the most versatile low-cost, high-quality EFP camera available today. To start with, a newly developed digital multiplex system gives you real operational freedom. Using 13.5 mm diameter flexible cable, the camera head can be separated by 300 feet from the CCU using battery power at the camera head, and up to 1000 feet using AC power at the CCU.

Look what else the ITC-730 EFP gives you for $11,950* (less lens and accessories). 3-tube prism optics with advanced, dependable Saticon II** tubes, an extra sharp 5-inch viewfinder, and a full roster of automatics. And there's more—a 2H detail corrector, a noise-free contrast compression circuit and a character generator in the viewfinder that indicates filter selection, gain selection, auto-white balance, VTR start/stop, gen-lock and battery test—all standard.

The f/1.4 RGB prism beam-splitter delivers excellent low-light performance (a standard sensitivity of 2000 lux at f/4) and a consistent 54 dB S/N ratio from the preamp. And the ITC-730's unique circuitry makes it a miser on power consumption. One fully charged Nicad battery provides over two hours of shooting time.

There's also an ENG version that we believe is the world's finest modestly priced, hand-held TV camera. EFP or ENG, you'll never have to accept anything less than an Ikegami again. Contact us for full details.

Ikegami ITC-730

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607

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*Manufacturer's suggested list price **TM of Hitachi Ltd.

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CARTRIDGES *(Continued)*
CAMERA MART (1018)
CAPITOL MAGNETICS (463)
CECO COMMUNICATIONS (118)
CENTURY 21 (204)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
FIDELIPAC (103)
GOTHAM AUDIO (503)
HARRIS BROADCAST (401)
IGM COMMUNICATIONS (403)
McCURDY (207)
PROCART (115)
RTI (1626)
RAMKO (415)
STANTON (102)
TELEX COMMUNICATIONS (600)
UMC (114)
UNITED RESEARCH LABS (406A)

CARTS, MOBILE EQUIPMENT
CAMERA MART (1018)
CETEC BROADCAST (601)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
EXCALIBUR (1106)
LEE-RAY INDUSTRIES (1151)
RTI (1626)
STANTRON (1133)
STAR CASE MFG.
TELEX COMMUNICATIONS (600)
UNITED RESEARCH LABS (406A)
WINSTED (1238)

CHARACTER GENERATORS & TITLERS
AMTEL SYSTEMS (1745)
AURORA SYSTEMS (1312)
BEI-BESTON ELECTRONICS (1620)
BOSCH-FERNSEH (1207)
CMC TECHNOLOGY (1425)
CAMERA MART (1018)
CAT SYSTEMS (1424)
CHYRON (1610)
CIPHER DIGITAL (1606)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
DATAMETRICS-DRESSER
DUBNER COMPUTER SYSTEMS (1630)
ESE (116)
FOR-A (1340)
GLENTRONIX (1318)
GRUMMAN AEROSPACE (1631B)
HARRIS VIDEO SYSTEMS (401)
INTERAND (1622)
KNOX VIDEO
LAIRD TELEMEDIA (1425)
LISTEC (1406)
MCI/QUANTEL (1631)
MZB & ASSOCIATES (1507A)
MIDWEST (1710)
McINNIS-SKINNER & ASSOCIATES (1349)
PANASONIC INDUSTRIAL (1019)
QSI SYSTEMS (1325)
QUANTA (1432)
RECORTEC (1209)
SHINTRON (1421)
TELEVISION ENGR. (1700)
THOMSON-CSF BROADCAST (1001)
3M (1002)
TORPEY CONTROLS
UNITED MEDIA (1300)
VIDEO DATA SYSTEMS (1506)
VIDEOMEDIA (1308)

COMPUTER SOFTWARE
BASYS (1503)
CAT SYSTEMS (1424)
COLUMBINE SYSTEMS (1122)
COMSEARCH (1136)
DATA COMMUNICATIONS-BIAS (1014)
GENERIC COMPUTER SYSTEMS (308)
GRUMMAN AEROSPACE (1631B)
HALLIKAINEN & FRIENDS (306)
JEFFERSON DATA SYSTEMS (1629)
JENEL (1338)
RTI (1626)
STATION BUSINESS SYSTEMS (311)
TFT (109)
TELESOURCE COMMUNICATIONS (1616A)

COMPUTER HARDWARE
BASYS (1503)
CAT SYSTEMS (1424)
DATA COMMUNICATIONS-BIAS (1014)
GENERIC COMPUTERS SYSTEMS (308)
HALLIKAINEN & FRIENDS (306)
RTI (1626)
SOUND TECHNOLOGY (502)
STATION BUSINESS SYSTEMS (311)
TFT (109)
TELESOURCE COMMUNICATIONS (1616A)

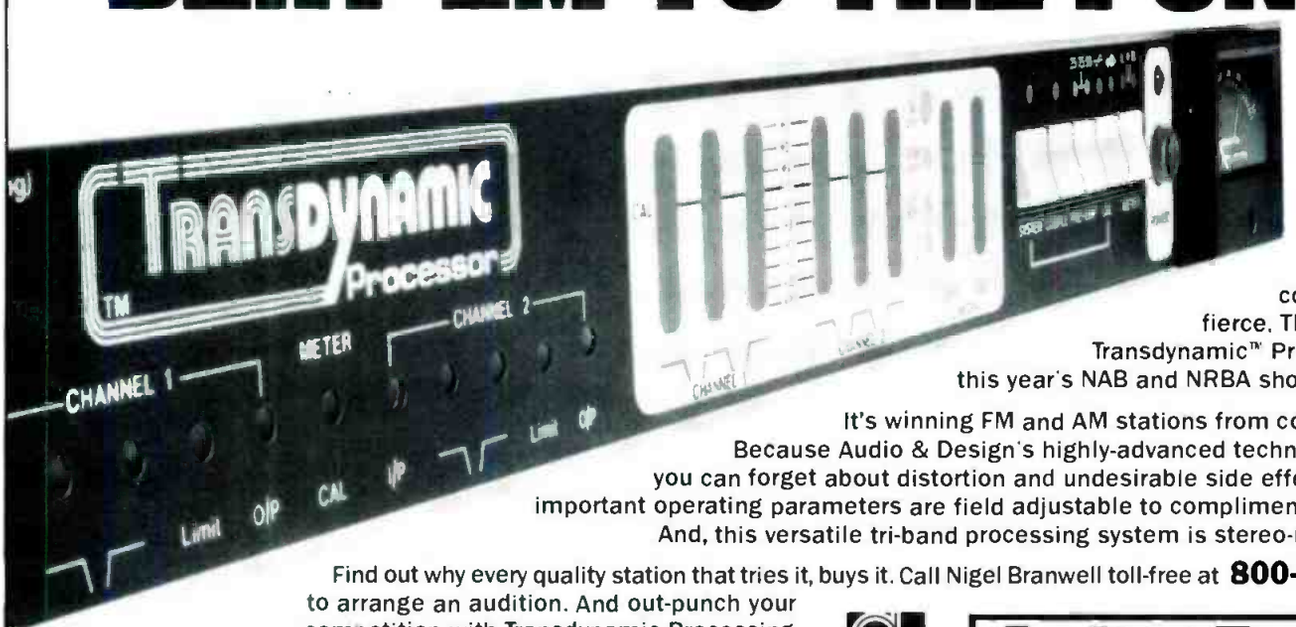
DELAY SYSTEMS (AUDIO)
AMPEX (1400)
BSM SYSTEMS
HEDCO (1516)
LENCO (1419)
TV EQUIPMENT ASSOCIATES (1216)

DELAY SYSTEMS (VIDEO/PULSE)
BROADCAST VIDEO SYSTEMS (1326)

EDITORS, FILM
ARRIFLEX (1644)

Here's what Programmers and Engineers know about ratings:

BEAT'EM TO THE PUNCH



Let's face it, competition is fierce. That's why the Transdynamic™ Processor took this year's NAB and NRBA shows by storm.

It's winning FM and AM stations from coast to coast. Because Audio & Design's highly-advanced technology means you can forget about distortion and undesirable side effects. Plus, all important operating parameters are field adjustable to compliment any format. And, this versatile tri-band processing system is stereo-ready for AM.

Find out why every quality station that tries it, buys it. Call Nigel Branwell toll-free at **800-426-6170** to arrange an audition. And out-punch your competition with Transdynamic Processing.

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THE HIT SOUND IN BROADCAST SCIENCE.

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The ENG/VCR news team that will take you to the top.

Meet the ideal news team.

The camera is the proven, compact HL-83. The VCR, our new M-format HM-100, or any high performance ¾" U-matic or 1" VTR of your choice. All are totally compatible with the HL-83 by means of the separate Y and I/Q (with optional system adapter) and encoded NTSC video outputs.

The HL-83 is extremely compact and well balanced. It's about the size and weight of competitive one-tube cameras—yet, it's a high performance three-tube, prism optics design. And it uses proven, readily available components. Inside are ⅔" Plumbicon* or Saticon** pickup tubes coupled to advanced Ikegami circuitry that delivers usable pictures in low light with up to 18 dB of gain. Automatic white balance corrects colorimetry over a wide color temperature range with the touch of a single button—there's no need to fumble with filters.

And with the HL-83's low-power requirement (16W), you can keep on shooting for up to 3 hours with an on-board Nicad battery.

The HM-100 VCR captures the image intact with a very respectable luminance/chrominance S/N ratio of better than 47/48 dB. Audio is better than 50 dB. This flexible, lightweight recorder (9.0 lbs) can be carried on a shoulder strap or mounted on-board for use as a one-piece system.

Add the available ML-79/83 Microlink ENG microwave system for go-anywhere flexibility. Or set up for EFP with a full feature multicore base station and a 4.5" viewfinder. There's also provision for future systems capability with the optional system adapter. Ikegami never stands still.

Put together the HL-83 camera system of your choice. Then head straight to the top.

Ikegami

HL-83 Camera Systems

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607

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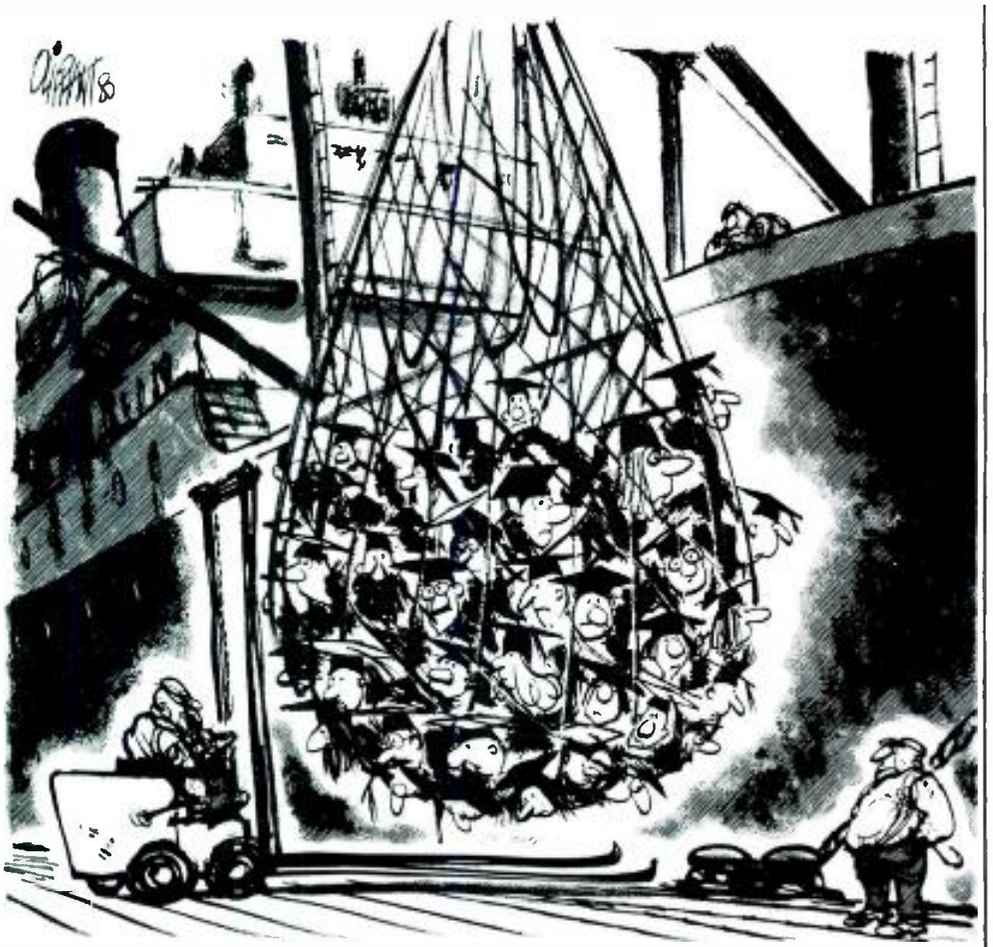

WHAT WILL WE HAVE TO IMPORT NEXT, COLLEGE GRADUATES?

Ever since World War I, most of the rest of the world has come to the United States for the latest technology and for the newest in business management.

Now we're in real danger that the pendulum is swinging the other way. Our technological lead is being cut. We're importing know-how in many fields instead of exporting it.

Unfortunately this situation will get progressively worse. Unless we all make absolutely sure that our colleges and universities continue to be first-class.

For our colleges and universities supply most of the basic research upon which technological progress is built. Not to mention the trained minds that are best able to direct its uses.

But America's colleges are being hurt by inflation. Rising costs are eating away at their operations to a dangerous degree.

So, please make sure that your company is giving as much as it can, as much as it should, to the colleges of its choice. This year. Today.

If we keep the intellectual "balance of trade" in our favor, the industrial balance is bound to follow.

Send for our free booklet, "How to Develop an Effective Program of Corporate Support for Higher Education." Write CFAE, 680 Fifth Ave., New York, N.Y. 10019.

HELP PRESERVE AMERICAN KNOW-HOW.
GIVE TO THE COLLEGE OF YOUR CHOICE.

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COMEX (1508)
EECO (1314)
ALAN GORDON
RTI (1626)

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AUDIO KINETICS (1173)
CAMERA MART (1018)
CONTROL VIDEO (1157)
DATATRON (1005)
EECO (1314)
GLENTRONIX (1318)
HITACHI DENSHI (1402)
INT'L VIDEO (1509)
MIDWEST (1710)
PANASONIC INDUSTRIAL (1019)
RCA/CCSD (1000)
STUDER REVOX AMERICA (201)
UNITED MEDIA (1300)
VIDEOMEDIA (1308)

ENG MICROWAVE EQUIPMENT
ANDREW (1202)
BROADCAST MICROWAVE (1749)
E-N-G CORPORATION (1022)
HARRIS BROADCAST (401)
HARRIS BROADCAST MICROWAVE (401)
IKEGAMI (1013)
LISTEC (1406)
M/A-COM VIDEO SYSTEMS (1004)
MARTI (501)
MICRO COMMUNICATIONS (1617)
MIDWEST (1710)
NURAD (1426)

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ASACA/SHIBASOKU (1226)
BOSCH-FERNSEH (1207)
BROADCAST VIDEO SYSTEMS (1326)
CAMERA MART (1018)
CINEMA PRODUCTS (1221)
COMEX (1508)
HM DYER ELECTRONICS
FAROUDJA LABORATORIES (1753)
FOR-A (1340)
JATEX (1132)
LENCO (1419)
MARCONI ELECTRONICS (1609)
OAK COMMUNICATIONS (1331)
TELEMET (1003)
THOMSON-CSF BROADCAST (1001)

ENCODERS, TONE & EBS
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
HM DYER ELECTRONICS
ESE (116)
GORMAN REDLICH (506)
JATEX (1132)
McMARTIN INDUSTRIES (701)
TFT (109)

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AF ASSOCIATES/MARCONI (1611)
ARRAKIS SYSTEMS (121)
BROADCAST SYSTEMS (1500)
CAT SYSTEMS (1424)
CSI ELECTRONICS (507)
CAMERA MART (1018)
CENTRO (1101)
CINEMA PRODUCTS (1221)
CLYDE ELECTRONICS
COMSEARCH (1136)
DATATRONIX (1504)
DELCOM (1507)

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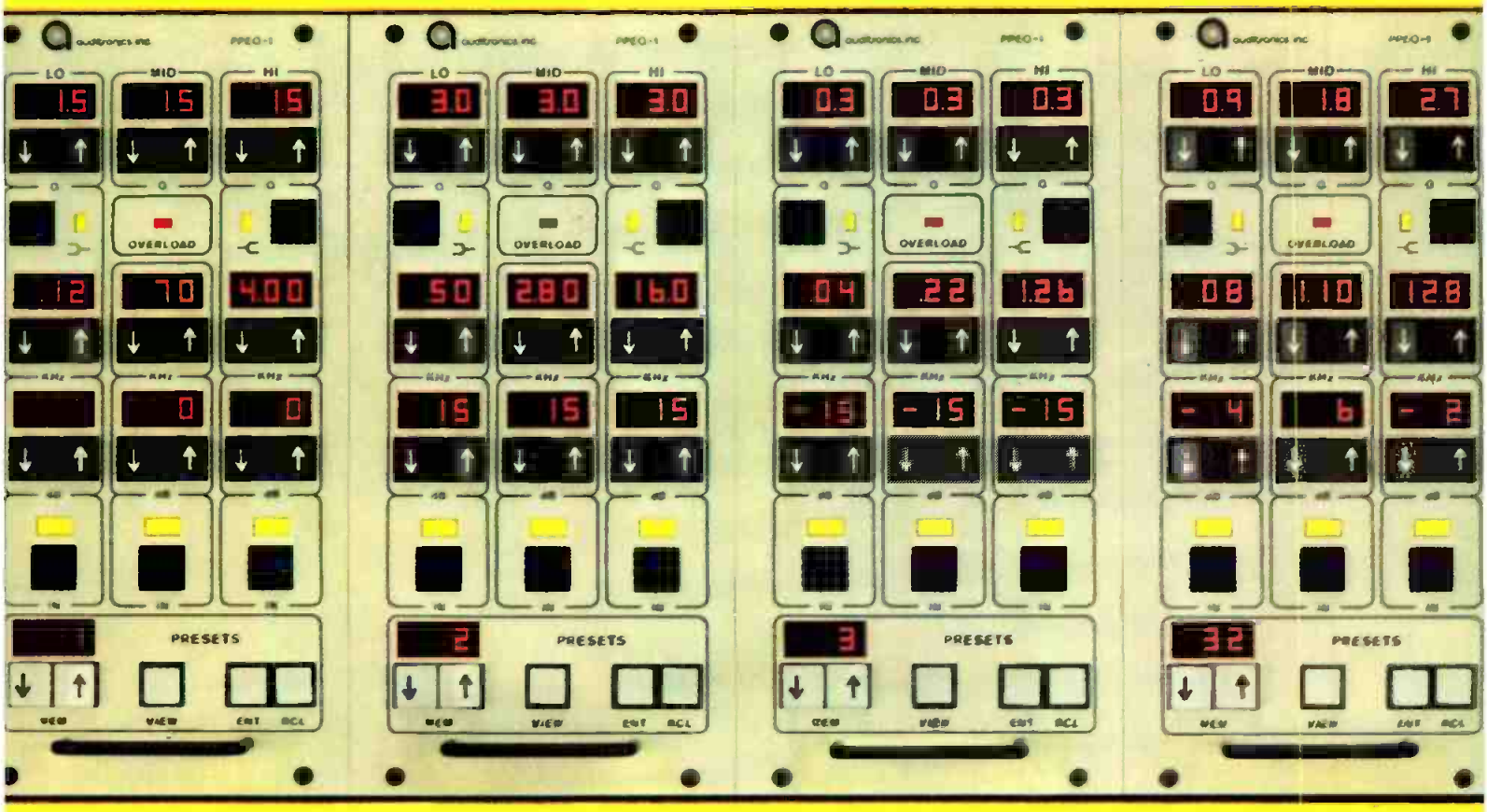
EQUALIZATION
A NEW CONCEPT



Development of the Auditronics Model PPEQ-1 Programmable Parametric Equalizer marks another milestone in the evolution of master equalization. Carefully designed to provide the flexibility and expediency demanded by today's production methods, the PPEQ-1 is a totally new concept. Each equalizer is a self-contained unit, and up to four mono or stereo tracking equalizer units may be mounted in a compact 19" equipment rack mounting package. Each unit includes three bands of equalization with variable frequency, variable boost/cut, variable Q, peak/shelf selection on the high and low bands, and a separate in/out switch for each band. An overload indicator is provided, and all parameters are accessable and visually indicated on all bands at all times. 32 on-board non-volatile memories are included, along with the ability to interrogate and display the complete contents of any memory at any time without affecting current program material. Interface to computers or editors for external sequencing or programming as well as a full function remote control are available. The PPEQ-1, advanced technology from Auditronics.

auditronics, inc.
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Master the art of color

with a B&K-PRECISION NTSC generator

Model 1250 $883

- Generates NTSC color bars with or without -IWQ signal; five step linear staircase (with high or low chroma); dot, cross-hatch, dot-hatch, center cross and 8 raster patterns
- External video input modulates rf or i-f carrier outputs
- Crystal controlled rf, i-f, NTSC sync
- 4.5MHz audio intercarrier modulation: selectable 1kHz or external

The B&K-PRECISION 1250 is a state-of-the-art generator intended for color broadcast, CATV and industrial applications. It's simple operation also makes it a time-saving tool for aligning and trouble-shooting video tape recorders. Even if you've never used an NTSC generator before, the B&K-PRECISION 1250 will give you the master's touch for color.

Available for immediate delivery at your local B&K-PRECISION Distributor.

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GRAHAM-PATTEN SYSTEMS (1227A)
HARRIS BROADCAST (401)
IGM COMMUNICATIONS (403)
JAMIESON & ASSOCIATES (1718)
JENEL (1338)
LeBLANC & ROYLE (1149)
MZB & ASSOCIATES (1507A)
McCURDY (207)
MICRO COMMUNICATIONS (1617)
NURAD (1426)
PERROTT ENGR. (1729)
RCA/CCSD (1000)
REAL WORLD TECHNOLOGIES (1637)
SHIVELY LABORATORIES (623)
SHOOK ELECTRONICS (1310)
SOUND GENESIS (331)
TWEED AUDIO (313)
UNITED RESEARCH LABS (406A)
VIDEOMEDIA (1308)

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CAT SYSTEMS (1424)
CENTRO (1101)
CLYDE ELECTRONICS (106A)
COMPUCON (1616)
COMSEARCH (1136)
DATATRONIX (1504)
DELCOM (1507)
DUBNER COMPUTER SYSTEMS (1630)
GRAHAM-PATTEN SYSTEMS (1227A)
HARRIS BROADCAST (401)
JAMIESON & ASSOCIATES (1718)
JENEL (1338)
MICRO COMMUNICATIONS (1617)
REAL WORLD TECHNOLOGIES (1637)
TENNAPLEX (1127)
TWEED AUDIO (313)
UNITED RESEARCH LABS (406A)
VIDEOMEDIA (1308)

ENHANCERS, VIDEO IMAGE
ASACA/SHIBASOKU (1226)
BOSCH-FERNSEH (1207)
CAMERA MART (1018)
COMEX (1508)
FAROUDJA LABORATORIES (1753)
FOR-A (1340)
HARRIS BROADCAST (401)
HITACHI DENSHI (1402)
LISTEC TV EQUIPMENT (1406)
MICROTIME (1230)
SONY (1200)
TELEMET (1003)
THOMSON-CSF BROADCAST (1001)

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BAYLY/AEG-TELEFUNKEN (500)
BROADCAST ELECTRONICS (303)
CSI ELECTRONICS (507)
COMARK COMMUNICATIONS (1217)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
HARRIS BROADCAST (401)
KAHN COMMUNICATIONS (625)
LPB (405)
MARCOM
McMARTIN INDUSTRIES (701)
MOSELEY ASSOCIATES (301)
NEC AMERICA (1415)
ORBAN (607)
POWER PAK SYSTEMS
QEI (1325)
RCA/CCSD (1000)
ROHDE & SCHWARZ (1203)
SINGER (309)
TELEMET (1003)
TV TECHNOLOGY/WILKINSON (305)

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COMREX (400)
KAHN COMMUNICATIONS (625)
MARCOM
McCURDY (207)

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ARTEL COMMUNICATIONS (1118)
BIW CABLE (1405)
BOSCH-FERNSEH (1207)
CAMERA MART (1018)
GRASS VALLEY (1207)
JENEL (1338)
M/A-COM VIDEO SYSTEMS (1004)
MOSELEY ASSOCIATES (301)
NEC AMERICA (1415)
TELEMET (1003)

FILM & PROCESSING SERVICES
EASTMAN KODAK (1214)

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BEI (1620)
BOSCH-FERNSEH (1207)
CAMERA MART (1018)
COMEX (1508)
DUBNER COMPUTER SYSTEMS (1630)
ALAN GORDON
IKEGAMI (1013)
JVC (1234)
LAIRD TELEMEDIA (1425)
MAGNASYNC/MOVIOLA (1147)
MARCONI INSTRUMENTS (1615)
MARCONI ELECTRONICS (1609)
NYTONE ELECTRONICS (1135)
RCA/CCSD (1000)
RANK CINTEL (1219)

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ALLEN AVIONICS (1627)
AUDIO + DESIGN (402)
AUDIO-VIDEO ENGR.
BIRD ELECTRONICS (1625)
BOGEN PHOTO (1705)
BROADCAST VIDEO SYSTEMS (1326)
CSI ELECTRONICS (507)
CAMERA MART (1018)
CINEMA PRODUCTS (1221)
CLYDE ELECTRONICS (106A)
COMARK COMMUNICATIONS (1217)
FAROUDJA LABORATORIES (1753)
ALAN GORDON
HARRIS VIDEO SYSTEMS (401)
MATTHEY PRINTED PRODUCTS
SHIVELY LABORATORIES (623)
SOLUTEC
SOUND GENESIS (331)
TV EQUIPMENT ASSOCIATES (1216)
UREI (513)

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ADDA (1100)
APERT-HERZOG (1703)
ASACA/SHIBASOKU (1226)
CAMERA MART (1018)
DELCOM (1507)
DIGITAL VIDEO SYSTEMS (1017A)
HM DYER ELECTRONICS
GRUMMAN AEROSPACE (1631)
HARRIS BROADCAST (401)
HARRIS VIDEO SYSTEMS (401)
INT'L VIDEO (1509)
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TEKTRONIX (1601)

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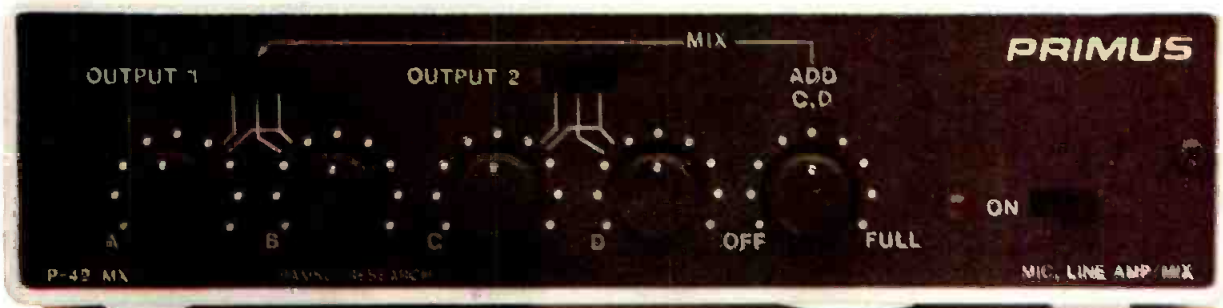
INTRODUCING THE NEW PRIMUS™ AUDIO COMPONENTS



CERTIFIED PERFORMANCE

Powerful performance in the palm of your hand.

PRIMUS (Prē-mŭs): an array of compact, performance-engineered audio electronics from Ramko Research.

The new PRIMUS components are unlike any professional audio equipment you've ever used. Never before has so much advanced performance been put into such compact and rugged packages. Rarely have you had available so many features and options to help get the job done. Never have you had a three-year warranty that's backed up by factory certified proof-of-performance.

PRIMUS is a comprehensive range of components that give you the flexibility to configure an audio sysem limited only by your imagination. Whether you choose from tabletop or rack mounting versions, there's hardly an audio job that can't be improved upon.

Here's a partial list of models currently available:

- Lab standard mono or stereo turntable preamplifiers.
- Dual and quad input, gain selectable microphone/line amplifier mixers.
- Audio distribution amps from three (3) stereo/six (6) mono up to eight (8) stereo/sixteen (16) mono outputs. All models feature individual recessed front panel adjustments or optional high resolution, conductive plastic potentiometers.
- Mic/Line equalizer amplifiers with balanced I/O and up to ±15 db of reciprocal equalization.
- Expandable audio console mixers with cueing, selectable EQ, metering phones and monitor.
- Voicegard™ combination limiter/compressor, noise gate with variable threshold and slope ratio; gain reduction metering.
- Signal processing VCA's with six (6) independently controlled channels. DC remote control with balanced outputs.
- R/P and playback, stereo and mono NAB cart machines.

Whichever combination of precision PRIMUS audio components you choose, you're guaranteed outstanding specifications. For example, our stereo turntable preamplifier measures:

Signal-to-noise Ratio: −93 dB (A weighted)
Total Harmonic Distortion: Below .0018%
Frequency Response: 10 Hz to 20 kHZ, ±.25 dB
Stereo Separation: −70 dB @ 1 kHz
Output Level: +25 dBm (10 Hz - 20 kHz)

The simplified and modular packaging of PRIMUS allows us to concentrate the quality where it belongs: in state-of-the-art circuitry. High slew-rate integrated circuits and extensive ground planes insure the highest RFI protection. All IC's plug into gold plated sockets. All models feature quick disconnect I/O connectors and require only 1¾ inch standard rack height.

We've taken another important step, too.

When you invest in PRIMUS, you receive a *Certified Performance Gold Card* that instantly puts you in touch with our Technical Assistance Department on a toll-free line. Just call in your registered serial number and you're in touch with the advice you need.

To put PRIMUS audio components to task on a free two-week trial, call toll free (800) 821-2545 or contact your nearest Ramko Research sales representative or distributor. Put the powerful performance of PRIMUS in the palm of your hand.

PRIMUS audio components are an array of compact, performance-engineered rack mounting or tabletop packages.

PRIMUS is a division of Ramko Research, Inc. 11355-A Folsom Blvd., Rancho Cordova, California 95670 (916) 635-3600

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CONTINENTAL ELECTRONICS (101)
DELTA ELECTRONICS (105)
GRUMMAN AEROSPACE (1631B)
HARRIS BROADCAST (401)
KAHN COMMUNICATIONS (625)
MARCOM
MARCONI ELECTRONICS (1609)
MARTI (501)
McMARTIN INDUSTRIES (701)
MICRO CONTROL ASSOCIATES (206A)
MOSELEY ASSOCIATES (301)
ORBAN (607)
POWER PAK SYSTEMS
QEI (1325)
ROHDE & SCHWARZ (1203)
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SOUND TECHNOLOGY (502)
TFT (109)

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BEAVERONICS (1313)
CAMERA MART (1018)
COMEX (1508)
CROSSPOINT LATCH (1321)
HM DYER ELECTRONICS
ECHOLAB (1510)
GRAHAM-PATTEN SYSTEMS (1227A)
GRASS VALLEY (1207)
GRUMMAN AEROSPACE (1631B)
IKEGAMI (1013)
IMAGE VIDEO LTD. (1341)
INDUSTRIAL SCIENCES (1232)
INTERAND (1622)
JVC (1234)
LEADER INSTRUMENTS (1702)
MCI/QUANTEL (1631)
NEC AMERICA (1415)
PANASONIC INDUSTRIAL (1019)
PHILIPS TEST & MEASURING (1408)
PRECISION ECHO (1417)
ROHDE & SCHWARZ (1203)
SHINTRON (1421)
TELEVISION ENGR. (1700)
VGR CORPORATION
VIDEO ASSOCIATES LABS (1303)
VITAL INDUSTRIES (1212)

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AF ASSOCIATES (1611)
AMTRON (1104)
ASACA/SHIBASOKU (1226)
BOSCH-FERNSEH (1207)
BROADCAST SYSTEMS (1500)
CMC TECHNOLOGY (1425)
CAMERA MART (1018)
CENTRAL DYNAMICS (1409)
COMEX (1508)
CROSSPOINT LATCH (1321)
DIGITAL VIDEO SYSTEMS (1017A)
HM DYER ELECTRONICS
FOR-A (1340)
GRASS VALLEY (1207)
GRUMMAN AEROSPACE (1631B)
INDUSTRIAL SCIENCES (1232)
JATEX (1132)
LANG VIDEO SYSTEMS
LEADER INSTRUMENTS (1702)
LEITCH VIDEO OF AMERICA (1021)
LENCO (1419)
MZB & ASSOCIATES (1507A)
MARCONI ELECTRONICS (1609)
PANASONIC INDUSTRIAL (1019)
PHILIPS TEST & MEASURING (1408)
QSI (1325)
ROHDE & SCHWARZ (1203)
SHINTRON (1421)
SIGMA ELECTRONICS (1125)
TEKTRONIX (1601)
TELEMET (1003)
TELEVISION ENGR. (1700)

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BROADCAST ELECTRONICS (303)
CMC TECHNOLOGY (1425)
GLENTRONIX (1318)
INT'L VIDEO (1509)
NORTRONICS (205)
SAKI MAGNETICS (416)
SOUND GENESIS (331)
VIDEOMAGNETICS
UNITED RESEARCH LABS (406A)

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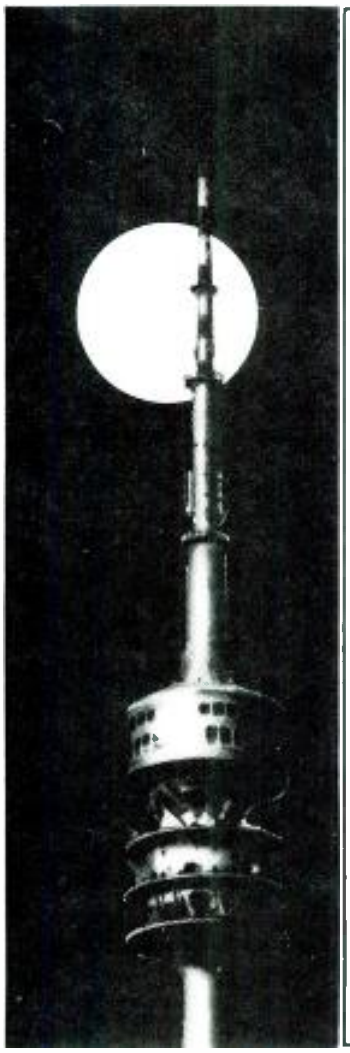
AUDIO-TECHNICA US (1141)
BEYER DYNAMIC (426)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CLEAR-COM INTERCOM SYSTEMS (1502)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
CONTINENTAL ELECTRONICS (101)



LPTV to HPTV

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If you consider the cost of labor, building your own jackfields is tremendously expensive. ADC can deliver pre-wired, pre-tested jackfields in just 2 to 4 weeks. And, at prices significantly lower than the do-it-yourself-variety.

We offer more than 240 standard configurations in longframe or bantam jacks, wire wrap or solder terminations, variable cable lengths, plus a choice of normalling configurations and types of terminations. We inspect and computer test every circuit to ensure that it meets our strict specifications and quality control standards. That's why we can offer a five-year warranty on every unit we sell. If that's not enough, we'll design and build to *your* specifications if you need it.

Since 1953, ADC has been a leader in designing and building high-quality test and access equipment for the telecommunications, broadcast and data industries. Now, we're the largest supplier of pre-wired jackfields in the world.

For information about ADC Jackfields, write ADC, 4900 West 78th Street, Minneapolis, MN 55435. Or call our toll-free hotline—1-800-328-6188. In Minnesota, call 612-835-6800.

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AN FM EXCITER TO GET EXCITED ABOUT!

Our new FM30F Exciter will make you think twice about buying anyone else's exciter.

- specs comparable to the best on the market
- built as well as any other manufacturer's
- more attractive than any other exciter
- almost 25% less expensive than the most popular exciter on the market

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HEADPHONES *(Continued)*
FITZCO SOUND (1514)
GLENTRONIX (1318)
ALAN GORDON
HM ELECTRONICS (1130)
MZB & ASSOCIATES (1507A)
R-COLUMBIA PRODUCTS (1111)
SENNHEISER ELECTRONICS (1137)
SOUND GENESIS (331)
STANTON (102)
STUDER REVOX AMERICA (201)
SWINTEK (1345)
SYSTEMS WIRELESS
TV EQUIPMENT ASSOCIATES (1216)
TASCAM (1304)
TELEX COMMUNICATIONS (600)

HELICOPTER SALES & RENTAL
HUGHES HELICOPTERS (1518)

INTERCOMS, WIRED
BROADCAST ELECTRONICS (303)
BROADCAST TECHNOLOGY (1701)
CAMERA MART (1018)
CETEC VEGA (1210)
CLEAR-COM INTERCOM SYSTEMS (1502)
CLYDE ELECTRONICS (106A)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
CROSSPOINT LATCH (1321)
DATATRONIX (1504)
HM DYER ELECTRONICS
FARRTRONICS LTD. (1159)
FITZCO SOUND (1514)
ALAN GORDON
HM ELECTRONICS (1130)
MZB & ASSOCIATES (1507A)
McCURDY (207)
R-COLUMBIA PRODUCTS (1111)
RTS SYSTEMS
SOUND GENESIS (331)
SWINTEK (1345)
SYSTEMS WIRELESS
TV EQUIPMENT ASSOCIATES (1216)
TELEX COMMUNICATIONS (600)
WARD-BECK SYSTEMS (1224)

LIGHTING DIMMERS & CONTROLLERS
B-W LIGHTING (1733)
WALTER S. BREWER
CAMERA MART (1018)
CINEMILLS
COLORTRAN (1205)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
DYNAMIC TECHNOLOGY (1719)
ELECTRO CONTROLS (1103)
FIDELIPAC (103)
THE GREAT AMERICAN MARKET (1108)
HARRIS BROADCAST (401)
KLIEGL BROTHERS (1604)
KOBOLD OF AMERICA (1725)
LTM (1516)
LOWEL-LIGHT MFG. (1309)
MATTHEWS STUDIO EQUIPMENT (1775)
PHOEBUS
SKIRPAN LIGHTING SYSTEMS (1783)
STRAND CENTURY (1418)
TVI (1730)
TV TECHNOLOGY/WILKINSON (305)
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B-W LIGHTING (1733)

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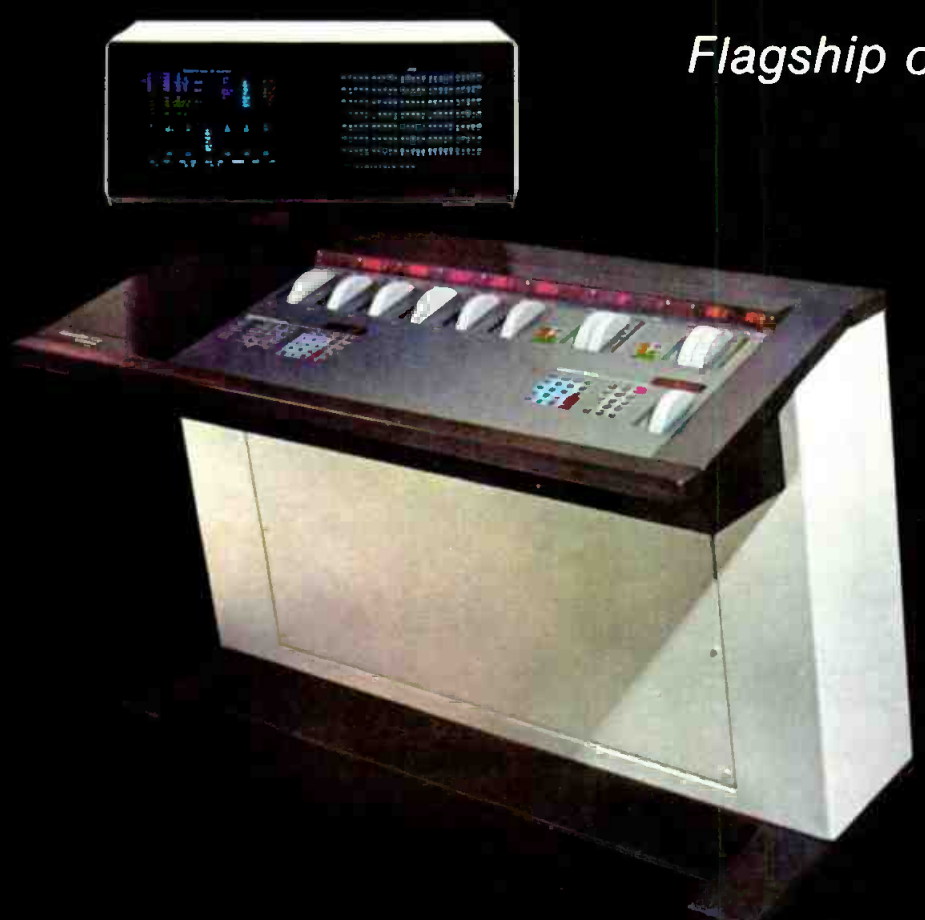

The most versatile and logical lighting control system in the world translates advanced technology and design into a new performance standard. Blending careful ergonomic design with versatile features, Dimension Five meets the needs of the lighting designer and board operator providing a powerful but straight forward system to operate. Excited? We are! Write Colortran in Burbank for full specifications on Dimension Five.

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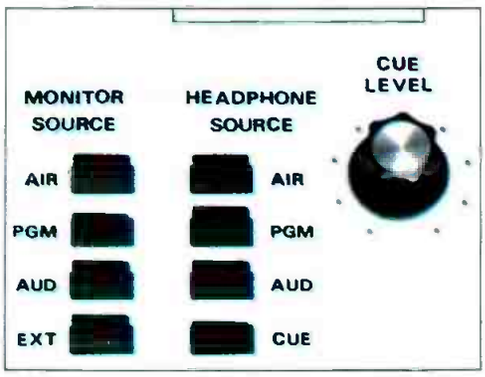
Anyone Could Put the Phone Jack in the Correct Place...

The UREI Broadcast Consoles

At UREI, we believe details and solid construction make the difference between a good product and an excellent one. For instance, headphone cords are on the left side. But virtually all on-air boards put the jack on the right side of the console. On the new UREI boards, we give you two jacks, one on the left, where it should be, and another on the right to let two people monitor simultaneously.

Before we started designing the new Series 1650 and 1680 consoles, we talked to you... engineers, jocks, announcers and consultants. Then we went to the drawing boards to plan a line of on-air boards with the



features you wanted.

The result is a fresh answer to the operational requirements of the broadcaster of the '80's. Six all-new on-air boards... choice of 5 mixers (1650 Series) or 8 mixers (1680 Series) ... choice of Penny & Giles slide pots, Shallco or conductive plastic rotary attenuators.

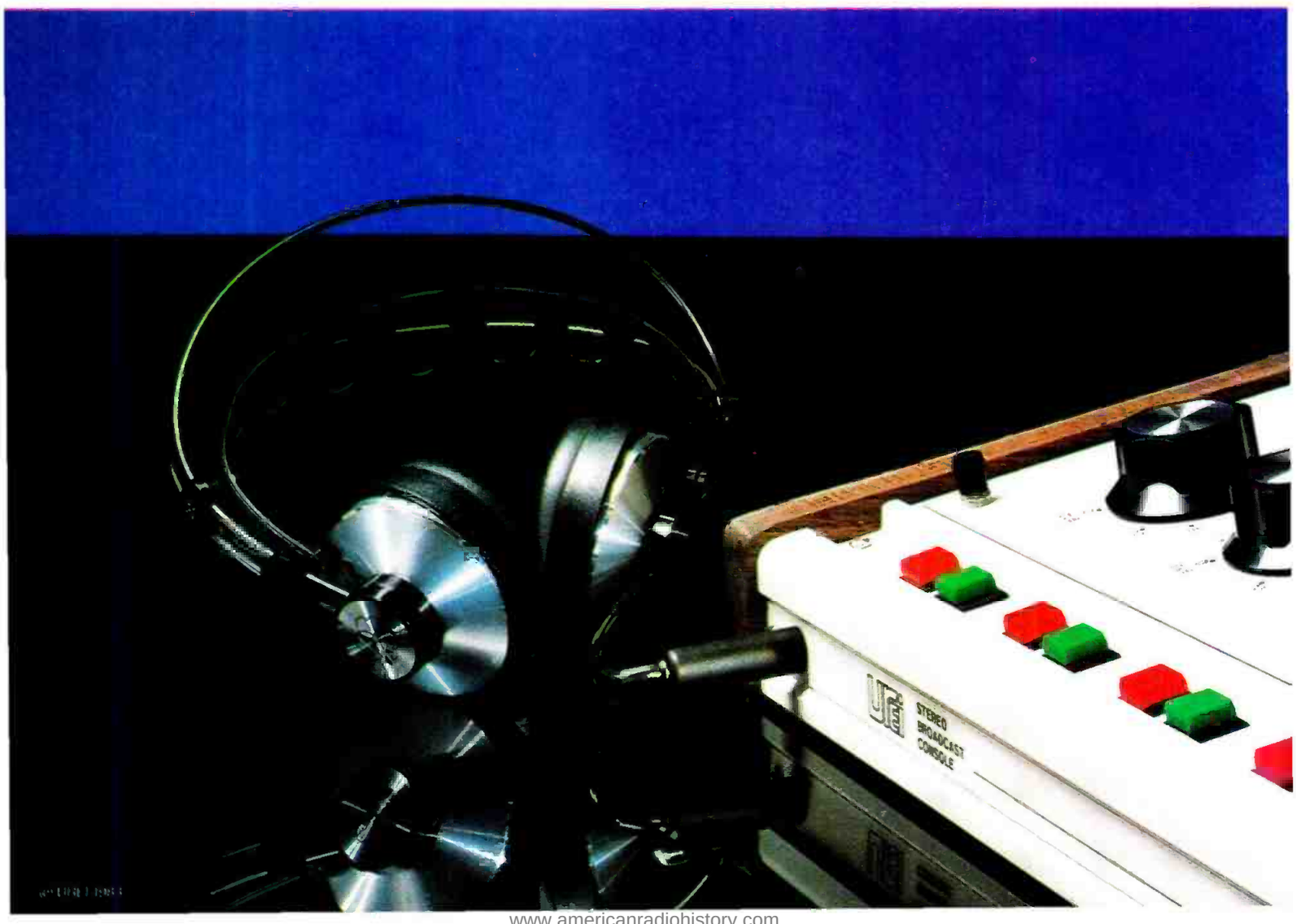
High Output, Low Distortion, Low Noise

The Series 1650 and 1680 Consoles can easily handle today's dynamic program material with +24 dBm output into 600 ohms. Signal to noise is better than 90 dB. At normal operating levels of +4 to +8 dBm, THD is typically less than 0.02%.

Flexible, Simple Operation

Each mixer position has two inputs selected by a gold contact rocker switch. Two banks of four push-buttons each may be assigned to any mixer input for additional sources such as remote or network feeds.

All channel on/off switching is performed by reliable FET switches; extra contacts are provided for activating cart machines or turntables.



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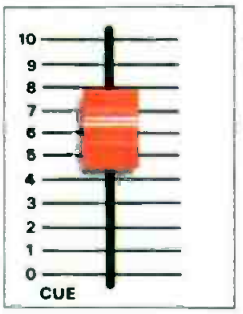
Only UREI Did.

Monitoring is easy. Four-position pushbutton selectors connect Program, Audition, Air or External input to an internal 8 W stereo power amp (or to a line output for a larger external amp). Another four-position selector sends Program, Audition, Air or Cue to an internal 1 W stereo amp and the two stereo phone jacks.

The three independent mute busses can be activated by any mixer position. Each buss drives one of three mute relays. Mute buss 1 electronically mutes the cue amp and speaker without affecting the headphone output.

Durable and Reliable

A special plastic overlay on the console surface makes it virtually impervious to marks. The electronics are built to rigid UREI standards using MIL-SPEC glass epoxy circuit boards and highest quality components. The meter box and front panel are hinged to allow easy access to all interior circuitry and modules for rapid maintenance.



Ready to Go

You can customize the new UREI consoles, but no accessories are required to put a stock console on the air. The Series 1650 consoles are supplied with one monaural, transformer isolated mic input and four stereo line input preamps. The 1680 Series comes with one mic preamp and seven line preamps. All preamps are interchangeable in all positions.

The line inputs can accept nominal +4 dB or +8 dB (ref. 0.775 V) professional sources or may be adjusted for use with −10 dB equipment. These inputs are differentially balanced and referenced to ground; input transformers are an available option.

The Modern Ones

You've been asking for a new line of UREI on-air consoles for years. We took the time to make them "the modern ones"... the ones that will meet your requirements through the 80's and beyond. For more information on the UREI Broadcast Consoles, see your authorized UREI dealer, or write:

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United Recording Electronics Industries
8460 San Fernando Road
Sun Valley, California 91352
(213) 767-1000 TLX 472 0889 UREI SNVY
Canada: E.S. Gould Marketing, Montreal

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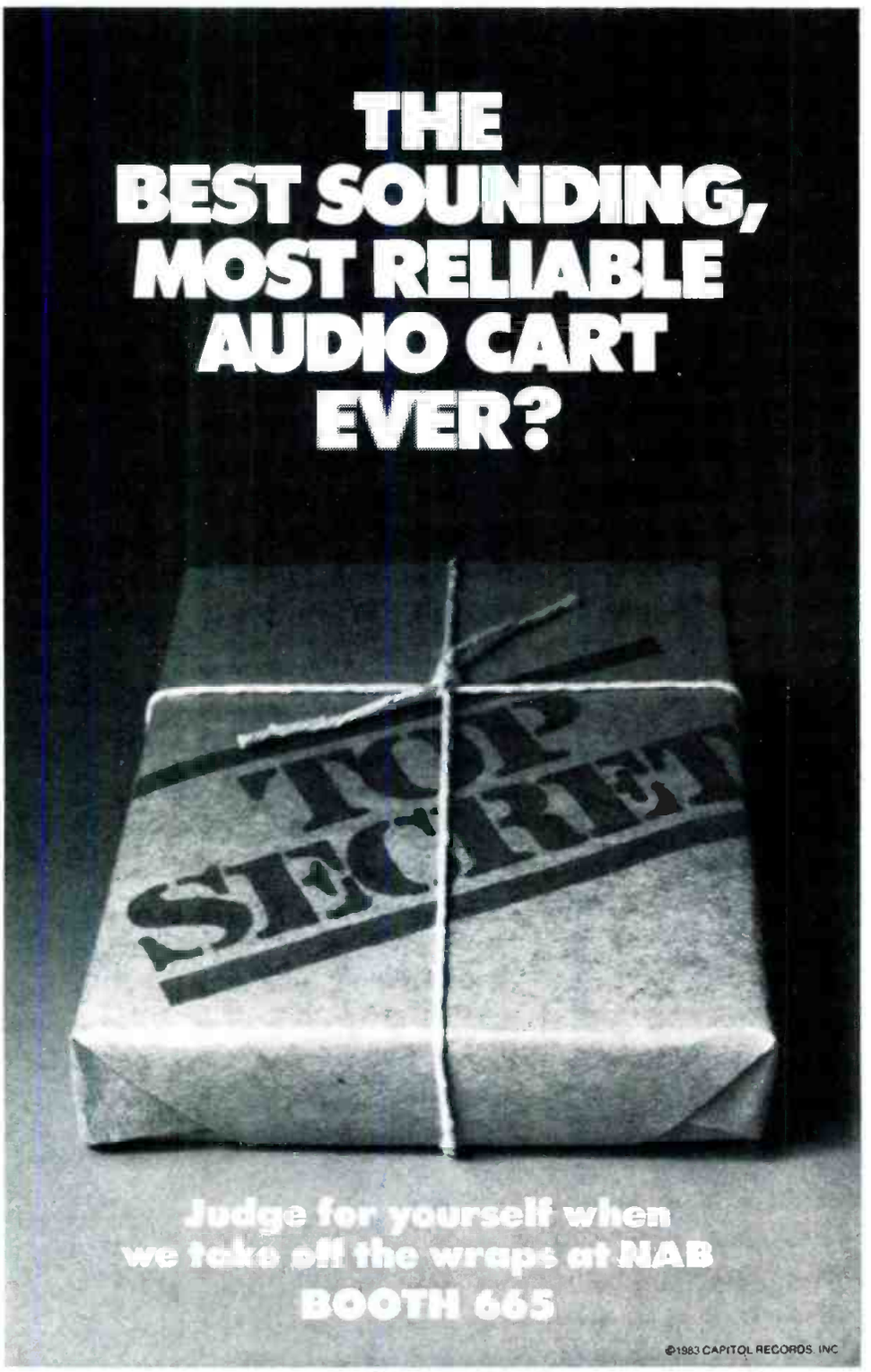
LIGHTING *(Continued)*
BELDEN COMMUNICATIONS (1416)
BOGEN PHOTO (1705)
CAMERA MART (1018)
CINEMILLS
COLORTRAN (1205)
ALAN GORDON
KOBOLD OF AMERICA (1725)
TVI (1730)
TIFFEN (1422)

LIGHTS, PORTABLE & STUDIO
ALLIED BROADCAST EQPT. (639)
ANTON/BAUER (1337)
B-W LIGHTING (1733)
BELDEN COMMUNICATIONS (1416)
BOGEN PHOTO (1705)
WALTER S. BREWER
CALZONE CASE (1011)
CAMERA MART (1018)
CINEMA PRODUCTS (1221)
CINEMILLS
CINE 60 (1423)
COLORTRAN (1205)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
COOL-LIGHT (1322)
ELECTRO CONTROLS (1103)
FIDELIPAC (103)
FREZZOLINI (1107)
ALAN GORDON
THE GREAT AMERICAN MARKET (1108)
KLIEGL BROTHERS (1604)
KOBOLD OF AMERICA (1725)
LOWEL-LIGHT (1309)
PHOEBUS
STRAND CENTURY (1418)
TVI (1730)



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THEATRE SERVICE & SUPPLY (1513)

MACHINE SYNCHRONIZERS (ATR & VTR)
AUDIO KINETICS (1173)
CONTROL VIDEO (1157)
GRUMMAN AEROSPACE (1631)
STUDER REVOX AMERICA (201)
THOMSON-CSF BROADCAST (1001)

METERS (ALL TYPES)
AUDITRONICS (505)
BAYLY/AEG-TELEFUNKEN (500)
BIRD ELECTRONICS (1625)
CAMERA MART (1018)
DATATRONIX (1504)
DORROUGH ELECTRONICS (312)
FIDELIPAC (103)
LTM (1516)
LEADER INSTRUMENTS (1702)
ROHDE & SCHWARZ (1203)
SELCO/SIFAM
SOUND GENESIS (331)
SOUND TECHNOLOGY (502)
TV EQUIPMENT ASSOCIATES (1216)
TENTEL (1613)
WARD-BECK SYSTEMS (1224)

MICROPHONES AND ACCESSORIES
AKG ACOUSTICS (508)
ACCURATE SOUND
AUDIO + DESIGN (402)
AUDIO-TECHNICA US (1141)
BEYER DYNAMIC (426)
BROADCAST ELECTRONICS (303)
CALZONE CASE (1011)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CETEC VEGA (1210)
CINEMA PRODUCTS (1221)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
COMREX (400)
CONTINENTAL ELECTRONICS (101)
ELECTRO-VOICE (511)
FIDELIPAC (103)
FITZCO SOUND (1514)
ALAN GORDON
GOTHAM AUDIO (503)
HM ELECTRONICS (1130)
KARL HEITZ (1115)
LTM (1516)
MARTI (501)
KEITH MONKS (512)
NADY SYSTEMS (1133)
PANASONIC INDUSTRIAL (1019)
R-COLUMBIA PRODUCTS (1111)
SENNHEISER ELECTRONICS (1137)
SESCOM (112)
SHURE BROTHERS (1602)
SOUND GENESIS (1602)
STUDER REVOX AMERICA (201)
SWINTEK ENTERPRISES (1345)
SYSTEMS WIRELESS
TV EQUIPMENT ASSOCIATES (1216)
TASCAM (1304)
TELEX COMMUNICATIONS (600)

MICROWAVE SYSTEMS (MOS, ITFS)
ANDREW (1202)
BROADCAST MICROWAVE (1749)
CABLEWAVE SYSTEMS (108)
COMEX (1508)
COMSEARCH (1136)
CONTINENTAL ELECTRONICS (101)
EMCEE BROADCAST PRODUCTS (1621)
HARRIS VIDEO SYSTEMS (401)
IKEGAMI (1013)

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MICROWAVE SYSTEMS *(Continued)*

M/A-COM VIDEO SYSTEMS (631)
MARTI (501)
MICRO COMMUNICATIONS (1617)
MICRODYNE (1129)
MICROWAVE POWER DEVICES
MOSELEY ASSOCIATES (301)
NURAD (1426)
RF TECHNOLOGY (1306)
TFT (109)
TV TECHNOLOGY/WILKINSON (305)
VARIAN ASSOCIATES/MICROWAVE (1605)

MONITORS (AUDIO)

ARRAKIS SYSTEMS (121)
BGW SYSTEMS (421)
BROADCAST AUDIO (213)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CLYDE ELECTRONICS (106A)
COMEX (1508)
COMREX (400)
CONTINENTAL ELECTRONICS (101)
DATATRONIX (1504)
DI-TECH (1301)
DORROUGH ELECTRONICS (312)
HM DYER ELECTRONICS
ELECTRO-VOICE (511)
FITZCO SOUND (1514)
FOSTEX (1739)
HARRIS BROADCAST (401)
IMAGE VIDEO LTD. (1314)
JBL (615)
LOGITEK (613)
MARTI (501)
McCURDY (207)
McMARTIN INDUSTRIES (701)
MERLIN ENGR. (1236)
MICRO-TRAK (104)
QEI (307)
SOUND GENESIS (331)
STUDER REVOX AMERICA (201)
TFT (109)
TELEMET (1003)
UMC (114)
UREI (513)
UNITED RESEARCH LABS (406A)
VIDEOTEK (1633)

MONITORS (VIDEO/PICTURE)

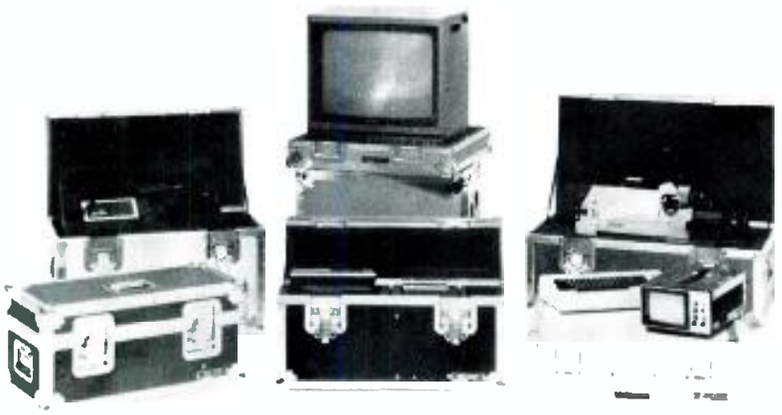
AMTRON (1104)
ASACA/SHIBASOKU (1226)
BOSCH-FERNSEH (1207)
BROADCAST SYSTEMS (1500)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
COMEX (1508)
CONRAC (1401)
DELCOM (1507)
HM DYER ELECTRONICS
ELECTOR (1131)
ELECTROHOME LTD.
GLENTRONIX (1318)
HITACHI DENSHI (1402)
IKEGAMI (1013)
IMAGE VIDEO LTD. (1341)
JVC (1234)
LENCO (1419)
LISTEC (1406)
MZB & ASSOCIATES (1507A)
MIDWEST (1710)
PANASONIC INDUSTRIAL (1019)
PHILIPS TEST & MEASURING (1408)
RCA/CCSD (1000)
ROHDE & SCHWARZ (1203)
SHARP ELECTRONICS (1102)
SHINTRON (1421)
SONY (1200)
TEKTRONIX (1601)
TELEVISION ENGR. (1700)
TELEMET (1003)
VIDEOTEK (1633)

MONITORS (TEST EQUIPMENT/ METERS

AMBER ELECTRO DESIGN (427)
ASACA/SHIBASOKU (1226)
BIRD ELECTRONICS (1625)
BROADCAST ELECTRONICS (303)
BROADCAST VIDEO SYSTEMS (1326)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CONTINENTAL ELECTRONICS (101)
DELTA ELECTRONICS (105)
DORROUGH ELECTRONICS (312)
FIDELIPAC (103)
GORMAN REDLICH (506)
HEDCO (1516)
LEADER INSTRUMENTS (1702)
LEITCH VIDEO OF AMERICA (1021)
MZB & ASSOCIATES (1507A)
McMARTIN INDUSTRIES (701)
PINZONE (Outside)
POTOMAC INSTRUMENTS (100)
POWER-OPTICS
QEI (307)
REAL WORLD (1637)
ROHDE & SCHWARZ (1203)
SOUND TECHNOLOGY (502)
TFT (109)
TELEMET (1003)
TENTEL (1613)
VIDEOTEK (1633)

MUSIC LIBRARIES

CENTURY 21 (204)
COLUMBINE SYSTEMS (1122)



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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.

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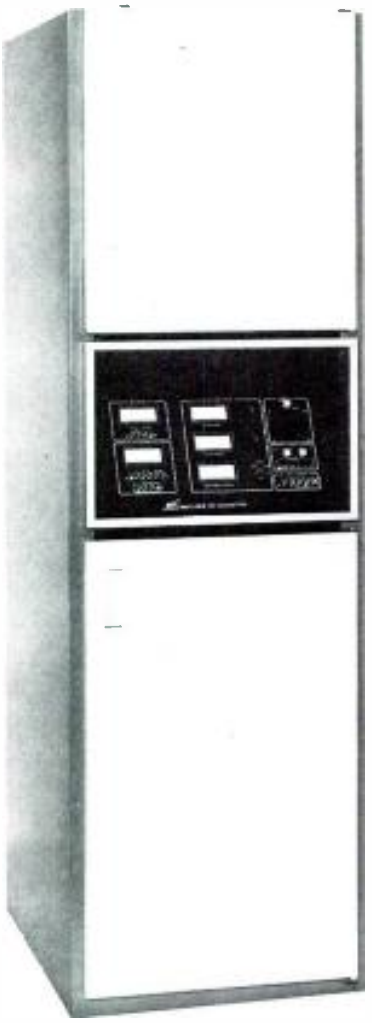
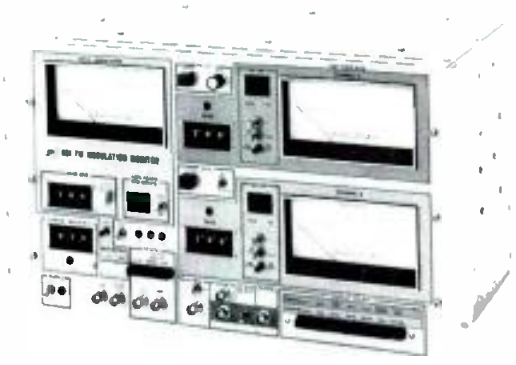
Perhaps low price is most important? Look at the deal you can make with companies assembling those 25 years old look alikes.
And maybe you can find a good used remote control unit... cheap.
Prepare for the future, or hold-the-line?
Price or Technology?



The New 695T3.5KW



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MUSIC LIBRARIES *(Continued)*

COMEX (1508)
COMPREHENSIVE VIDEO (1315)
NETWORK (1138)
VALENTINO MUSIC LIBRARY (1231)

NOISE REDUCTION SYSTEMS (AUDIO)

ATI-AUDIO TECHNOLOGIES INC. (420)
AUDIO + DESIGN (402)
BOSCH-FERNSEH (1207)
COMPOSITE VIDEO
CONTINENTAL ELECTRONICS (101)
DBX (621)
DOLBY (1301)
HM DYER ELECTRONICS
FAROUDJA LABORATORIES (1753)
GOTHAM AUDIO (503)
INOVONICS (304)
MICMIX AUDIO PRODUCTS (604)
MICRODYNE (1129)
MICROTME (1230)
PHILIPS BROADCAST (1408)
SESCOM (112)
SOUND GENESIS (331)
SONY (1200)
STRAIGHT WIRE AUDIO (130)
SYMETRIX (641)
THOMSON-CSF (1001)
UREI (513)
VALLEY PEOPLE (318)

NOISE REDUCTION (VIDEO)

HM DYER ELECTRONICS
FAROUDJA LABORATORIES (1753)
FOR-A (1340)
HARRIS VIDEO SYSTEMS (401)
MICROTIME (1230)
THOMSON-CSF BROADCAST (1001)

PATCH PANELS, JACKS, PLUGS, CONNECTORS

ADC PRODUCTS (1320)
ADM TECHNOLOGY (1223)
AF ASSOCIATES (1611)
AUDITRONICS (505)
BROADCAST ELECTRONICS (303)
BROADCAST SYSTEMS (1500)
CABLEWAVE SYSTEMS (108)
CLYDE ELECTRONICS (106A)
COMARK COMMUNICATIONS (1226)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
DATATRONIX (1504)
DIELECTRIC COMMUNICATIONS
HM DYER ELECTRONICS
ELECTRO CONTROLS (1103)
FARRTRONICS (1159)
GLENTRONIX (1318)
HEDCO (1516)
IMAGE VIDEO LTD. (1341)
JENEL (1338)
KLIEGL BROTHERS (1604)
LEMO USA (1171)
MZB & ASSOCIATES (1507A)
McCURDY (207)
MODULAR AUDIO PRODUCTS
POTOMAC INSTRUMENTS (100)
RTI (1626)
SHIVELY LABORATORIES (623)
SOUND GENESIS (331)
SYMETRIX (641)
TELEVISION ENGR. (1700)
TROMPETER ELECTRONICS (1211)
TWEED AUDIO (313)
WARD-BECK SYSTEMS (1224)

POWER SUPPLIES

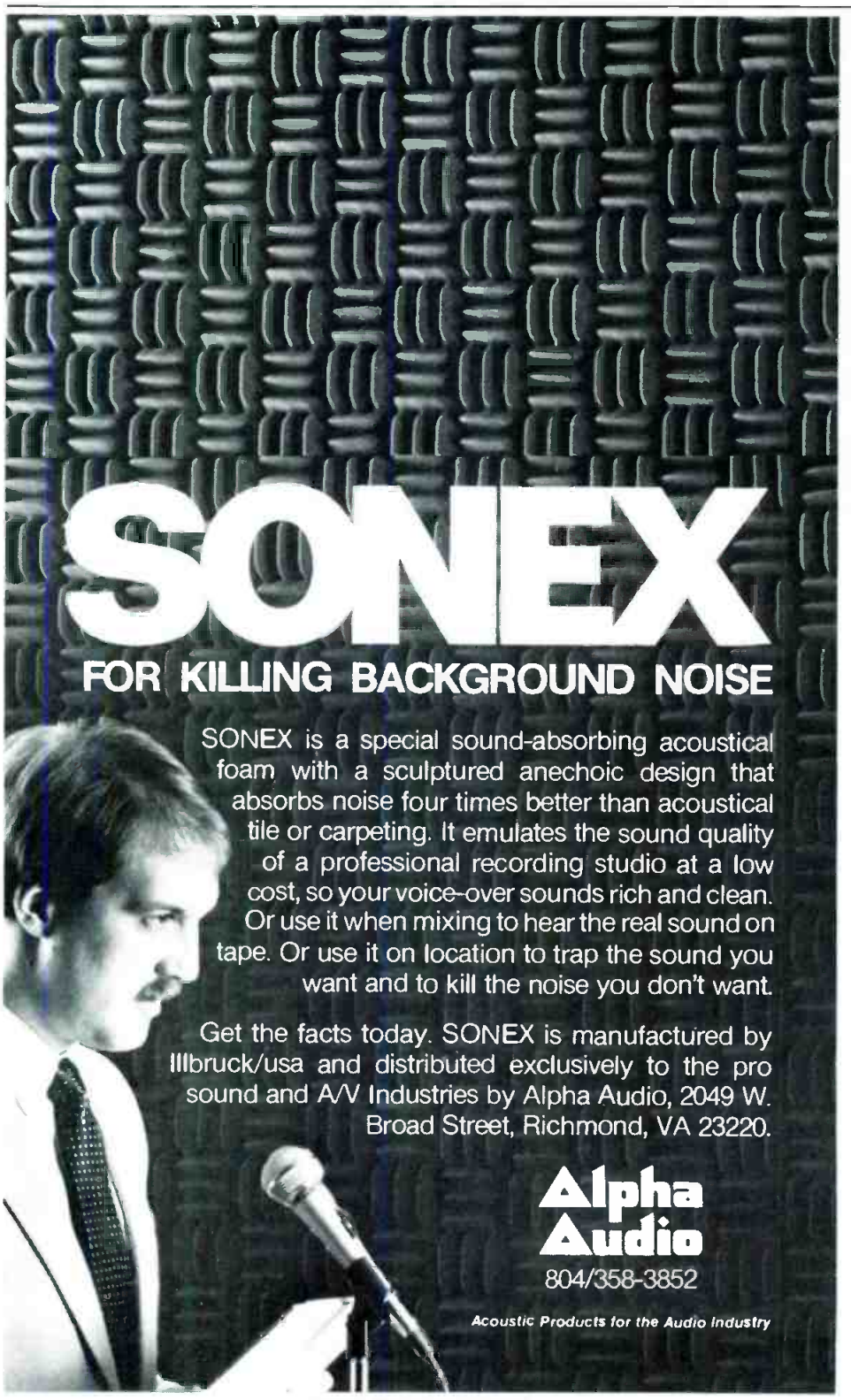
ANTON/BAUER (1337)
BROADCAST MICROWAVE (1749)
BROADCAST TECHNOLOGY (1701)
CAMERA MART (1018)
CHRISTIE ELECTRIC (1016)
CINEMA PRODUCTS (1221)
CINE 60 (1423)
CLYDE ELECTRONICS (106A)
DATATRONIX (1504)
FREZZOLINI (1107)
ALAN GORDON
IKEGAMI (1013)
LEADER INSTRUMENTS (1702)
McCURDY (207)
MODULAR AUDIO PRODUCTS
PHILIPS TEST & MEASURING (1408)
SOUND GENESIS (331)
STRAIGHT WIRE AUDIO (130)
TWEED AUDIO (313)
VARIAN ASSOCIATES/MICROWAVE (160
WARD-BECK SYSTEMS (1224)

PROGRAM SERVICES

BPI (IZZ) INT'L. (122)
CENTURY 21 (204)
CONCEPT PRODUCTIONS (423)
COLORGRAPHICS WEATHER SYSTEMS (1116)
DRAKE-CHENAULT (408)
KALAMUSIC
NETWORK (1138)
SOLID STATE LOGIC (1723)
VALENTINO MUSIC LIBRARY (1231)

PROJECTORS (TV LARGE SCREEN

CAMERA MART (1018)
ELECTOR (1131)
ELECTROHOME LTD.
ALAN GORDON
PANASONIC INDUSTRIAL (1019)



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See all the new NEC Imagination Machines, including the E-FLEX Perspective Rotational Accessory; portable 7GHz Short Range Microwave Link; and 3 Chip CCD Camera, at the NEC Imagination Theatre, Booth 1415, NAB, Las Vegas, April 10-13.

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PROJECTORS (TELECINE & ACCESSORIES)
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CAMERA MART (1018)
COMEX (1508)
ALAN GORDON
THE GREAT AMERICAN MARKET (1108)
IKEGAMI (1013)
LAIRD TELEMEDIA (1721)
RCA/CCSD (1000)

PROMOTIONAL MATERIAL & SERVICES
AMERICAN IMAGE PRODUCTIONS
CENTURY 21 (204)
IGM COMMUNICATIONS (403)
US TAPE & LABEL (602)

PROMPTING SYSTEMS
BEI-BESTON ELECTRONICS (1620)
CAMERA MART (1018)
CINEMA PRODUCTS (1221)
COMEX (1508)
ALAN GORDON
LISTEC (1406)
Q-TV (1206)
TELESCRIPT (1407)

RECEIVERS (ALL TYPES)
ARTEL COMMUNICATIONS (1118)
BROADCAST MICROWAVE (1749)
CAMERA MART (1018)
COMREX (400)
DELTA ELECTRONICS (105)
GORMAN REDLICH (506)
HARRIS VIDEO SYSTEMS (401)
MARTI (501)
McMARTIN INDUSTRIES (701)
MICRODYNE (1129)
MOSELEY ASSOCIATES (301)
NURAD (1426)
PINZONE (Outside)
POTOMAC INSTRUMENTS (100)
POWER PAK SYSTEMS
QSI SYSTEMS (1325)
RF TECHNOLOGY (1306)
STUDER REVOX AMERICA (201)
TFT (109)
TELEMET (1003)
TEKTRONIX (1601)
TRUE TIME INSTRUMENTS (643)

RECORD CARE PRODUCTS
ALLSOP (1177)
AUDIO-TECHNICA US (1141)
BROADCAST ELECTRONICS (303)
KEITH MONKS AUDIO (512)
STANTON (102)

RECORDER/CAMERA COMBINED SYSTEMS
AMPEX (1400)
CALZONE CASE (1011)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
HITACHI DENSHI (1402)
IKEGAMI (1013)
JVC (1234)
PANASONIC INDUSTRIAL (1019)
RCA/CCSD (1000)
SONY (1200)

RECORDER CARE PRODUCTS
ALLSOP (1177)
ASACA/SHIBASOKU (1226)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
COMPREHENSIVE VIDEO (1315)
FIDELIPAC (103)
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And that's the

Meet the Press–NBC–11/20/47 to present

John Cameron Swayze–NBC–Camel News Caravan 1948 to 1956

Dave Garroway–Garroway at Large 1949, Today Show 1952 to 1961

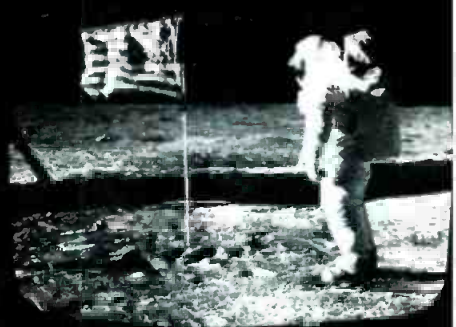
Army vs McCarthy Hearings April 1954

Huntley/Brinkley Report NBC News 10/15/56 to 7/5/70

Kennedy-Nixon Debates–ABC–10/3/60

Vietnam War

60 Minutes News Magazine 7/24/68 to present



U.S. Lands Men on the Moon July 1969

Garroway was introducing early risers to a show called *Today* and Conrac was introducing its first black and white monitor.

Swayze was anchoring network news, the McCarthy-Army hearing were being held in America's living rooms, and Conrac was introducing the first color monitor.

News and newspeople changed year after year, decade upon decade. All the while, Conrac was earning a position of trust and respect throughout the broadcast community.

Special acknowledgement to CBS, NBC, ABC.

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way it was.

Senator Estes Kefauver Crime Hearings 1951

Edward R. Murrow–CBS–See It Now 4/20/52 to 7/5/55

Coronation of Queen Elizabeth June 1953

Walter Cronkite–CBS Evening News 1962 to 1980

John Kennedy Assassination 11/22/63

Lee Harvey Oswald Killed on Nationwide TV 11/24/63

Watergate 5/17/73 to 8/8/74 (Nixon Resigns)

Iran 11/4/79 to 1/20/81

Space Shuttle on a Model 6142 Conrac Monitor

Today, Conrac is working on the next generation of broadcast monitors. To give you the highest resolution. The truest colors. The best value.

The first. And still number one.

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NORTRONICS (205)
RTI (1626)
SOUND GENESIS (331)
STUDER REVOX AMERICA (201)
TENTEL (1613)
UNITED RESEARCH LABS (406A)

RECORDERS (AUDIO, CARTRIDGE)
AMPRO/SCULLY (407)
AUDI-CORD (123)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CENTURY 21 (204)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
FITZCO SOUND (1514)
ALAN GORDON
HARRIS BROADCAST (401)
IGM COMMUNICATIONS (403)
INT'L TAPETRONICS/3M (107)
MZB & ASSOCIATES (1507A)
PACIFIC RECORDERS & ENGR. (113)
RAMKO (415)
SONO-MAG (202)
SOUND GENESIS (331)
TELEX COMMUNICATIONS (600)
TIFFEN (1422)
UMC (114)
UNITED RESEARCH LABS (406A)

RECORDERS (DIGITAL AUDIO)
CAMERA MART (1018)
DBX (621)
GOTHAM AUDIO (503)
PANASONIC INDUSTRIAL (437)
SOUND GENESIS (331)
STUDER REVOX AMERICA (201)
TIFFEN (1422)

RECORDERS (AUDIO, REEL & CASSETTE)
ACCURATE SOUND
AMPEX (1400)
AMPRO/SCULLY (407)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CENTURY 21 (204)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
DICTAPHONE (211)
FOSTEX (1739)
GARNER IDUSTRIES (1233)
ALAN GORDON
INOVONICS (304)
INT'L TAPETRONICS/3M (107)
MCI/SONY (605)
NAGRA (1213)
OTARI (601)
PANASONIC INDUSTRIAL (437)
RAMKO (415)
RANK CINTEL (1219)
SOUND GENESIS (331)
SOUNDCRAFT (1724)
STUDER REVOX AMERICA (201)
TELEX COMMUNICATIONS (600)
TASCAM (1304)
UNITED RESEARCH LABS (406A)

RECORDERS (VIDEODISC, SLOW MOTION REPLAY)
CECO COMMUNICATIONS (118)
ECHO SCIENCES
EIGEN VIDEO (1227)
MIDWEST (1710)
OKTEL
PRECISION ECHO (1417)

RECORDERS (VIDEOTAPE)
AF ASSOCIATES (1611)
ALPHA VIDEO & ELECTRONICS (1722)
AMPEX (1400)
BOSCH-FERNSEH (1207)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
COMPACT VIDEO (1315)
DELCOM (1507)
ALAN GORDON
HITACHI DENSHI (1402)
IKEGAMI (1013)
INT'L VIDEO (1509)
JVC (1234)
MZB & ASSOCIATES (1507A)
MAGNA-TECH ELECTRONICS
MERLIN ENGR. WORKS (1236)
MIDWEST (1710)
NEC AMERICA (1415)
PANASONIC INDUSTRIAL (1019)
RCA/CCSD (1000)
RECORTEC (1209)
SONY (1200)
3M (1002)

REMOTE CONTROL SYSTEMS, LINKS, STLs
AEG-TELEFUNKEN (500)
BSM SYSTEMS
BAYLY/AEG-TELEFUNKEN (500)
BROADCAST ELECTRONICS (303)
BROADCAST SYSTEMS (1500)
COMARK COMMUNICATIONS (1217)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
DELTA ELECTRONICS (105)
GRUMMAN AEROSPACE (1631)
HALLIKAINEN & FRIENDS (306)
HARRIS BROADCAST (401)
M/A-COM DCC (631)
MARTI (501)
MATTHEWS STUDIO EQUIPMENT (1775)

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- Plug in module allows frequency to be changed in the field.

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REMOTE CONTROL (Continued)
MICRO CONTROL ASSOCIATES (206A)
MOSELEY ASSOCIATES (301)
NURAD (1426)
POTOMAC INSTRUMENTS (100)
POWER PAK SYSTEMS
RF TECHNOLOGY (1306)
SWINTEK (1345)
SYMETRIX (641)
TFT (109)
TV TECHNOLOGY/WILKINSON (305)
TOWNSEND ASSOCIATES (1420)

REMOTE CONTROL SYSTEMS, VIDEO
AF ASSOCIATES (1611)
CAT SYSTEMS (1424)
CMC TECHNOLOGY (1425)
COMEX (1508)
COMPACT VIDEO (1142)
CONTROL VIDEO (1157)
DYNAIR TECHNOLOGY (1404)
EVERSHED POWER OPTICS
GRUMMAN AEROSPACE (1631B)
HARRIS BROADCAST (401)
IMAGE VIDEO LTD. (1341)
JATEX (1132)
MATTHEWS STUDIO EQUIPMENT (1775)
MOSELEY ASSOCIATES (301)
NEC AMERICA (1415)
POWER OPTICS
TFT (109)

SATELLITE COMMUNICATIONS (EARTH STATION & ANTENNA)
ANDREW (1202)
ANTENNA TECHNOLOGY (1737)
BLONDER-TONGUE LABORATORIES (1134)
CAT SYSTEMS (1424)
CALIFORNIA MICROWAVE (619)
COMEX (1508)
COMTECH DATA SYSTEMS (314)
COMPACT VIDEO (1142)
COMSEARCH (1136)
FORT WORTH TOWER (1010)
GRUMMAN AEROSPACE (1631)
JENEL (1338)
LEITCH VIDEO OF AMERICA (1021)
McMARTIN INDUSTRIES (701)
MICRO COMMUNICATIONS (1617)
MICRODYNE (1129)
MICROWAVE POWER DEVICES
MODULATION ASSOCIATES
NEC AMERICA (1415)
OAK INDUSTRIES (1331)
PINZONE (Outside)
RCA/CCSD (1000)
SATELLITE TRANSMISSION SYSTEMS
TELEMET (1003)
UMC (114)
VARIAN ASSOCIATES/MICROWAVE (1605)
WOLD COMMUNICATIONS (1515)

SECURITY SYSTEMS
CECO COMMUNICATIONS (118)
HEDCO (1516)
LEITCH VIDEO OF AMERICA (1021)
M/A-COM VIDEO SYSTEMS (1004)
TFT (109)

SEQUENCE CONTROLLER
BROADCAST ELECTRONICS (303)
BTX (1124)
CMC TECHNOLOGY (1425)
CENTURY 21 (204)
COMPACT VIDEO (1142)
CONTROL VIDEO (1157)
IGM COMMUNICATIONS (403)
MOSELEY ASSOCIATES (301)
ROSS VIDEO (1110)
UNITED MEDIA (1300)
VITAL INDUSTRIES (1212)
VIDEOMEDIA (1308)

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COMPREHENSIVE VIDEO (1315)
THEATRE SERVICE & SUPPLY (1513)
UNI-SET (1023)
UNITED RESEARCH LABS (406A)

SOUND SYSTEMS
CAMERA MART (1018)
ELECTRO-VOICE (511)
FITZCO SOUND (1514)
ALAN GORDON
McMARTIN INDUSTRIES (701)
MICRO-TRAK (104)
RTS SYSTEMS (1142)
SOUND GENESIS (331)
UMC (114)
UREI (513)
WIREWORKS (1511)

SPEAKERS & ENCLOSURES
BGW SYSTEMS (421)
BROADCAST AUDIO (213)
BROADCAST ELECTRONICS (303)
CECO COMMUNICATIONS (118)
COMEX (1508)
CONTINENTAL ELECTRONICS (101)
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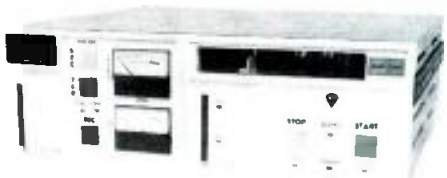

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McCURDY (207)
MICRO-TRAK (104)
MIDWEST (1710)
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RAMKO (415)
SOUND GENESIS (331)
STUDER REVOX AMERICA (201)
UREI (513)
UNITED RESEARCH LABS (406A)

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AF ASSOCIATES (1611)
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OKI ELECTRIC (1505)

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ANDREW CORPORATION (1202)
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BAYLY/AEG-TELEFUNKEN (500)
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COMEX (1508)
CONTINENTAL ELECTRONICS (101)
HM DYER ELECTRONICS
HARRIS BROADCAST (401)
HARRIS BROADCAST MICROWAVE (401)
MARTI (501)
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TFT (109)
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TENNAPLEX (1127)

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ADDA (1100)
AMPEX (1400)
APERT-HERZOG (1703)
ASACA/SHIBASOKU (1226)
CAMERA MART (1018)
COLORADO VIDEO (1222)
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DIGITAL VIDEO SYSTEMS (1017A)
ECHO SCIENCES
EIGEN VIDEO (1227)
FOR-A (1340)
HARRIS BROADCAST (401)
LYON LAMB (1414)
MCI/QUANTEL (1631)
MIDWEST (1710)
NEC AMERICA (1415)
PRECISION ECHO (1417)
RCA/CCSD (1000)
RANK CINTEL (1219)

STUDIO FIXTURES & HANGERS
B-W LIGHTING (1733)
CAMERA MART (1018)
COLORTRAN (1205)
COMPREHENSIVE VIDEO (1315)
CONTINENTAL ELECTRONICS (101)
RCA/CCSD (1000)

SWITCHERS, ROUTING
AMERICAN DATA (1409)
AMPEX (1400)
AMTEL SYSTEMS (1745)
ARRAKIS (121)
AUDITRONICS (505)
BSM SYSTEMS
BOSCH-FERNSEH (1207)
BROADCAST SYSTEMS (1500)
BROADCAST TECHNOLOGY (1701)
CENTRAL DYNAMICS (1409)
CAMERA MART (1018)
COMEX (1508)
CLYDE ELECTRONICS (106A)
DATATEK (1428)
DIELECTRIC COMMUNICATIONS
DYNAIR ELECTRONICS (1404)
FOR-A (1314)
GLENTRONIX (1318)
GRASS VALLEY (1207)
HEDCO (1516)
IMAGE VIDEO LTD. (1341)
INDUSTRIAL SCIENCES (1232)
LANG VIDEO SYSTEMS
McCURDY (207)
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PACIFIC RECORDERS & ENGR. (113)
SHINTRON (1421)
SHIVELY LABS (623)
SIGMA ELECTRONICS (1125)
TELEMET (1003)
3M (1002)
TWEED AUDIO (313)
UTAH SCIENTIFIC (1114)
VIDEOTEK (1633)
VITAL (1212)

TBCs
ADDA (1100)
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AMPEX (1400)

NAB Booth 208A

MORE IS LESS

Our new 10 channel digital remote control is a lot more system for a lot less money - and it's expandable up to 100 channels. Add memory and standard computer peripherals and you get capability no other system offers at *any* price. The DRC-190 can be fully programmed, in BASIC, for automated broadcast control and logging. It will display and print phase, relative amplitude, calculated ratios and deviations; perform long term analysis of these parameters, keep track of down time, and any other function you choose. With distortion analysis equipment the DRC-190 will even test and log Proof of Performance data - automatically.

If a factory-programmed system is too inflexible for your needs, check out the DRC-190. It's a system you can get into and grow with.

$2995

DRC-190

Programmable, Expandable, Digital Remote Control

Hallikainen & Friends

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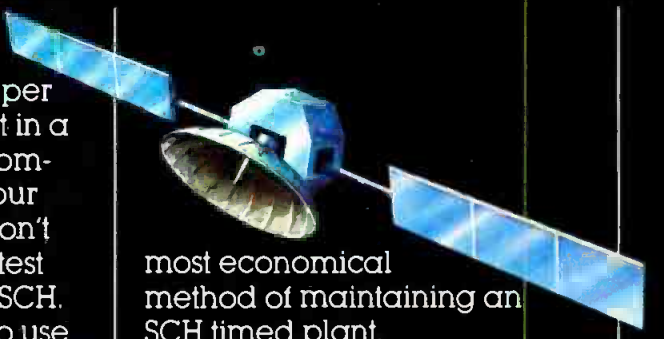
WE'VE DEVELOPED A WAY TO ELIMINATE HORIZONTAL SHIFT. AUTOMATICALLY.

Grumman has solved the problem of horizontal shift caused by improper SCH timing. And solved it in a way that's not only economical, it's automatic. With our SYNC PROC™ unit you won't waste time, people and test equipment establishing SCH. And editors won't have to use trial and error to get the correct matched frame edit between two video signal sources.

SYNC PROC™ solves the problem in a simple way. It generates a color field identification signal that's positioned on the "front porch" of the TV signal. The ambiguity with RS-170A is thereby ended; you get positive identification for one field of the four-color field sequence. With color field identification, the SYNC PROC™ automatically maintains proper SCH timing, eliminating horizontal shift.

SYNC PROC™ provides the most economical method of maintaining an SCH timed plant.



And it comes packaged with normally required features: a processing amplifier and sync generator and other optional features. Our expanding line of unique process and control products for the broadcast industry include color encoding, satellite transmission processing, machine control and many other state-of-the-art developments, and beyond.

For more information, write Business Development, Mail Stop A24-43, Grumman Aerospace Corporation, Great River, NY 11739, or call (516) 435-6001.

See us at NAB Convention, Booth #1631, April 10-13, Las Vegas, Nevada

GRUMMAN

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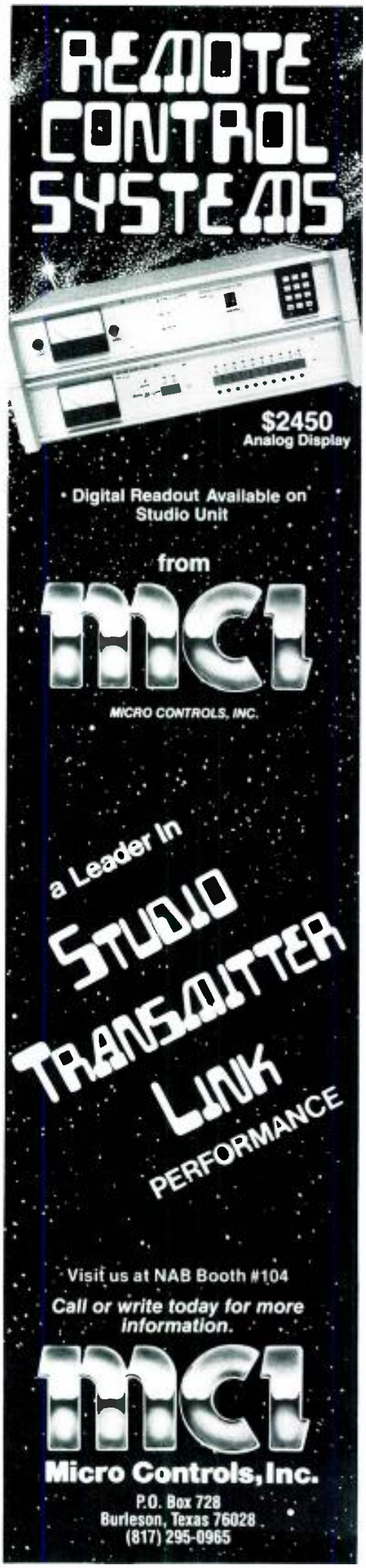

Circle (76) on Reply Card

TBCs *(Continued)*

AUDIO KINETICS (1173)
BTX (1124)
CAMERA MART (1018)
COMEX (1508)
DATATRON (1005)
DELCOM (1507)
DIGITAL VIDEO SYSTEMS (1017A)
HM DYER ELECTRONICS
EECO (1314)
ESE (116)
FOR-A (1340)
FORTEL (1323)
HARRIS BROADCAST (401)
HARRIS VIDEO SYSTEMS (401)
HITACHI DENSHI (1402)
INT'L VIDEO (1509)
MARCONI ELECTRONICS (1615)
MCI/QUANTEL (1631)
MERLIN (1236)
MICROTIME (1230)
MIDWEST (1710)
NEC AMERICA (1415)
RCA/CCSD (1000)
SONY (1200)
THOMSON-CSF BROADCAST (1001)
3M (1002)

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CMC TECHNOLOGY (1425)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CETEC BROADCAST (601)
CHRISTIE ELECTRIC (1016)
COMPREHENSIVE VIDEO (1315)
CONTINENTAL ELECTRONICS (101)
FIDELIPAC (103)
FITZCO SOUND (1514)
GARNER INDUSTRIES (1233)
GLENTRONIX (1318)
RTI (1626)
SOUND GENESIS (331)
UMC (114)
UNITED RESEARCH LABS (406A)

TAPE DUPLICATING EQUIPMENT

ACCURATE SOUND
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GARNER INDUSTRIES (1233)
MERLIN (1236)
OTARI (601)
TELEX COMMUNICATIONS (600)
VIDEOMEDIA (1308)

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ACCURATE SOUND
AMPEX (1400)
ASACA/SHIBASOKU (1226)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
CECO COMMUNICATIONS (303)
CAMERA MART (1018)
CHYRON (1610)
FIDELIPAC (103)
GLENTRONIX (1318)
NOVA
QUANTA (1432)
SOUND TECHNOLOGY (502)
TV EQUIPMENT ASSOCIATES (1216)
UNITED RESEARCH LABS (406A)

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AGFA-GEVAERT (1334)
AMPEX (1400)
BROADCAST CARTRIDGE SERVICE (611)
BROADCAST ELECTRONICS (303)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CHYRON (1610)
CONTINENTAL ELECTRONICS (101)
DICTAPHONE (211)
FIDELIPAC (103)
FITZCO SOUND (1514)
GOTHAM AUDIO (503)
JVC (1234)
MAXELL (1612)
STEPHENS ELECTRONICS (1757)
TDK ELECTRONICS (1707)
UMC (114)
UNITED RESEARCH LABS (406A)

TAPE, MAGNETIC RECORDING (VIDEO)

AGFA-GEVAERT (1334)
AMPEX (1400)
AUDICO (1343)
BROADCAST AUDIO (213)
BROADCAST CARTRIDGE SERVICE (611)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
COMEX (1508)
COMPREHENSIVE VIDEO (1315)
FIDELIPAC (103)
FUJI (1413)
JVC (1234)
MAXELL (1612)
MIDWEST (1710)
PANASONIC INDUSTRIAL (1019)
RCA/CCSD (1000)
TDK ELECTRONICS (1707)
UNITED RESEARCH LABS (406A)

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EEG ENTERPRISES (1155)
LOGICA LTD.
TV EQUIPMENT ASSOCIATES (1216)
UNITEL

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AUTOGRAM (120)
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COMEX (1508)
CONTINENTAL ELECTRONICS (101)
HM DYER ELECTRONICS
EVENTIDE CLOCKWORKS (323)
FIDELIPAC (103)
FITZCO SOUND (1514)
GRUMMAN AEROSPACE (1631B)
HARRIS BROADCAST (401)
INOVONICS (304)
LEADER INSTRUMENTS (1702)
LENCO (1419)
MARCOM
POTOMAC INSTRUMENTS (100)
QEI (307)
REAL WORLD (1637)
ROHDE & SCHWARZ (1203)
SESCOM (112)
SOUND GENESIS (331)
SOUND TECHNOLOGY (502)
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UREI (513)
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OPTIMODS are fully adjustable to program requirements. Their patented technology has literally revolutionized audio processing in the last six years, and yields a cleaner, brighter, louder sound unmatched at any price.

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Money may be tight. But, particularly in trying economic times, the winners are those who compete hardest and deliver the best-sounding product to their audience. OPTIMODs are lethal competitive weapons. And, at 13¢/hr, *very* sound investments.

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Circle (294) on Reply Card FM

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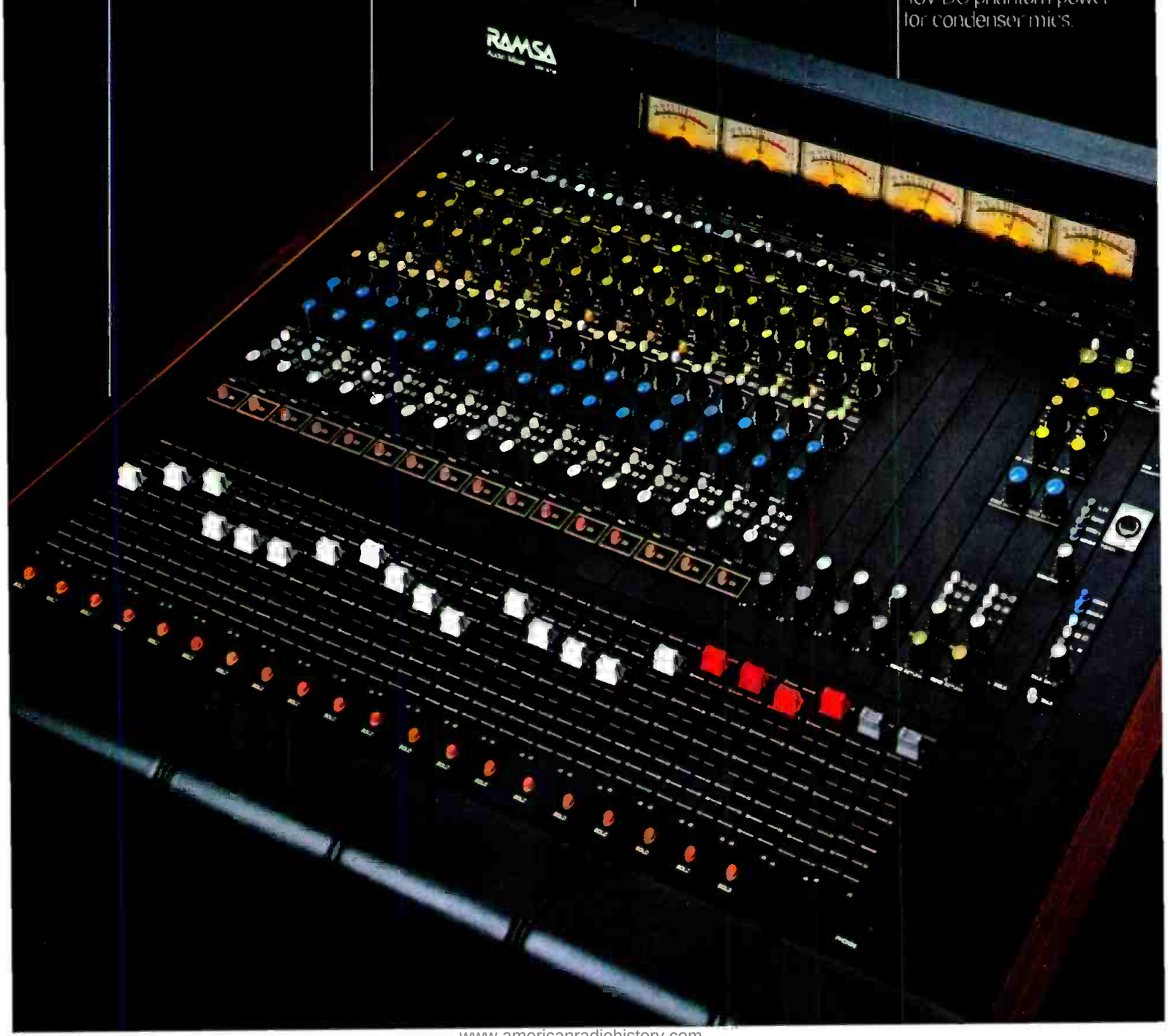
If you're ready to move up to a specialized mixer, you're ready for Ramsa.

The Sound Reinforcement Specialist: Ramsa WR-8716

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

The WR-8716 is a fully modular sound reinforcement console with 16 input modules, 4 group modules, and 2 masters. It features 16 input pre-fader solo buttons, 4 group modules with pre-fader insertion patch points, and lockable post-fader solo buttons. There are 6 illuminated VU meters with peak LED's for easy outdoor reading and a separate stereo variable frequency EQ for monitor sends. Pan pot controls allow panning to the left or right masters while level controls permit 16 x 6 board operation. The left and right direct channel assign function lets you bypass the group modules for individual sources. Portable operation is a snap with easy access connectors.

And the WR-8716 features plastic conductive faders for greater reliability and smooth, low-noise operation; external power supply for light weight, and switchable -18V DC phantom power for condenser mics.



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RAMSA

The Recording Specialist: Ramsa WR-8816

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

You'll command a variable frequency EQ section with 3 frequency settings for the high and low frequencies plus continuously variable midrange. Stereo echo send replaces the separate mono controls you'll find on competitive boards. And you get two independent stereo monitor controls—one for musician's headphones, one for control room monitors—a special feature for any mixer in this class. And there are other important features like low noise electronically balanced mic inputs with high-speed IC's, 16 switchable post-fader solo controls and XLR-type mic connectors.

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

Panasonic
PROFESSIONAL AUDIO DIVISION

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BROADCAST VIDEO SYSTEMS (1326)
CAMERA MART (1018)
CECO COMMUNICATIONS (118)
CLYDE ELECTRONICS (106A)
COMPREHENSIVE VIDEO (1315)
DBX (621)
DATATEK (1428)
DORROUGH ELECTRONICS (312)
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TELEMET (1003)
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TENTEL (1613)
VIDEOTEK (1633)

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COMEX (1508)
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DELTA ELECTRONICS (105)
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ELECTRO IMPULSE (117)
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MICRO COMMUNICATIONS (1617)
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TEKTRONIX (1601)
TELEMET (1003)
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HM DYER ELECTRONICS
HALLIKAINEN & FRIENDS (306)
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MARTI (501)
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MOSELEY ASSOCIATES (301)
POTOMAC INSTRUMENTS (100)
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ESE (116)
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HARRIS BROADCAST (401)

When news is made... Ski-Hi makes the news.

When you look at this photo, there's only one tall structure among the masts that TMD did not build. TMD is proud of its reliable position in the ENG industry. If you have any questions about our engineered performance, contact us and we'll discuss your application.

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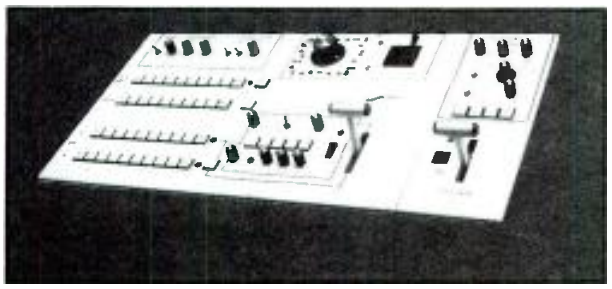
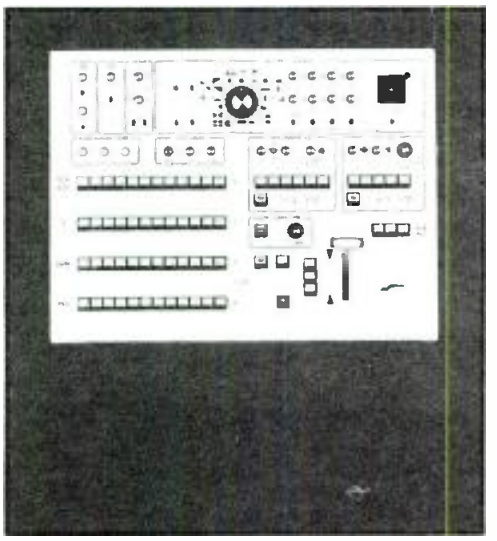


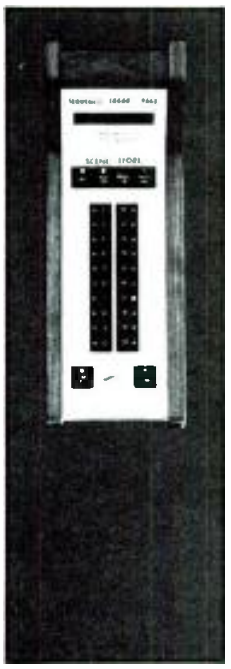
Circle (195) on Reply Card

ROSS RVS 10-4 & 10-4R
10 inputs, 4 buses, 1 mix/effects system, rack/desk mount control panel with self contained or remote electronics. Downstream keyer available.

ROSS RVS 524
12 or 20 inputs, 4 buses, 1 MLE (Multi-Level Effects), 18 basic wipes plus optional rotary patterns. Analog or digital key borders and interfaces for editors and digital effects available.



Circle (196) on Reply Card



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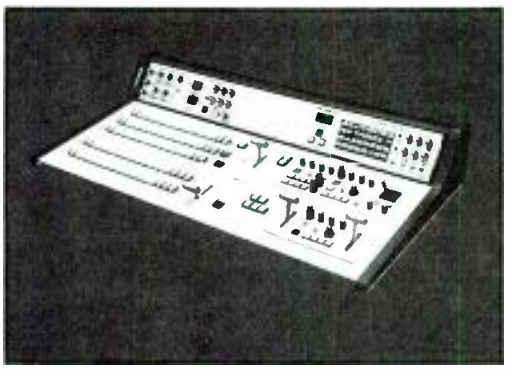
ROSS SCENE STORE
Memorizes and recalls switcher set-up for 200 scenes. A cassette storage option provides unlimited capacity.

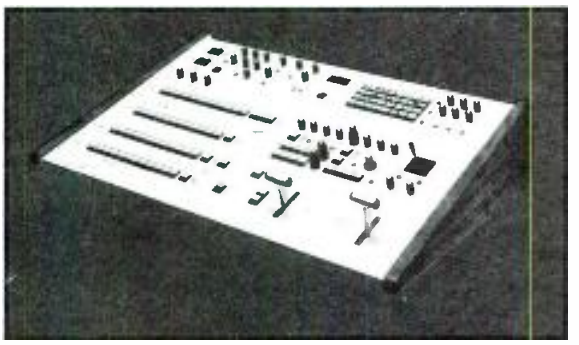


Circle (197) on Reply Card

ROSS RVS 505
16, 20 or 24 inputs, 5 buses (program and preset plus MLE system). Full range of available options including a downstream keyer.

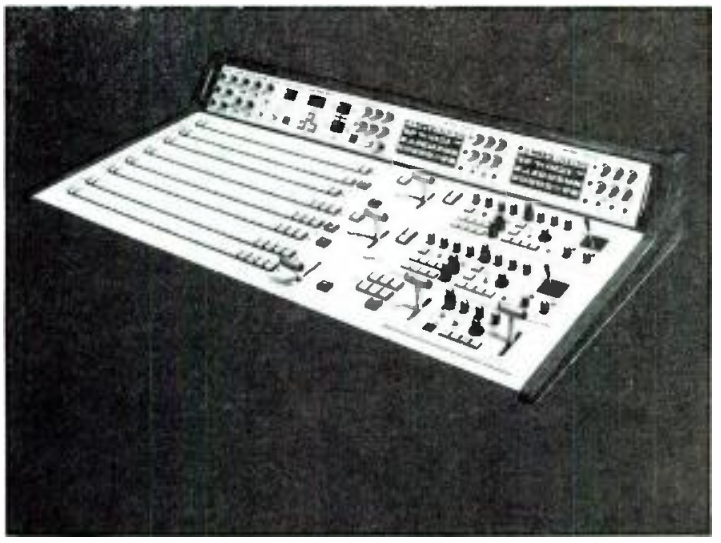
ROSS RVS 504 (not pictured)
Similar to the RVS 505 but with 4 buses and 16 or 20 inputs. Program and preset buses are incorporated into the Multi-Level Effects system.

ROSS RVS 514
Similar to RVS 524 with more features such as key mask, non-additive mix, spotlight and options including quad split and matrix wipes.



Circle (199) on Reply Card

ROSS RVS 508
20 or 24 inputs, 8 buses including two completely independent Multi-Level Effects systems plus program and preset buses. Full range of options is available.



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SOUND GENESIS (331)

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HARRIS BROADCAST (401)
LARCAN (1626A)
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MICRO-TRAK (104)
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SOUND GENESIS (331)
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EEV (1335)
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EEV (1335)
RCA (1000)
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VARIAN ASSOCIATES/EIMAC (1605)
VARIAN ASSOCIATES/MICROWAVE (1605)

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WOLF COACH (1317)

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ASACA/SHIBASOKU (1226)
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DATA COMMUNICATIONS-BIAS (1014)
HM DYER ELECTRONICS
FOR-A (1340)
GLENTRONIX (1318)
GRASS VALLEY (1207)
IMAGE VIDEO LTD. (1341)
JVC (1234)
LANG VIDEO SYSTEMS
MIDWEST (1710)
PANASONIC INDUSTRIAL (1019)
RCA/CCSD (1000)
ROSS VIDEO (1110)
SHINTRON (1421)
VIDEOMEDIA (1308)
VITAL (1212)

WEATHER SYSTEMS
AURORA SYSTEMS (1312)
CALVERT ELECTRONICS (1761)
CAMERA MART (1018)
COLORGRAPHICS WEATHER SYSTEMS (423)
DUBNER COMPUTER SYSTEMS (1630)
ECHO SCIENCES
ENVIRONMENTAL SATELLITE DATA
GORMAN REDLICH (506)
NAGRA (1213)
McINNIS-SKINNER & ASSOCIATES (1349)
SPECTRA COMPUTER SYSTEMS

WIRELESS MICROPHONES, INTERCOMS, REMOTE PICKUP SYSTEMS
CAMERA MART (1018)
COMPREHENSIVE VIDEO (1315)
COMREX (400)
CONTINENTAL ELECTRONICS (101)
ALAN GORDON
HM ELECTRONICS (1130)
MARTI (501)
MIDWEST (1710)
MOSELEY ASSOCIATES (301)
NADY SYSTEMS (1133)
POWER PAK SYSTEMS
R-COLUMBIA (1111)
SWINTEK ENTERPRISES (1345)
TELEX COMMUNICATIONS (600)

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To find your best synchronizer buy just fill in the blanks.

Synchronizer Comparison

Feature	HVS 690	ADDA	NEC	QUANTEL	MICROTIME
9 bit 4X F_{SC} Transparent Digital Architecture	YES				
Hysterysis Circuitry for pointer crossing compensation	YES				
Full Frame Memory	YES				
Built-in, Infinite Window TBC with Look-ahead Velocity Compensation	YES				
Heterodyne & Direct for all VTR formats	YES				
Multiple-criteria Hot Switch Circuitry	YES				
Freeze Frame or Freeze Field	YES				
3.5-inch Vertical Rack Space	YES				
Price	$15,500 (F.O.B. HVS)				
Initial Deliveries	July				

Or, to save time just buy the HVS 690

Go ahead, compare if you wish. But, we must warn you, it'll probably be a waste of time. Not only does the HVS 690 have all the features above, it also has such things as a 59dB S/N ratio, a 1% K Factor, very low power consumption, and readily available industry standard components.

In short, the HVS 690 is simply the best price/performance package around. To ensure early delivery, place your order now. For details, call or write: **Harris Corporation, Harris Video Systems, P.O. Box 523, 1255 E. Arques Avenue, Sunnyvale, CA 94086, Telephone 408/737-2100 Telex 35-2028.**

See us at Booth 401

HARRIS

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NAB-'83/Las Vegas

Exhibitor roundup

This special section alphabetically lists the NAB-'83 exhibitors and previews products to be displayed in Las Vegas. Following each exhibitor listing is a number by which the Reader Service Card may be used to provide exhibitor data. Also, if the exhibitor is advertising in this issue, the location of the ad is indicated for additional details about the company's NAB-'83 exhibit products.

Although this section will be a valuable aid in planning NAB-'83 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-'83 to make your final plans. Look for the BE wrap-up of this convention in the June issue.

ADC Products
Booth 1320
Established products
Series: Audio and video jack fields
Series: Audio connectors
New products
See at booth
Circle (399) on Reply Card
see ad on page 65

ADM Technology
Booth 1223
Established products
ST 160: Radio broadcast console with equipment and furniture
ST 100: Radio production console
1600 II: TV on-air/production console 16 x 4 x 2
2442 II: TV on-air/production console 24 x 4 x 2
3283 II: TV production console 32 x 8 x 2 x 1
DA16B/CH20C: Radio distribution system
New products
1603 II: Video post-production console with VCA control, direct outputs and remote control from switcher/editor.
High tech console with random access audio routing switcher.
Circle (400) on Reply Card
see ads on inside front cover and page 173

AEG-Telefunken
See Bayly Engineering

AF Associates
Booth 1611
Established products
Series: Turnkey systems engineering and fabrication including studios, post-production, mobile vans, satellite playback facilities.
B3410: Marconi line-array CCD digital telecine system
MR2B: Marconi 1-inch Type C VTR
1200/2000: Refurbished quad VTRs
HV-100: TV interval analyzer
New products
AVS-6000: TV standards converter
Circle (433) on Reply Card
see ad on page 175

AT&T
Booth 1429
Circle (835) on Reply Card

ATI (Audio Technologies Inc.)
Booth 420
Established products
P100: Encore series of precision turntable amplifier
P1000: MicroAmp series high output precision turntable amplifier
M1000: Dual Mic/program amplifier
L1000: Dual line bridging amplifier
MA1000: 10W/ch stereo or 25W mono power amplifier
DA1000: 1 x 8 mass feed distribution amplifier
DA2008: Dual 1 x 4 mass feed distribution amplifier
DA1008: 1 x 8 output individual adjustable DA with metering and phone output
DAZ016: Dual 1 x 8 individually adjustable DA, metered with phone sup.
New products
DA10000: Modular, plug in 10 channels of 1 x 6 DA with dual power supplies in 5¼ inches of rack space
Circle (434) on Reply Card

Acrodyne
Booth 1228
Established products
T-210 V/V: 10W transiator VHF
T-230 U/U: 100W translator UHF
T-230 M/U: 100W low power transmitter UHF
TT-335 VH: 250W VHF transmitter
TT-348 VH: 5kW VHF transmitter
TT-3480 U: 5kW UHF transmitter
New products
TT-3401 U: 1kW UHF transmitter
TT-3500 U: 10kW UHF transmitter
TT-3500 VH: 10kW VHF transmitter (high band)
TT-3500 VL: 10kW VHF transmitter (low band)
Circle (435) on Reply Card
see ad on page 47

Accurate Sound Corporation
No booth at press time
Established products
AS-100: Duplicator, magnetic tape, high speed
Series: Reel and loop bin master
Formats: Cassette and reel-to-reel
Starbird: Microphone boom
AS-100: Recorder, audio, reel-to-reel
New products
See at booth
Circle (403) on Reply Card

ADDA Corporation
Booth 1100
Established products
VW-1: TBC/frame synchronizer
VW-2: TBC/frame synchronizer
ESPEC: Electronics still-storage system
VIP: Video image processor-compressor
AC-20: Dual-channel TBC
New products
See at booth
Circle (404) on Reply Card
see ad on page 19

Advanced Music Systems
Booth 1330
Established products
DMX 15-80: Digital delay and effects processor
DMX 15-80S: Stereo digital delay and effects processor
RMX 16: Digital reverberation system
DMX 15 Sync: Audio delay compensator
New products
See at booth
Circle (405) on Reply Card

→

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If you need rigid line, here's where to get it fast.

Phelps Dodge rigid coaxial transmission line is available in sizes from ⅞ inch to 3⅛ inches in 50 ohm impedance and 6⅛ inches in both 50 and 75 ohm impedances.

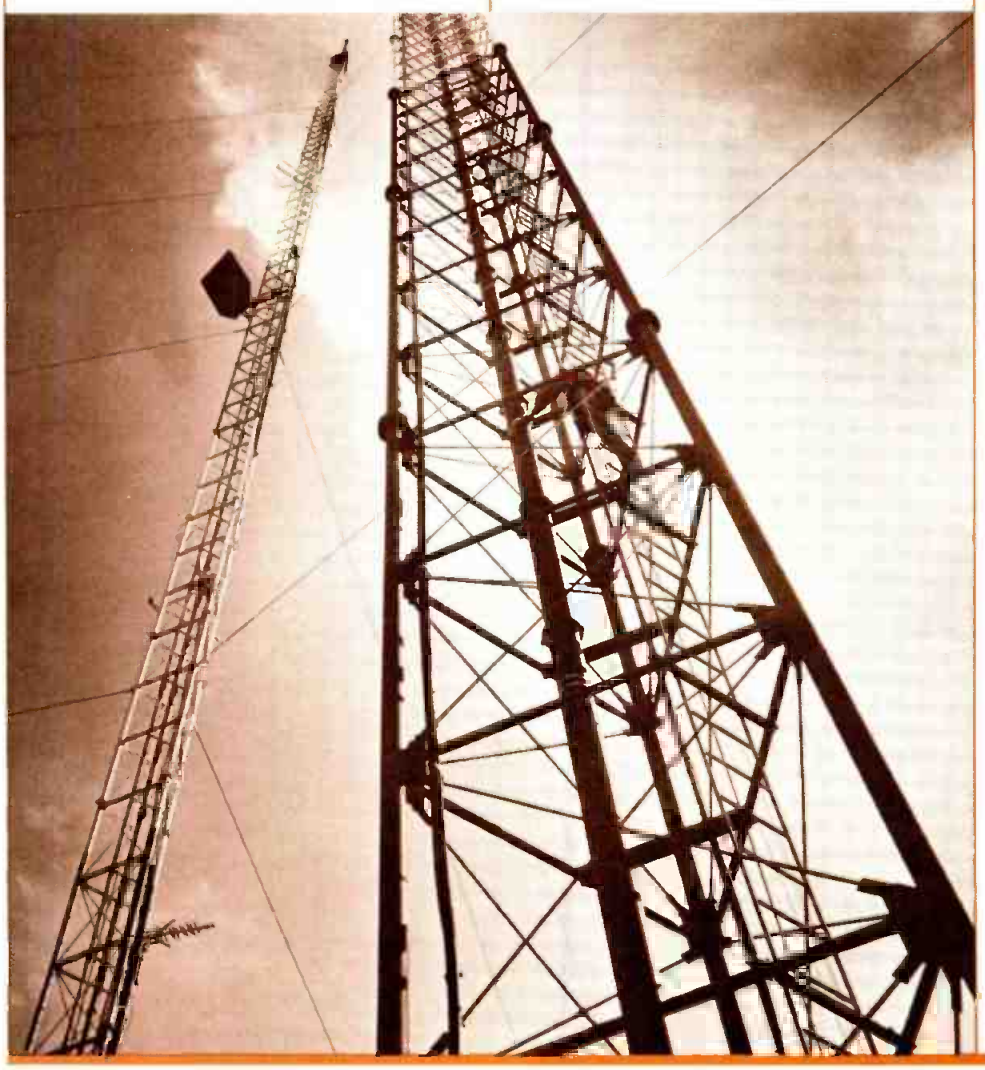
Not only available, but in most cases, we can ship from stock. You will rarely have to wait more than two weeks.

You can order twenty foot lengths or any shorter length cut to your specifications. You can request that line be fitted with flanges on both ends, one end or without the flanges.

Hardware and other installation accessories are also available from stock. Aluminum outer conductor is available, as well.

Quality? You can count on it. Every inch is constructed of high conductivity, hard drawn copper tubing and fitted with pin-type Teflon dielectric insulators produced to exacting standards.

And, all rigid line, flanges and conductors are manufactured in accordance with Mil-L-3980, EIA Standard RS-225 and international IEC recommendations.



While purchasing rigid line for system upgrading and repair may be a simple matter, you may encounter layout and design problems in a new installation. We can help here too, with appropriate technical and engineering assistance. Just ask.

Write, telephone or TWX for Catalog 779 with all the details: Phelps Dodge Communications Company, Route 79, Marlboro, NJ 07746, (201) 462-1880, TWX: 710-722-3861.

phelps dodge
Communications Company
A Division of Phelps Dodge Industries, Inc.

See Us at Booth 1007, NAB Convention.

Circle (83) on Reply Card

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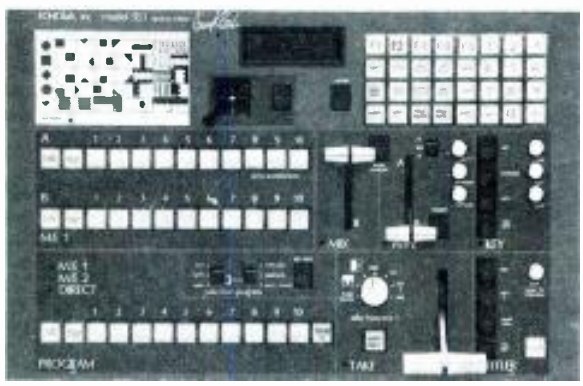
Agfa-Gevaert
Booth 1334
PEM 369: Studio mastering tape
PEM 428: SMPTE lockup mastering tape
PEM 468: Studio mastering tape
New products
Package shelf boxes and bulk/duplicators
Circle (833) on Reply Card
see ad on page 259

Alexander Mfg. Company
Booth 1714
Established products
Battery packs for VTR equipment
Battery packs for communications equipment
Circle (1100) on Reply Card

Allen Avionics
Booth 1627
Established products
Variable binary toggle switch delay lines
Binary strappable variable delay line
Infinitely variable delay lines
Rotary switch delay lines
Delay equalized low-pass filter
New products
Rack-mountable slide switch variable delay lines
Rack-mountable strappable binary delay lines
Hum eliminator coil
Pre- and de-emphasis wave-shaping networks
Random noise measurement networks
Circle (801) on Reply Card
see ad on page 128

TEACH YOUR EDITOR NEW TRICKS

Here is a simple, cost-effective way to add a full range of special effects to your post-production editing routines.



Now, directly from the keyboard of your editing controller, you can mix, wipe, dissolve, key and produce complex transitions. Through either standard or optional interfacing, ECHOlab's SE/3 μP-controlled production switcher can add a new level of sophisticated capability to virtually any inexpensive editor.

Contact Closure Interface — Permits your editor to initiate a wide range of mix, wipe, key and transition effects.

Customized Serial Interfaces — Available for many editing controllers, including Videomedia Z6000, Convergence 103, 104 Series, United Media Commander II and Sony BVE 800. Gives your editor *complete functional control* of the switcher. You can create complex animation sequences and/or access complex multiple transitions previously stored in the SE/3's 5000 steps of programmable memory — all directly from your editor.

The SE/3 is the only switcher in its class with serial-editing interfaces completely self-contained. There are no costly, external boxes or computers to purchase.

External Computer Interface — In addition to the editing interfaces, a general-purpose serial interface protocol is available for full remote control of the SE/3 by an external computer.

Future Interfacing Capabilities — ECHOlab is rapidly expanding its line of editing interfaces and is dedicated to supporting the full SMPTE editing standard when it becomes available in the final form.

SE/3 with Contact Closure Interface	**$14,000**
Serial Interface Option	**$2,225**

For details, write or call:

ECHOlab, Inc.

175 Bedford Road, Burlington, MA 01803 (617) 273-1512

Circle (82) on Reply Card

Allied Broadcast Equipment
Booth 639
Established products
Complete line of Bonneville distribution amps
Telemix telephone interface
Kustom Kraft studio furniture
Auditronics console
Otari MTR-10 recorder
Elgin telephone equipment
Audiometrics pre- and distribution amplifiers and timers
Circle (1141) on Reply Card
see ad on page 140

Allied Tower
Booth 409
Circle (832) on Reply Card

Allsop
Booth 1177
Established products
71100: Ultra line audiocassette cleaner
60100: VHS VCR cleaning system
65100: Beta VCR cleaning system
Allsop: U-matic VTR cleaning system
New products
See at booth
Circle (407) on Reply Card

Alpha Audio
Booth 422
Established products
Sonex: Acoustic materials for studios and control rooms
New products
See at booth
Circle (408) on Reply Card
see ad on page 74

Alpha Video & Electronics Company
Booth 1722
New products
VO-5850/α, VO-5800/α, VO-5600/α, VO-5000/α,: Alphatized versions of the Sony type 5 U-matics, includes increased shuttle speed, head switch in vertical, automatic external sync selection, balanced audio inputs with XLR connectors, switchable audio input levels, +4dB or mic, switchable input impedance, balanced audio outputs with XLR connectors, adjustable audio output level with the +4dB at detent.
Circle (1101) on Reply Card

Amber Electro Design
Booth 427
Established products
3501: Distortion and noise measuring system
4400A: Multipurpose audio test set
New products
3501: New features and accessories
Circle (409) on Reply Card

Amco Engineering Company
Booth 1218
Circle (834) on Reply Card
see ad on page 237

Amperex Electronic Corporation
Booth 1412
Established products
78XQ: 30mm diode gun Plumbicon tube
80XQ: ½-inch diode gun Plumbicon tube for ENG →

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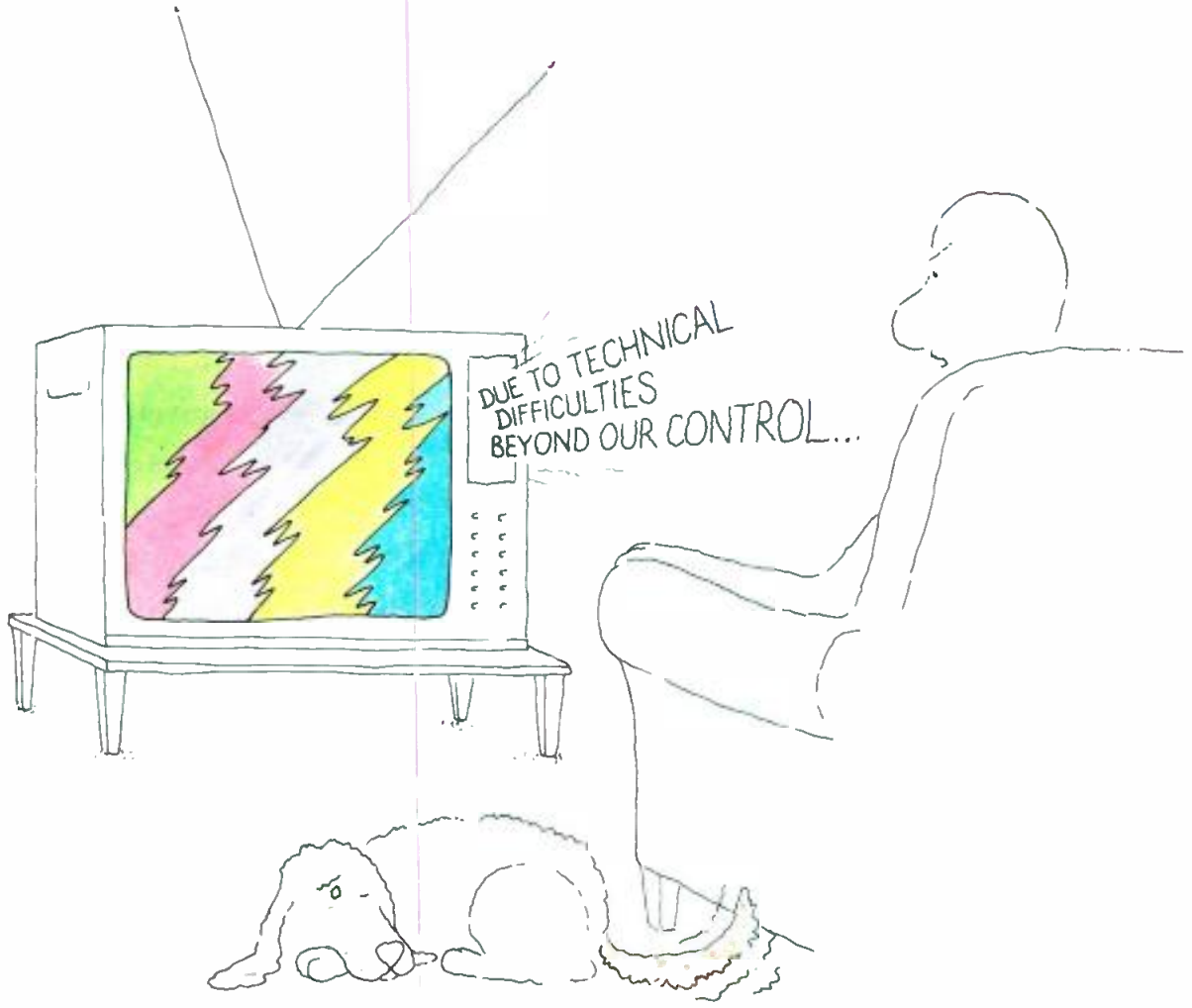

(Translation: The cassette broke.)
(Solution: Maxell U-Matic cassettes.)

If jammed U-Matics ever make you yearn for the days of live television something is wrong with the brand of U-Matics you're using. A lot of things are very right with Maxell U-Matic cassettes.

They're built to stand up to the toughest handling and editing conditions you can dish out. The unique Maxell Epitaxial™ tape formulation gives you an extremely dense magnetic coating that yields superior chroma and luminance. The proprietary Maxell binder system makes sure the formulation, and everything you record on it, stays up to your standards, indefinitely.

That's why every one of the networks, hundreds of independent television stations and just about every major producer, director and cameraman in the business who tries Maxell U-Matic cassettes, buys Maxell.

Your Maxell supplier can make sure <u>your</u> programming isn't interrupted. Ask him for Maxell U-Matic cassettes. Or ask us for more information.

maxell®

PROFESSIONAL / INDUSTRIAL DIVISION

Our success is magnetic.

See us at NAB, Booth 1612, Las Vegas.

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

Circle (85) on Reply Card

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Amperex (1412)
Continued
XQ1427: ⅔-inch Plumbicon tube
XQ2427: ⅔-inch diode gun Plumbicon tube
XQ3427: ⅔-inch diode gun, low capacitance Plumbicon tube
XQ1070: 1-inch Plumbicon tube
XQ1410: 30mm Plumbicon tube
XQ4500: 30mm high resolution diode gun Plumbicon tube
New products
XQ2170: 1-inch diode gun Plumbicon tube
XQ3170: 1-inch diode gun, low capacitance Plumbicon tube
Circle (411) on Reply Card
see ad on page 71

Ampex Corporation
Audio Video Systems Div.
Booth 1400
Established products
VPR-3: 1-inch helical scan type C VTR
VPR-5: Portable 1-inch helical scan type C VTR
VPR-80: 1-inch helical scan type C VTR
ARC-10: ½-inch integrated camera/recorder system
ADO: Digital special effects system
ACE: Computerized editing system
BCC-20/21: Digicam portable color camera (BCC-20), studio (BCC-21) camera
AVC series: Video production switchers
HPE-104: Modular editing system
4100 series: Video production switchers
VPR-2B: 1-inch helical scan type C VTR
VPR-20: Portable 1-inch helical scan VTR
ATR-124: Multi-track audio recorder
ATR-800: Audio recorder
Circle (412) on Reply Card
see ads on page 24, 25, 27, 29

Ampex Corporation—Tape Division
Booth 1400
Established products
Professional videotapes: 175 Quad, 196 Helical, 167 U-matic, 102 VHS, 101 Beta
Audiotapes: 456 and 457 GrandMaster, 406/407 Mastering, 466 High Energy Digital Audio Mastering, 600 Series, low noise/high output tapes and standard output tapes, 671 professional audiocassettes
New products
196: 1-inch video mastering tape for the Ampex Nagra VPR-5 (introduced at IBC-'82)
Circle (1102) on Reply Card
see ads on pages 8-9, 112A-D

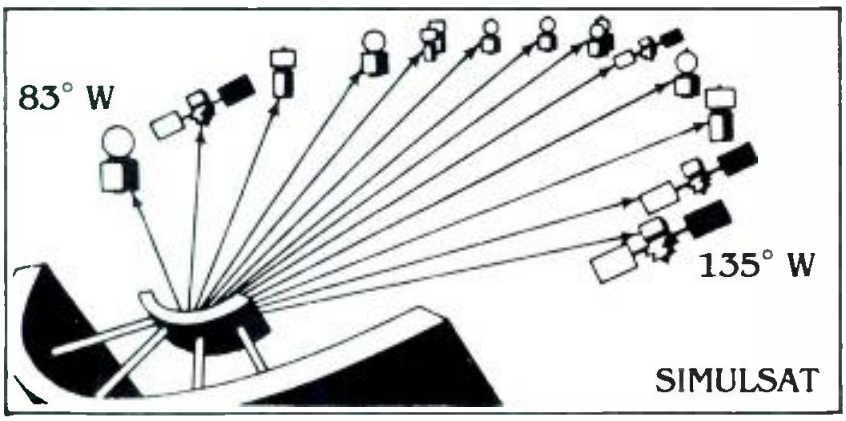
Ampro/Scully
Booth 407
Established products
8300: 3-deck cartridge reproducer
280B, 285B, 284B-8: Scully reel-to-reel record/reproducer
270: Scully bi-directional reel-to-reel reproducer
250: Scully economy reel-to-reel recorder/reproducer
255: Scully economy reel-to-reel reproducer
AC: Ampro rotary fader consoles
LC: Ampro slide fader consoles
MT: Ampro microtouch consoles
New products
See at booth
Circle (413) on Reply Card

Amtel Systems
Booth 1745
Established products
STG-300: Safe area safe title generator
3700: SMPTE edit code master
New products
4000: SMPTE edit code generator/reader
1260: Video character generator
Circle (836) on Reply Card
see ad on page 280

Amtron Corporation
Booth 1104
Established products
AG-341: Generator, safe area-safe title
New products
8308: 8-inch broadcast color monitor, high resolution
8313: 13-inch broadcast color monitor, high resolution
8319: 19-inch broadcast color monitor, high resolution
Circle (414) on Reply Card

Andrew Corporation
Booth 1202
Established products
Heliax coaxial cables
Rigid transmission lines
STL microwave antenna systems
Trasar UHF-TV transmitting antennas
Earth station antennas
New products
Trasar LPTV antenna
6⅛-inch 75Ω rigid line

DISCOVER SIMULSAT - 3 FOR YOUR SMATV SYSTEM



1. ONE SIMULSAT LETS YOU SAVE TODAY
Simulsat-3 can see all domestic satellites, simultaneously, with the performance characteristics of a conventional 3.3 Meter parabolic antenna. That means you can invest in one Simulsat rather than several earth stations, one foundation, one (smaller) site, one installation, one planning commission to deal with, and one capital outlay.

2. SIMULSAT CAN PROVIDE ADDITIONAL PROFIT OPPORTUNITIES
As new programs continue to become available on various satellites, Simulsat gives you the flexibility to easily receive these satellites in order to preserve your future options. This inherent flexibility can make you more competitive in your market and more responsive to your customers' needs.

3. SIMULSAT CAN HELP BRING YOU NEW CONTRACTS
The inclusion of Simulsat into your next proposal will give you an advantage over your competition. Apartment owners appreciate the low profile of Simulsat vs an antenna farm and they understand the potential obsolescence of a conventional dish. Start selling the flexibility of a Simulsat installation and win a new competitive edge.

For more information, contact:

ANTENNA TECHNOLOGY CORPORATION

8711 East Pinnacle Peak Road Suite C-103
Scottsdale, Arizona 85255
(602) 264-7275

Distributorships Available.

Circle (86) on Reply Card

www.americanradiohistory.com

Amid the hostility, the confusion, the competition, one microphone stands above the crowd.

The SM63.

No matter how rough things get in the field, the Shure SM63 Omnidirectional Dynamic Microphone gives your crew the whole story with a lot less handling noise than any microphone in its class. When Shure's engineers developed the SM63 and SM63L (with longer handle), their objective was to create a high-output, lightweight microphone perfect for the needs of electronic news journalists.

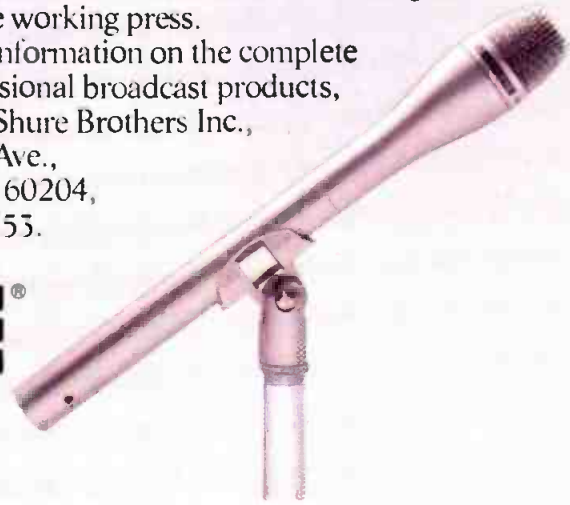
With the SM63's patented internal mechanical isolation system reducing undesirable handling noise, its high output and smooth extended frequency response lets your story come through crisp and clear. Its omnidirectional polar pattern prevents boominess that is often encountered during close miking situations. And its overall lightness makes continuous hand-held ENG/EFP assignments less fatiguing, without sacrificing ruggedness. Even its profile is small and elegant so it won't obscure faces on camera.

The output of the SM63 is a full 6 dB higher than comparable hand-held interview microphones.

And there are even more precision-engineered refinements. A highly effective internal humbucking coil rejects strong magnetic fields encountered around lights and other broadcast situations. And when things get really tough, the Shure-developed *VERAFLEX*® grille is virtually impervious to rust, moisture and dents. This system includes a highly effective internal anti-wind and -pop filter; and for more adverse conditions, a dual-density two-layer windscreen also is supplied.

The Shure SM63. The hard-working microphone for the working press.

For more information on the complete line of professional broadcast products, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.



SHURE®

THE SOUND OF THE PROFESSIONALS®...WORLDWIDE

Circle (87) on Reply Card

www.americanradiohistory.com

OUR NEW ½" TAPE GIVES YOU COLOR

For professional tape users, it used to be that stepping down to half-inch video tape also meant stepping down in color quality.

But that was before Scotch® half-inch videocassettes with Color Plus oxide.

Now you can give your productions bright, brilliant color that no other half-inch tape can beat. Not even competitive high grade tapes.

3M's Color Plus oxide sets a standard for the industry for color signal-to-noise and broadband signal-to-noise. The result is better picture quality, more brilliant color and more realism. We've got the test results to prove it.

But the advantages of our half-inch tape go beyond color. You'll also get professional recording features like fewer dropouts, low headwear and extended stop motion capability. The same characteristics that have made our 2", 1" and ¾" tapes the leaders in the professional market.

New packaging plus a convenient labelling and hanger/storage system make our half-inch tape professional right down to the last detail.

But to get the true picture of our improved half-inch videocassettes you just have to try them. They're available in both Beta and VHS formats from your authorized dealer of Scotch Video Tape.

Or ask your 3M Sales Representative for more information and test results on Color Plus half-inch tape. You'll get a free Color Plus painters hat as a bonus.

Magnetic A/V Products Division/3M

"Scotch" is a registered trademark of 3M. © 3M Company. 1982

See us at NAB Booth No. 1002

www.americanradiohistory.com

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NOW, ONE MICROPHONE CAPTURES IT ALL.

The Sennheiser Telemike Electret Microphone System.

Its unique modular design provides all the flexibility and precision of a collection of separates—from omni to super cardioid, spot to shotgun, telescopic boom to tie-clip lavalier.

All, at a fraction of the price of comparable separates.

And all, with the most advanced electret technology available: our unique back-electret.

See your Sennheiser dealer for details. And capture it all.

All components available separately or as a package.

SENNHEISER
ELECTRONIC CORPORATION
10 West 37th Street, New York, N.Y. 10018
(212) 239-0190

See Us At NAB Booth 1137

© 1981, Sennheiser Electronic Corporation (N.Y.)

Circle (89) on Reply Card

In satellite communications, go with total systems engineering experience.

Spectrum Planning provides the full spectrum of services for planning reliable and interference-free satellite earth stations:

- Site selection/design
- Frequency coordination
- Frequency protection
- RFI measurements
- Site shielding design
- FCC filings

We believe no other frequency coordination company can match our experience. And in this rapidly changing field, experience is worth its weight in gold.

Call us now at (214) 699-3536 or write for more information.

SPECTRUM PLANNING INC.
P. O. Box 1360 • Richardson, Texas 75080

Circle (90) on Reply Card

Andrew (1202)
Continued
UHF circular waveguide
Circle (415) on Reply Card
see ad on page 229

Angenieux
Booth 1201
Established products
15X9: 9 to 135mm, f/1.5 high aperture, all weather ENG/EFP lens
25X10: 10 to 250mm, f/1.4 long range zoom lens for ⅔-inch cameras
15X7: 7 to 105mm, f/1.4 rugged design lens for new ½-inch cameras
42X12.5: 12.5 to 525mm, f/1.5 longest range zoom for 25mm/30mm cameras
12X12.5: 12.5 to 150mm, f/1.5 lens for 25mm cameras
Accessory lens attachments to provide wide range of focal lengths and focusing ranges for Angenieux lenses
New products
To be announced
Circle (416) on Reply Card

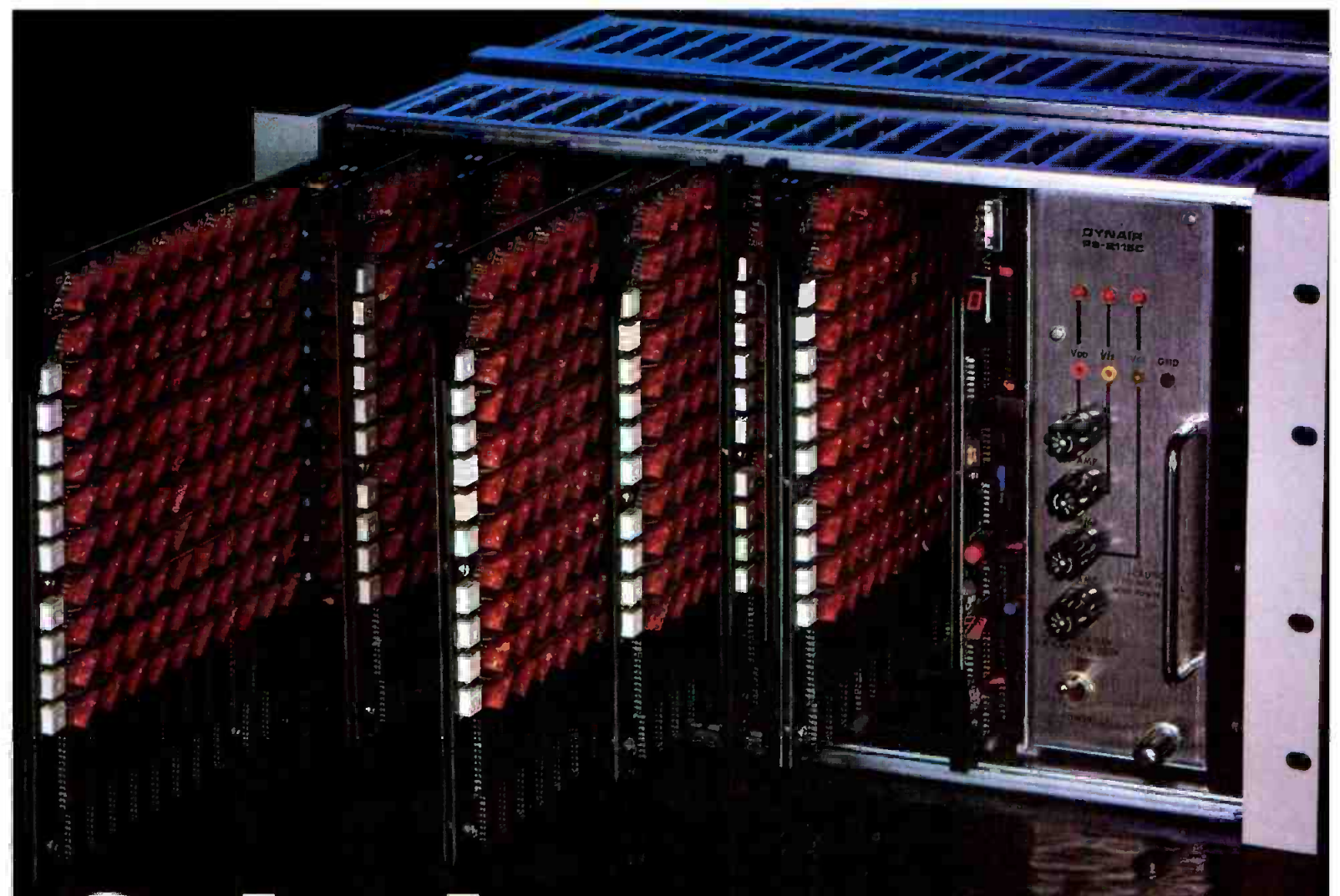
Antenna Technology Corporation
Booth 1737
Established products
Simulsat-5: Multibeam satellite receive antenna
New products
Simulsat-3: 3.3m comparable multibeam satellite receive antenna designed for radio and SMATV
Simulsat-7: 7m comparable multibeam satellite receiver antenna especially designed for TV broadcasters
Circle (1103) on Reply Card
see ads on pages 98, 193

Anton/Bauer
Booth 1337
Established products
Series: Snap-On nicad batteries
SQ-4N: 4-position overnight charger
QRSV: Mounting brackets for cameras and VTRs
LG-30: 12/30V portable lighting head
LB-30D: 30V lighting belt
SNDS: Diagnostic discharger with up-counter
FC-L: Fast/slow charger for Super-D batteries
SCD: Silver zinc batteries-equalizer
DB-13: 8Ah 13.2V nicad video belt
PS-2: ac camera supply in Snap-On package
MC-W: Wide range microcharger
U-FC: Programmable universal fast/slow charger
M-FC: Mobile fast charger
B-19K: Nicad Snap-On system
New products
See at booth
Circle (419) on Reply Card

Anvil Cases
Booth 1112
Established products
Anvil ATA 300, Category 1 cases: Heavy-duty rugged transit cases, rack-mount cases and airline containers
Circle (420) on Reply Card
see ad on page 72

Apert-Herzog Corporation
Booth 1703
Established products

www.americanradiohistory.com



Only the beginning

A thing of beauty . . . this Dynair System 21.

Begin with this single, high density frame using as few as 10 inputs and 10 outputs. Select combinations of video, audio, time code, data, tally, or machine control switch modules.

Grow sensibly, easily and cost effectively to impressive matrices of one thousand inputs and one thousand outputs of every module type by simply adding frames and modules.

Grow into high definition TV, if this possibility is in your future, without changing a thing. Bandwidth of the System 21 is already 30 MHz.

Write or phone. We would like to send you additional information. Give us a chance to beg n with you as you upgrade your plant.

DYNAIR

5275 Market Street, San Diego, CA 92114 U.S.A. Phone (619) 263-7711 TWX (910) 335-2040

Circle (91) on Reply Card

www.americanradiohistory.com

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Harris TC-90. The new ENG/EFP camera built for the way you use them.

Now there's an ENG camera designed for the real world of a news cameraman.

A *super-light* camera you can float on your shoulder hour after hour without fatigue. An ENG camera with *balance* for sure-footed shooting from impossible angles. With *low power consumption* that lets you keep rolling after others quit.

It's the new Harris TC-90.

The lightest, best balanced, least power-hungry, most rugged, low-profile three-tube prism ENG/EFP camera you can buy.

Only 7.9 pounds.

The basic TC-90 body weighs only 7.9 pounds, less lens, viewfinder, and battery. To realize just how light that is, the Ikegami HL-79 body weighs 13 pounds; the Philips LDK-14S is 11.9; and the Hitachi FP-22 weighs in at 11.7.

When you average the weights of the six cameras closest to the Harris TC-90, you'll find ours is 25 percent lighter.

The TC-90 is one of the smallest. But we deliberately made it a bit bigger than it had to be, to add balance and stability. A little longer, to let the cameraman grasp the lens in a natural, comfortable, controlled way. And we carefully shifted extra weight to the tail, so that the weight of the lens is counterbalanced for easy, smooth handling.

No blind-siding to the right.

The height of conventional ENG cameras blocks the sightline to your right. But the TC-90 has a low profile for peripheral viewing no other camera can equal. So you won't miss the action no matter where it happens.

That low-profile TC-90 body is built of graphite Nylon plastic, the same kind of material used for high-stress components in jet aircraft. Its strength-to-weight ratio is ideal for resisting damage from bouncing in the back of the van, from heavy weather, hostile newsmakers, inevitable accidents. The TC-90 housing should never need repair, which saves a lot of shots and a lot of money.

Inside that awesomely strong housing are, among other components, 14 LSI chips. They not only substantially reduce weight, but greatly reduce power consumption. You can keep on shooting with the TC-90 long after a conventional camera's batteries would run down. More than two hours on a fully charged 4-ampere/hour battery.

Built-ins, not add-ons.

Features that make the TC-90 a high-performance ENG/EFP camera are tucked inside, not plugged in or dangling from the outside. TC-90 on-board components include genlock, microphone amplifier, intercom amp, and CCU interface. And they're built into the price, too.

Also built in are the 24-hour Harris Hotline and service network.

Get all the specs on the new Harris TC-90 ENG/EFP camera. Fill in and mail the coupon today. Or phone. Ask for your own hands-on demonstration. You owe yourself a look at the camera somebody should have built for you a long time ago.

BE

☐Please call me to arrange a demonstration of the TC-90, lightest, best-balanced, lowest power consumption ENG/EFP camera.

☐Please send me your latest brochure.

Name_____

Title_____

Firm_____

Address_____

City_____

State_____ Zip_____

Phone_____

Harris Corporation
Broadcast Products Division
P.O. Box 4290, Quincy, IL 62305
(217) 222-8200

HARRIS

Circle (305) on Reply Card

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Apert-Herzog (1703)
Continued

Model A: Digital frame synchronizer
VBB-1: Hybrid video line driver
TDAC: Traveling digital-to-analog converter
New products
1 x 24: Distribution amplifier
Circle (421) on Reply Card
see ad on page 323

Aphex Systems Ltd.
Booth 515
Established products
Aphex II-B: Broadcast aural exciter
Aphex II-S: Studio aural exciter
Aphex Type B: Semi-Pro aural exciter
EQF-2: Sweep equalizer/filter module
CX-1: Compresser/expander module
New products
EQF-2S: Stereo sweep EQ/filter
CX-1S: Stereo compressor/expander
Circle (802) on Reply Card

Arben Design
Booth 1721
Circle (838) on Reply Card

Arrakis Systems
Booth 121
Established products
100RS: Routing switcher
150SC: Audio console
5000SC: Audio console
2000SC: Audio console
2000R: Audio console
Circle (422) on Reply Card

Arriflex Corporation
Booth 1644
Established products
16SR-II: 16mm studio film camera
HMI lighting: Full range of ARRI HMI lights, including the 200W Openface, the 575W, the 1.2kW, the 2.5kW, the 4kW and the 6kW.
New products
NC TA-1: ARRI nicad battery tester
BTM 616: ARRI editing table
CineJib: Crane for film and video cameras
200W HMI Fresnel: HMI stand/hand-held lighting kit
ARRI battery multicharger
Circle (803) on Reply Card

Circle (92) on Reply Card

Artel Communications Corporation
Booth 1118
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
New products
T/R-2020: Fiber-optic composite video/audio plug-in module system for the SL-2000
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
Circle (423) on Reply Card

Arvin/Diamond
Booth 1608
Established products
System: Satellite weather displaying system; capable of displaying 1400 weather pictures per month
New products
See at booth
Circle (839) on Reply Card

Asaca/ShibaSoku Corp. of America
Booth 1226
Established products
925R: Color video noise meter
205: Sweep generator
201: Envelope delay set
CB53A1: Test signal generator with character generator included
TG7: Test signal generator
ASW100/200: Portable production systems
898: Color analyzer
SV-11: Sweep generator (30MHz)
CC-5: Color encoder
New products
Digital color correction system
Digital frame store
Tape dropout analyzer and counter →

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IF YOU CAN THINK IT, YOU CAN DO IT.

Computer Graphics Lab, Inc. and IMAGES ® frees your creativity. And that's just the beginning.

IMAGES — Image Manipulation and Graphic Enhancement System — increases productivity, streamlines operations, improves on-air appearance and saves time.

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COMPUTER GRAPHICS LAB, INC.

Visit us at NAB Booth 1143

Circle (93) on Reply Card

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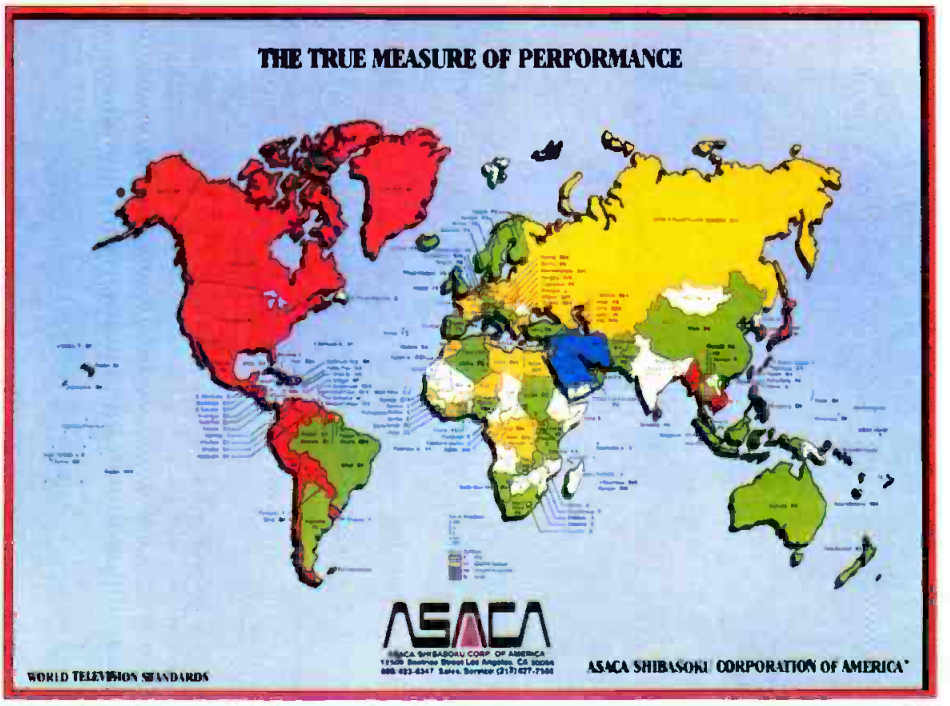

Asaca plans to have a wall chart on world TV standards available for NAB attendees. Stop by the company's booth (1226) and pick up your copy.

Asaca 1226
Continued
Portable production system
Waveform generator (digital)
Frame synchronizer
Circle (804) on Reply Card
see ads on pages 49, 321, 326

Associated Press Broadcast Services
Booth 419
Circle (840) on Reply Card

Atlas Tower Corporation
Booth 617
Established products _____
Series: AM, FM and TV broadcast towers
New products _____
See at booth
Circle (424) on Reply Card

Auburn Instruments
Booth 1711
Circle (841) on Reply Card
see ad on page 281

Audico
Booth 1343
Established products _____
System III: Videocassette tape loader/reloader
751: Audio loaders
200-9: Audiocassette timer/exerciser/rewinder
MF6b: Professional impulser
Hockey Puck Splicer
Module: U-matic pay-off for spooling tape, available for VHS and U-matic
New products _____
Audio loader that can be upgraded to include video
Circle (425) on Reply Card

Audi-Cord Corporation
Booth 123
Established products _____
100 series: Recorders and reproducers, NAB Cartridge
"A" series: Recorders and reproducers, NAB cartridge
New products _____
See at booth
Circle (426) on Reply Card
see ad on page 82

***THE DATUM COMMITMENT:* DIGITAL DATA IN THE VIDEO RASTER, VERTICAL BLANKING INTERVAL, ON FILM AND FOR RF TRANSMISSION**

DIGITAL DATA INSERTION IN THE VIDEO RASTER
- Inserts a time word and/or alphanumeric message in standard video signals for recording and/or display
- Up tc 16 numeric or alphanumeric characters per row
- Rack mount, portable and custom configurations available

DIGITAL DATA ENCODING AND DECODING IN THE VERTICAL BLANKING INTERVAL OF A VIDEO SIGNAL
- 48 or 96 bits per line serial data insertion
- Insert up to 752 data bits in up to 8 consecutive lines
- 8 bit parallel or serial data input and output

CUSTOM CAMERA TIME DISPLAY SYSTEMS
- Decimal LED displays for continuously annotating film with time information
- Serial input time decoding to drive LED indicators mounted in camera data chambers

AACOM TRANSMITTERS AND RECEIVERS
- Rugged, minimum size telemetry and video transmitters
- Transmission frequencies from 135 to 6000 MHz with output power up to 50 watts
- Ground station telemetry and wideband video receivers

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1363 S. State College Blvd., Anaheim, CA 92806 (714) 533-6333
TD 106

Circle (94) on Reply Card

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Varian GEN II KPA. Pushing earth terminal technology through the 80's.

Designed specifically for today's modern world of earth terminal communications, the new Varian GEN II KPA simplifies complex communications problems with its advanced computer interface options. Easily adaptable, GEN II can be programmed to IEEE 488, RS-232 and RS-422 data busses.

Smaller, more modern design.
Modular construction includes a proprietary,* digitally-controlled, all solid-state, low noise regulated power supply.

Integrated in the RF section is a digitally-controlled PIN diode attenuator to provide precise setting of the RF output.

Controls/Monitors/Logic section circuits use C-MOS high noise immunity digital techniques to energize, protect, control and monitor KPA performance. The modern front panel features all-LED indicators and digital meter displays.

Enhanced Varian klystron for high efficiency.
GEN II utilizes the original, field-proven Varian VA-936 series klystron, with enhanced specification including 24-channels for top performance.

GEN II provides high efficiency with only 12 kVA for a full 3.35 kW tube, less than 1 kVA in standby and automatic 10% reduction of heater voltage for extended klystron life.

*Patent applied

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

Electron Device Group
Microwave Components and Subsystems Division
3200 Patrick Henry Drive
Santa Clara, California 95050
Telephone: 408•496-6273

varian

Circle (95) on Reply Card

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FACT!

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- KLEANLINE ELECTRONIC FILTERING SYSTEMS TO PROTECT AGAINST LIGHTNING STRIKES OF 50,000 JOULES PER PHASE PLUS AN RFI/EMI FILTER TO HANDLE RF INTERFERENCE FOR SENSITIVE SOLID STATE EQUIPMENT.
- TRANSIENT ELIMINATORS FOR DATA LINES, PHONE LINES, COMMUNICATIONS EQUIPMENT WITH A FREQUENCY RESPONSE FROM D.C. TO 1 GIGAHERTZ.
- LIGHTNING WARNING SYSTEMS PROVIDING ½ HOUR ADVANCE WARNING OF AN APPROACHING STORM.
- SURGE AND TRANSIENT GENERATORS
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- PERFECT POWER VOLTAGE REGULATORS
- POWER LINE CONDITIONERS
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LIGHTNING ELIMINATION ASSOCIATES
12516 Lakeland Road
Santa Fe Springs, CA 90670
(213) 944-0916
TWX: 910-586-1381
See Us at NAB Booth #302

Circle (96) on Reply Card

Audio Kinetics
Booth 1173
Established products
Q-LOCK 3.10-2: 2-machine synchronizer
Q-LOCK 3.10-2: 3-machine synchronizer
ADR: Automated dialogue replacement
SFX: Audio sweetening/sound effects assembly
New products
Q-SCAN: Off-line spotting, computerized list management, on-line auto assembly
Q-LINK: Interlock and control of five or more machines
Circle (428) on Reply Card
see ad on page 162

AUDIO + DESIGN
(Audio & Design Recording)
Booth 402
Established products
Transdynamic: Multiband audio processor for AM/FM and television
Express Limiter: Stereo compressor-limiter and noise reducing expander
F601 Super-Dynamic Limiter: Peak limiter for AM/FM and television
Compex-Limiter: Compressor-limiter and noise reducing expander
Vocal Stresser: Combines 4-band equalizer with compex-limiter for total program control
Easy-Rider: Compressor-limiter
E950 Paragraphic Equalizer: 12-section mono/6-section stereo parametric/graphic equalizer
SCAMP System: Standardized compatible audio modular package can be configured for any processing situation
New products
S27: Phase coherent 4-band crossover (variable) and summing amplifier
Circle (427) on Reply Card
see ad on page 58

Audio-Technica US
Booth 1141
Established products
ATC820: 8-channel mixer
ATC1220: 12-channel mixer
AT815: Shotgun microphone
AT815R: Phantom power shotgun microphone
ATP: Phono cartridges and tonearms
ATH: Headphones
Point Series: Headphones
New products
AT835: Short shotgun microphone
Circle (842) on Reply Card

Audio Technologies
See *ATI*

Audio-Video Engineering
Booth 1313
Established products
HSC-1: Video hum stop coil
Circle (843) on Reply Card
see ad on page 258

Auditronics
Booth 505
Established products
110 Series: Production recording audio consoles
200 Series: On-air broadcast control consoles
700 Series: Multichannel audio mixing consoles
1100 Series: Audio accessory system
RTW: Peak program meters
New Products
PPEQ-1: Programmable parametric equalizer
Circle (844) on Reply Card
see ads on pages 61, 184, 266, 267

Aurora Systems
Booth 1312
Established products
Aurora/100A: Videographics system featuring electronic painting and drawing, anti-aliasing, color video input, curve generation, real time and frame animation, new work station design.
New products
Improved resolution, full-color frame buffer, prototype display.
Circle (430) on Reply Card
see ad on page 317

Autogram Corporation
Booth 120
Established products
AC-6: Audio console
AC-8: Audio console
IC-10: Audio console
New products
All-microprocessor-controlled console
Circle (431) on Reply Card

BEI (Beston Electronics Inc.)
Booth 1620
Established products
CG2000: High resolution video production titler
DP1000: Data-prompter/character generator
709: Automatic light controls
CG3000: High resolution video production titler
New products
See at booth
Circle (436) on Reply Card

BGW Systems
Booth 421
Established products
75: 25W/channel stereo power amplifier
150: 50W/channel stereo power amplifier
250: 100W/channel stereo power amplifier
750: 225W/channel stereo power amplifier
SRM10: Tannoy monitors
SRM12: Tannoy monitors
M1000: Tannoy monitors
New products
See at booth
Circle (437) on Reply Card

BIW Cable Systems
Booth 1405
Established products
TV camera cable: Multiconductor and triaxial camera cable assemblies and connectors
VTR: Assemblies and connectors
New products
Fiber-optic cables and systems
Circle (846) on Reply Card

BMI (Broadcast Music Inc.)
Booth 124
Circle (853) on Reply Card

BPI (Broadcast Programming Int'l.)
Booth 122

www.americanradiohistory.com

Model 5104 16 in/4/2/1

Model 5104 24 in/4/2/1

YOUR REPUTATION,

The 5100 Series is a complete range of TV and broadcast audio consoles, from 16 in/4 sub-group to 48 in/8 sub-group, with optional multitrack facilities. A wide selection of standard facilities and options are available. Choose mono or stereo input modules, 2 or 4 band EQ, 4 or 8 Aux sends, limiter/noise gate and continuously variable high and low pass filters on every input, VCA sub-grouping or NECAM computerized audio editing and mixing, to mention a few. The audio performance and the mechanical engineering is in the best Neve tradition. Prices start at less than $40,000.

When you choose a Neve 5100 Series Audio Console for your broadcast facility in 1983, you need not worry about being outpaced by new technologies. The 5100 Series is the absolute state-of-the-art in audio console technology, yet already proven in many North American installations and around the world. Take a close look at the others. Can you afford to choose outdated technology? After all, it's your reputation.

AND OURS!

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Neve Electronics International Ltd. Cambridge House, Melbourne, Royston, Hertfordshire, SG8 6AU England Tel: (0763)60776
Rupert Neve GmbH 6100 Darmstadt Bismarckstrasse 114, West Germany Tel: (06151)81764

Circle (97) on Reply Card

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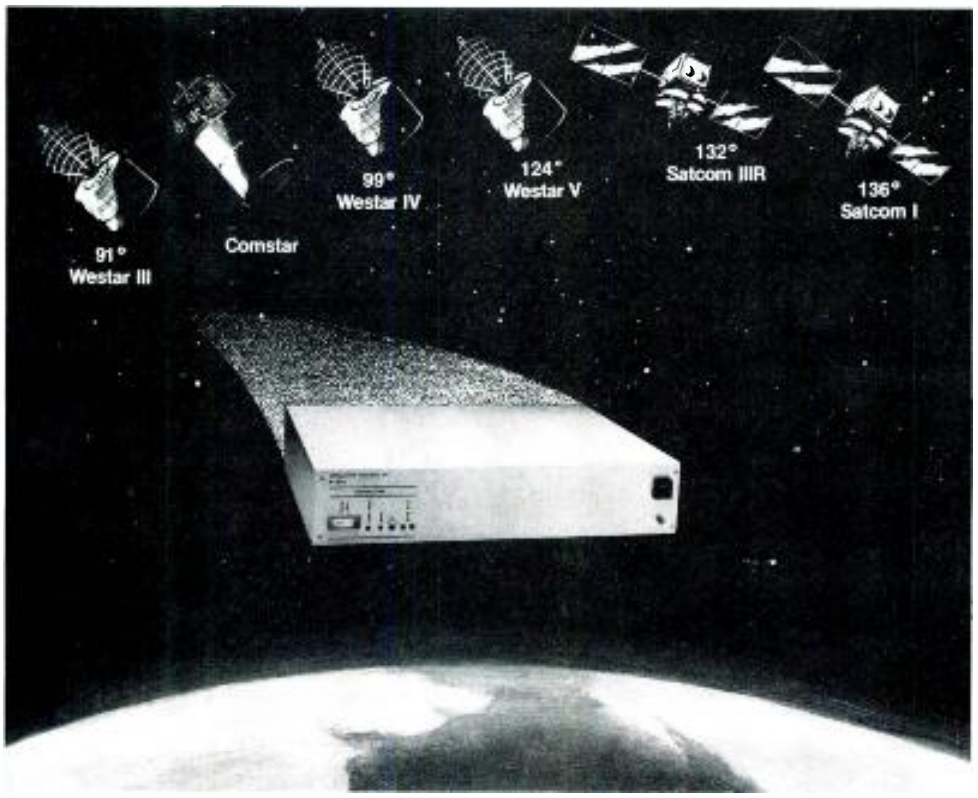
BPI (122)
Continued
Established products
Music formats: Album, rock, adult contemporary, country, easy listening and concerts.
New products
See at booth
Circle (438) on Reply Card

BSI (Broadcast Systems Inc.)
Booth 1500
Established products
Series: Dynatech video jack panels and accessories
Series: Electrohome monochrome broadcast video monitors
Series: Leader audio-video test equipment (full line)
Series: Canadian Amphenol Precision video cable
Series: Westpin audio cable
Series: Lenco video terminal equipment
Series: Stantron cabinet racks
BJ-240: Prewired audio jack panel system
New products
See at booth
Circle (447) on Reply Card

BSM Systems
No booth at press time
Established products
RBU-1: Portable remote broadcast unit without dial
RBU-11: Portable remote broadcast unit with dial

REGIONAL RADIO NETWORKS . . . SATELLITE DELIVERY IS NOW AFFORDABLE!!



. . . and you thought you could not afford your own Network . . . then look again at our R-SAT System!

MODULATION ASSOCIATES, the high tech innovators, is now in the production of its R-SAT Receiver for the Louisiana State Network. This "optimized" Single Channel Per Carrier (O-SCPC) makes it possible for ALL Regional Networks to cut space segment power requirements and costs . . . from $11,400 per month (the average 19dBW space tariff) to UNDER $1,900 PER MONTH. That savings is more than a **FREE** MAI 3.7 meter R-SAT installation per month. Uplinking can be from anywhere in the United States. For as little as $50,000 to $70,000 a Regional Network can own its own uplink . . . **THAT'S AFFORDABLE!!**

. . . so if you are looking for dedicated program audio transmission professionals and field proven satellite radio network systems, contact Terry Sheffield, Vice President of Marketing at:

Modulation Associates
897 Independence Avenue
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(415) 962-8000

Circle (98) on Reply Card

ADA-1: Audio distribution amplifier
ADA-5: Audio distribution amplifier
New products
8-channel remote control system
5-channel rack-mount audio mixer
Audio tone generator
Audio monitor
Audio routing switcher, mono and stereo
Circle (1104) on Reply Card
see ad on page 239

The BTX Corporation
Booth 1124
Established products
BTX Shadow: Fully intelligent interface for multimachine control of audio, video and film transports
Models 5100, 5200, 5300 and 5400: SMPTE/EBU time code generators/readers and character inserters
Series: SMPTE/EBU/VITC time code products
New products
See at booth
Circle (451) on Reply Card

B-W Lighting Systems
(formerly Panoak Lighting)
Booth 1733
Established products
50-000: Distribution
50-100/110: Grid hardware and pipe
70-100: Cyclorama track
70-000: Cyclorama and background curtains
10-610/618: Newsman Mini-lite Kit and Nova-lite Pro Q Kit
20-000: Various lighting fixtures
Circle (1105) on Reply Card

William Bal Corporation
Booth 1614
Circle (847) on Reply Card

Basys
Booth 1503
Established products
News Fury: Computer system that aids the preparation of radio and TV news programs
Clip Fury: Library computer system for archived tape or film research
Cart Fury: Label printer for audio feeds
New products
Roll Fury: Teleprompter control for News Fury computer terminals
Circle (848) on Reply Card

Bayly Engineering
Booth 500
Established products
S3161: 100W VHF broadcast transmitter
R1W6: Remote control wattmeter
Series: Dummy loads
Series: Card frames/packaging system
FM25V: 25W VHF mobile 2-way radio
FM15V: 5W portable VHF 2-way radio
AC12: Desk-top nicad drop-in battery charger
FM25VU: 25W mobile UHF 2-way radio
FM12VU: 2W portable UHF 2-way radio
FM45V: 45W mobile VHF 2-way radio
FM25VM: 25W manpack VHF 2-way radio
FM14VU: 4W portable UHF 2-way radio
New products
See at booth
Circle (401) on Reply Card
see ad on page 263

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Now, there's a new meaning to 'broadcast-quality.'

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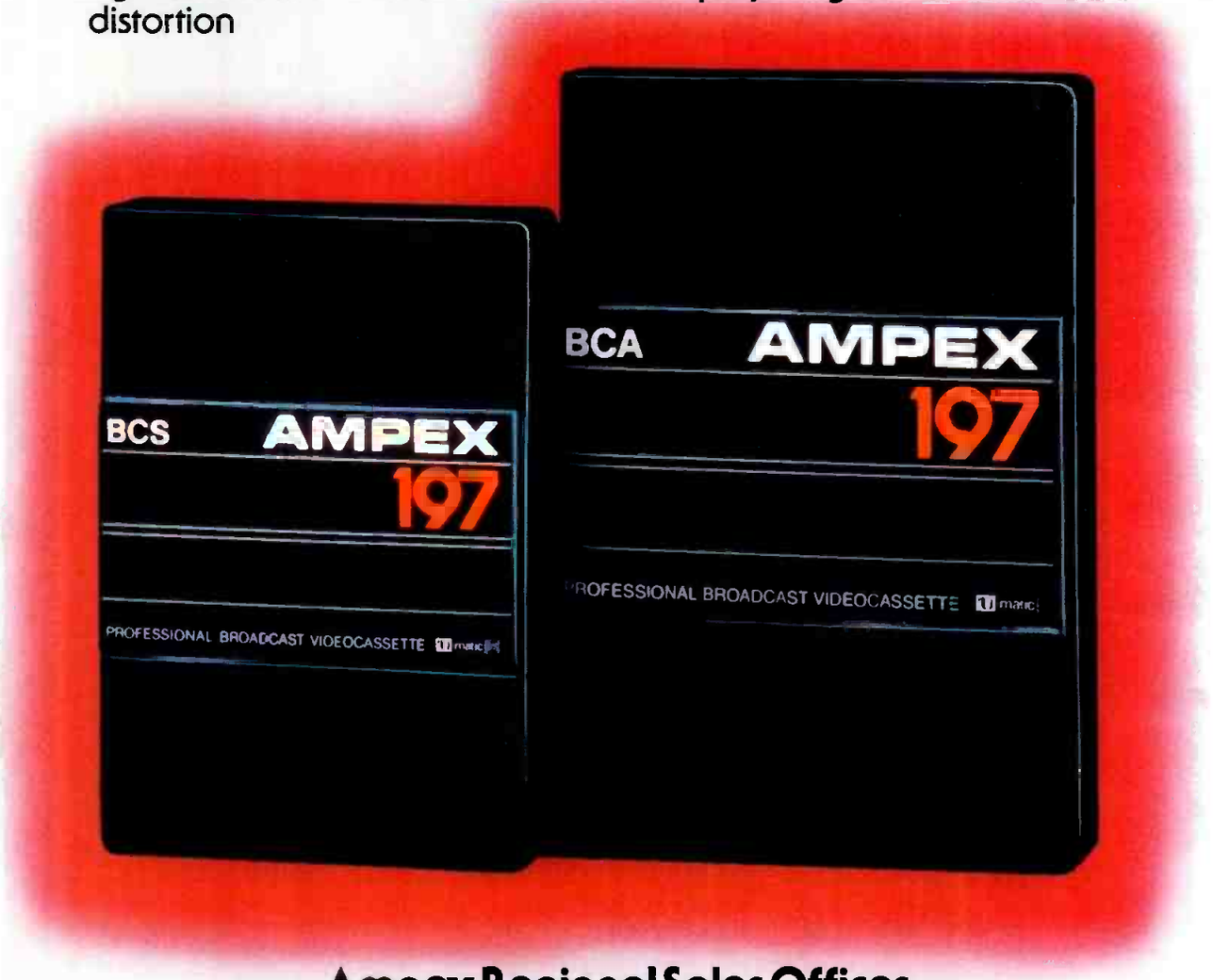
Ampex 197: Quality worth broadcasting

- Outstanding chrominance and luminance performance
- Excellent durability and mechanical reliability
- Superior audio output, signal-to-noise and low distortion
- Designed to optimize performance of Sony BVU's
- Ideal for ENG, EFP and on-line editing
- Available in all popular ¾" play lengths



Ampex Regional Sales Offices

5 Pearl Court
Allendale Industrial Park
Allendale, New Jersey 07401
(201) 825-9600

10215 Fernwood Road
Bethesda, Maryland 20817
(301) 530-8800

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Atlanta, Georgia 30340
(404) 451-7112

3353 Earhart Drive
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719 West Algonquin Road
Arlington Heights, Illinois 60005
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GET YOUR HANDS ON A FREE SCOTCHCART AT BOOTH 203

AND YOUR EARS WILL NOTICE THE DIFFERENCE.

Our new Scotchcart Broadcast Audio Cartridge offers some dramatic improvements that are absolutely unheard of. So to make sure you hear these improvements, we're offering you a free Scotchcart. Just stop in and listen at booth 203 of the NAB show.

Scotch is a registered trademark of 3M

3M hears you...

3M

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Circle (99) on Reply Card

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Beaveronics
Booth 1313
Established products
712: 4-bus, 12-input video production switcher with Eff/Key Amp and Mix Amp
BI-154: 4-bus, 15-input video production switcher with Mix/Eff/Key Amp and Mix/Key Amp
BI-156: 6-bus, 15-input video production switcher with two Mix/Eff/Key Systems
QMS: Favag precision master clock systems
DSK-6-DL: Stand-alone downstream keyer, specifically designed for character generator inserts
New products
See at booth
Circle (452) on Reply Card

Belar Electronics Labs Corporation
Booth 300
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 (849) on Reply Card
see ad on page 256

Belden Communications
Booth 1416
Established products
Series: Lee filters Colormedia
HMI: High wattage unit that replaces Brute arc lights
New products
Lee resin camera filters
Circle (439) on Reply Card

Bell Helicopter Textron
Booth 1175
Circle (837) on Reply Card

Beyer Dynamic
Booth 426
Established products
M69, M88, M500, M400, M300, M600: Dynamic mics
DT108, DT109: Communication headsets
Circle (446) on Reply Card
see ad on page 125

Bird Electronic Corporation
Booth 1625
Established products
8630 Series: Moduload self-cooled line terminations
8730 Series: Water-cooled load resistors
4380 Series: RF power analyst
3127: RF power monitor/alarm
3171: High-speed transmission line monitor/alarm
4712-4802: Thruline RF wattmeters
8800-8900 Series: Air-cooled loads
8630-601 Series: Moduload RF calorimeter/load system
4391: RF power analyst
4388: RF power analyst
4384: RF power analyst
8730-677: Dolly-mounted, water-cooled load resistor series
3127-044: Rack-mounted Thruline wattmeter panels
Circle (441) on Reply Card

Blonder-Tongue Laboratories
Booth 1134
Established products
Products for LPTV systems including pre-amplifiers, signal processors, filters, scramble and unscramble equipment and TVRO systems
New products
Live demonstration of the new BTVision III multichannel fully addressable STV system
Circle (442) on Reply Card

Bogen Photo Corporation
Booth 1705
Established products
Series: Bogen tripods
Auto Pole: Background support system
Series: Super Boom
Series: Camera stands
Series: Light stands
Series: Metz electronic flash units
Series: B&W filters
3063: Mini fluid head
3066: Cine/video fluid head
3067: Cine/video dolly
3061: Bogen heavy-duty tripod
3068: Bogen universal tripod
3115: Super "C" swiveling clamp
2965: Ball leveller for mini fluid head
Series: Bogen quartz lights/kits
3124: 3011 tripod with microfluid head
3125: 3121 tripod with microfluid head
3127: Cine/video dolly →

DELTA's Newest

The FMC-1 Frequency Modulation Controller

- Controls the Modulation Level of an FM or Aural Television Transmitter
- Up to ±8 dB Adjustment
- Choice of Single Channel or Dual Channel Unit
- Counters Indicate Positive and Negative Overmodulation
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- Optional ATS Overmodulation Alarm

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Bogen (1705)
Continued
3145: Video tripod caddy
4200: Bogen power pack
New products
See at booth
Circle (443) on Reply Card

Bogner Broadcast Equipment Corporation
Booth 1319
Established products
B Series: High-power UHF TV broadcast antenna
B4UA: UHF LPTV broadcast antenna
B2VO: VHF LPTV broadcast antenna
BVP: VHF-TV and FM dipole broadcast antenna
B8SO: MDS/ITFS TV broadcast antenna
BLP1E: FM circularly polarized broadcast antenna
LPS4: LPTV broadcast antenna
DK21: MDS receiving antenna
New products
See at booth
Circle (444) on Reply Card
see ad on page 299

Bosch-Fernseh
Booth 1207
Established products
FDL-60: CCD digital film telecine
TCF-3000 Plus: Telecine
Compositor I: Character generator
Mach One: Computerized editing system
TVS/TAS-1000: Routing switcher system
TVS-1: Machine control system
BCN-51: B format 1-inch VTR
KCA-100: ENG camera
KCP-60: Automated studio camera
MC-37BA: Color studio monitor
FGS-4000: Graphics system
BCN-100: B Format 1-inch automated cassette VTR
KCI-90: Production outside broadcast camera
BFS-9B: VTR slow-motion programmer
MC51BAB: Color studio monitor
New products
Graphic system, camera/recorder system, and grain reducer
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British Videotex and Teletext
Booth 1600B
Established products
Teletext equipment and services
Circle (852) on Reply Card

Broadcast Audio Corporation
Booth 213
Established products
System 5: 5-mixer single-channel mono console
Series II: 6-16 mixer modular multichannel stereo consoles
System 14: 14-mixer digitally controlled modular stereo console
System 20: 20-mixer modular stereo console with extensive options
BA 6x4: Distribution amplifier
BA 235/435: MOSFET monitor amplifiers
BA 205/405: Passive RIAA EQ phono preamps
New products
System 14A: Analog version of System 14 stereo console
Pro Craft: Modular studio furniture
Model slide fader and retrofit kits for Series II consoles
Circle (449) on Reply Card
see ad on page 203

Broadcast Cartridge Service
Booth 611
Established products
Broadcast tape cartridges: Aristocart, Capitol/Audiopak, Fidelipac, 3M Scotchcart
Storage systems, alignment tools, accessories
Reloading service
Fone Box
New products
Stereo phase meter
Videocassette reloading service
Circle (445) on Reply Card

Broadcast Electronics
Booth 303
Established products
FM-30: 30kW 1-tube, FM transmitter
FX-30: 30W solid-state synthesized FM exciter
FS-30, FC-30: FM stereo generator and SCA generator
Control 16: Microprocessor program automation system
SAT-16: Satellite program automation system
Series 3000: Single-deck cartridge machines
Series 5300: 3-deck cartridge machine
Series 150/250: Audio control consoles.

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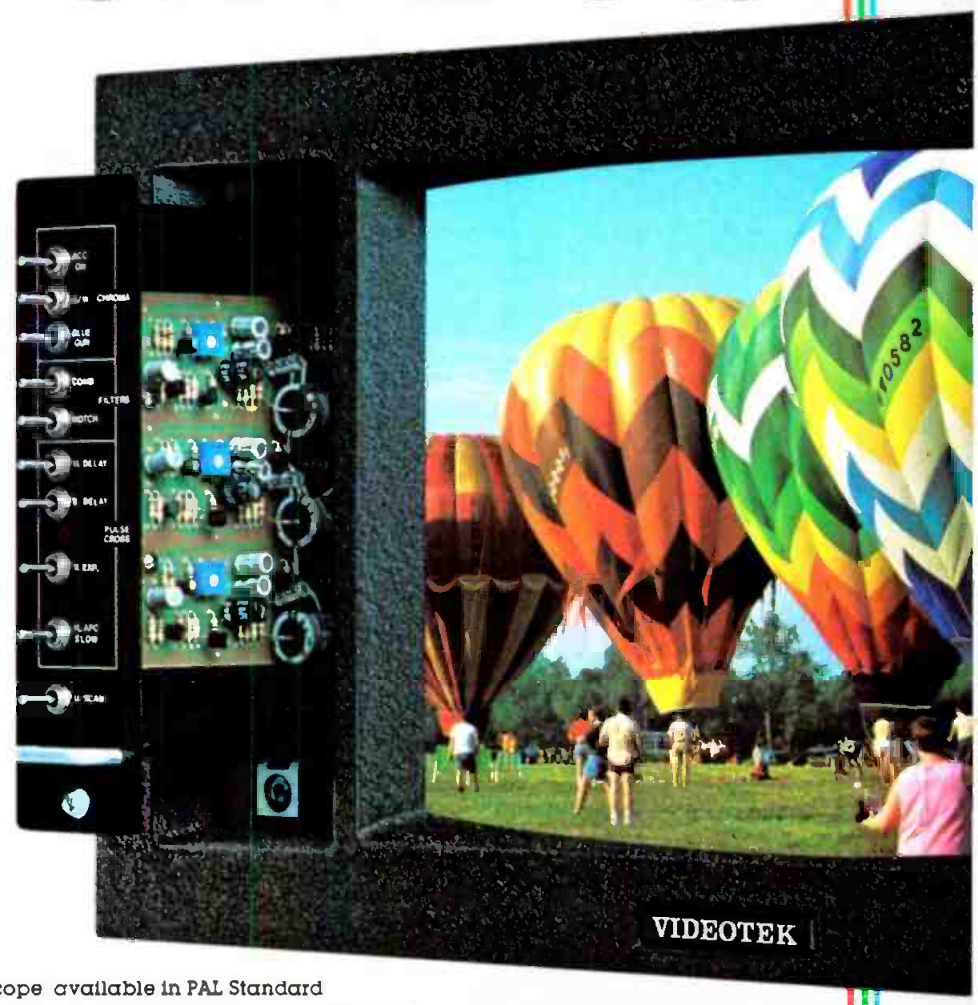

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Broadcast Electronics (303)
Continued
5- to 10-mixer models
Model 12C: Turntables and tonearms
New products
FM-5: 5kW FM transmitter
FM-3.5: 3.5kW FM transmitter
FM-1.5: 1.5kW FM transmitter
Circle (1303) on Reply Card

Broadcast Microwave Services
Booth 1749
Established products
TBT 50A: 2-pound video transmitter for portable use
TBT 50: 1-pound video transmitter—single channel
TBT 202 1CR: Rack-mount intercity video transmitter
TBR 202 1CR: Rack-mount intercity video receiver
Truck system for TV ENG news
TBR 1K: Video receivers
Portable antenna systems for live news and sports
New products
TBA-14-0: Omnidirectional receive antenna
GCA-1: Gyro-controlled antenna for exceptional helicopter ENG
TBR 50A: 2-pound video receiver. frequency-agile 80dB dynamic range
Circle (1106) on Reply Card
see ad on page 231

Broadcast Technology
Booth 1701
Established products
AM 3001: Microphone preamplifier
AU 3101: Universal line amplifier
AD 3108: 8-output distribution amplifier
AP 3210: 10W monitor amplifier
AS 3316: 16x1 audio switchcard
MA 110: Meter amplifier
OA 400: Operational amplifier
PS 3400: Power supply card
PR 3402: Power supply regulator card
AE 3002: Equalizer film preamplifier
AG 3501: Remote-controlled graphic equalizer card
CF 9101: Card frame
DD 9307: On-air digital profanity delay
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Booth 1326
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New products
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EV4020A: Vector monitor
VSI-900: Vertical interval ident and control system
COX 600J: Color corrector with variable gamma and SMPTE time code interface
Circle (448) on Reply Card
see ads on pages 254, 256, 318

Bryston Mfg. Ltd.
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Established products
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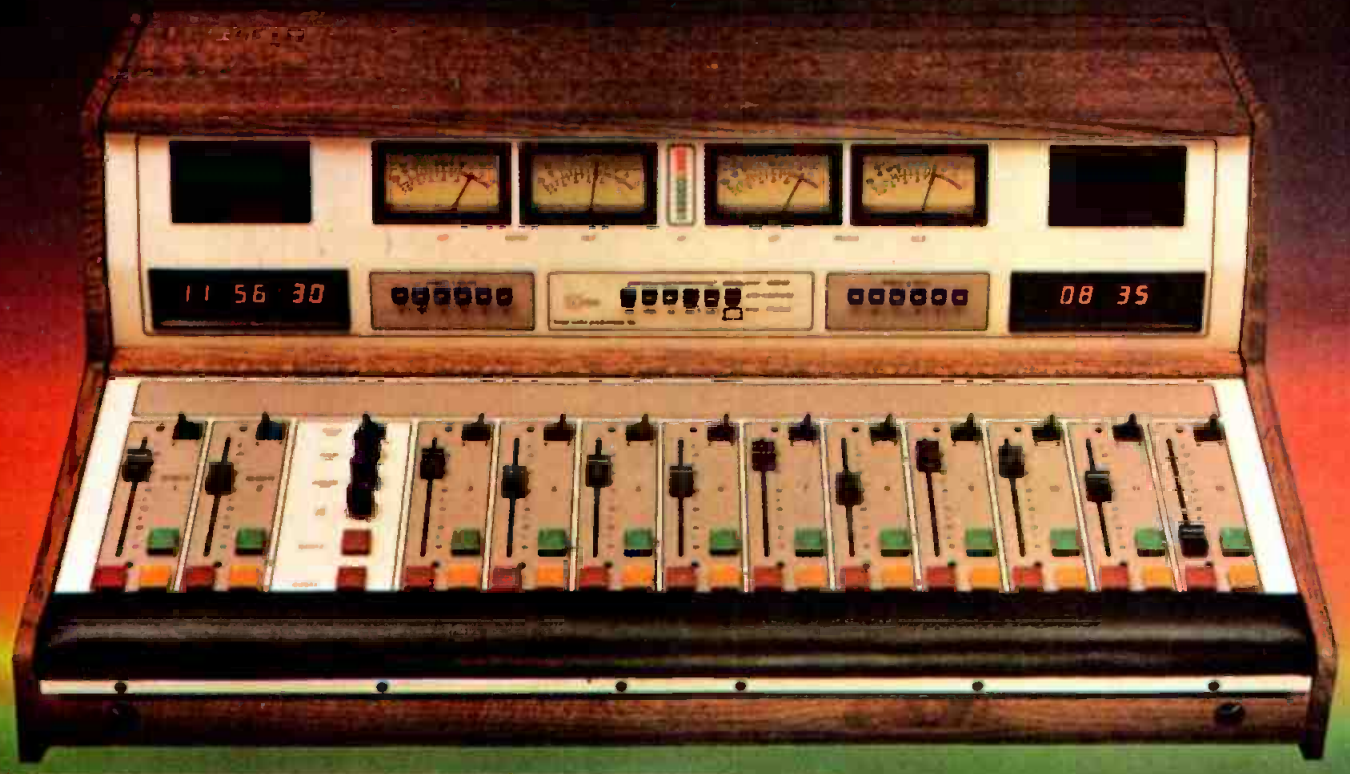

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Continued
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4B: 200W power amplifier
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Bush & Millimaki Services
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Circle (851) on Reply Card

CBS Radio Stations News Service
Booth 606
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CEI/Panavision Electronics
Booth 1638
Established products
Foton: Studio color camera; 25mm and 30mm format
Panacam: Electronic cinematography camera
New products
310SP: EFP color camera with "film look" special performance features
Circle (1107) on Reply Card

CMC Technology Corporation
Booth 1009
Established products
Refurbishing of all quadruplex VTRs—Ampex Mark XX, XV, X and RCA High Band units. Available in either *Alfesil* or Ferrite.
New products
TD-800: Videomax TD-800 automatic tape demagnetizer
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CMX Systems, Orrox Corporation
Booth 1639
Established Products
340X: Computer-assisted editing system
The Edge: Microprocessor editing system
Series: Software features for 340X
Series: New enhancements for The Edge
New products
See at booth
Circle (489) on Reply Card
see ad on page 158

CSI Electronics
Booth 507
Established products
T-1-A: Single cabinet high level modulated AM transmitter
T2.5A1: Single cabinet high level modulated AM transmitter
T-10-A: Dual cabinet high level modulated AM transmitter
T-1-F: Single cabinet solid-state IPA FM transmitter
FM3000E: Single cabinet grounded grid FM transmitter
FM5000E: Single cabinet grounded grid FM transmitter
FM12000E: Single cabinet grounded grid FM transmitter
T-25-F: Dual cabinet grounded grid FM transmitter
EX-20F: Solid-state synthesized FM exciter
T-25-A1: Dual cabinet high level modulated AM transmitter; directional antenna phasing equipment
New products
See at booth
Circle (457) on Reply Card
see ad on page 309

Cablewave Systems
Booth 108
Established products
Coaxial cable and elliptical waveguide transmission line systems, parabolic antennas, radomes, RF connectors, tower mounting hardware, pressurization equipment and associated accessories
New products
Low loss, low density transmission line
Self-flaring connectors
Circle (458) on Reply Card
see ad on page 123

California Microwave
Booth 619
Established products
SAT10: Radio program receive-only earth station
AD2A: Dual-frequency downconverter
New products
See at booth
Circle (459) on Reply Card

Calvert Electronics
Booth 1761
Established products
RCA camera and power tubes; Eimac power tubes and translator tube replacements; and related broadcast components
New products
Y730: Replacement tube for 100W TV translators
Circle (1108) on Reply Card
see ad on page 33

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Escort Cases: ATA approved shipping containers
Convoy Cases: Transport cases
New products
Convoy II Series: Travel cases
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Cambridge Products
Booth 1328
Established products
Series: RF and UHF coaxial connectors
New products
See at booth
Circle (460) on Reply Card

The Camera Mart
Booth 1018
Established products
A&J, ADDA, Ampex, Angenieux, Anton/Bauer, Artel, Asaca, Barco, Canon, Chyron, Cine 60, Citipher, Convergence, Crosspoint Latch, Datatek, Digivision, Ditech, Dynair, Elemack, FOR-A, Frezzolini, Fujinon, Hitachi, Ikegami, IVC, JVC, Kangaroo, Lisand, Listec, Microtime, Multidyne, O'Connor, Panasonic, Quanta, Ronford, Sachtler, Schneider, Sharp, Sigma, Sony, 3M, Time Code Technology and Videotek equipment
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ENG lens: J13X9BIE Type 2, J25X11.5B
Accessories for above
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J15X9.5B: For ⅔-inch ENG camera; focal length 9.5 ~ 143mm; f/1.8
New products
See at booth
Circle (491) on Reply Card
see ad on page 149

CAT Systems
Booth 1424
New products
4200: Computerized earth station remote control with color graphics
5200: Computerized transmitter remote control with color graphics
4000: Color graphics system with digitizer and font generator
Circle (1109) on Reply Card

CeCo Communications
Booth 118
Established products
Tubes, semiconductors, cameras and video equipment
New products
Video equipment and semiconductor departments
Circle (463) on Reply Card

Central Dynamics Ltd.
Booth 1409
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CD480/4/16: Compact Video production switcher
CD480-10/24: Video production switcher
CAP2XL: Computer-assist production accessory
MC990-7/24: Master control switcher
APC-910: Machine control
VS-14RB: Small production switcher
APC-920: True time broadcast automation system
2170: 1-bus quadplexer-digital test signal generator
2300A: Full range video and audio distribution
8000: Amplifiers
CD480-65: Video production switcher
New products
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Beyer MCM Condenser System

Beyer MCE 5 Lavalier

Beyer M 260

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The Dynamic Decision **beyerdynamic**

*Extracted from competitive promotional literature or advertising.
*Documentation supporting specific comparative claims available upon request.

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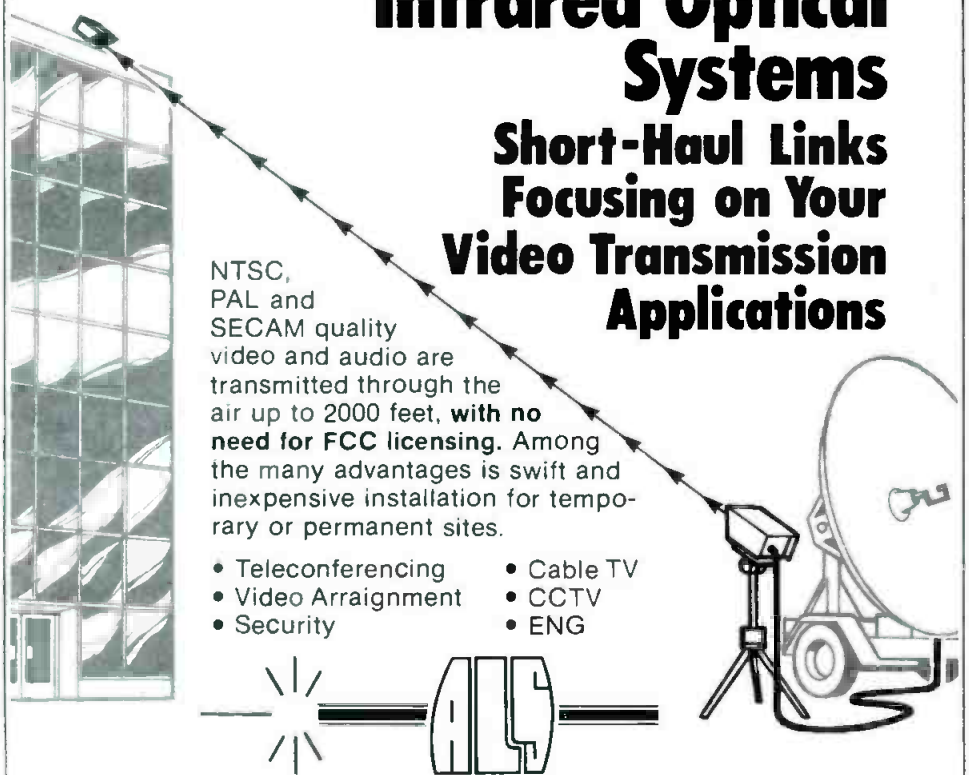

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Representation of their C-1000 product van
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Century 21 Programming
Booth 204
Established products
Series: Radio automation programming and equipment
New products
See at booth
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Cetec Antennas
Division of Cetec Corporation
Booth 601
Established products
JTC: CP TV spiral antenna for VHF and UHF transmitting
JRP: CP TV ring panel antenna for VHF/UHF
Several types CP FM tower-mounted antennas
New products
JSP: CP FM spiral panel antenna for multistation use
A new wide bandwidth panel type antenna offering high operating power levels and controlled beamwidth
Circle (1431) on Reply Card
see an on page 207

Cetec Broadcast Group
Booth 601
Established products
7000: Microprocessor-based program automation system
7000GLS: Microprocessor-based program automation system
2000: Console series
8000: Console series
MAPS: Business data system for radio
Circle (492) on Reply Card
see ad on page 269

Cetec Vega
Booth 1210
Established products
77D: Pocket transmitter
80/81/82-D: Hand-held transmitter
58D: Radio mic receiver
63D: Diversity radio mic receiver
66D: Portable radio mic receiver
QX-1 & QX-2: Wireless intercom master stations
New products
C-466: Quad case
Circle (493) on Reply Card
see ad on page 156

Chase Media
Booth 609
Established products
System: Broadcast station system for traffic and billing, financials, music format control and word processing
New products
See at booth
Circle (467) on Reply Card

John Chiles
Booth 1747
Circle (859) on Reply Card →

www.americanradiohistory.com

THE MICROMINICOMPUTER

"You don't have to buy a mini-computer to get speed and the ability to do more than one task at a time . I bought the one multi-tasking micro-computer that offered me everything I needed at the best dollar value."

Sophisticated, Cost-Effective Hardware.

"Snarr/Chase Systems offers a choice of hardware, with floppy or hard disks, from desk-top units to a 64-device super system. And if my hardware needs change, no hassle... their software works on every size computer they sell. It's a powerful micro system that acts like a mini-computer. It's not a toy. It's a fast , multi-tasking business computer, using today's state-of-the-art micro technology, not yesterday's mini. It's the only micro rated in the top five by a recent survey of broadcasters in Radio and Records. They thought it was a mini-computer... and so will you."

A Complete Selection of Software

"Snarr/Chase Systems offers every major traffic software feature rated important by broadcasters in that same Radio and Records survey. That includes co-op copy, over 80 management and sales reports, a feature that allows me to generate custom reports, financial packages including Receivables, Payables, General Ledger, Payroll, and a new feature for business forcasting and graphing. There's a Music Format Control package. Plus...this system is a powerful Word Processor, which we use for everything from promotional and business letters to the newsroom. And there's more to come."

Bottom Line Value

"The bottom line is that with Snarr/Chase Systems I got every major feature I needed at a price that made sense. They have proven software, with over 85 station users around the world, and local hardware service just about everywhere. Why spend more and get less? Buy the microminicomputer. Only from Snarr/Chase Systems."

G.Craig Hanson, General Manager
KSFI / KDYL Radio
Salt Lake City, Utah

www.americanradiohistory.com

Christie Electric Corporation
Booth 1016
Established products
Reflex-20 Line DM Series Charger: 20-minute "burping" charger
E, H & K Series Batteries: Super nicad batteries
KSI: Lightweight, camera-mounted ac/dc power supply
New products
MaxErase-16: Bulk tape/cassette degausser for high-coercivity audio, video and audio/video formats
Circle (494) on Reply Card
see ad on page 189

Chyron Corporation
Booth 1610
Established products
Chyron IV: Graphics and titling system
Chyron RGU: Graphics and titling system
Chyron CCE-UIA: Cassette cleaner and evaluator
M.G.M.: Multimode Graphics Module/ background graphics generator
New products
See at booth
Circle (468) on Reply Card

Cine 60
Booth 1423
Established products
H3014PM: Universal video powerbelt for 30V light or 14.4V cameras
H7714PM: Universal video powerbelt
6201A: Sun-Guns, Sun-Gun kits
BP912FC: BP-90 VTR batteries
9400-U: 110/220V Universal fast chargers
Powerbelts, powerpaks, battery cables, camera "snaploks"
snaploks
New products
05-12-14: Rechargeable nicad battery pack and cable system for remote operation of Canon J13X9B servo lens
PL-12: 12V 100W miniaturized power light for hand-held or camera-mounted operation
94AC14: Power supply, switching type
Circle (469) on Reply Card
see ad on page 10

Cinema Products Corporation
Booth 1221
Established products
Camraprompter: Portable camera prompting system for ENG/EFP cameras
Co-Ax Digital Remote Control: Systems in NTSC and PAL-B standards for RCA, Ikegami, Sony, Thomson, Sharp and NEC ENG/EFP video cameras
RDS/HMI Fresnel Spot Light series: 575W, 1200W, 2500W and 4000W luminaires and ballasts
RDS/HMI 200W Open Face: ac/dc portable location production lighting systems. Ikegami EC-35 video camera for electronic cinematography, with Cinema Products manufactured accessories, such as: Matte Boxes; Follow Focus System; J-6 Zoom Control
ZIP-PAK: Lightweight regulated ac power supply (Anton/Bauer SNAP-ON style), which permits operation of 12 to 14V ENG/EFP type cameras
GSMO: 16mm camera with 100-foot quick-change cassette-type magazine
New products
Steadicam Universal Model III: Lighter, more streamlined design of Steadicam
J-6 "Joystick" Zoom Control: A 1-piece, hand-held, self-contained unit featuring a silent range of precision zoom speeds from 2 seconds to 30 minutes.
Universal Studio Matte Box: Production system including rotatable stages for two 4" x 5.65" square and three 138mm round filters with provisions for additional filters
For more information, contact: Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025.

Cinemills Corporation
No booth at press time
Established products
Series: Incandescent portable lights
Series: Lee color correction filters and camera filters
Series: DMI 575, DMI 1200, DMI 2500, DMI 4000 and DMI 6000
Series: Cine 60 battery packs and belts
Series: Complete dimmer systems
New products
Series: Soft-Lights
Circle (1110) on Reply Card

Cipher Digital
Booth 1606
Established products
700: SMPTE code reader with 4-keyer character generator
716: SMPTE code generator with jam sync
722A: SMPTE code reader/generator/ character generator

Video Delay Lines

ALLEN AVIONICS Video & Pulse Delay Lines replace 75 ohm coaxial cable, provide a more suitable method of achieving precise short delays. The units reduce size, weight, installation costs, save time & effort in making delay changes.

Part No.	Delay Range (Nano-Sec.)	Delay Steps (Nano-Sec.)	Method of Variation	Maximum Insertion Loss @ 100 KHz (db)	Amplitude Flatness At Any Delay Setting 100 KHz to 5.5 MHz (db)	Max. Rise Time (Nano-Sec.)	Package Size (Inches)
VAR005	3-7	Continuous	Trimmer	.20	.2 Max.	N.A.	3⅝ x 1½ x 1¼
VAR011	0-11	Continuous	Trimmer & Toggle	.20	.25	N.A.	4⅜ x 2⅜ x 1 1/16
VP0010	0-10.5	.5	Toggle	.15	.2	3	4⅜ x 2⅜ x 1 1/16
VP0127	0-127	1.0	Toggle	.15	.3	14	4⅜ x 2⅜ x 1 1/16
VP0255	0-255	1.0	Toggle	.15	.3	16	4⅜ x 2⅜ x 1 1/16
VP0317	0-317.5	2.5	Toggle	.15	.3	20	4⅜ x 2⅜ x 1 1/16
VP0635	0-635	5.0	Toggle	* .50	.4	25	4 11/16 x 3 11/16 x 2 1/16
VP1100	0-1100	10.0	Rotary	1.25	.4	30	4 11/16 x 3 11/16 x 2 1/16
VP1270	0-1270	10.0	Toggle	*3.00	.4	30	4 11/16 x 3 11/16 2 1/16
VP2075	0-2075	25.0	Toggle	*3.00	.5	40	7⅜ x 4 11/16 x 2⅜16
VS0315	0-315	5.0	Strap	.25	.4	28	4 x 2 x 1¼
VS0635	0-635	5.0	Strap	.60	.5	33	5 x 2 x 1¼
VS1275	0-1275	5.0	Strap	1.25	.5	33	5 x 3 x 1¼
VS2075	0-2075	25.0	Strap	2.50	.5	40	6½ x 3½ x 2
RACK MOUNTABLE UNITS							
VRM0255	0-255	1.0	Slide Switch	.40	.4 Max.	20	1¼ x 4⅛ x 4
VRM0637	0-637.5	2.5	Slide Switch	*1.00	.4	28	1¼ x 4⅛ x 6
VRM1275	0-1275	5.0	Slide Switch	*3.00	.4	33	1¼ x 4⅛ x 9
VRM2270	0-2270	10.0	Slide Switch	*3.00	.5	40	1¼ x 4⅛ x 9
VRS0317	0-317.5	2.5	Strap	.40	.5	26	1¼ x 4⅛ x 4
VRS0635	0-635	5.0	Strap	.75	.5	35	1¼ x 4⅛ x 6
VRS1270	0-1270	10.0	Strap	1.50	.5	37	1¼ x 4⅛ x 9
VRS2260	0-2260	20.0	Strap	3.00	.5	40	1¼ x 4⅛ x 9

See us at the NAB Show, Booth 1627

*±.2db variation at any delay setting.

RACK MOUNTABLE VIDEO & PULSE DELAY LINES
A complete Rack Mountable series of Video & Pulse Delay Lines, with the capability of replacing up to 1450 feet of cable, is now being marketed by Allen Avionics. (See listing in table at left.)

Impedance: 75 ohms.
Pulse Distortion: Less than 4% with an input pulse rise time of 20 nanoseconds.
Working Voltage: 100 volts maximum. 50 volts maximum for Rack Mountable series.
Return Loss: 20db minimum. 15db minimum for VP2075, VS2075 and Rack Mountable series.
Delay Tolerance: 5% or 1 nanosecond, whichever is greater.

CALL/WRITE
For Video Delay Lines & Filters Catalog

ALLEN AVIONICS, INC.
224 EAST SECOND ST., MINEOLA, NY 11501
Phone: 516-248-8080

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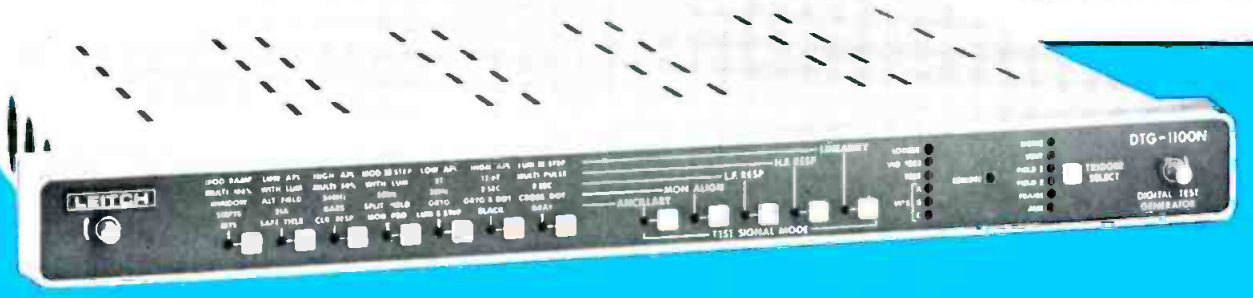
www.americanradiohistory.com

Digital Test Generator



Price/Performance at its Peak

If cost effectiveness of your equipment dollar is as important to you as state-of-the-art technology, then you cannot afford to ignore the DTG-1100N.

In just one rack unit you get 35 computer generated, precision video test signals and microprocessor controlled signal selection.

The user-friendly front panel menu and status indicators let you look and select... easy as 1-2-3!

Full remote control is also available.

NEW FOR NAB '83

The VIP-1101N Vertical Interval Processor is a sophisticated, versatile companion for the DTG-1100N Digital Test Generator. It is a stand-alone unit featuring a digital sync generator which always maintains RS170A in the digitally generated black output. Microprocessor control with digital read-out allows insertion/deletion of VIT signals or data in lines 10 to 21 of either field. The unit is scheduled to be shown at NAB '83. Don't miss it!

LEITCH

Circle (117) on Reply Card

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Cipher Digital (1606)
Continued
733: Portable SMPTE code reader
New products
710A: SMPTE/EBU code reader
735 Series: Full function SMPTE/EBU readers
760: State-of-the-art SMPTE/EBU reader
766: 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
Circle (1111) on Reply Card
see ad on page 60

Circuit Research Labs
Booth 106
Established products
APP 400: Audio preparation processor
SEP 400A: Spectral energy processor
PMC 300A: Peak modulation controller
SMP 800: Stereo modulation processor
SPP 800: Stereo preparation processor
New products
SMP 1000A: Stereo modulation processor for AM stereo
SCA processor/generator
Circle (471) on Reply Card
see ad on page 295

Clear-Com Intercom Systems
Booth 1502
Established products
PS-452: 2-channel power supply with power monitor and selectable program
MS-200: 2-channel rack-mount station
RS-100A: Compact, stainless-steel, single-channel belt pack station
SB-412: 4-channel rack-mount master station
RS-201: 2-channels plus program remote intercom station
AC-10K: 3.5-inch rack-mount universal interface
New products
MS-800: 8-channel main station
KB-115A: Remote intercom station
KB-112: Remote intercom station
KB-111A: 2-channel intercom station
Circle (472) on Reply Card

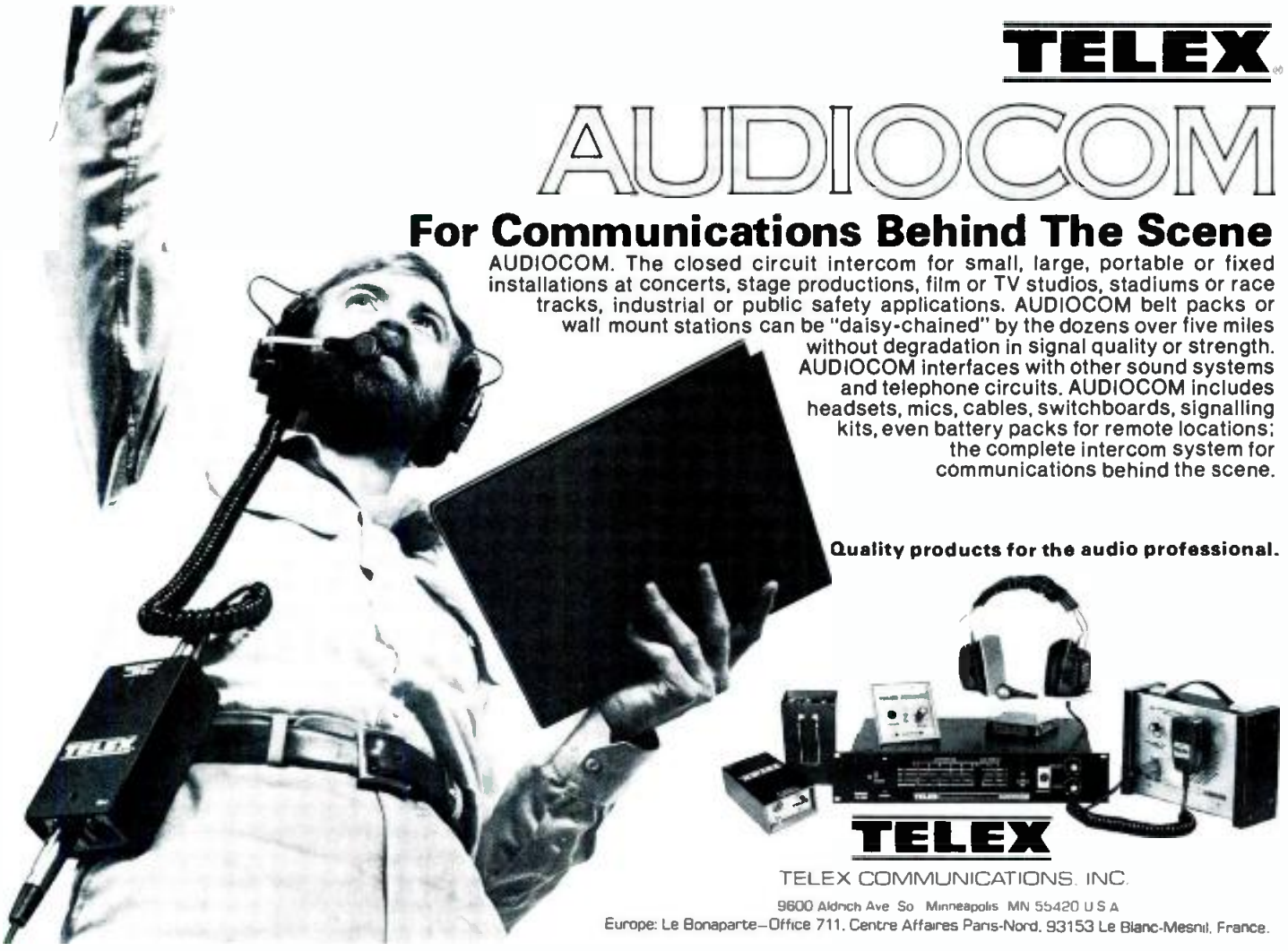
Clyde Electronics
Booth 106A
Established products
ALPHA: Modular mixing desk
DELTA: Logic-controlled auto level-controlled push-button mixer/switcher
C-DUB: Multiswitcher IP mixer
Circle (495) on Reply Card

Colorado Video
Booth 1222
Established products
290: Monochrome slow-scan TV transceiver
250: Monochrome slow-scan TV transceiver
290C: Color slow-scan TV system
930: Digital disc video storage system
New products
See at booth
Circle (473) on Reply Card

Colorgraphics Weather Systems
Booth 1116
Established products
LI: Graphics display system
LIII: High resolution (756X482) graphics display system
New products
Flash: Real time lighting display system
Newstar: Automated newsroom system
Datastore: 140Mbyte storage with 2400 image recall
Video Digitizer: Digitized DISC source for 16-color 756x482 resolution
Super Sports: Scores automatically updated on your graphic backgrounds
Broadcast Line: Broadcast line for sports, satellite, surface weather data
Circle (474) on Reply Card
see ad on page 31

Colortran
Booth 1205
Established products
168-200: ColorTrack
171-100: High density dimmer pack
104-181: 1kW/4kW Soft-Lite
New products
100-215: 1kW Fresnel, pole-operated
100-235: 2kW Fresnel, pole-operated
100-255: 5kW Fresnel, pole-operated
168-703: Patchman, control console
Circle (475) on Reply Card
see ad on page 67

Columbine Systems
Booth 1122
Established products
IBM System/34 with Columbine's complete broadcast information system
Circle (476) on Reply Card



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CUSTOM SWITCHERS AT STANDARD PRICES

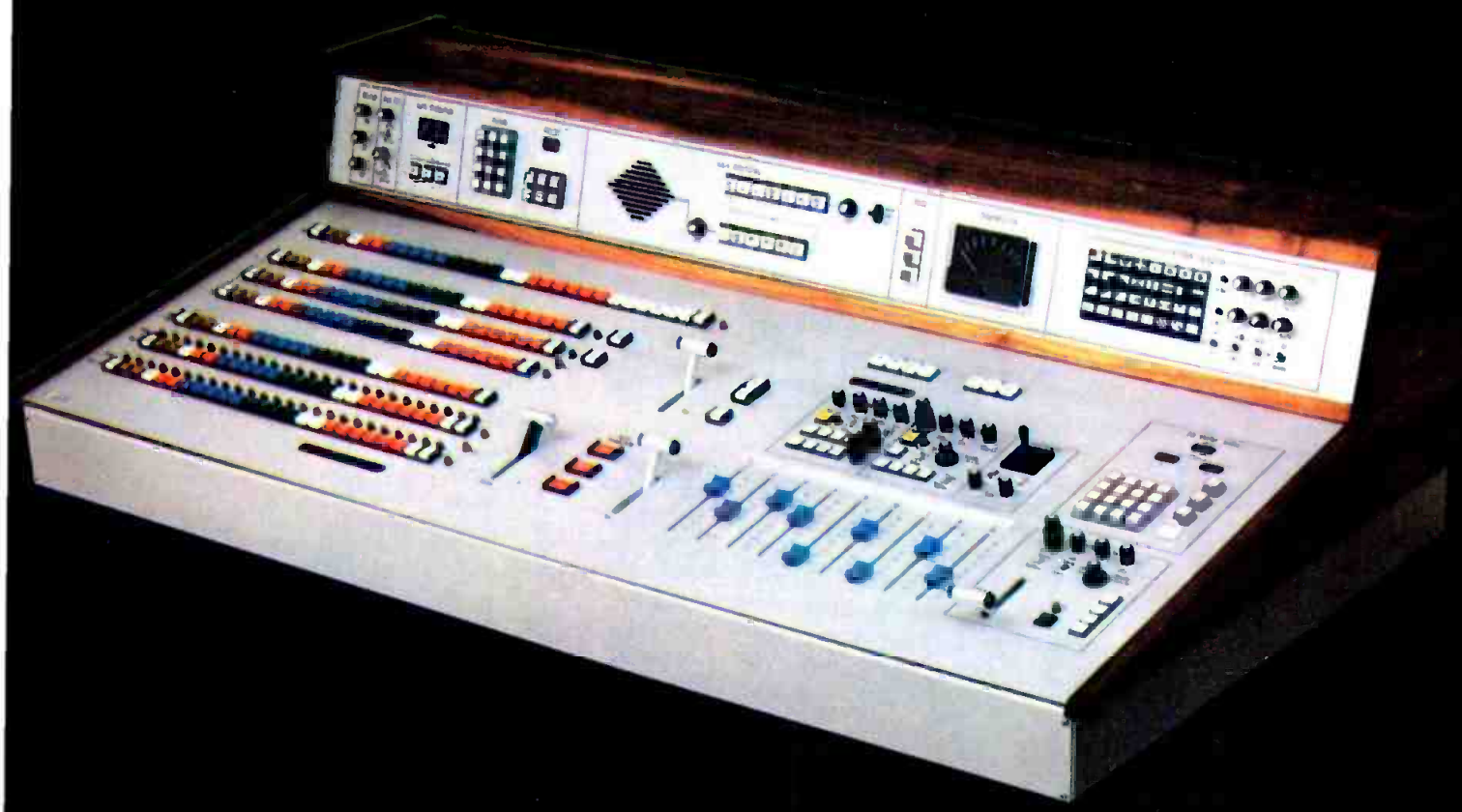

Image Video specializes in designing Routing Switchers, Master Control Switchers, Machine Control Systems and other related broadcast products with the customer's needs in mind.

WE CAN BUILD A SYSTEM FOR YOUR SPECIAL REQUIREMENTS

See our new products at NAB/83

BOOTH 1341

IMAGE VIDEO LIMITED

705 Progress Avenue, Unit 46, Scarborough, Ontario, Canada M1H 2X1 Telephone: **(416) 438-3940** Telex: **065-25392**

1051 Clinton Street, Buffalo, New York, 14206 USA Telephone:(716) 855-2693
Telex.: 065-25392

Circle (119) on Reply Card

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Comark Communications
Booth 1217
Established products
CTT-U Series: TV transmitting systems and turnkey services
All inclusive line of transmission line products, diplexers, directional couplers, filters, power dividers, hybrids, switches and patch panels
New products
CTT-U-30/60-S: "S" series, High-Tech 30kW and 60kW UHF TV transmitters
CTE-20: Solid-state, broadband, high-power TV exciter systems
CTP-20: Mod anode pulser systems
ED and ICPM correctors, broadcast modulators
Circle (477) on Reply Card
see ad on page 161

Comex Corporation
Booth 1508
Established products
Ultamatte: Video matting system
Shively: FM antennas
New products
See at booth
Circle (478) on Reply Card
see ad on pages 186 and 271

Comprehensive Video Supply Corporation
Booth 1315
Established products
PML-8: Music production library
Series: Bilora tripods
Series: PAG battery belts, batteries, lights
Series: Comprehensive battery belts
Series: Comprehensive microphones
New products
QB-650: Quartz beam variable-focus lighting fixture
QB-1000: Quartz beam variable-focus lighting fixture
MFL-650: Quartz beam mini flood lighting fixture
FL-1000: Quartz beam flood lighting fixture
QB-2000: Quartz beam variable focus lighting fixture
Circle (808) on Reply Card

HEDCO
Specializing in Audio and Video Distribution

NOW . . .
you have a choice of Routing Switchers and Distribution Equipment in both audio and video.

You *can* have RELIABILITY
PERFORMANCE
DELIVERY
and PRICE
from *one* manufacturer

Our complete line of products will be on display at NAB, booth 1225, and IBC 83 in Montreux.
(ask how you can buy the IRS)

Hughes Electronic Devices Corporation
P.O. Box 1985, Grass Valley, CA 95945
916/273-9524

HEDCO™

Circle (84) on Reply Card

Compucon
Booth 1616
Established products
Engineering services for communications planning including: satellite earth station frequency analysis and coordination, transportable earth station frequency engineering, terrestrial microwave frequency planning and coordination, cellular and land mobile engineering, LPTV engineering services, multipoint distribution systems services, FCC license application preparation, ongoing frequency protection, on-site field support, communications marketing research, DTS/DEMS engineering and CATV aeronautical frequency compatibility studies
Circle (860) on Reply Card

Computer Concepts Corporation
Booth 404
Established products
The Broadcast System: Business computer that automates traffic and accounting for a radio station
Word Processing: An intelligent, electronic typewriter
Music Management System: Generates playlists and controls a station's inventory
Total Station Automation: Communication link between the business automation and the program automation
New products
Coop Management: Using WordMaster, a word processor created specifically for broadcasters, the Broadcast System can generate scripts to be included with billing documents for cooperative advertising.
Circle (480) on Reply Card

Computer Graphics Lab
Booth 1143
Established products
IMAGES: Image Manipulation and Graphic Enhancement System, an electronic design and art rendering system
New products
TWEEN: 2-dimensional, minicomputer-based broadcast animation system
Circle (861) on Reply Card
see ad on page 107

Comrex Corporation/Itame
Booth 400
Established products
PLX, RLX, TLX: Frequency extender
AGA: Auto gain adjuster
CTA, LPQRA: RF IFB system for ENG cueing
CRA: TV aural monitor
HHT -1KA: ENG transmitter →

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INCREASING PRODUCTIVITY.

IT'S ABOUT TIME.

The challenge to increase productivity facing video professionals today really means faster production and more efficient editing. Just in time, EECO's computer controls for video production help you slash production and post production time by improving edit accuracy.

Using SMPTE/EBU Time Code, our video equipment allows you to electronically index every field/frame. And lets you locate scenes, preview and synchronize video or audio tapes for editing precisely, rapidly and automatically.

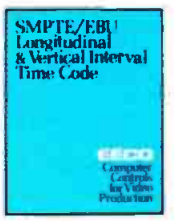
Time Code Pioneers

For over fifteen years we've been helping leading video production facilities increase productivity and cost effectiveness. Simply put, we wrote the book on time code – we helped establish the SMPTE Time Code standards and engineered the first SMPTE Time Code Generators and Readers.

Today, we offer a full line of innovative Video Products, Time Code Generators, Readers and Multi-Cue Synchronizers. And the first microprocessor-based equipment enabling you to utilize Vertical Interval Time Code (VITC). Designed for performance, all of our products are easily interfaced and provide quality, reliability and precision at affordable prices.

Ask For Our Free Time Code Booklet

Everything you need to know about time code for increasing productivity is included in our FREE time code booklet. For your copy, write or call, EECO Incorporated, 1601 E. Chestnut Ave., P.O. Box 659, Santa Ana, CA 92702-0659, phone: 714/835-6000.



EECO Incorporated

NAB #1314

Circle (120) on Reply Card

Supported and serviced by our factory, EECO Video Products are distributed by: **Custom Video** – Seattle; **Harvey Professional Products** – New York City; **Hoffman Video Systems** – Los Angeles; **Lake Systems Corporation** – Newton, MA; **Lerro Electrical** – Philadelphia; **MZB & Associates** – Dallas; **Professional Products** – Bethesda, MD; **Swiderski Electronics** – Elk Grove Village, IL; **Ampex Corporation** – Worldwide.

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SHIVELY LABORATORIES
FM and TV
ANTENNAS

FM MODEL 6814 25KW PER BAY

FM MODEL 6810 10KW PER BAY

TV MODEL UTV-01/24
PATTERN STUDIES AND
OPTIMIZATIONS AVAILABLE

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COAXIAL SWITCHES
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Comrex/Itame (400)
Continued

450RATA: Wireless microphone system
202: Studio telephone conferencer/ integrator talk show system
SLX: Sports console
New products
New frequency extenders
Circle (810) on Reply Card
see ad on page 66

Comsearch
Booth 1136
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
New products
Service: LPTV engineering services and cellular radio services
Circle (481) on Reply Card

Comtech Data Corporation
Booth 314
Established products
RCV 350: Downconverter, SCPC, 3-channel converter
5m fiberglass transportable transmit/ receive antenna
New products
Series: 24-channel frequency agile receiver
RCV 350-10: Card-mounted frequency agile receiver
Circle (863) on Reply Card
see ad on page 136

Concept Productions
Booth 423
Established products
Voice-tracked automation programming
Formats: Adult contemporary, rock and country music
VMS: Voice/Music Synchronizer
New products
See at booth
Circle (482) on Reply Card

Conrac Corporation
Booth 1401
Established products
6100: 19-inch master studio color monitors
5700: 13-inch color VTR high resolution monitor
DZB: 15-inch monochrome high resolution over-console monitor
SNA: 9-inch and 15-inch monochrome standard resolution
New products
2400: High resolution monochrome 19-inch CRT, wideband video
6200: 19-inch master color monitor, in-line CRT
Circle (483) on Reply Card
see ad on pages 78, 79

Continental Electronics
Booth 101
Established products
317C: 50kW AM transmitters
316F: 10kW AM transmitters
315R-1: 5kW AM transmitters
314R-1: 1kW FM transmitters
817R-1: 50kW FM transmitters
817R-2: 40kW FM transmitters
816R-3: 25kW FM transmitters
816R-2: 20kW FM transmitters
Circle (484) on Reply Card
see ad on page 18

Continental Recordings
Booth 333
Circle (864) on Reply Card

Control Video Corporation
Booth 1157
Established products
Lightfinger Plus LF 2000: Multiple machine, A/B roll tape editor with touch-active CRT
Intelligent Controller: SMPTE time code (longitudinal and VITC) generator, reader, ATR and VTR controller and machine synchronizer
New products
Lightfinger Plus LF 2500: Floppy disc memory storage and advanced list management
Spot Editor: Low cost, cuts-only editor for the auto assembly of spot reels
"Auto Front Panel": New feature for Intelligent Controller for editing and pre-programmed single-event playback
Circle (811) on Reply Card

Convergence Corporation
Booth 1430
Established products
ECS-104: List management editing system
ECS-103: Multisource editing system
ECS-90: Editing system
Series: Interfaces to peripheral video equipment
New products
See at booth
Circle (485) on Reply Card

Cool Light Company
Booth 1322
Established products
A14-003: Ninelight
A51-003: Starlite
A51-005: Starlite
A60-003: Mini Cool including handle
A60-004: Mini Cool including handle
A23-003: Triple Tri-Light
A23-006: Triple Tri-Light
A41-003: Focusing Single Handi
A41-006: Focusing Single Handi
New products
Tri-Light, new model Mini-Cool, universal precision light framer
Circle (486) on Reply Card

Corporate Communications Consultants
Booth 1611
Established products
SYSTEM 60XL: Computerized color correction; film-to-tape transfer
SYSTEM 60B: Computerized color correction system for the Bosch FDL-60A2
SYSTEM L-100: Computerized color correction for positive and negative film
SYSTEM 30: Computerized color correction; scene-by-scene especially designed for the Sony BVX-30
New products
See at booth
Circle (865) on Reply Card

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NOW YOU DON'T HAVE TO BUY PROBLEMS!

Until now, if your budget for a multi-track tape recorder was around $23,000 you had to settle for a **used** 24-track machine and someone else's problems...or settle for fewer tracks and compromised quality.

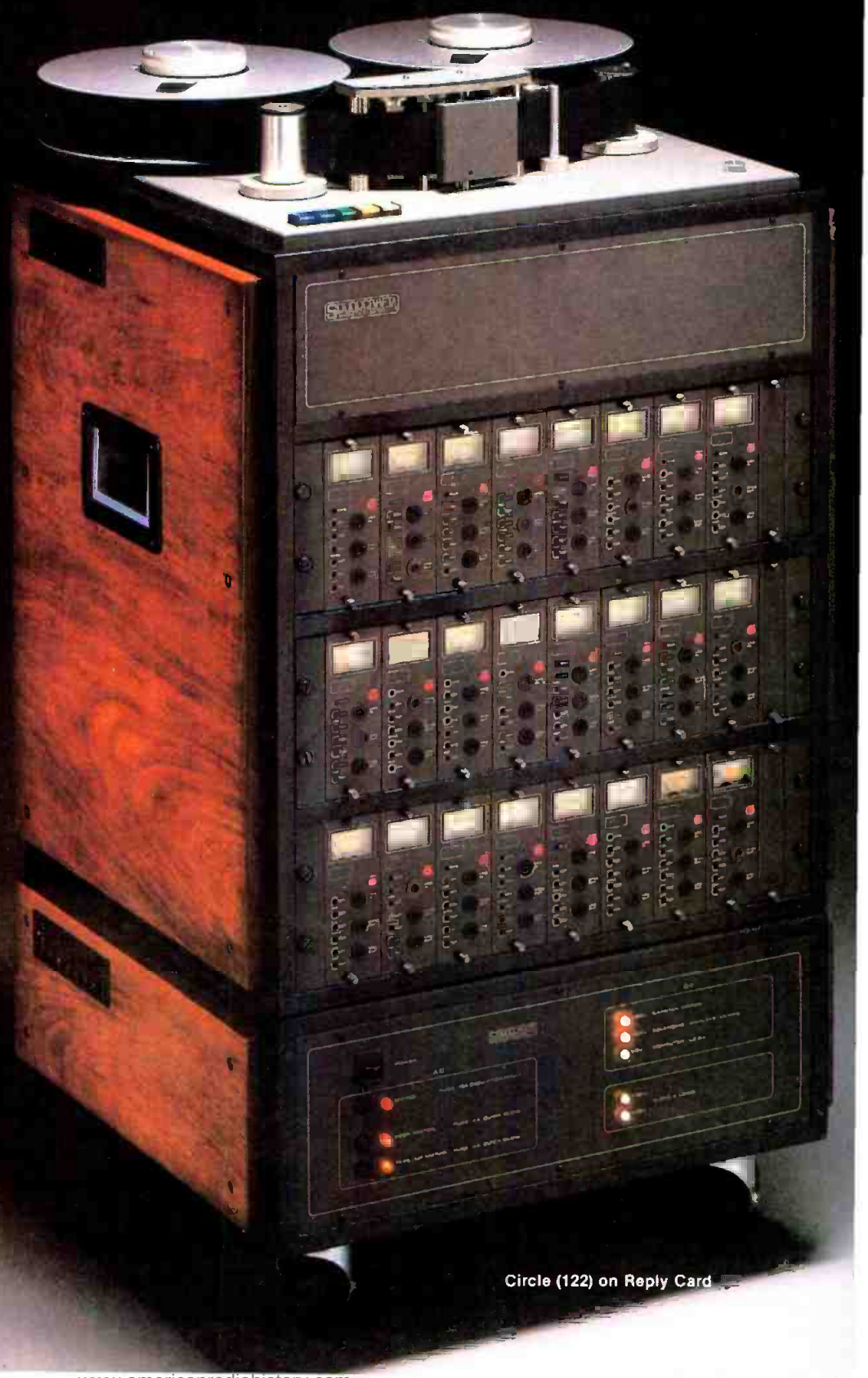
Soundcraft decided today's economy demanded a line of new multi-track recorders that are fully professional, yet reasonably priced. We took a look at all the major professional machines and went back to the drawing board. The result is a new line of tape machines...basic in design, but with all the professional features and reliability you demand.

The new Soundcraft multi-tracks are lighter and smaller than other machines. The 24-track is compact enough to fit in the most cramped mobile production truck and light enough to roll between rooms.

Best of all, you can buy the **new** Soundcraft two-inch, 24-track recorder for as little as $23,550* ...its 16-track counterpart for only $21,500 with a complete list of options so you can tailor your machine to your own requirements.

Take a look at the new Soundcraft multi-tracks. You'll see that we really do offer you **More for Less!**

* Model 762/24



Soundcraft

THE CHALLENGER

For the name of your nearest Soundcraft Multi-Track dealer, contact:

SOUNDCRAFT ELECTRONICS U.S.A.
20610 Manhattan Place, Suite 120
Torrance, CA 90501
(213) 328-2595 • Telex 182-499

SOUNDCRAFT MAGNETICS LTD.
9, Great Sutton Street
London, EC1V 0BX
Tel. 01-251 3631 • Telex 21198

SEE US AT BOOTH 1724

Circle (122) on Reply Card

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COME TO COMTECH FOR THE PERFECT SOLUTION.

Comtech's engineering excellence, cost-effective manufacturing and sustained inventory will assure you prompt delivery of high-quality systems. Just look at the features:

- 3.8 meter antenna/2° spacing
- Optional built-in SCPC demodulator
- Optional composite video baseband for MCPC applications
- Antenna mounted LNC allows single low-cost coax interconnect
- Remote three-channel select
- Broadcast quality audio

For details and prices, call Comtech Antenna Corp., P.O. Box 428, St. Cloud, FL 32769, (305) 892-6111, TWX 810-870-0220. Or Comtech Data Corp., 350 North Hayden Rd., Scottsdale AZ 85257, (602) 949-1155, TWX 910-950-0085.

COMTECH
Creative solutions in satellite communications.

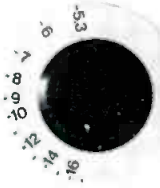
Comtech Data Corporation
Comtech Antenna Corporation
Subsidiaries of
Comtech Telecommunications Corp.

Circle (182) on Reply Card

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

Suprisingly, 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

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Crosspoint Latch Corporation
Booth 1321
Established products
6107: 6-input, 2-bus production switcher with one mix effect
6114: 8-input, 3-bus production switcher with one mix effect
6142: 8-input, 3-bus production switcher with one mix effect
6112: 9-input, 4-bus production switcher with two mix effect
6124: 12-input, 4-bus production switcher with two mix effect
6403: Editor switcher interface
6800: Audio mixer
6139: 8-input, 6-bus production switcher with three mix effect
6112A: 9-input, 4-bus production switcher with two mix effect
7200: Computer controller for 6112, 6124, 6139
New products
6109: 8-input, 3-bus production switcher with editor interface
6179: 24-input computer-controlled switcher
6116: 3-level switcher
6139B: 16-input, 6-bus production switcher with three mix effect
6139C: 24-input, 6-bus production switcher with three mix effect
Circle (487) on Reply Card
see ad on page 336

Crown International
Booth 428
Established products
PZM3LVR: Redundant pressure zone microphone
D75: Crown 1.7-inch power amplifier
New products
PZM 2.5: Directional pressure zone microphone
Circle (866) on Reply Card

Custom Business Systems
Booth 317
Established products
Radio Broadcast Business Computer System
Music Library Software
New products
See at booth
Circle (488) on Reply Card

dbx
Booth 621
Established products
900 Series: Modular signal processors—de-esser, compressor, noise gate, parametric EQ, flanger, gated compressor
160 Series: Compressor/limiters
500 Series: Signal enhancers
150, 180, 208, 140: Type I and Type II Noise Reduction Systems for broadcast and studio use
610: Autographic computerized room equalizer
New products
700: Digital audio processor for the professional market
Circle (506) on Reply Card

Peter W. Dahl Company
Booth 612
Circle (868) on Reply Card
see ad on page 238

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Introducing the Panasonic AT Series. The natural choice for accurate color reproduction.

Video is changing right before your eyes. With more sensitive cameras, more advanced recorders and more sophisticated production techniques. Now Panasonic introduces two shining advances in video technology. The AT Series Color Broadcast Monitors.

The AT Series consists of the 13" AT-H130G and the 19" AT-H190G (screen sizes meas diag). Both incorporate high-resolution delta gun shadow mask CRTs with a dot pitch that's 1/3 finer than conventional CRTs. The result is more than 600 lines resolution with an NTSC signal and a picture with excellent colorimetry and geometry.

The AT Series goes on to show its sophistication with its switchable comb filter decoder. Unlike subcarrier notch filters in conventional decoders, the AT Series uses an ultrasonic switchable comb filter. It not only maintains the full luminance bandwidth, it also prevents loss of color resolution.

For accurate phase demodulation, both AT monitors incorporate automatic frequency phase control. Black level clamp circuits to reduce hum. Plus LF tilt and pulse cross display with separate vertical and horizontal delay.

The AT Series looks even better with RGB inputs, active convergence and pushbutton degaussing. There are also lockable side-mounted drawers on the 13" model and lockable bottom-mounted drawers on the 19" unit.

So whatever field you're in—broadcast production, computers, medicine or education—whenever accurate reproduction of color and detail is crucial, the choice is natural. The AT Series from Panasonic.

Panasonic
AUDIO-VIDEO SYSTEMS DIVISION

For additional information on the Panasonic AT Series Color Broadcast Monitors, mail to:

Panasonic Industrial Company
Audio-Video Systems Division
One Panasonic Way
Secaucus, NJ 07094

Name _____ (Please Print)
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Phone (___) _____

BE 383

Circle (124) on Reply Card

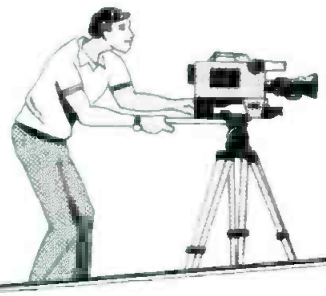
www.americanradiohistory.com

Bill Daniels Company
Booth 1333
Circle (869) on Reply Card

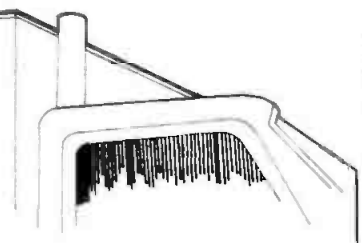
Data Communications Corporation
BIAS
Booth 1014
Established products
BIAS Traffic/MCA: Master control automation provides control for all on-air switcher functions, machine controls, delegation, material ID, FCC log, reports and switcher readback
New products
BIAS Newsroom Management System: Provides a flexible tool in the management of resources for newsgathering
Circle (496) on Reply Card
see ad on page 37

Datatek Corporation
Booth 1428
Established products
D-2000: Video-audio routing switchers
D-4300: Video-audio routing switchers
D-701: TV transmitter color phase equalizers
Video, audio and time code amplifiers
D-2050: CRT supervisory display terminal for routing switchers
New products
See at booth
Circle (498) on Reply Card

Datatron
Booth 1005
Established products



BALANCING ACT



Our new ITE/Miller H16 fluid-dampened head is specifically designed for state-of-the-art ENG cameras where balancing problems are of prime consideration.

MULTIPLE, ADJUSTABLE COUNTERBALANCE MODES

Four counterbalance modes provide for changes in camera center-of-gravity caused by variations in viewfinder and lens size. Both pan and tilt are adjustable in four steps, from free-wheeling through maximum fluid tension. Thus, total shooting freedom is yours be it quick pans and tilts, or slow, panoramic coverage.

The H16's **adjustable** center-of-gravity provides **incremental** fluid dampening in both pan and tilt. Nose- and tail-heavy camera configurations are completely eliminated, with perfect, dynamic counterbalancing achieved in seconds.

AUTOMATIC CAMERA LOCKING

An automatic camera locking quick-release plate assures instant and perfect camera mounting and balance. Once the plate has been fitted to the camera, simply snap it onto the head and you're ready to shoot. And a one-motion movement releases it for hand-held operation or transport.

A REAL LIGHT-HEAVYWEIGHT

The H16 is engineered and built to last. Weighing in at less than six pounds, it can support cameras of up to 30 pounds.

One control handle, a built-in spirit level and claw ball mounting for all ITE/Miller tripods are standard features of the H16. Dual handles are optionally available.

When it comes to ENG coverage—or **any** location shooting—count on the ITE/Miller H16 to keep you in perfect balance.

Available through all camera manufacturers and from quality dealers and distributors throughout the world.

See Us at NAB Booth 1215
INNOVATIVE TELEVISION

EQUIPMENT
P.O. Box 681
6445 De Soto Avenue • Woodland Hills, CA 91365
213/888-9421 TELEX: 181028
Total Television Camera Support Equipment—From The Ground Up.
Circle (125) on Reply Card

5300: Intelligent time processor
Vanguard Computerized Videotape Editor
ST-3 Computerized Videotape Editor
Circle (499) on Reply Card
see ad on page 202

Datatronix
Booth 1504
Established products
1604: Broadcast console
Equalizers: line amps, mic/preamps, distribution amps; compressor/limiters; sine wave generators; faders; patch fields; VU meter amps
8160: Programmable personality equalizer
300PR: Powered equipment enclnsure
New products
See at booth
Circle (500) on Reply Card

Datum
Booth 1708
Circle (870) on Reply Card
see ad on page 108

Delcom Corporation
Booth 1507
Established products
AE-3: Auto effects interface
VO-5850D: Delcom/Sony advanced U-matic VTR
New products
See at booth
Circle (507) on Reply Card

Delta Electronics
Booth 105
Established products
DAM-1: Digital antenna monitor
RCS-1V: Microprocessor-based remote control system
OIB-1: Operating impedance bridge
TCAs: RF ammeters (various models and scales)
RG-3: Receiver/generator
6730: Coaxial motorized RF switch
CPB-1: Common point bridge
FMC-1: Frequency modulation controller
AMC-1: Amplitude modulation controller
New products
AMC-1 Stereo: Stereo amplitude modulation controller
Circle (501) on Reply Card
see ad on page 114

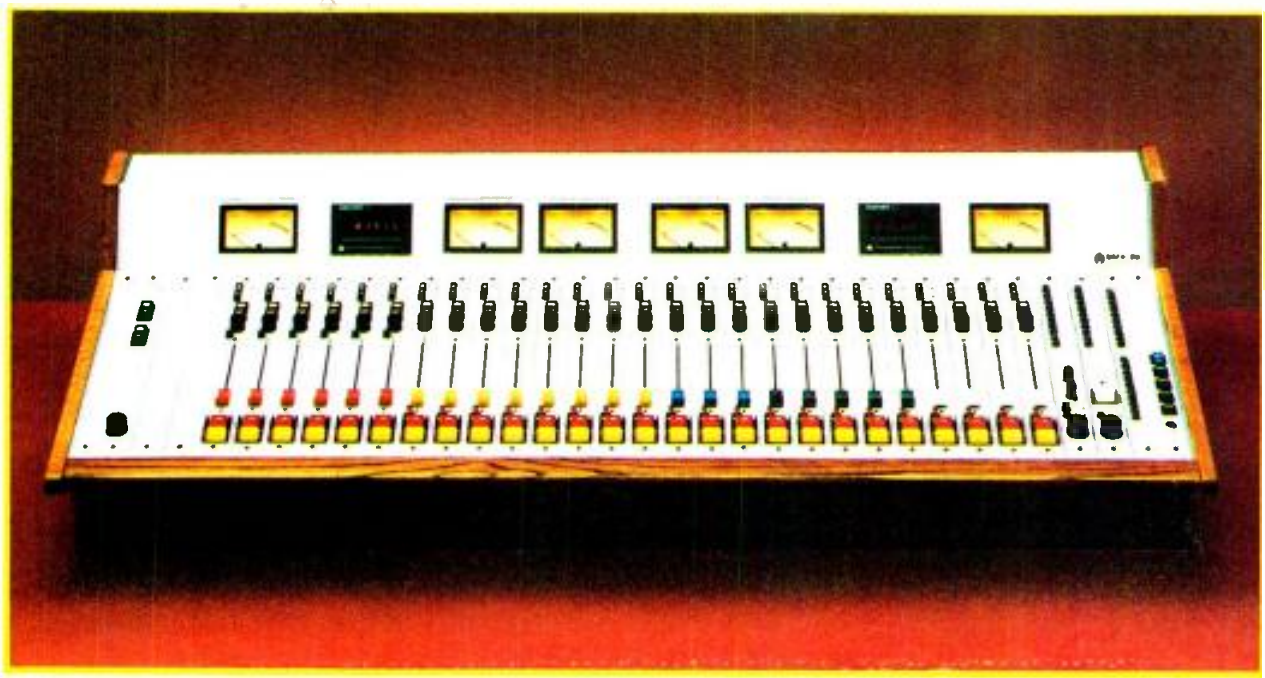
Deltamod Corporation
Booth 614
Circle (890) on Reply Card

DeWolfe Music Library
Booth 1120
Circle (871) on Reply Card

Dictaphone Corporation
Booth 211
Established products
VERITRAC 5000: 4-40-channel recorder/reproducer—slow speed logger
VERITRAC SL 5600: 1-4-channel recorder/reproducer—slow speed logger
Circle (872) on Reply Card
see ad on page 243

Dielectric Communications
Booth 326

www.americanradiohistory.com



BMX: Simply the very finest

By whatever standard of comparison you choose, be it quality, flexibility, innovation or service after the sale, one broadcast console stands tall above the rest: BMX.

A quick glance at the long list of professionals who hove installed and now enjoy the **BMX** reads like a "Who's Who" of American broadcasting. Most major groups and many of the leading broadcast stations in the U.S. have stepped up to **BMX**. Tested and accepted in the field, it is without doubt The Trendsetter in professional consoles.

But you won't require a multi-million dollar budget to purchase the console that is being imitated more than any other in the industry!

The **BMX** series of consoles is designed for every broadcast station, every application and every budget. All **BMX** consoles, from the **BMX** 10 and 14 through the 22 and 26 produce the same superior sound and enjoy the maximum in proven reliability.

BMX makes thorough use of the most advanced circuitry, CMOS remote control logic and efficient construction techniques.

And the compact, low profile **BMX** series console is carefully engineered for the lowest susceptibility to RF interference, crosstalk, noise and easy installation and maintenance.

It is this attention to user oriented design, precision construction and sheer innovotion that makes **BMX** the industry's standard of excellence. Consider:

- **BMX** was the industry's first console to come fully wired and equipped to accept just about any option the broadcaster needed to tailor his operation.
- **BMX** was the first to accept o telephone mix module that could interface easily for telephone talk show operation.
- **BMX** was first with a wide variety of frame sizes to fit every need and budget.

Consistently ahead of the competition in technology and quality performance, the **BMX** series remains year after year the first choice of discerning broadcasters the world over.

You can share the quiet satisfaction of knowing you have selected a console of incomparable design, quality and craftsmanship; one that offers the ultimate in flexibility for your present and future needs.

Why not investigate now how **BMX** can offer you superior performance in any environment, more features than any competitor, and a price that you can afford. Call or write us today and we'll rush to you the complete story about our entire line of unique consoles.

BMX: THE Trendsetter in Consoles, from Pacific Recorders & Engineering Corporation.

pacific recorders & engineering corporation

11100 Roselle Street – San Diego, California 92121 – Telephone: (619) 453-3255 – Telex: 181777

Southeast Regional Office

Three Maryland Farms – Suite 340 – Brentwood, Tennessee 37027 – Telephone: (615) 373-3313

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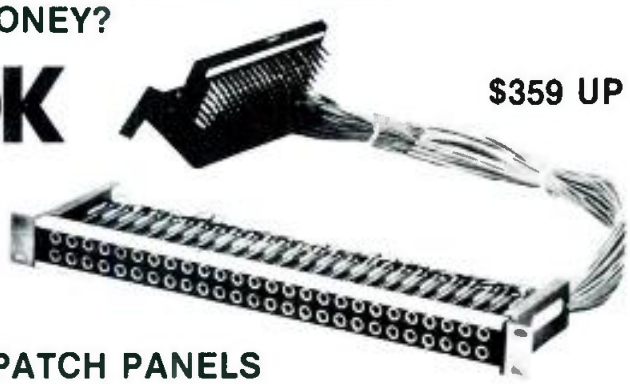
INTERESTED IN SAVING VALUABLE TIME AND MONEY?

HOOK UP



$359 UP

WITH GENTNER PRE-WIRED PATCH PANELS

Reasonably priced • Fast delivery • Wide variety of terminations and bays • Soldered-not wire-wrapped connections for extra security • Bundle lengths up to eight feet with no extra cost • Normals at bay or brought to termination point • Stranded wire for improved flexibility and dependability • Finest quality parts available • Custom panels-reasonably priced-delivered fast • Impeccable quality

Call Allied today with your patch panel specifications

VISIT ALLIED AT BOOTH 639 NAB '83

ALLIED Broadcast Equipment

RICHMOND	(317)962-8596
CHICAGO	(312)794-0224
SEATTLE	(206)927-4337
DALLAS	(214)423-8667
ATLANTA	(404)964-1464

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MOVING?

If you're planning a move in the near future, don't risk missing an issue of Broadcast Engineering. Please give us 6-8 weeks notice if you're planning on changing your address. Just write in your new address below and mail this coupon, WITH YOUR SUBSCRIPTION MAILING LABEL, to:

BROADCAST® engineering

Subscriber Services
P. O. Box 12901
Overland Park, KS 66212

Name _____
Address _____
City _____ State _____ Zip _____

Dielectric (326)
Continued
Established products
DCP: FM and TV panel antennas
RF loads and wattmeters
Rectangular waveguide and access
Coax switches
New products
3500: Digital wattmeter
Circle (1450) on Reply Card
see ad on page 222

Digital Video Systems
Booth 1017A
Established products
Phaser: TBC frame synchronizer
Phaser IV: Synchronizer
Phaser IIA: TBC framestore synchronizer
DPS-100: 162 sync generator, 165 sync/test generator, 175 test/calibration generator
Digital Phaser V: Framestore synchronizer
Digital Phaser VI: Chroma-inverting synchronizer
DPS-103: Component TBC
New products
Satellite transmission systems, single clock component TBC and special effects mixer
Circle (508) on Reply Card
see ad on page 157

Di-Tech
Booth 1301
Established products
5840: Audio-video routing switcher
5800: Audio-video routing switcher
5412: Audio-video routing switcher
5413: Audio-video routing switcher
170: Audio DA
120: Video DA
110: Video DA
2100: Audio-video routing switcher logger
New products
See at booth
Circle (509) on Reply Card

Dolby Laboratories
Booth 1311
Established products
Cat. Number 221: Audio noise reduction module for Sony BVH 1000/1100
Cat. Number 226: Audio noise reduction module for Ampex VPR-2
Model 361: Freestanding audio noise reduction units
SP 24: Audio noise reduction unit for multi-track recording
New products
Cat. Number 234: Audio noise reduction module for Sony BVH 2000
Circle (510) on Reply Card
see ad on page 297

Dorrough Electronics
Booth 312
Established products
610: Discriminate audio processor
40-A: Dorrough loudness monitor
Circle (812) on Reply Card

Drake-Chenault
Booth 408
Established products
Service: Programs including Great American Country, Contemporary 300 (adult contemporary), Contemporary MOR, SuperSoul and XT 40

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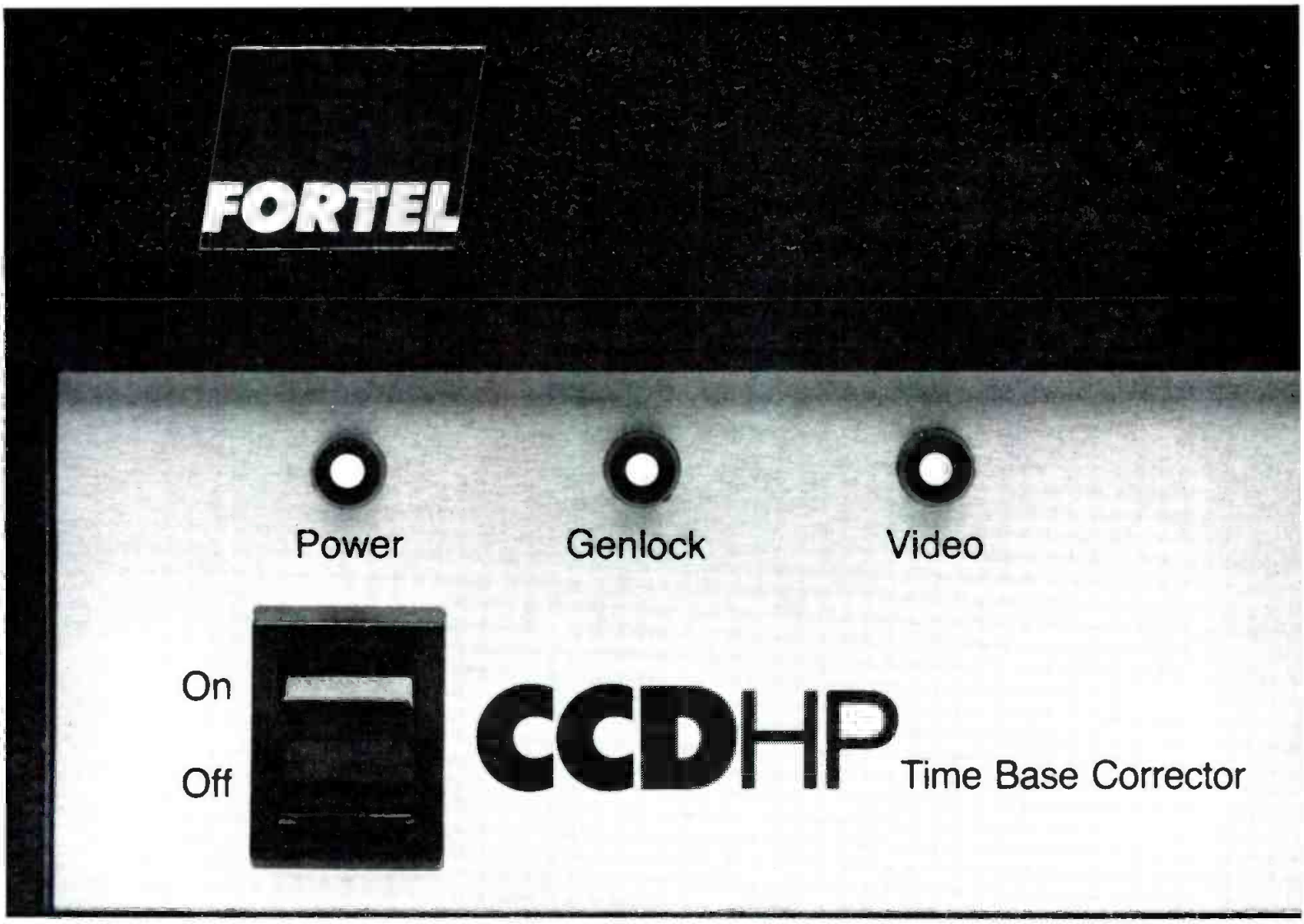
FORTEL



HIGHEST PERFORMANCE

Why settle for less than highest performance in a TBC?

The new CCDHP delivers the highest performance of any heterodyne TBC built anywhere by anyone. Of course it's a full performance TBC that meets all FCC broadcast requirements. Use it in editing for A/B rolls and special effects.

Where the CCDHP really performs is in picture quality. It delivers better pictures. You can measure how much better by testing signal to noise ratio, bandwidth, differential phase and gain, K factor and ringing. The CCDHP outperforms the competition in all of these. It delivers better pictures and it does it at a price that is a lot better too.

See our better picture. Test our better specifications. Compare the CCDHP to more costly TBC's.

Call or write Fortel today for more information or an on-site demonstration.

Better by Design

	S/N Ratio	Differential Phase	& Gain	K Factor	Bandwidth	Noise Reduction and Enhancement	Power	Suggested List Price
Fortel CCDHP	60dB	0.5°	1.5%	2%	2.8MHz	Yes	100W	$5995
Microtime T-120	58dB	2.0°	2.0%	*	2.5MHz	No	140W	$9950
Harris 516	55dB	1.5°	1.5%	4%	2.5MHz	Optional	175W	$9950

*No specification given for heterodyne mode. All specifications are from manufacturers product brochures.

Fortel Incorporated
6649 Peachtree Industrial Boulevard
Norcross, Georgia 30092-9990
Telephone (404) 447-4422
Telex 804822

FORTEL

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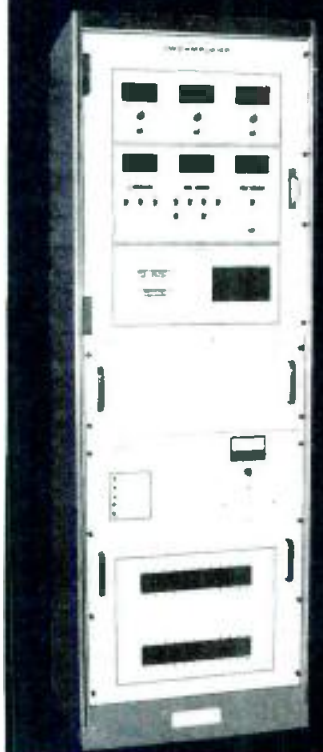
Drake-Chenault (408)
Continued
Service: Program designed for AM radio 40+ demographics including a detailed marketing plan
New products
See at booth
Circle (503) on Reply Card

Dubner Computer Systems
Booth 1630
Established products
CBG-2: A powerful character generator, a digital painting system, and 3-dimensional image creation and rotation software in a single system
CBG-1: Full-function character generator
CCC-12: Color Corrector Computer
Circle (504) on Reply Card
see ads on pages 244, 270, 324, 325

H. M. Dyer Electronics
No booth at press time
Established products
NEC: Digital effects, synchronizers
Leitch: Sync generators, proc amps, test equipment
TFT: Transmitter controls, transmitter monitors
HEDCO: Routing switchers, AFV; audio and video distribution
QSI: Source ID; color bar generators
Shively Labs: FM antennas
Barco: Video monitors

SPECIFY MCL

NEW TWTA HIGH POWER AMPLIFIER



TWTA C-Band Satellite Transmitter System-Model 10717, delivers 2.8KW of usable power throughout the C-Band frequency range (5.85-6.45GHz). Innovative design and exclusive engineering techniques have produced this **new** MCL TWTA SYSTEM for extended reliable commercial service in the satellite communications earth terminals.

Quality features include the Thomson #3640 traveling wave tube, protective circuitry, solid state IPA, RF input and output impedance matching, necessary power supplies, and controls and monitor circuits as required.

MCL stands behind all of its equipment. Included is a one-year warranty against defects and workmanship from date of shipment; The TWT tube is warranted by the tube vendor. Operations and maintenance manual are provided.

This advanced system includes so many advantageous features (including a Linearizer to give system performance equal to a 6KW system) to users throughout the world that we suggest you write for the technical, illustrated literature on MCL HIGH POWER TWT AMPLIFIERS which also describes the full line of MCL SATCOM TWTA's in 'C' and 'Ku' Band.

Join the rapidly growing list of users of MCL equipment. SPECIFY "MCL": you'll be glad you did.

WRITE for complete illustrated, technical reference brochure.

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

Circle (130) on Reply Card

Skotel: Time code generators
Circle (1112) on Reply Card

Dynacom Electronics Ltd.
Booth 1163
Circle (875) on Reply Card

Dynair Electronics
Booth 1404
Established products
System 21: Routing switcher, audio/video
System 23: Machine control
System 23: Data/control switching
Series 10: Routing switcher, audio/video
Series 5300: High performance distribution equipment
Series 1500: High performance distribution equipment
New products
Series 1600: 16x1 switching modules
Series 25: Routing switcher, 20x20 audio/video, single frame
Series 5300: Audio and pulse DA modules
Series 1500: Pulse DA module
Circle (505) on Reply Card
see ad on page 103

Dynamic Technology
Booth 1719
Circle (876) on Reply Card

EECO
Booth 1314
Established products
VIG-850: Vertical interval time code generator/reader
VIR-950: Vertical interval time code reader
VCG-750: Video character generator (VITC and longitudinal)
TCR-650: Longitudinal time code reader
MTG-550: Longitudinal time code generator
New products
IVES-I: Intelligent video editing system
PTG-560: Portable time code generator
Circle (511) on Reply Card
see ad on page 133

EEG Enterprises
Booth 1155
Established products
EN210: Line 21 simple encoder for closed captioning
EN230: Line 21 smart encoder
DE101: Line 21 video decoder
UB121: SMPTE time code user bit inserter
EN212: Line 21 user bit encoder
Tele-copy floppy system
Turnkey text editing and encoding system
DE201: Line 21 video decoder
New products
See at booth
Circle (512) on Reply Card

EG&G, Electro-Optics Div.
Booth 1327
Established products
SS-122: Controller
SS-111: Power supply
SS-112: Power supply
SS-107: Flashhead
SS-123: Single enclosure obstruction light
LS-159: 300mm antenna beacon with power supply
LS-161: 300mm twilight/night marker beacon
LS-162: 155mm self-contained beacon

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A major breakthrough in satellite antenna performance... Harris' 6.1 meter Delta Gain*.

Harris has developed a revolutionary new design for satellite antennas...with direct benefits for broadcasters, such as high gain and exceptional sidelobe suppression. A special reflector shape and unique feed design combine to deliver service comparable to larger antenna systems...at a convenient 6.1 meter size and price.

The Harris Delta Gain concept is based on Gregorian optics, near field Cassegrain theory, and a deep-dish reflector design. A "monopod" subreflector support eliminates support spars and the troublesome 5 to 10 dB increase in sidelobe levels that occur along spar contours.

The feed position also rejects noise and interference from all directions beyond the antenna edge. This improved sidelobe performance is of particular benefit to the SNR capability of TVRO systems in crowded terrestrial RF spectrum environments. In many cases, this advantage may save you the expense of remote siting or settling for compromised performance.

Future 2° or 3° spacing requirements are met, ensuring solid SNR performance even with worst case adjacent satellite C/I contributions. Future Ku Band operation is accommodated by the 6.1 meter size and a design based on convertibility.

The Harris Kingpost pedestal is designed for repositioning of the antenna to any domestic satellite in 60 seconds or less! 110° of azimuth travel is standard from a universal ±70° arc referenced from a non-critical foundation centerline.

Everything needed for local or remote site TVRO operation is available as an integrated system from Harris...your single-source supplier. From Delta Gain antenna, to micro-processor based facilities control, to microwave interconnect, to all the satellite equipment required, Harris provides the means to better broadcasting. And it's all backed by Harris' 24-hour-a-day service...the most responsive in the industry.

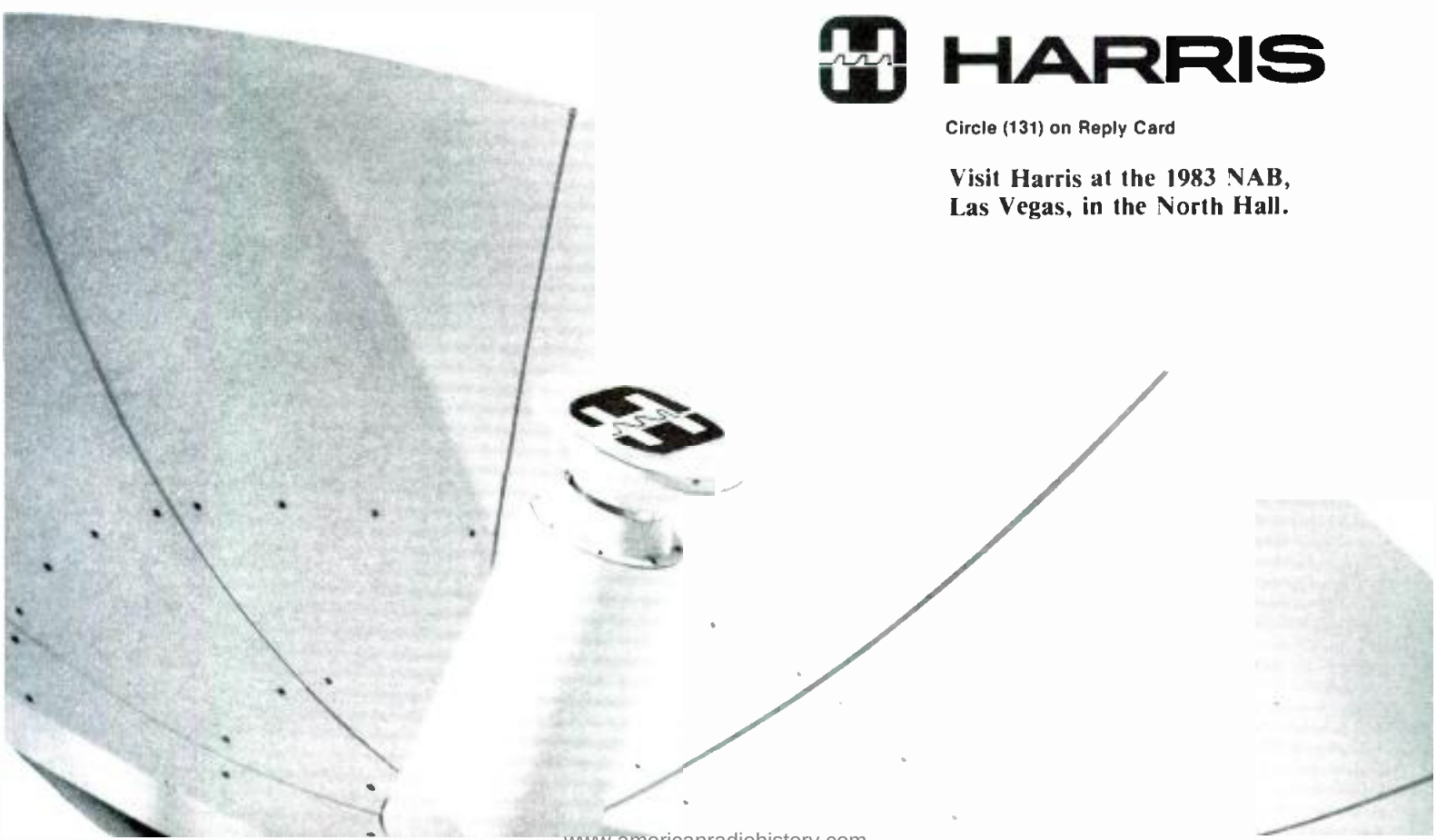
Contact Harris Corporation, Broadcast Division, P.O. Box 4290, Quincy, Illinois 62305. 217/222-8200.

*Patent Pending

HARRIS

Circle (131) on Reply Card

Visit Harris at the 1983 NAB, Las Vegas, in the North Hall.



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EG&G (1327)
Continued
New products
See at booth
Circle (514) on Reply Card

EEV
Booth 1335
Established products
P4300: Monochrome CCD hand-held camera
P8600: CCD image sensor
P8190/P8196: 1-inch diode gun Leddicon
P8460: ⅔-inch diode gun Leddicon
P8460: ⅔-inch diode gun Leddicon
P8038, 8134V1, 8541A: 1-inch Vidicon camera tubes
4CX 10,000D, 4CX 15,000A, 4CX 35,000C: Power tubes for AM and FM transmitters
New products
K3270 BCD: 15kW high efficiency UHF TV Klystron with beam control device
K3271BCD: 25kW high efficiency UHF TV Klystron with beam control device
K3230: 30kW high efficiency UHF TV Klystron (replacing the K376)
P8470: ½-inch diode gun Leddicon
P8420: 30mm diode gun Leddicon
P8440: 30mm diode gun Leddicon
P8462: Diode gun Leddicon
P8166: ⅔-inch HOP Leddicon
107F/109F: LCDs for static or multiplex operation
E3465: EMP devices for protection against electro magnetic pulse
Circle (513) on Reply Card
see ad on pages 164, 165

E-N-G Corporation
Booth 1022
Established products
E-N-G Van
E-N-G Suburban
New products
K-82: Backpack
E-N-G remote control unit for microwave unit
Circle (877) on Reply Card

ESE
Booth 116
Established products
ES206: Video time and date generator
ES255: SMPTE reader/video generator
ES254: SMPTE reader/video generator
ES160: Master clock system
ES241: Digital thermometer
ES214: Audio level indicator
ES302: Up/down presettable timer
ES510: 60-minute timer
ES562: Clock/timer with memory
ES790: 1000-event programmable timer
ES260: SMPTE generator
New products
See at booth
Circle (523) on Reply Card
see ad on page 327

Eastman Kodak Company
Booth 1214
Established products
Motion picture film products especially suited to origination for television
New products
DATAKODE: Magnetic Control Surface Technology
Circle (824) on Reply Card

Echolab
Booth 1510
Established products
SE/3: Computer-controlled SEG
New products
See at booth
Circle (515) on Reply Card
see ad on page 96

Eigen Video
Booth 1227
Established products
16-10: Analog disc recorder for color instant replay slow motion animation
DSR-4C: Digital frame stores for monochrome applications
Circle (525) on Reply Card

Elcom-Bauer
Booth 412
Established products
710B: 1000/250W AM transmitter
705C: 5000/1000W AM transmitter
AGC: Level guard AGC
WBL: Wideband composite limiter
690B: FM exciter
600C: Solid-state FM transmitter
601B: Solid-state FM transmitter
610B: 10,000W grounded grid single-tube transmitter
VIVA 5: Audio console
SEVILLE: Series cartridge equipment
AP-50B: Insta-Peak III peak limiter
New products
See at booth
Circle (516) on Reply Card
see ad on page 197

Elector
Booth 1131
Established products
Series: Barco monochrome and color monitors for broadcast and data display applications
CTVM series: Master broadcast monitors
CM series: Color multipurpose monitors for broadcast use
CDCT series: High resolution monitors for computer graphics applications
CF series: Open chassis color display units
BARCOVISION: Large screen projection systems
Circle (517) on Reply Card
see ad on pages 273, 275, 277

Electro Controls
Booth 1103
Established products
Series: Studio lighting and control systems such as Lite Cue, Plexus 1000, ILS, Lite Patch, Plexus 2000
New products
See at booth
Circle (518) on Reply Card

Electrohome Ltd.
Booth 1628
Established products
EVM 920: 9-inch monochrome video monitor
EVM 1220: 12-inch monochrome video monitor
EVM 1519: 15-inch monochrome video monitor
EVM 1719: 17-inch monochrome video monitor
EVM 2319: 23-inch monochrome video monitor
New products
ECM 1301: 13-inch high resolution color monitor
TRI-ED: Off-air receiver, computer monitor
Circle (1113) on Reply Card
see ad on page 312

Electro Impulse Laboratory
Booth 117
Established products
RF loads, calorimeters, wattmeters, attenuators and baluns
Circle (519) on Reply Card

Electro-Voice
Booth 511
Established products
Sentry 100A: Studio monitor
Series: Broadcast microphones
Sentry 500: Broadcast/recording studio monitor
Series: Microphone products
New products
See at booth
Circle (813) on Reply Card
see ad on page 145

EMCEE Broadcast Products
Booth 1621
Established products
Series: LPTV transmitters/translators
All solid-state 10W MDS transmitter
Single-bay 1kW UHF amplifier
TTU100S: 100W all solid-state UHF low power transmitter
TUA1000CP: Single bay 1kW UHF amplifier
TTS-10S: Solid-state 10W MDS transmitter
Complete turnkey installations of communications systems
Tower erection and maintenance
New products
See at booth
Circle (520) on Reply Card
See ad on page 183

Emcor Products
Booth 429
Circle (879) on Reply Card

Enstrom Helicopter Corporation
Booth 1700
Circle (905) on Reply Card

Enterprise Electronics Corporation
Booth 1329
Circle (880) on Reply Card

Environmental Container System
Booth 323
Established products
Series: Rack-mount enclosures and cases for video and broadcast equipment
Series: In-stock cases to protect A-V, video and broadcast equipment
New products
See at booth
Circle (521) on Reply Card

Environmental Satellite Data
Booth 1766
Established products
Dial-up digital weather satellite images
Complete array of continental, regional and special coverage sectors for United States, Canadian and Caribbean markets

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"The Electro-Voice Sentry® 500 is a monitor by design."

Greg Silsby talks about the New Sentry® 500 studio monitor...

Everyone expects a studio monitor system to provide a means of quality control over audio in production.

True, other audio test equipment can supply you with valuable data. But that data by itself is incomplete and only displayed in visual form.

Only a true studio monitor speaker system can deliver an accurate indication of audio quality in... audio! After all, this is the language of the trained ear and doesn't require a complex interpretation process.

I believe the Electro-Voice Sentry 500 Studio Monitor System will meet your every expectation.

What's a "studio monitor?"

The term "studio monitor" is often a misnomer. It's easy to tack a label on a box and call it a "studio monitor" without including the best precision engineering available, and careful attention to application design. Too often, these all-important considerations are traded-off for such marketing reasons as high cosmetic appeal, a particular type of popular sound, and low component manufacturing cost. While all of this may translate into high profit margins for the manufacturer it does nothing to produce a reliable standard for audio testing and evaluation.

Linear frequency response

The Sentry 500 follows the well-established Electro-Voice tradition of combining the most advanced engineering and manufacturing technology available. The Sentry 500 has been carefully thought-out and built to meet the specific needs of the audio professional. Like the smaller Sentry 100A, the Sentry 500 provides linear response throughout its range (40-18,000 Hz ± 3 dB). In fact, because the two systems share this linearity, program material may be mixed on one, sweetened on the other, with complete confidence in quality. Acoustic "Time Coherence" (the synchronous arrival of acoustic wave fronts from both high and low-frequency drivers) has been maintained through careful crossover design and driver positioning.

Constant Directivity

The Sentry 500 is a Constant Directivity System, benefitting from years of E-V experience in the design and application of constant directivity devices. Utilizing a unique E-V-exclusive high-frequency "Director", the Sentry 500 provides essentially uniform coverage over a 110° angle from 250 Hz on up to 10 kHz and 60° dispersion from 10 kHz clear out to 18,000 Hz! And it does this on both the vertical and horizontal axes. This means the "sweet spot", once a tightly restricted area large enough for only one set of ears, has been broadened to allow accurate monitoring by the engineer, producer, and talent—all at the same time. That's what we call Constant Directivity.

A monitor by design

To qualify as a truly accurate test device, a monitor speaker system must faithfully reproduce the wide dynamic range required by today's music and current digital recording techniques, and do it with low distortion. This is no problem for the Sentry 500 which combines the high efficiency of an optimally-tuned Thiele-aligned cabinet to the brute power handling of Electro-Voice Sentry components. Consider what you get with proven E-V components in the Sentry 500: the Sentry 500 will deliver 96 dB at one meter with only one watt and yet will handle 100 watts continuous program material with 6 dB of headroom. That's 400 watts on peaks! The same Super-Dome®/Director combination which maintains uniform dispersion of linear response out to 18 kHz also handles a full 25 watts of program power or 5 times the power handling capacity of most "high powered" tweeters. After all, tweeters should convert electrical energy to acoustical energy—not to smoke and fire.

The Sentry 500 is another no-nonsense Electro-Voice Sentry design with the incredible performance and credible price you've learned to expect from EV. I'd like to tell you the rest of the Sentry 500 story and send you the complete Engineering Data Sheet. Write to me: Greg Silsby, Market Development Manager/Professional Markets, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.

Greg Silsby

Market Development Manager, Professional Markets

Electro-Voice® SOUND IN ACTION™

a gulton company

Circle (132) on Reply Card

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Environmental Satellite (1766)
Continued
Expanding selection of conventional weather data graphic overlays to the satellite projection
New products
PMT: Professional model terminal
Low cost display terminal for meteorologists to receive, store and display all ESD satellite and weather data products
Circle (1114) on Reply Card
see ad on page 196

Eventide Clockworks
Booth 323
Established products
H949: Harmonizer; pitch change, special effects unit
BD955: Broadcast digital audio delay line
RD780: Monstermat; mono/stereo matrix unit
2830: Omnipressor; compressor, expander, noise gate and limiter
Computerized Timesqueeze System
Timesqueeze Jr. System
SP2016: Programmable digital reverb/effects processor
Specsystem: Spectrum analyzer
New products
See at booth
Circle (522) on Reply Card
see ads on pages 282, 283

Excalibur
Booth 1106
Established products
Custom cases
New products
See at booth
Circle (814) on Reply Card
see ad on page 242

Faroudja Laboratories
Booth 1753
Established products
PRX-N: Portable Recordex
RM-RX-N: Rack-Mount Recordex
PR-1: Portable Record One
RM-R1: Rack-Mount Record One
PB-1: Playback One
CSF-01: Comb Filter Separators
New products
CRX-N: Colorex, chroma noise reducer and enhancer
CDF-N: NTSC decoder, stand-alone active comb filter decoder
Circle (526) on Reply Card

Farrtronics Ltd.
Booth 1159
Established products
M81: Intercom system
M82: Party-line communications systems
M750: Pre-wired audio patchfields
M76: Audio distribution amplifiers
M70: Audio consoles for computer editing systems
New products
2-channel belt pack communications system
Pre-assembled video patchfields
Circle (527) on Reply Card
see ads on pages 10 and 238

Fidelipac Corporation
Booth 103
Established products
550: Master Cart II NAB audiotape cartridge
380: Master Cart tape cartridge
140: Model 300 tape cartridge
350: Model 350 tape cartridge
149: Model 600 tape cartridge
150: Model 1200 tape cartridge
Alignment tapes and gauges, on-air lights bulk tape eraser
New products
Table-top bulk tape degausser
Circle (533) on Reply Card
see ad on page 122

Film/Video Equipment Service
Booth 1153
Established products
Service: Optical repair for ENG/EFP and studio lenses
New products
Wide Eye I and II: Wide angle attachments for ENG/EFP lenses
New video camera and recorder cases from Kangaroo Video Products
Circle (534) on Reply Cards

Firstcom Broadcast Services
Booth 219
Circle (882) on Reply Card

FitzCo Sound
Booth 1514
Established products

IT'S THE ONLY ONE LIKE IT!

ANIXTER 5.0 Meter Hydraulically Steerable Antenna System

• Covers the entire Geostationary arc with no changes to mount members. • Antenna repositioning rate of 1° per second. • System can position the antenna within 0.05° accuracy. • Standard control has 20 programmable positions plus one position that can be used as a manual override. (Additional satellite positions available upon request.) • Completely weatherproofed motor. (Nema 56C). • Wind loading rates at 70 MPH operational, 125 MPH survival.

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Over 30 years of experience in engineering and manufacturing antennas
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CORPORATE OFFICES ANIXTER BROS. INC. 4711 Golf Road Skokie IL 60076

Circle (133) on Reply Card

NAB '83
See it at Booth 1716
YEC/PHOTRON VS-1000
SYNC/TEST SIGNAL GENERATOR

STANDARD FUNCTION: Sync, Color Bar, Linearity, Convergence, Level Control
OPTION: Pulse & Bar (Sin²), Multiburst & Sweep
FEATURES: Five signal generators
RS-170-A standard
Stable subcarrier (accuracy ±10Hz or ±1Hz)
Genlock/Internal sync generator
Low profile (1.7") and light weight (18 lbs)
Better cost performance
Also available: SG-1000 Sync Generator
ED-1000 Color Encoder/Decoder
DA-1000 Distribution Amplifier

J. OSAWA & CO., LTD.
2-8, Shibaura 4-chome, Minato-ku, Tokyo 108, Japan
Tel. 03-455-0111 Telex J 23881 OSAWAIMP

Circle (134) on Reply Card

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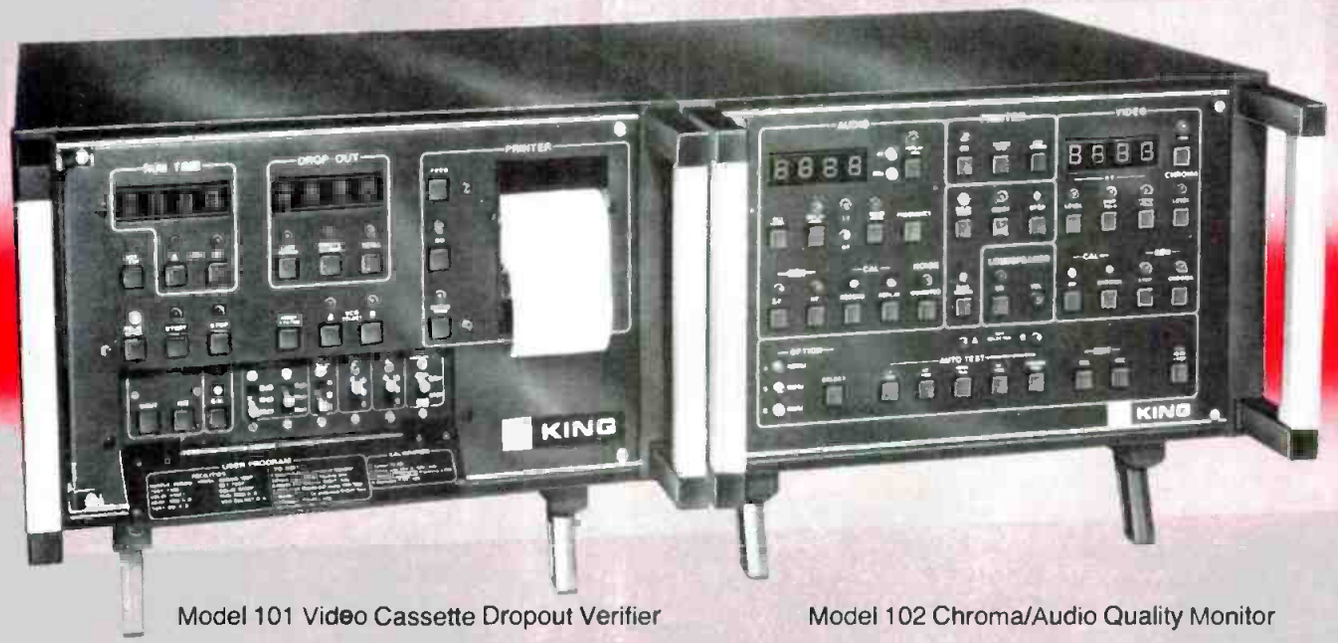
Set your standard of videotape quality...the King way.

With King's new programmable Video Cassette Dropout Verifier and dedicated companion unit, the Chroma/Audio Quality Monitor, you can actually see and hear a representative tape sample under real life conditions and know exactly the quality of your blank or prerecorded VHS, BETA or U-MATIC video cassettes.
This videotape evaluation equipment, the world's most sophisticated and precise, conforms to all current standards.



Model 101 Video Cassette Dropout Verifier

Model 102 Chroma/Audio Quality Monitor

For details, call or write
King Instrument Corporation, 80 Turnpike Road, Westboro, MA 01581 U.S.A.
(617) 366-9141 • Cable KINGINST • Telex 94-8485

KING

World Leader in Tape Tailoring Systems

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Fitzco (1514)
Continued
AAE-1: Automator
44: Audioarts console
Wheatstone: Audiocarts console; Hannay wire reels; Ivie analyzers; shipping cases; BGW-Tannoy; furniture (record cabinets, etc.)
New products
See at booth
Circle (529) on Reply Card

Flash Technology
Booth 1619
Circle (883) on Reply Card

For-A Corporation of America
Booth 1340
Established products
FA-410 N: NTSC TBC
FA-410 P: PAL TBC
TKY-4600: Title keyer
CCS-4200: Color corrector
New products
FA-430: TBC and image processor
TKY-4600: Title keyer
VTW-210: Video typewriter
CI-500: Color option for VTW-600 video typewriter
KS-10: Camera switcher
FVW-300: Video writer
Circle (535) on Reply Card

Fortel
Booth 1323
Established products
CCD 1H: TBC
CCD 2H: TBC
Y-688 32: TBC
New products
See at booth
Circle (815) on Reply Card
see ad on page 141

Fort Worth Tower Company
Booth 1010
Established products
Towers, earth stations and prefabricated equipment buildings
Circle (530) on Reply Card

Fostex Corporation of America
Booth 1739
Established products
A-8LR: 8-channel multi-track recorder/reproducer
A-8: 8-track recorder/reproducer
A-2: 2-track recorder/reproducer
350: 8x4x2 mixing console
250: 4-track cassette/mixer
250AV: 4-track cassette/mixer
6301: Self-powered personal monitors
Signal processors
New products
Multichannel recorder/reproducer with interlock capabilities
Circle (884) on Reply Card

Frezzolini Electronics
Booth 1107
Established products
BP14: Complete line of nicad on-board batteries for most ENG/EFP cameras
FBP90: Complete line of nicad in-board batteries for most VTRs
Complete line of portable lighting and power systems
MBC4: Universal multiple battery fast-charge stations
BC77UB: Complete line of Universal ac input fast-charge systems
SP650: "Lightweight" ac/dc portable lighthead with accessories
RPS1: "Lightweight" on-board ac adapter/battery eliminator for Ikegami, Sony, JVC, Hitachi, Sharp and Panasonic ENG/EFP cameras
New products
OCR1: 1-piece VHS-C camera/recorder/battery system for JVC KY-1900
OCR2: 1-piece VHS-C camera/recorder/battery system for most ENG/EFP cameras with Anton/Bauer and Frezzi Battery Brackets
RPS2: 2-channel combination regulated power supply or fast charger
RPS3: Lightweight 50W "Switcher" power supply for most ENG/EFP cameras
VC1: Compact carrying case for (six) BP-90 battery packs with built-in fast charger and second battery slow charger
RM6000/DC6H: New BP-90 mounting brackets for Sony DXC-1800/6000, also for 14.4V on-board batteries
CR4: New line of "current regulated" chargers for cameras/VTR battery packs
Circle (531) on Reply Card

Fuji Photo Film USA
Booth 1413
Established products
H701E: 2-inch videotape
H621: 1-inch videotape
¾-inch U-matic videocassettes
VHS/BETA videocassettes
Super HG videocassettes
VHS/BETA headcleaners
Circle (817) on Reply Card
see ad on page 187

Fujinon
Booth 1411
Established products
A3.5X6.5: ⅔-inch format EFP lens; focal length 6.5 ~ 23mm; f/1.7
A17X8.5 ESM: ⅔-inch format EFP lens; focal length 8.5 ~ 145mm; f/1.5
A14X9.5 ERM: ⅔-inch format ENG/EFP lens; focal length 9.5 ~ 133mm; f/1.7
A30X11ESM: ⅔-inch EFP lens; focal length 11 ~ 330mm; f/1.6
P28X11 ESM: Studio EFP 1¼-inch format; 11 ~ 310mm; f/1.6
R17X12.5 ESM: Studio 1-inch format; 12.5 ~ 212mm; f/1.6
P17X16.5: Servo adaptable 1¼-inch format; 16.5 ~ 280mm; f/2.1
New products
See at booth
Circle (816) on Reply Card
see ad on page 83

Gagnon LaForest
Booth 1717
Circle (885) on Reply Card

Garner Industries
Booth 1233
Established products
1100: Bulk videotape eraser
270: Bulk videotape eraser
70: Bulk audiotape eraser
105: Bulk audiotape eraser
114: Bulk audiotape eraser
116: Bulk audiotape eraser
3056: Full-track tape duplicator
4056: 2-track tape duplicator
Circle (537) on Reply Card
see ad on page 28

General Electric Company
Booth 1109
Circle (886) on Reply Card

Generic Computer Systems
Booth 308
Established products
Applelog: Complete automation for traffic and billing on Apple II with hard disc
Circle (887) on Reply Card

Glentronix
Booth 1318
Established products
Ross Video Ltd.—Production switchers
Telcom Research—SMPTE time code generators, readers, reader/character generators
Conrac Corporation—Video monitors
Porta Pattern—Camera charts, slides, film, transparencies and illuminators
Torpey Controls & Engineering—Clock drivers and clocks, machine control system, temperature equipment
Hitachi Denshi Ltd.—Oscilloscopes, waveform monitors, vectorscopes
BAL Passive Components—Delay lines
Pentronics—Logic analyzer boards
Scientel Ltd.—Sideband analyzers
New products
See at booth
Circle (538) on Reply Card

Alan Gordon Enterprises
Booth 1726
Established products
Goldtop power supplies and batteries
Elemack cricket dolly and accessories
Pearson fluid heads
Cool-Light nine light
Zeppelin windscreen and sound accessories
Nagra soundtote
Production accessories
New products
Mini-crab dolly and accessories
Cool-Light mini-Cool for ENG/EFP cameras
Cool-Light triple twilight
Video test charts
Super Grip 2
Circle (1325) on Reply Card

Gorman Redlich Mfg. Company
Booth 506
Established products
CEB: EBS encoder decoder
CRW: Rack-mounted weather radio for NOAA weather information and alerts
CM: Digital antenna monitors for locations where studio and transmitter are co-located
CMR: Digital antenna monitor for locations that require remote control of the antenna monitor
New products
CE: EBS encoder with an option for stereo operation
Circle (539) on Reply Card

Gotham Audio Corporation
Booth 503

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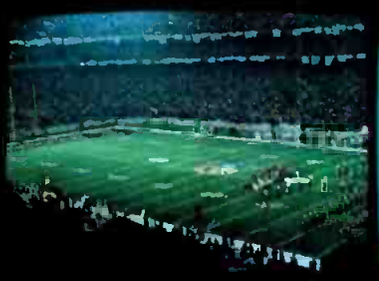
40 to 1

Canon PV40 x 13.5B IE: THE OLYMPIAN



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

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

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

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

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

See us at NAB booth #1012

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Gotham (503)
Continued
Established products
EMT 948: Broadcast turntable system
EMT 10.02: Broadcast console
EMT 266: Transient limiter
Microphones: Neumann's full line including U89, KMR 82, KM 84 and USM 69
New products
EMT 938: Broadcast turntable system
M 21: Telefunken analog audiotape machine
Circle (540) on Reply Card

Graham-Patten Systems
Booth 1227A
Established products
9400 Series: Video, pulse and subcarrier distribution amplifiers
1200 Series: Video, pulse and subcarrier distribution amplifiers
New products
1230: Downstream video keyer system
612: Post-production audio mixer
Circle (1115) on Reply Card
see ad on page 174

Grass Valley Group
Booth 1207
Established products
300 & MKII: Video production system
1600: Video production switcher
1680: Video production switcher
440: Routing switcher
Ten-X: Utility switcher
4S-M200: Master control automation
3291: Fiber-optic communications system
3258: SC/H phase meter
3240: Video processing amplifier
Circle (541) on Reply Card
see ads on pages 7, 250, 251

Gray Engineering Laboratories
Booth 1618A
Established products
DR-107: Reads and displays time-code or user-bits on video monitors
DT-104F: Transmits time-code at 24, 25 or 30 frames/sec.
DR-109: Reads and displays time-code or user-bits on LED readout
DT-113: Transmits time-code at 24, 25 or 30 frames/sec.
VR-116: Video reticle generator
New products
VIE-224: Translates longitudinal time code to vertical interval time code for insertion into one or more video lines
VID-225: Decodes both longitudinal and/or VITC and outputs longitudinal time code at a rate proportional to either input
Circle (1116) on Reply Card
see ad on page 118

Great American Market, The
Booth 1108
Established products
The Great American Scene Machine
Starstrobe
Lighthesizer programmable sequencer and control console
Special effects generator/fire simulator
RDS/HMI lights
Great American patterns
Excalibur custom cases
Colormax—The Rolling Color Changer
RDS/Fresnels
Cameralite
New products
Stik-Up: Compact single source luminaire
Camralite: Variable intensity "Obie" light
Circle (542) on Reply Card

David Green Broadcast Consultants
Booth 417
Established products
Sperry Weather Radar for radio stations
IBM computer package for radio stations
Eventide time squeezer
Broadcaster brand supply items
New products
See at booth
Circle (543) on Reply Card

Gregg Laboratories
Booth 455
Established products
Telemix: Studio/telephone interface device
New products
2540: AM audio processing system
2040: Broadcast control console
Circle (544) on Reply Card

Grumman Aerospace Corporation
Booth 1631
Established products
501-000 SYNC PROC™: Combination of full feature sync generator and video

YOU MAY NEVER AGAIN HAVE TO BUY ANOTHER TRIPOD!

Now there's no need to buy special tripods for special tasks. QuickSet's new S-Y-S-T-E-M 2000 is a unique modular component tripod system that can be adapted to virtually any environment or any task that you, the professional, will face!

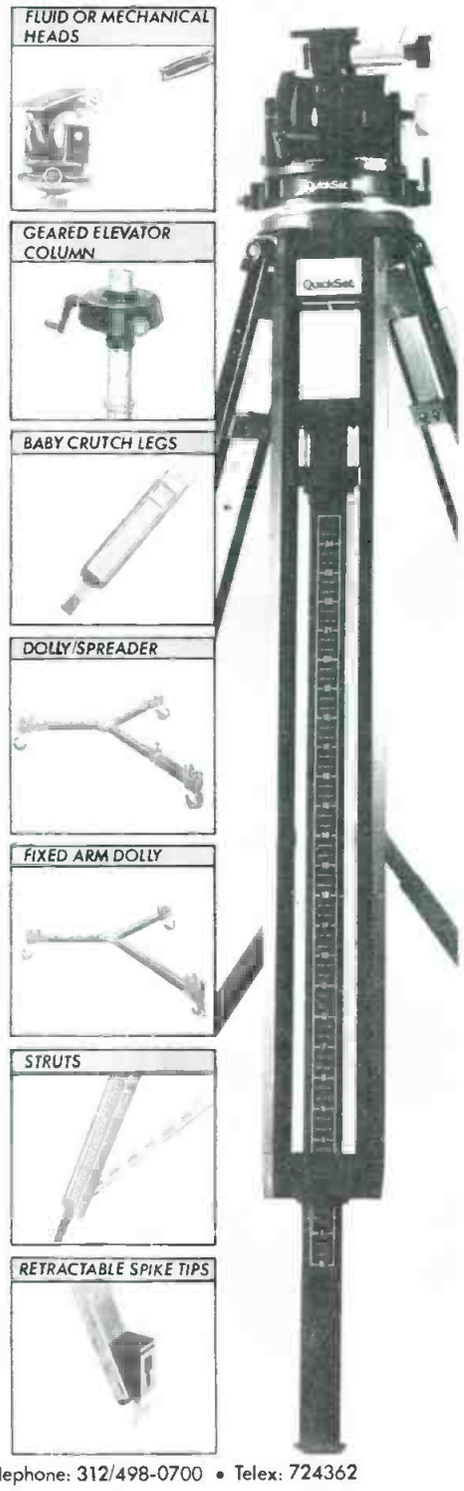
S-Y-S-T-E-M 2000 starts with a basic tripod unit which includes extendable crutch legs (33" to 55"), a spreader and, multi-purpose mounting plate. To the basic unit you may add or interchange any of the following components:

- Baby Crutch Legs (19" to 27")
- Dolly/Spreader
- Fixed Arm Dolly
- Fluid or Mechanical Heads
- Struts
- Retractable Spike Tips
- Geared Elevation Column

S-Y-S-T-E-M 2000 is ideal for most ENG, EFP or film cameras, microwave transmission equipment, lasers and electro-optical equipment. It's lightweight yet impact resistant alloy and DuPont Zytel® construction assures a lifetime of service in any conditions.

S-Y-S-T-E-M 2000 is the only tripod to offer you modular versatility. Start with the basic system today and add to it as needed. Enjoy the good feeling of knowing that you may never again need another tripod!

-S-Y-S-T-E-M-
2000



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QuickSet

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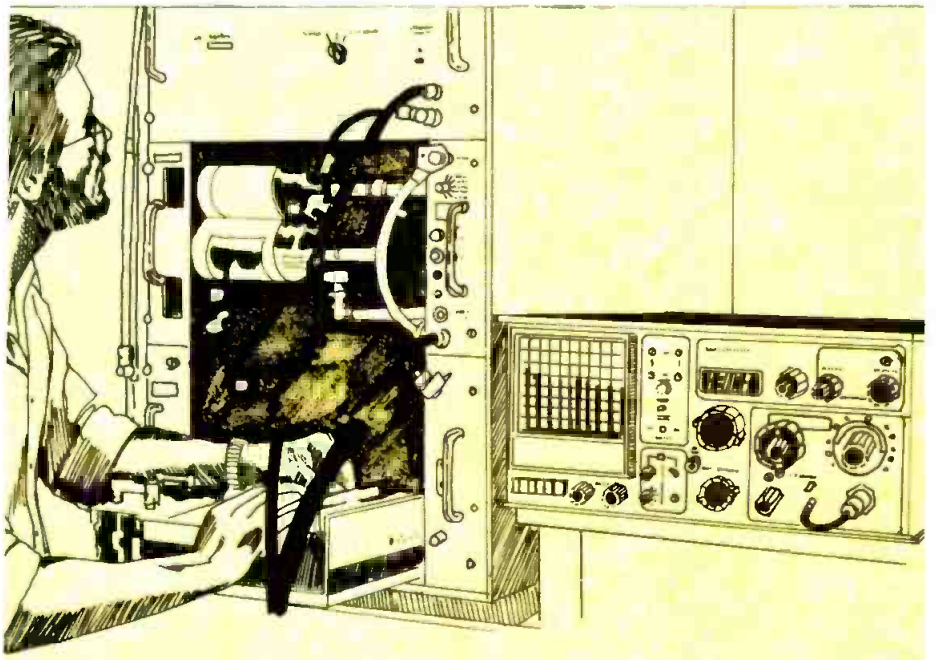
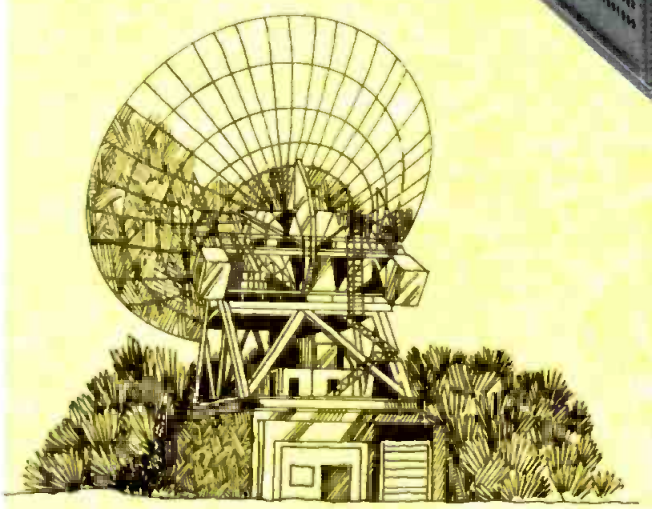
NEW SPECTRUM ANALYZERS



For monitoring, service and testing 100 kHz to 2 GHz

The Model 632B-1 compact Spectrum Analyzer provides excellent performance, high accuracy, ease of use and high reliability.

It is well suited for modern communications signal analysis, CATV, CB, wide range distortion and noise measurements, test equipment calibration, EMC tests, and other frequency domain applications up to 2.0 GHz.



Send for our new brochure.

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The new Philips LDK6

The first "total" automatic camera.

Only the LDK6 provides 100% automatic control for all primary and secondary setup adjustments...plus it has multiple diagnostic systems and many other automatic and operating features.

The LDK6's advanced design provides unprecedented reliability and flexibility. It launches a new era for broadcast and production.

If you are interested in the most advanced studio/field camera available today, and the best investment for the '80s...put yourself behind the LDK6.

Call or write for details.
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PHILIPS

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At NAB...visit us at
Booth 1409A

PHILIPS

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Grumman (1631)
Continued
proc amp. with chroma capabilities
501-301: Video source identif.
501-302: VITS VIRS
502-307: Color encoder with composite and component outputs
New products
601-000: RAINBOW SOUND: System for encoding audio into video—TV stereo audio demonstration
701-000: Machine Control System
Circle (907) on Reply Card
see ad on page 85

HEDCO
See Hughes Electronic Devices Corporation

HM Electronics
Booth 1130
Established products
System 22EF: ENG/EFP wireless microphone system
System 22E: Studio wireless microphone system
System 25E: Studio hand-held wireless micrnphone system
System 25EF: ENG/EFP hand-held wireless microphone system
150E Series: Full duplex wireless intercom system
AD-10A: Triple antenna diversity system
New products
System 85: Second generation hand-held wireless microphone system
700 Series: Cabled intercom system
PAL: Precision audio link for sound reinforcement
Circle (551) on Reply Card
see ad on page 291

Hallikainen & Friends
Booth 306
Established products
TVA132/142: Expandable modular audio mixer
TEL171: Digital metering adapter for Moseley TRC-15A
TEL172: Digital metering adapter for Moseley PBR 30A
PCC181: Transmitter control and logging for Moseley TRC 15A
PCC182: Transmitter control and logging for TFT 7610/7815/7832
PCC183: Transmitter control and logging for Moseley DRS 1A
New products
191: Digital Remote Control
Circle (552) on Reply Card
see ad on page 84

Harris Corporation, Broadcast Div.
Booth 401
Established products
SX-1: AM transmitter
SX-2.5: AM transmitter
SX-5: AM transmitter
FM25K: 25kW FM transmitter
FM 2.5: FM transmitter
TV50H: 50kW TV transmitter
TVE55: 55kW TV transmitter
Satellite antenna and control system
Autotron Star Word Processing unit
9003 automation system
9001 facilities control system
Micro Mac audio console
MSP 90 audio processing rack
Amplifier
TC-85 camera
New products
PK-90: Phono preamp, 10-channel audio console
STX-1: AM stereo exciter
MX-15: FM exciter, UHF TV slot antenna
TC-90: ENG/EFP camera
Circle (1147) on Reply Card
see ads on pages 51, 143, 159 and 185

Harris Corporation/
Broadcast Microwave
(formerly Farinon Video)
Booth 401
Established products
FV-13MP: 13GHz ENG microwave transmitter and receiver
FV2MP: 2GHz ENG microwave transmitter and receiver
FV2/25G: Global IX transmitter
FV/F: STL/TSL fixed radio
FVCR: 2, 2.5 and 7GHz receivers
60732: Power amplifier
FV7MP: 7GHz ENG microwave transmitter and receiver
60828: Power amplifier
New products
Portable antenna systems
Circle (546) on Reply Card
see ads on pages 51, 143, 159 and 185

Harris Video Systems
Booth 401
Established products
HVS 516: Digital TBC
HVS 516WB: Digital TBC with extended bandwidth for BVU type VTRs
HVS 515: Digital TBC for PAL-M
HVS 630: Frame synchronizer/noise reducer/TBC
HVS 631: Frame synchronizer/noise reducer (PAL) TBC
HVS 690: Frame synchronizer/TBC
HVS 590: Digital TBC—for all format VTRs
IRIS II: Digital still-store system
New products
HVS 517 Highband: Digital TBC (PAL format) for BVU type VTRs
Digifont: High resolution character generator for slide titles
Circle (554) on Reply Card
see ads on pages 93, 104, 105 and 115

Harrison Systems
Booth 1324
Established products
TV-3: Stereo TV production and post-production mixing console
DS-1: Videographic metering system
New products
TV-4: Stereo TV production and live "on-air" mixing console
Circle (892) on Reply Card

Karl Heitz
Booth 1115
Established products
KINOPTIK: Lenses cine/video
GITZO: Cine/video tripods
Combi tripods, tripods with counter-balanced heads, leveling balls, dollies, microphone booms, lightstands, projection stands, platforms
GITZO: Spring-balanced video heads, tripods
GITZO: Fluid heads, fluid base, tripods
GITZO: Monopods with soft grips
New products
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 combi tripods with spring-balanced head
Circle (555) on Reply Card

Hero Communications
Outside exhibit
New products
3.8m, 5m, 6m and 7.5 m Super-Tennas
9m Super-Tenna scheduled for introduction in three months
Circle (1324) on Reply Card
see ad on page 316

Hitachi Denshi America, Ltd.
Booth 1402
Established products
SK-110: Computer studio camera
SK-1: All solid-state camera with three MOS sensors
SK-11: Computer hand-held camera
SR-10: 1-piece combined camera/recorder—M format
SK-91: Ultra-light ENG camera with diode gun
SK-81: Gltra-light ENG camera
FP-22: Computer set-up ENG camera
FP-10: High resolution single tube camera
HR-310: 3-hour Type "C" machine (VTR)
HR-210: Production console Type "C" VTR
HR-200E: Auto diagnostic studio Type "C" VTR
HR-100: Portable, battery-operated type "C" VTR
New products
SR-3: ENG/EFP recorder/camera using ¼-inch tape format recorder and 3-tube prism optics
½-inch recorder/camera using ½-inch tape M Format recorder and 3-tube prism optics
ECR-5: ¼-inch playback VTR
ECR-50: ½-inch playback VTR
FP-15, FP-11: ENG/EFP color camera with 3-tube prism optics
Circle (547) on Reply Card
see ad on page 3

Howe Audio Productions
Booth 406
Established products
7500 Console: Slide fader
7012A: Slide fader
7012: Slide fader
2000: Phase Chaser
New products
2100 Phase Chaser: Improvements included and built-in power supply
Circle (556) on Reply Card
see ad on page 119

Hughes Electronics Devices Corporation (HEDCO)
Booth 1516
Established products
TransPath I: 100 inputs x 100 outputs 3-stage routing switcher with alphanumeric control heads with processor-based matrix for automatic, redundant path selections
Routing switchers: Varying sizes of 8x1 thru 16x16 in either video, audio or AFV
Distribution equipment: Equalizers, subcarriers, pulse, clamper and sync stripper video distribution amplifiers

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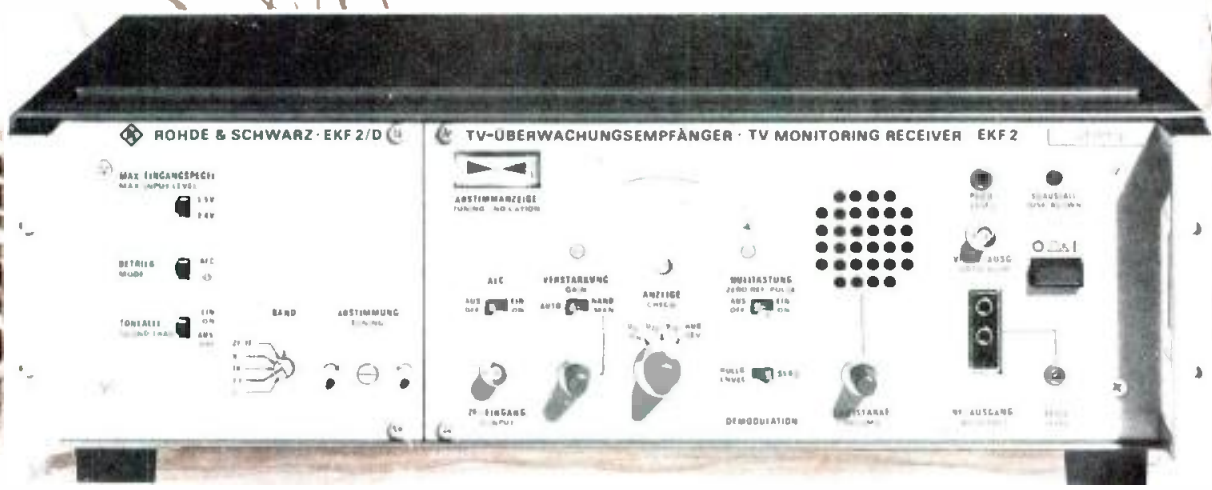
THE FUTURE IS IN STEREO SOUND TV... AT NAB BOOTH 1203

It Stands Alone

The Rohde & Schwarz Precision TV Demodulator Type EKF2/D



- **20 mV-1.5V Input For Precision Transmitter-Site Monitoring**
- **Off-Air Monitoring Receiver EKF2** also available (250 μV-150 mV)
- **Unique 2-Way Tuning:**
  PLL Tuning Across The Complete Broadcast Range (Channels 2-83)
  plus
  One Crystal (Any Channel) For High-Accuracy
  (All included! No plug-ins or modifications necessary!)
- **All Demodulation Modes:**
  Switchable Envelope/Synchronous Demodulation
  Switchable Sound-Trap
  Zero-Reference Pulse
- **Built In Speaker For Direct Audio Monitoring**
  Available From Stock

The EKF2/D is the world's new standard for precision TV Demodulators ... price/performance is unequaled ... because it's from ROHDE & SCHWARZ — leaders in precision, quality video products.

Write For New 6 Page Brochure

ROHDE & SCHWARZ

13 Nevada Drive, Lake Success, New York 11042 • (516) 488-7300

RS82-4

Circle (140) on Reply Card

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HEDCO (1516)
Continued
ADF-100: Audio distribution in both 150 and 600 versions
New products
Distribution equipment: Expanded line of distribution amplifiers
IRS 48: Intermediate routing switcher allows modular building from 12 x 12 to 48 x 48 in one frame including processor
Circle (557) on Reply Card
see ad on page 132

IGM Communications
Booth 403
Established products
Instacart: 12/24/48 instant random access multiple cart units
Go-Cart: 24/42/78 random access multiple cartridge units
New products
MARC: Remote controller for Instacart and Go-Cart
Circle (566) on Reply Card

ITE
See *Innovative Television Equipment*

Ikegami Electronics (USA)
Booth 1013
Established products
EC-35: Electronic cinematography camera
HL-83: ENG/EFP compact ⅔-inch format video camera
HM-100 & 300: M Format ½-inch video recorders (portable unit and studio edit/recorder)
HL-79D: ENG/EFP camera series with triax and multicore systems
HK-302: Low cost, high performance studio camera
HK-357A: Field/studio camera system and accessories
TKC-970: Telecine camera system
Monitors: Color and monochrome broadcast quality monitors
VTN-110: Video distribution amplifier
New products
ITC-730ENG/EFP: ⅔-inch format prism optics video camera with Saticon II tubes
HL-79E: Ultra high performance ENG/EFP camera
ML-79/83: Microwave system (portable ENG) for HL-79 and HL-83 cameras
HK-322: Final version of Ikegami's most advanced studio/field camera system
Series 9 monitors: 9-inch in-line gun color
Series 3 monitors: 9-inch and 14-inch monochrome units
HDTV camera and monitor systems
Circle (568) on Reply Card
see ads on pages 52, 53, 55, 57 and 59

Image Video Ltd.
Booth 1341
Established products
8100: Automated master control
4100: Machine assignment 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
New products
9100: Routing switcher
8200N: Master control
7800: Routing switcher control panel
7300: Voltage monitor panel
7001: Dual video mix amplifier
Circle (569) on Reply Card
see ad on page 131

Industrial Sciences
Booth 1232
Established products
901: Video production switcher
902: Video production switcher
1002: Audio console
821: Master control switcher
660-4: RGB chroma-keyer
210: Video production switcher
200-3: Video production switcher
904: Video production switcher
659: Quad split generator
New products
See at booth
Circle (570) on Reply Card
see ad on page 332

Innovative Television Equipment (ITE)
Booth 1215
Established products
Dollies, tripods, studio pedestals, heads and camera-mounting equipment
New products
P2: Pneumatic studio pedestal
T3: Lightweight ENG tripod
H3A: Heavy-duty studio pan/tilt head

The Wireless Intercom System
designed for your specific needs

The Cetec Vega Q System fulfills the demanding applications of motion picture, broadcasting and stage production communications. Sound and camera crew cuing, stunt coordination, sound program monitoring, etc. can be achieved easily without running cables.

Features

- Can interface with wired intercom systems such as RTS, Clear-Com, David Clark, four wire, etc.
- Operates simplex or duplex with up to 6 walking units plus 1 plug-in unit (at the base station, which can include a wired-intercom interface).
- Operates in the VHF high band, 150 to 216 MHz, for minimal interference.
- Usable with commonly available headsets (electret or magnetic).

See Us at NAB Booth 1210

Cetec Vega
Division of Cetec Corporation
P.O. Box 5348/El Monte, CA 91731/(213) 442-0782/TWX 910-587-3539
In Canada: A. C. Simmonds & Sons Ltd.

Circle (141) on Reply Card

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DPS-103 COMPONENT TBC

The single-clock TBC which delivers instantaneous high-speed correction and eliminates even the fastest of skew errors. The ideal low-cost editing TBC for heterodyne VTR's.

PHASER V FRAME SYNCHRONIZER

With freeze field and frame, for synchronizing head-ends and critical feeds.

PHASER I TBC/ FRAME SYNCHRONIZER

The same excellent transparency as the Phaser IIA, for 1/2 and 3/4" VTR's only.

PHASER VI CHROMA INVERTING SYNCHRONIZER

The Chroma Inverting Synchronizer with full bandwidth freeze, for high-quality studio and production use.

PHASER IV SYNCHRONIZER

For teleconferencing, ENG/mobile applications and all situations where a synchronizer with a field store will do the job.

PHASER IIA TBC/ FRAME SYNCHRONIZER

Sets industry standards for signal transparency. A TBC/ synchronizer for 1/2, 3/4 & 1".

DPS-1 TBC & SYNCHRONIZER

A 32 line TBC, or TBC/frame synchronizer for 1/2, 3/4 and 1". With test signals and sync drive outputs.

igital Video Systems: a ey source for studio products. ontact your nearest dealer for ore details on systems for roduction, broadcast, cable, dustrial or educational use.

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ofessional Video
stems Boston
17) 254-2101

nocraft Corp.
w York.
12) 760-9300

Midwest Corp.
Communications
Edgewood, Ky.
(606) 331-8990
Virginia Beach, VA.
(804) 464-6256
Miami, Fl., (305) 592-5355
(and other offices)

United Video
Ottawa, Ont.
(613) 741-5554

Digital Video
Systems, Toronto
(416) 499-4826

Los Angeles
(213) 462-6153

DIGITAL

ONE STOP SHOPPING

Circle (142) on Reply Card

	DPS-1TBC	DPS-1TBC/FS	PHASER	PHASER IIA	DPS-103	PHASER IV	PHASER V	PHASER VI
CORRECTION RANGE	32 lines	2 Fields	2 Fields	2 Fields	16 lines	1 Field	2 Fields	2 Fields
ADVANCE SYNC	Yes	Yes	No	Yes	Yes	N/A	N/A	N/A
DIRECT COLOR	Yes	Yes	Yes	Yes	No	N/A	N/A	N/A
HETERODYNE BOARD	Optional	Optional	Yes	Yes	No	N/A	N/A	N/A
VEL. COMP	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A
DROPOUT COMP.	Optional	Optional	No	Yes	No	N/A	N/A	N/A
SYNCHRONIZER	No	Yes	Yes	Yes	No	Yes	Yes	Yes
FRAME FREEZE	No	Yes	Yes	Yes	No	Non-select field freeze	Field & frame	Full B width frame
COMB FILTER	No	3 line	2 line	3 line	No	No	No	3 line
MATCH FRAME EDITS	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A
STABLE PIX. IN SHUTTLE	40 X	40 X	5 X	40 X	40 X	N/A	N/A	N/A
BUILT-IN CALIB./TEST GENERATOR	Yes & 9 test functions		Switch selectable test signals		Dip switch selectable color bars and ramp			
SYNC GENERATOR OUTPUTS	Yes	Yes	No	No	No	—	—	—
HYSTERESIS	—	11	11	11	—	2	2	2
PASSES	VITS, VIRS	VITS, VIRS T text optional	VITS, VIRS	VITS, VIRS teletext optional	VITS, VIRS	VITS, VIRS	VITS, VIRS, Closed Captions, teletext	
HOT SWITCH	(Sensitivity Selectable)							

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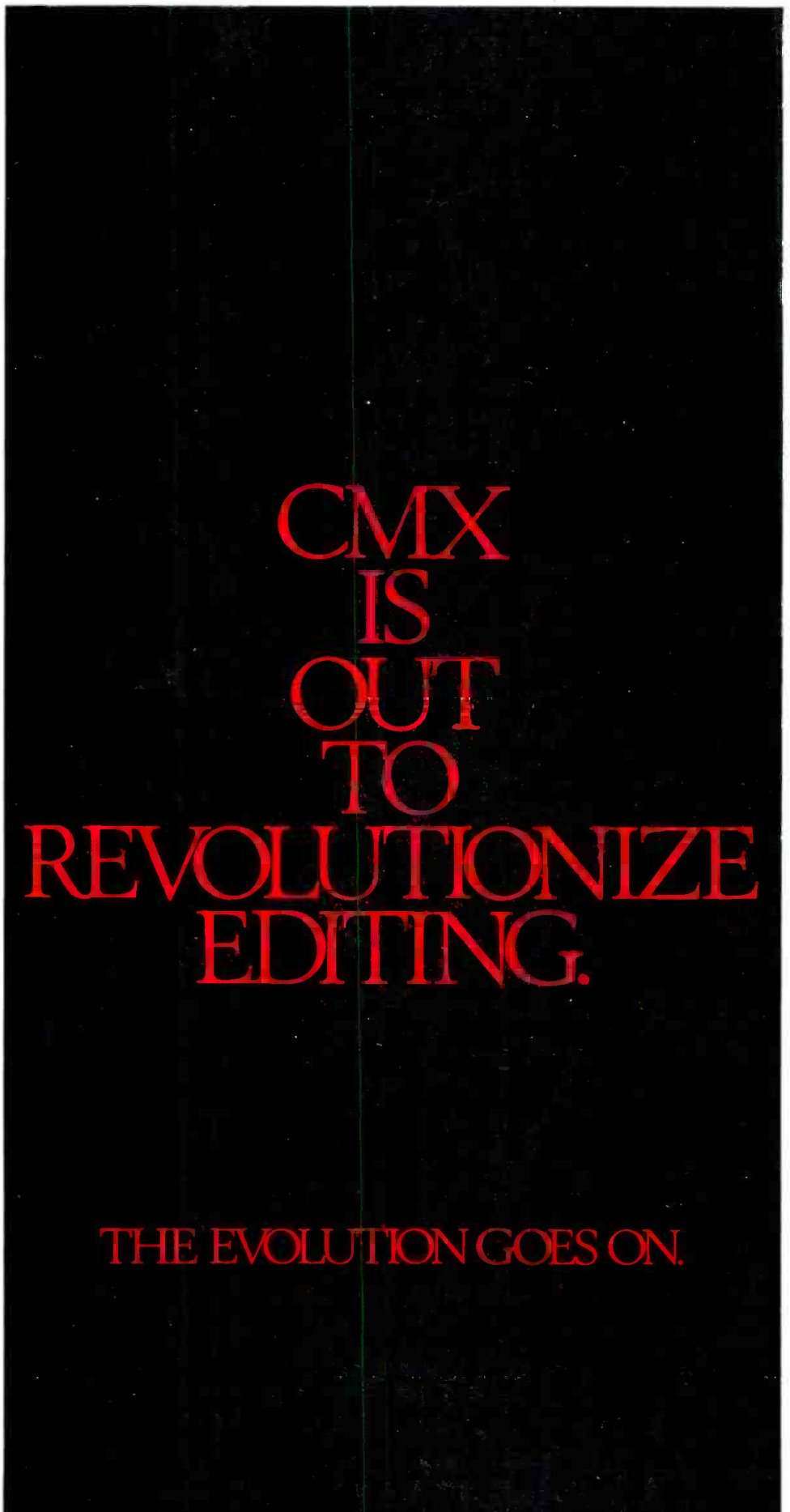

ITE (1215)
Continued
H16: Fluid head with adjustable counterbalance
H17: Fluid head with adjustable counterbalance
T14: Medium-duty field tripod and microwave
Circle (567) on Reply Card
see ad on page 138

Inovonics
Booth 304
Established products
201: Average and peak responding limiter for production and recording
215: Multifunction broadcast audio processor
231: "MAP-II" multiband audio processor for AM broadcast
241: "DYNEX" noise suppression unit to "clean up" noisy audio sources
370: Replacement audiotape recording electronics for older Ampex and Scully recorders
380: Magnetic recording electronics for tape and film
405: "TENTROL" constant tension kit for audio recorders
500: ⅓-octave real time and reverberation acoustic analyzer
"GHM": Gordon headroom meter "PPM" for audio level monitoring
New products
250: Programmable, multiband stereo audio processor for AM and FM stereo
"uniVUer": Video display device for monitoring audio levels via video monitors
Circle (571) on Reply Card
see ad on page 191

Integrated Technologies
Exhibiting with Colorgraphics Systems
Booth 1116
Established products
Newstar: Automated news/weather/sports computer system
Circle (1117) on Reply Card
see ad on page 31

Interactive Market Systems
Booth 310
Circle (939) on Reply Card

Interactive Systems Company
Booth 1167
Established products
21: Editing system
31: Editing system
409: Software
Trace: Software
Super Edit: Software
New products
41: Editing system, which includes 11/23 (CPU), motion control (jogger), RS 422 direct control and 32kW CMOS memory
"Mini" Software programs
Circle (1118) on Reply Card
see ad on page 245

Interand Corporation/
Telestrator Div.
Booth 1622
Established products
440: Telestrator products
100: Designed for news, sports, weather and special events coverage. Users of the unit can apply videographics instantly

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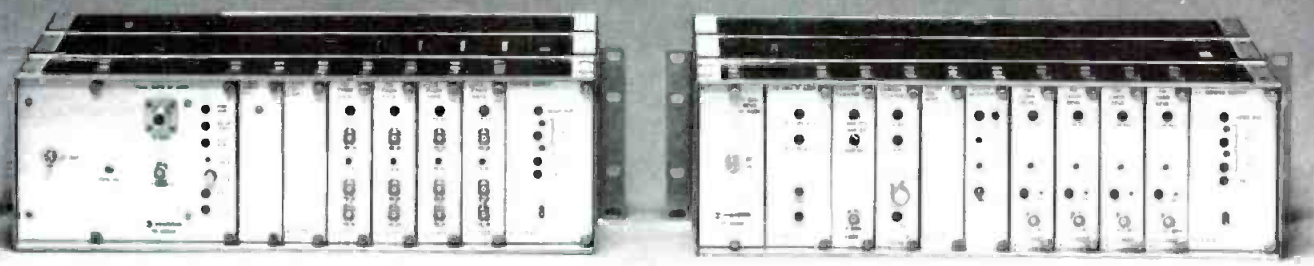
Advanced technology in a new, compact television relay system...



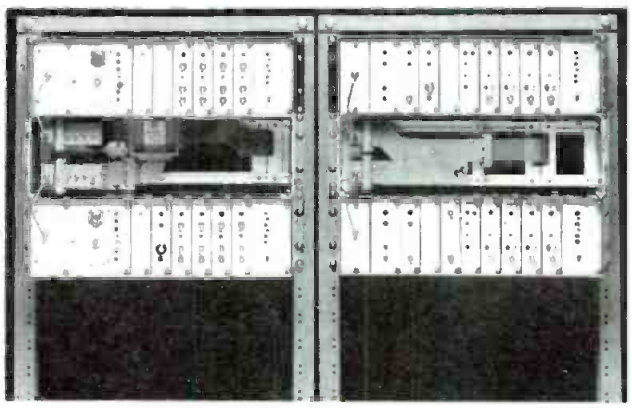
Harris 7FB Solid-State Microwave for Television Relay

Designed for STL, TSL and Multi-Hop Systems

Introducing a new, compact baseband radio from Harris Broadcast Microwave. Designed for easy installation in existing equipment racks, each receiver or transmitter uses only six rack mounting spaces. Yet this compact television relay system offers superior transmission performance for single-hop STL/TSL systems and for many multi-hop intercity systems.

FET Technology... Low-Noise Figure

The transmitter uses a phase locked source to assure precise transmit frequency and a power-efficient, state-of-the-art broadband FET output amplifier. Use of a thin film LNA and an Image Rejection Mixer result in a receiver noise figure of only 7 dB.



In this fully protected system, the audio and video signals automatically switch to a second system in the event of service interruption to the main receiver and transmitter.

Video Clamper is a Standard Feature

Some manufacturers call this a luxury option. We call it built-in quality. Our 7FB receiver includes a clamper which stops picture bounce, reduces low frequency noise and eliminates hum from the video signal.

Expandable System

You can easily expand your 7FB system, in the field if you wish, to a fully protected version. The monitored hot standby protection arrangement is offered as a factory option or as a field installed add-on. And you can equip the system with up to four audio subcarrier channels—in the same shelf as the radio.

Simplified Maintenance

To save maintenance time and cost, the 7FB is designed with modular plug-in units. This design allows each unit to be quickly and easily removed for servicing.

Quality, Service & Technology Leadership

Farinon Video—now Harris Broadcast Microwave—built its reputation by supplying top quality television transmission equipment for STL, ICR and portable systems. You can continue to expect exceptional quality and the finest service-after-the-sale from the industry's technology leader...Harris Broadcast Microwave.

For all your microwave equipment and accessories, contact HARRIS CORPORATION, Broadcast Microwave, 1680 Bayport Avenue, San Carlos, CA 94070. Phone (415) 595-3500.

Visit Harris at the 1983 NAB, Las Vegas, in the North Hall.

HARRIS

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Interand (1622)
Continued
to the basic video image: live action, slow motion or freeze frame
880: Telestrator
New products
440: Designed for real time TV programming and quick pre- or post-production animation graphics and effects
Circle (572) on Reply Card

Interface Data Systems
Booth 1517
Established products
PDP-11: Digital computer system
VAX: Digital computer system
Service: Maintenance for mixed vender systems
TV station automation system
New products
See at booth
Circle (574) on Reply Card

Interface Electronics
Booth 215
Established products
200B: Modular location mixer for battery/ac operation with eight inputs and two outputs plus two auxiliary outputs
New products
550: Modular broadcast/TV production mixer
Circle (1119) on Reply Card
see ad on page 228

Integrated Sound Systems
Booth 327
Circle (893) on Reply Card

International Tapetronics/3M
Booth 107
Established products
Series 99B: Audiotape cartridge reproducer and recorder/reproducer
770 Series: Reel-to-Reel reproducer and recorder/reproducer
PD-II Series: Tape cartridge reproducer and recorder/reproducer
ESL-IV: Eraser/splice locator
FB-1: Telephone interface—answer only
New products
Delta Series: Audiotape cartridge reproducers and recorder/reproducers
Circle (573) on Reply Card
see ads on pages 285, 287 and 289

International Video Corporation
Booth 1509
Established products
ABR-1A: AB roll editor with animation
Edit Centres: 2-VTR editor with animation
Super Controller: 2-VTR editor
New products
Mimosync: Frame store synchronizer
Video Changer: TV station commercial automation
Circle (1120) on Reply Card

JBL (James B. Lansing)
Booth 615
Established products
4301: 2-way control monitor
4411: 3-way studio monitor
4312: 3-way control monitor
4430: Studio monitor, bi-radial horn
New products
4401: 2-way studio monitor
7510A: Automatic microphone mixer
Circle (581) on Reply Card
see ad on page 257

JVC Company of America
Booth 1234
Established products
KY-1900U: ENG camera
"TapeHandlers": Studio and portable ¾- and 1-inch VCRs
KM-2000U: SEG
C-2082U: 19-inch color monitor
VE-90A: Edit controller
GZ-S3U/HR-C3U: Camera/recorder
New products
See at booth
Circle (582) on Reply Card
see ad on page 235

Jam Creative Productions
Booth 206
Circle (894) on Reply Card

Jamieson & Associates
Booth 1718
Established products
Broadcast consulting and facility design
Circle (895) on Reply Card

Jatex
Booth 1132
Established products
VSEC 42TD: Automatic editing control unit
VGEN IV: Generator/reader
VSEC 62TMX: Editing controller
New products
See at booth
Circle (583) on Reply Card

Jefferson Data Systems
Booth 1629
Established products
System 90: Sales, traffic and general accounting for radio and television
New products
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
Circle (896) on Reply Card

Jenel Consultants Corporation
Booth 1338
Established products
Design, consulting, and engineering for TV/radio studios and facilities, system design, computer systems, earth stations, mobile vans, post-production facilities, interactive cable systems for industry and physical facilities
New products
Broadband interactive TV system
CRS "Computer Tutor" computer education
Computer-aided studio and system design
Circle (584) on Reply Card

Jensen Tools
Booth 1169
Established products
Series: Tool kits and tool cases
New products
See at booth
Circle (585) on Reply Card
see ad on page 171

Kahn Communications
Booth 625
Established products
STR77: AM stereo
NSM125: Non-Symmetra-Mod modulation enhancement equipment
LP-21: Lines-Plus quality enhancement equipment
SP581A: Symmetra-Peak
LP-2L: Lines-Plus
New products
See at booth
Circle (1142) on Reply Card

Kaman Sciences/BCS
Booth 1607
Established products
Series: Computerized traffic/billing system
Series: News inventory program
Series: Demographic system
Series: Film inventory, amoritization and programming program
Series: Audio-video cart inventory and allocation program
Series: Auto-switching interfaces
New products
See at booth
Circle (589) on Reply Card

Kavco
Booth 1706
Circle (897) on Reply Card

Kavouras
Booth 1635
Circle (898) on Reply Card

King Instruments
Booth 1794
New products
582: ¾-inch U-matic cassette loader
590: VHS/BETA videocassette loader
VCT 101: Videotape dropout verifier
VCT 102: Chroma/audio verifier
Circle (1331) on Reply Card
see ad on page 147

Kings Electronics Company
Booth 1623
Established products
Series: RF coaxial and triaxial connectors
Series: Video patch panels and accessories
New products
See at booth
Circle (588) on Reply Card

Kliegl Brothers
Booth 1604
Established products
Entertainer: Hands-on-memory control console
Performer: Memory control console
1550 Series: Ellipsoidal reflectors
New products
K96 Dimmers: Portable digital dimming system
Circle (590) on Reply Card

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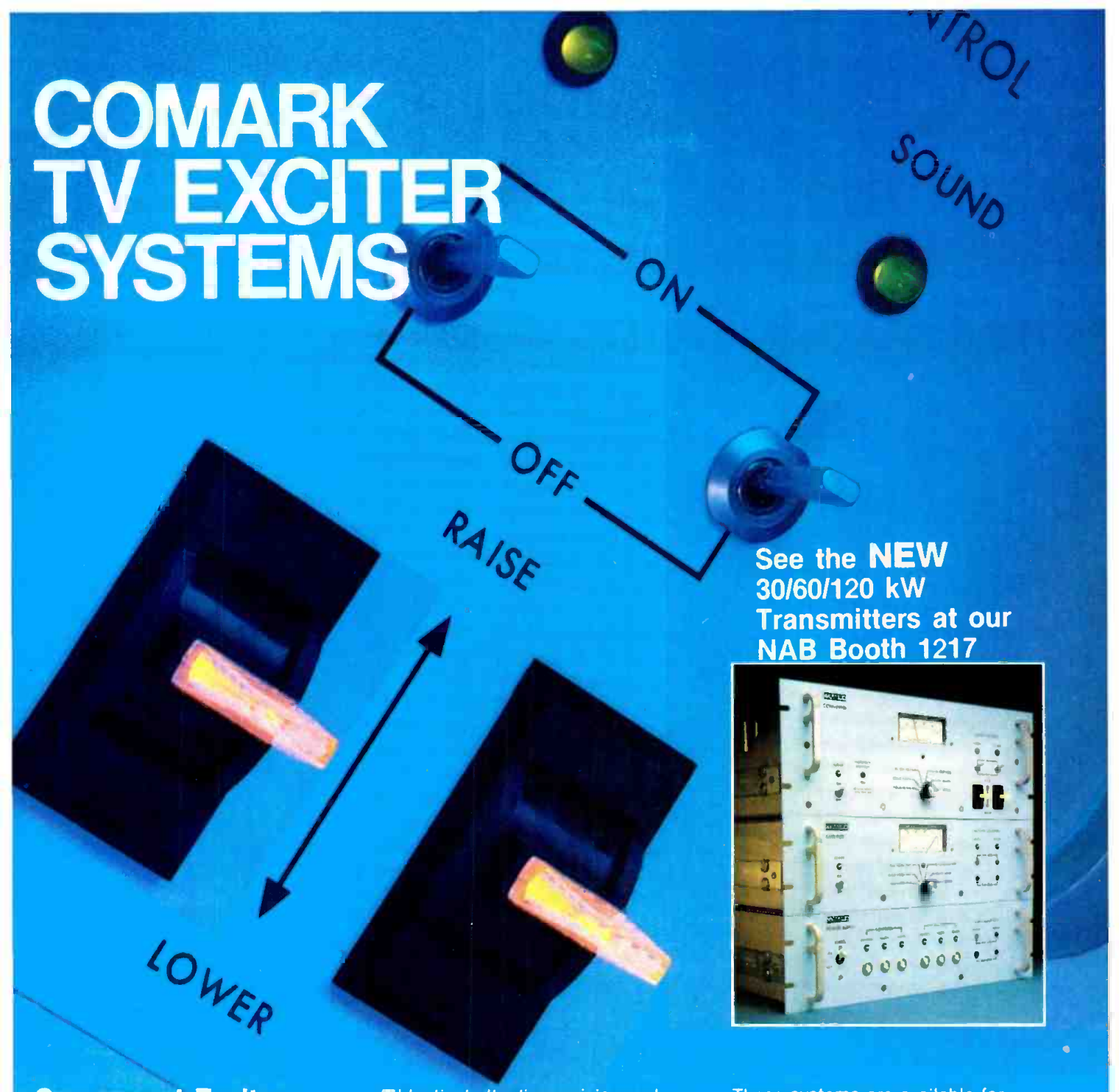
COMARK TV EXCITER SYSTEMS



See the NEW 30/60/120 kW Transmitters at our NAB Booth 1217

Component Exciter Systems Only from Comark

Comark introduces a truly new concept in television exciter design—the "component" exciter system. With Comark exciters you get the versatility to upgrade your existing RF plant one piece at a time as your needs require.

All of these unique features are available only with the Comark exciter concept.

- Totally broadband operation from 460 MHz to 890 MHz eliminates all tuning adjustments in any amplifier or multiplier stage.
- Parallel signal path design and redundant power supplies insure highest on-air reliability.
- Identical ultra-linear vision and sound chains permit instantaneous emergency multiplexing through both channels by remote control.
- Plus, you can choose to incorporate these options:
  - —output power ranges from 15 to 100 Watts, vision and sound
  - —separate drawers for System Envelope Delay Corrector, ICPM Corrector, Linearity Corrector and Mod Anode Pulser

In addition, Comark exciter systems include full front-panel meter monitoring and complete remote control capability. Plug-in modular RFI construction permits ease of maintenance, while insuring maximum system stability.

These systems are available for upgrading existing transmitter plants and are standard on all current Comark high powered UHF broadcast transmitters.

For a free copy of our Universal Exciter Systems brochure, write or call today.

COMARK

Engineering and Sales Offices
Rt. 309 and Advance Lane
Colmar, PA 18915
(215) 822-0777 Telex: 846075

International Headquarters
Rt. 57, Feeding Hills Rd.
Southwick, MA 01077
(413) 569-5939

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Kobold of America Corporation
Booth 1725
Established products
DLF-200: HMI lighting fixture
DLF-2500: HMI lighting fixture
ST-1000: Halogen lamp lighting fixture
New products
DLF-2000: Par 64 lighting fixture and ballast
FR-1000 and DLF-575: 1000W Halogen lamp fresnel fixture
Circle (1326) on Reply Card

Kodak
See Eastman Kodak

LPB
Booth 405
Established products
Signature Series: Audio consoles
Monogram Series: Audio consoles
Citation Series: Audio consoles
AM-50/250: Low power MW transmitters —50W to 250W AM
TIS: Traveler's and highway advisory transmission systems
New products
Benchmark Series: Audio consoles
Circle (591) on Reply Card

LTM Corporation of America
Booth 1516
Established products
Series: HMI lights
Series: Portable location lighting kits
12V minette camera—mounted 12V/100 W light
30V sun gun
New products
Luxarc 6000W: Daylight HMI light with 24-inch fresnel lens
MSL 250: Daylight balanced fiber-optics lighting system
Circle (604) on Reply Card

L-W International
Booth 1305
Established products
Athena 4000: Telecine projector
Athena 6000: Telecine projector
Circle (592) on Reply Card
see ad on page 278

Laird Telemedia
Booth 1721
Established products
5300: Multiplexer and associated projectors
5400: Multiplexer
3600: Character generator
1040: Video "Q" board
1060: Video pointer
7200: Character generator
3300: Message generator
1500: Character generator
1600: Character generator
New products
See at booth
Circle (593) on Reply Card
see ad on page 232

Lang Video Systems Corporation
Booth 1780
Established products
VSI-820: Video source identifier
ONE-SHOT: Video switcher, audio mixer and identifier
VAX-700: Automatic A/V 2X1 switch-over with identifier
New products
VSI-820 (PAL): In the PAL system
ONE-SHOT (PAL): In the PAL system
VAX-700 (PAL): In the PAL system
BIG-SHOT: 6- to 8-input video switcher, audio mixer, identifier and SMPTE bars
Audio DAs: 6- to 8-output DAs
Audio Switchers: 6- to 8-output DAs
Circle (605) on Reply Card

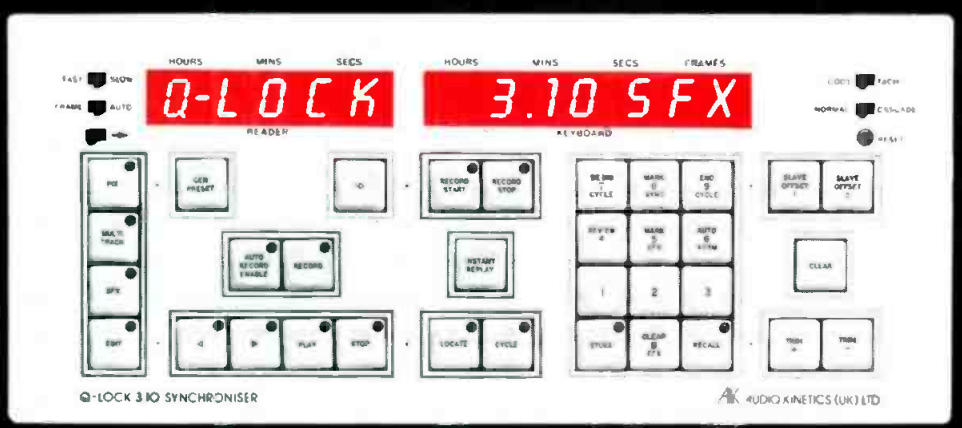
Lansing, James B.
See JBL

Larcan Communications Equipment
Booth 1626A
Established products
TTC30000FH: 30kW VHF high band TV transmitter
New products
TTC12000FH: 12kW VHF high band TV transmitter
Circle (455) on Reply Card
see ad on page 314

Leader Instruments Corporation
Booth 1702
Established products
LBO-5860: Waveform monitor
LVS-5860: Vectorscope
LCG-400M/S: Video generators
LCG-396/397/399: Generators
LBO-517: Oscilloscope (50MHz)
LFC-945: CATV level meter
LFR-5600: Frequency response recorder

See Us At NAB In Las Vegas-Booth 1173

S M P T E . . .
S I M P L Y



THE **Q-LOCK** IS JUST THIS SIMPLE:

We supply a complete Audio Post Production Synchronizing system including the interfaces and cable sets for your video, audio and film equipment. The 5-1/4 x 19 inch mainframe also includes a multi-standard time-code generator and any one or all of the following specialized operating programs.

- **AUDIO SWEETENING**
- **MUSIC SWEETENING**
- **ADR/LOOPING**
- **TELECINE**
- **FILM DUBBING**

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North Hollywood, California 91607
213/980-5717
Toll Free outside of California
800-423-3666
Telex—194781

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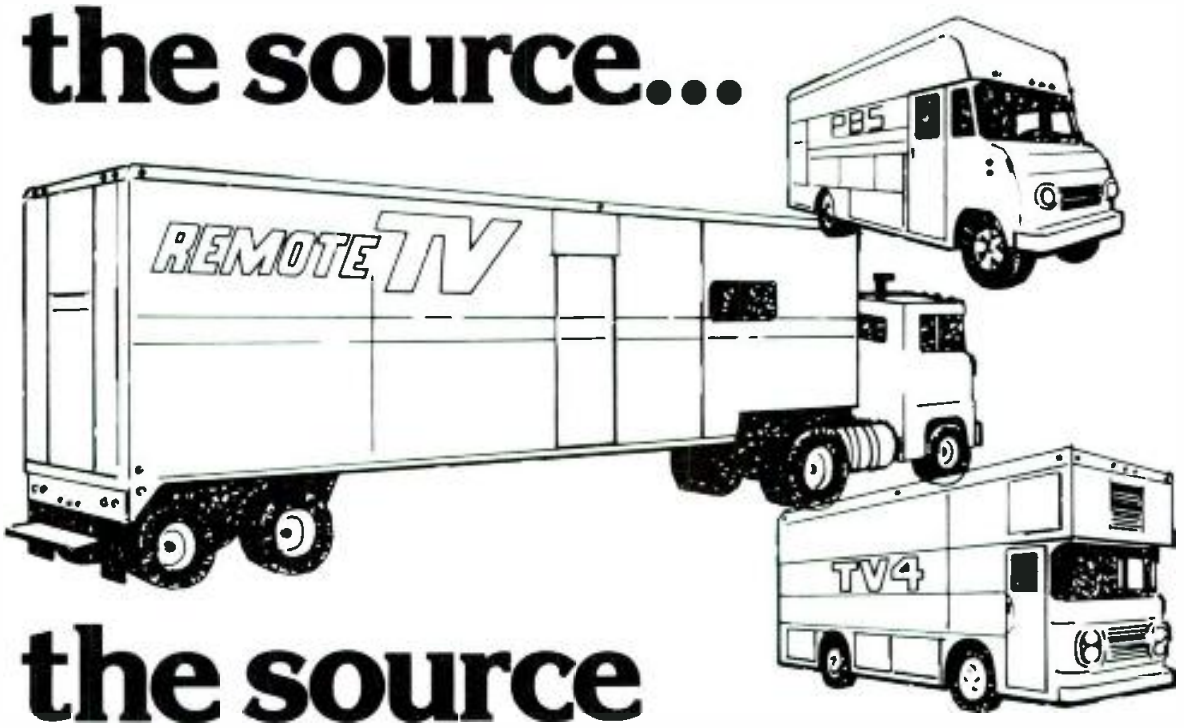
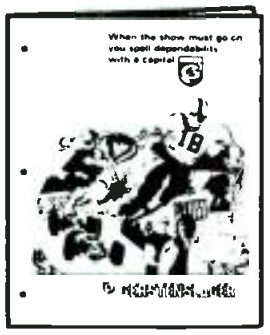
When you cover the action from the source...



the source for mobile studios should be Gerstenslager.

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



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

GERSTENSLAGER

The Gerstenslager Company, Wooster, Ohio 44691

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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 about blemishes - but then we know Leddicons aver less spotting than other tubes! The secret lies in the fact that all Leddicons must satisfy the most exacti manufacturing, testing and quality control standard These not only preclude loose particles from the ins of the tube but also ensure longer tube life.

Optimised geometry and registration

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

LEDDIC

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.
Tel: 914 592 6050. Telex: 646180. **Mid. Western Sales Office,** 2073 Arleen Court Schaumburg, IL 60194. Tel: 312 843 8417. **North-Eastern Sales Office,** 250 Han Drive, Snyder, NY 14226. Tel: 716 839 5959. **Southern Sales Office,** Route 1, Ann TX 75003. Tel: 214 837 2464. **South-Eastern Sales Office,** Suite 100E. 15 Dunwoody Park, Atlanta, GA 30338. Tel: 404 394 9201.
Tri-State Sales Office, 7 Westchester Plaza, Elmsford, NY 10523. Tel: 914 592 6
Western Sales Office, 19001 40th Place, N E Seattle, WA 98155. Tel: 206 363 22
IN CANADA EEV Canada Ltd, 67 Westmore Drive, Rexdale Ontario M9V 3Y6. Tel: 416 745 9494. Telex: 06 989 363.
REST OF THE WORLD English Electric Valve Co Ltd, Waterhouse Lane, Chelmsford, Essex CM1 2QU, England. Tel: 0245 61777. Telex: 99103.

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;ubes in the world.

st for customer service

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

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

When you add up all the facts about EEV ddicons, there is only one conclusion – namely, the finition of the best tubes for your camera. But don't ve it at that. Next time specify Leddicons for your w equipment and as replacements. Then find out at 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 (1¼in), 25mm (1in), 18mm (⅔in) and 12mm (½in) 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:

BCC10/20/21	HL79/81/83	MNC80	TC80/85
BVP300/330	HK312/322	MKVIII/IX	TK47
CEI310	KCU/KCK40	SK91/96	TK76
FOTON 1	LDK5/15/25	SK110	TTV1515/1516

ONS®

®Leddicon is the Registered Trademark of EEV Lead Oxide Camera Tubes

EEV Camera Tubes

See us at **NAB** on Booth **1335.**

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Leader (1702)
Continued
LDC-822/823S/824S: Frequency counters
LFM-3610: Wow and flutter meter
New products
LBO-51M-V: Vector display
LVS-5850A: Vectorscope
LBO-518: Oscilloscope (100MHz)
Circle (594) on Reply Card
see ad on page 5

LeBlanc & Royle Communications
Booth 1149
Established products
K2H: Chemical ground rod
LR450, LR24, LR33, LR1000: Broadcast tower and radiator
LR1400 and LR84: TV and FM tower
Circle (595) on Reply Card

Lee-Ray Industries
Booth 1151
Established products
LRI Model 2000: Video equipment carrier
LRI Model 2100F: Video equipment carrier
LRI Model 3000: Video equipment carrier
LRI Model 3100F: Video equipment carrier
LRI Model 5100F: Video equipment carrier
LRI Model 3500: Video equipment carrier
LRI Model 4000: Video equipment carrier
New products
LRW Model 6000: Video equipment carrier
Circle (1121) on Reply Card

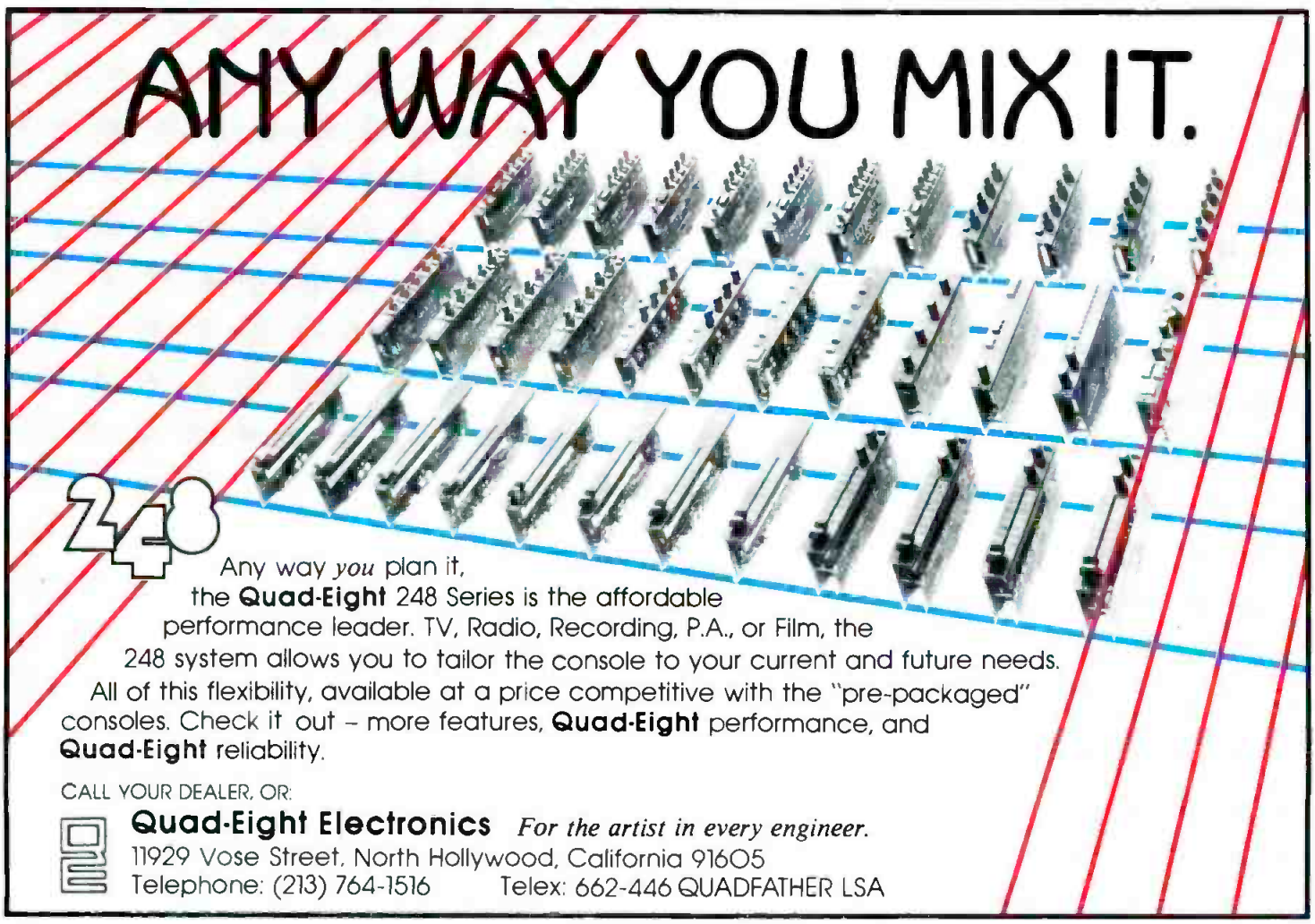
Leitch Video of America
Booth 1021
Established products
DTG-1000N: NTSC digital test generator
DTG-1100N: NTSC digital test generator
VPA-330N: NTSC video processing amplifier
SPG-102N: NTSC synchronizing pulse generator
SPG-130N: NTSC synchronizing pulse generator
Video DAs: Equalizing, clamping, pulse delay
Clock Systems: Master clock, digital and analog clocks
New products
VIP-1101N: NTSC vertical interval processor (deleter adder)
SCH-731N: NTSC SCH and horizontal timing monitor
DTS-2000N: NTSC digital TV video and multi-audio scrambler
DTD-2100N: NTSC digital TV video and multi-audio descrambler
VEA-662: Video equalizing distribution amplifier
Circle (596) on Reply Card
see ad on page 129

Lemo USA
Booth 1171
Established products
Series: Triaxial TV camera connectors
Series: Stereo and six contact patch panel connectors
Series: Cylindrical, self-locking connectors in coaxial, triaxial and multicontact configurations
New products
See at booth
Circle (597) on Reply Card

Lenco
Booth 1419
Established products
Videoscope: Certifying timing and phasing of TV system
PMG-312: Master RS170A sync generator
PGL-413: Gen-lock that conforms to RS170A requirement
PDM-470: Demodulator
VNM-428: Video noise meter
PCM-519: 19-inch color monitor
PCM-514: 14-inch color monitor
PMM-900: Black-and-white monitors
New products
400 Series: PAL sync generator
800 Series: Midrange black-and-white monitors
200 Series: Midrange color monitors
Circle (606) on Reply Card

Lerro Electrical Corporation
Outside exhibit
Established products
Completely equipped 40-foot trailer
Super Shooter III
Circle (1143) on Reply Card
see ads on pages 120 and 121

Lexicon
Booth 1139
Established products
224: Digital reverberation system →



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HEAR AND NOW.

Yamaha at NAB

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- AUDIO CONSOLES
- RECORDING MIXERS
- POWER AMPLIFIERS
- SIGNAL PROCESSORS
- SPEAKER SYSTEMS AND COMPONENTS

YAMAHA

Yamaha International Corporation • P.O. Box 6600 • Buena Park, CA 90622

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Lexicon (1139)
Continued
1200: Audio time compressor
97: Super prime time, digital audio delay processor/mixer
New products
See at booth
Circle (598) on Reply Card
see ads on pages 177, 179 and 181

Lightning Elimination Associates
Booth 302
Established products
SE-208-400: Power line surge eliminator
MB-430/3: Power line filtering system
TETM-39-1: 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
New products
PP120-8-1: Perfect power source
Circle (1144) on Reply Card
see ad on page 110

Lipsner-Smith Company
Subsidiary of Research Technology Int'l.
Booth 1626
Established products
CF200: Ultrasonic Micro-Perfect film cleaning system
New products
CF190: Film cleaning machine with submerged rotary buffers
Circle (1146) on Reply Card

Listec Television Equipment Corporation
Booth 1406
Established products
3084-3: MKVII fluid cam head for full-size cameras
3228-3: Avocet 70 fluid spring head for lightweight EFP cameras
3702-3: Fulmar broadcast standard studio pedestal
3197-3: Teal lightweight pedestal for EFP studio cameras
3741-3: Tern studio pedestal for full-size cameras
A-D17SH-1: Digivision 17-inch studio monitor on camera prompter
A-702S-1: Script drive unit for monitor prompters
3260-3: Vinten microwave pan and tilt head
New products
2000: Autocue products digital prompter
DRCCS: Vinten digital remote camera control
Merlin: Vinten manually controlled lightweight studio crane for EFP cameras
Circle (607) on Reply Card

Logitek Electronic Systems
Booth 613
Established products
Custom audio series broadcast consoles
BPA-100: Balanced-input phono preamplifier
ADA-8: Audio distribution amplifier
T-100: Presettable program timer
Audio power amplifiers
Bright-VU LED audio level displays
Large numeric display systems
Audiorack: Audio mixer designed specifically for TV ENG and EFP and TV editing booths
New products
Distribution/AGC/monitor amplifier frame
Pyramid MET-7, MET-11: Speaker systems
Circle (601) on Reply Card
see ad on page 240

Lowel-Light Mfg.
Booth 1309
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 Lowel clamping, support and rigging systems
New products
See at booth
Circle (602) on Reply Card

Lyon Lamb Video Animation
Booth 1414
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
New products
See at booth
Circle (603) on Reply Card

M/A-COM Video Systems
Formerly Microwave Associates
Booth 1004
Established products
Sky Scan, Super Scan and Mini-Scan Auto Track ENG Central Receive Systems; High gain disc array manual track ENG receiver system; 2, 2.5, 7, 13GHz ENG portable systems; 2, 7, 12GHz intercity microwave systems; 23GHz point-to-point microwave systems
New products
Skypod high gain helicopter ENG system
Super 2MX/2MR ENG transmitter/receiver
Circle (631) on Reply Card

MCI
A division of Sony Corporation of America
Booth 605
Established products
Complete line of professional recording systems for studio, broadcast and teleproduction applications
New products
JH-800 Series: Compact console
Audio production system which consists of the JH-618 console with 10 microphone inputs, five stereo line inputs and VCA grouping functions; a JH-110C-8-HP 8-channel, 1-inch recorder with remote control and Autolocator III; and the JH-110B-2-HP stereo recorder.
Circle (1304) on Reply Card
see ad on page 43

MCI/Quantel
Booth 1631
Established products
DFS 1550: Digital TBC/synchronizer
DFS 1750: Digital synchronizer/TBC
DAS 175: Digital audio synchronizer
DSC 4000 Series: Digital standards converters
DPE 5000/SP: Small-scale digital production effects system
DPE 5000: Digital production effects system
DPE 5000/PLUS: Multiple-channel digital production effects system with "Dimension"
DLS 6000: Digital library system
DPB 7000: Digital Paint Box
New products
Mirage: "The ultimate illusion"
DLS: Central library system for DLS 6000
Circle (612) on Reply Card

3M
See "Three" M

Magnasync/Moviola Corporation
Booth 1147
Established products
V-1000: Videola film-to-video transfer system with mag sound transport
V-500: Videola 2-plate for those with composite sound only
New products
V-400: 16mm broadcast Videola
Circle (903) on Reply Card

Magnavox AM Stereo
Booth 603
Circle (1123) on Reply Card

Magnum Towers
Booth 119
Established products
18M: 18-inch (face) tower section
24M: 24-inch (face) tower section
36M: 36-inch (face) tower section
42M: 42-inch (face) tower section
60M: 60-inch (face) tower section
New products
See at booth
Circle (614) on Reply Card

The Management
Booth 627
Circle (904) on Reply Card

Marcom
No booth at press time
Established products
82: Programmable broadcast audio processor
SC-203: FM stereo generator with digital overshoot corrector
New products
EBS-111 (BAX): Telephone line bandwidth expander
512: Audio line monitor/switcher
550: Motorola/Magnavox AM stereo generator-exciter
Circle (633) on Reply Card

Marconi Electronics
Booth 1609
Established products
MR2B: 1-inch C Format VTR
B4624: VTR monitoring unit
New products
B3410: CCD line array telecine with color corrector computer
Circle (615) on Reply Card

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TOWNSEND

The Television Transmission Specialists

Running a straight course keeps Townsend a step or two ahead of the competition.

The many opportunities in television have attracted several of today's largest corporations into our industry from a variety of backgrounds. Since the beginning, Townsend Associates has been dedicated to the design, development, and manufacture of television transmission equipment exclusively. It's not a sideline with us. And we're not someone else's subsidiary. From transmitters to components, everything we develop and produce is mainstream to the transmission of television.

INNOVATIONS THROUGH SPECIALIZED R&D

High Power UHF & VHF Television Transmission

FIRST solid state exciter.

FIRST to employ emergency klystron multiplex circuitry for UHF.

Low Power UHF And VHF Transmission Systems

FIRST manufacturer of High Power transmitters for L.P.T.V.

FIRST integrated antenna and amplifier transmission system for low power UHF.

Satellite Rebroadcast Systems

FIRST transmitter manufacturer to introduce satellite system concept through a cooperative effort with a TVRO manufacturer.

FIRST to have a complete line of transmitters for satellite rebroadcast systems. We design and build rebroadcasting systems for UHF and VHF and each is available in either low or high power configurations.

Multipoint Distribution Service (MDS) And ITFS

FIRST 100% solid state transmitters in both 10 watt and 100 watt.

FIRST with intermod free external diplexing of the aural and visual carriers.

Custom Engineering

FIRST and only manufacturer with hardware and the know-how to up-power all major brands of T.V. transmitters.

Major Components

FIRST
solid state pulser.

FIRST
to introduce external cavity klystrons.

FIRST
to provide a regulated and adjustable power supply...PERVEAC.

FIRST
to manufacture and employ plug in vacuum contactors for T.V. transmitters.

The R & D Group Our "FIRST" Team,

The many transmission innovations developed by the Townsend R & D group have often involved technologies borrowed from other fields. Their singular purpose is to find ways to measurably raise the state-of-the-art in just one field...television transmission.

TOWNSEND ASSOCIATES, INC.

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NAB Booth #1420

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Marconi Instruments
Booth 1615
Established products
2914A: Insertion signal analyzer
2920: TV interval timer
S1100: Automatic audio broadcast system
New products
2305: 2GHz modulation analyzer
2019: 1GHz synthesized signal generator
Circle (1305) on Reply Card

Marti Electronics
Booth 501
Established products
RPT 2: Hand-carried portable RPU transmitter
RPT 15: 15W mobile RPU transmitter
RPT 25: 25W portable RPU transmitter
RPT 40: 40W portable RPU transmitter
ARS-15: Broadcast-quality automatic repeater station
STL-10: Aural studio-transmitter link
TSL-15: Telemetry return link
RMC-15: Digital remote control
New products
TSL-15-2: Full back-up telemetry link with automatic switching
ATS-15: Automatic transmitter switcher using pin diode RF switching
Circle (634) on Reply Card
see ad on page 293

Matthews Studio Equipment
Booth 1775
Established products
Tulip crane, manual lighting control devices, manual lighting hardware, hanging devices, stands, outdoor lighting control (location) and Video Matth-Pak
New products
Sky-Cam, junior tulip crane and Cam-Remote
Circle (616) on Reply Card

Maxell Corporation of America
Booth 1612
Established products
Blank audio and video recording tape
Circle (617) on Reply Card
see ad on page 97

McCurdy Industries Ltd.
Booth 207
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
VLG-10: Video leader generator
8720-8: Radio and TV production console
8808: Edit booth console
8816: Air console
8824: Production/air console
CS 9000: Intercom system
New products
ARS 5020: Audio routing switcher
CS 9400: Digitally controlled intercom
SS 8800: Audio console
VSG-10: Video signal generator
Circle (618) on Reply Card
see ads on inside back cover and page 206

McMartin Industries
Booth 701
Established products
BA50K: 50,000W AM transmitter
BA10K: 10,000W AM transmitter
BA1K: 1000W AM transmitter
BF3.5M: 3500W AM transmitter
BF30M: 30,000W FM transmitter
BF300M: 300W solid-state FM transmitter
BFM2001: FM SCA generator
TR2001: FM SCA receiver
FM monitors
SCA receivers
Satellite receivers
Audio consoles
Remote pickup transmitters
New products
See at booth
Circle (635) on Reply Card

Merlin Engineering Works
Booth 1236
Established products
258: Ultra-wide band VTR
238: Extended play kits for 1-inch type C VTRs
Service: Refurbished 2-inch quad VTRs
New products
See at booth
Circle (619) on Reply Card

MICMIX Audio Products
Booth 604
Established products
D-2B Dynafex: Non-encode/decode noise reduction for broadcast applications
XL-515: Master-Room reverberation system, stereo, plate, room, hall, variable decay →

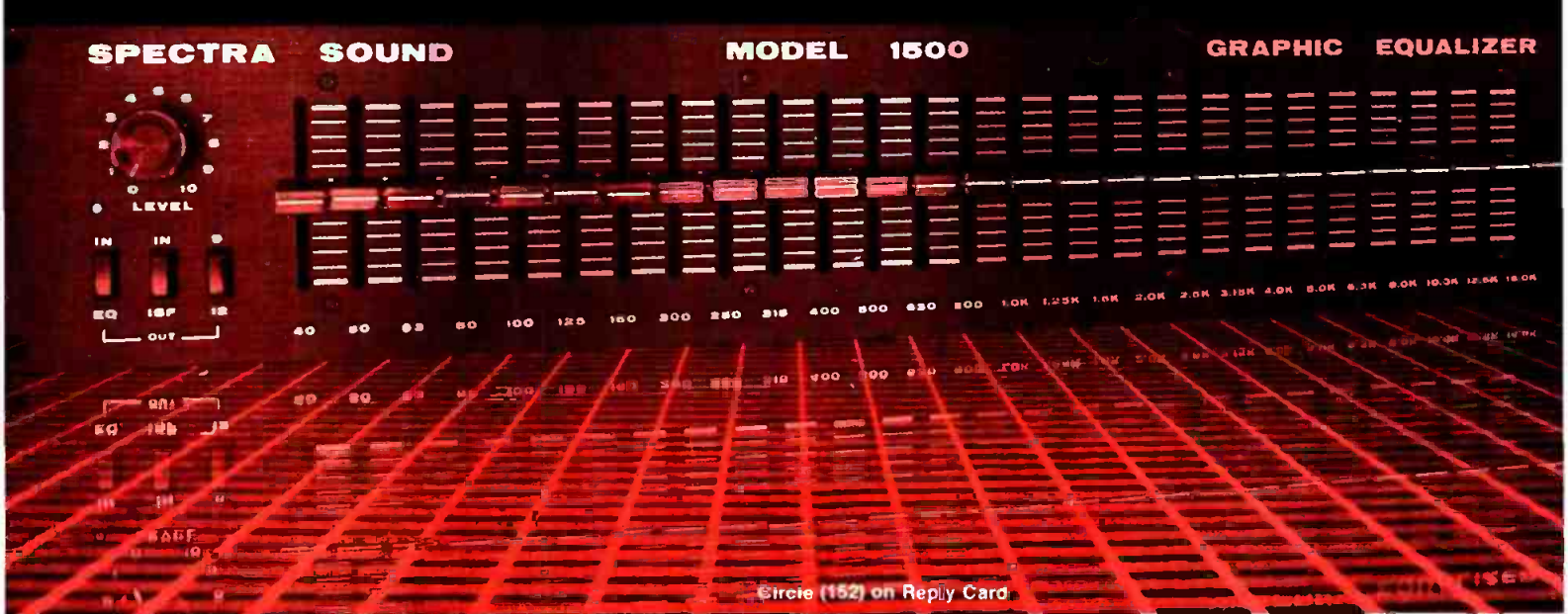
Unmeasurable Performance

The SPECTRA SOUND Model 1500 is the only graphic equalizer available with unmeasurable distortion. The 1500 is also the quietest of all equalization devices. The result, a *measurable* improvement in audio system performance when varied equalization requirements exist.

DISTORTION
I.M. and T.H.D. below .0018%, 20Hz to 20kHz, +18dBv, test equipment residual.

SIGNAL TO NOISE RATIO
104dB, + 4dBv input, unweighted, 20Hz to 20kHz.

Spectra Sound
3750 Airport Road
Ogden, Utah 84403
(801) 392-7531
Spectra Sound is a wholly owned subsidiary of Spectra Sonics



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If you demand absolutely the best audio transformer,
insist on a Jensen!

Choose From a Wide Variety of Types and Packages

- Microphone Input
- Microphone Bridging
- Line Input
- Direct Box
- Low Freq. Crossover
- M.C. Cart. Step-up
- Electret Mic Output
- Bridging
- Repeat Coil
- Line Output
- Special Types

Superb specifications, consistent performance, and unsurpassed reliability have earned Jensen a solid reputation as the world's preeminent manufacturer of audio transformers.

We control every facet of design and construction, from core alloy up, using sophisticated computer modeling techniques. With 5 years software development background, including an AC circuit analysis for Hewlett-Packard's 9845 desk top computer, we now market our own advanced circuit optimization programs. Because Jensen transformers are designed to function as an integral part of the circuit, not as an afterthought, *all* parameters can be optimized. The result is *a clearly audible improvement in transformer technology.* For example, our Model JE-115K-E mic input transformer has under 1% overshoot with no RC damping network (bridged output), and exceptional magnitude and phase response.

Our highly qualified technical staff is eager to assist you with expert applications engineering. Discerning engineers have field proven our transformers, by the tens of thousands, in the most demanding environments—professional recording studios, fixed and mobile broadcast facilities, and touring sound systems. That returns and failures are rare is no accident; we place strong emphasis on quality control.

We carefully inspect every transformer before and after encapsulation. Then, in our computerized automated test lab, we verify that each and every transformer meets or exceeds its specs.

We take this extra care because we are dedicated to excellence. So next time you need a transformer, *insist on the best—insist on a Jensen.*

jensen transformers
By REICHENBACH ENGINEERING

10735 Burbank Boulevard/N. Hollywood, CA 91601/(213) 876-0059
Write or call for information. Visitors by appointment only (closed Fridays).

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MICMIX (604)
Continued
XL-305: Master-Room stereo reverb for broadcast applications
XL-210: Master-Room stereo reverb for production applications
XL-121: Master-Room mono reverb for production applications
New products
XL-404: Master-Room plate synthesizer reverberation system with variable decay
MC Series: Modular signal processing system
Circle (620) on Reply Card

Micro Communications
Booth 1617
Established products
Circular waveguide transmission line, rectangular waveguide transmission line, UHF TV diplexer, MDS diplexer and transmission line hangers
New products
MDS combiners and LPTV antennas
Circle (621) on Reply Card
see ad on page 238

Micro Control Associates
Booth 206A
Established products
PTS-10C: Composite studio transmitter link
RRC-9: Radio remote control system
PLG-10: Subcarrier generator
PLR-10: Subcarrier receiver
PTS-250N: Narrowband studio-transmitter link
Stereo demodulator
New products
See at booth
Circle (622) on Reply Card

Microdyne Corporation
Booth 132 and 1129
Established products for Booth 1129
PR 10: 3m satellite receiving antenna
PR 12: 3.66m satellite receiving antenna
DC 4-70: Antenna-mounted SCPC down-converter
1100 FFC X1 (RDC)L: Rack-mounted SCPC downconverter
1100 PCDR: Single-channel per carrier (SCPC) demodulator
Complete SCPC uplink and network design
Established products for booth 1129
PR 23: 7m satellite receiving antenna
PR 16.4: 5m satellite receiving antenna
CH-14: 4.3m conical horn satellite receiving antenna for severe interference areas
MAPS II: Antenna motor drive and microprocessor-based controller
1100 TVR X-24 BW: TV broadcast satellite receiver for standard or OVT transmissions
1100 TVR X-24 B-2: TV broadcast satellite receiver
1100 CSR: Low cost broadcast satellite receiver
Circle (623) on Reply Card
see ad on page 81

Microtime
Booth 1230
Established products
S-130: Full frame synchronizer
S-120: TBC
C-150: Automatic VTR machine controller/commercial AD inserter
2525: TBC frame synchronizer
2525 SP: "Smart Proc Amp"
2100: Video image processor
New products
See at booth
Circle (624) on Reply Card

Micro-Trak Corporation
Booth 104
Established products
6618: 6-channel audio console
6509: 5-channel audio console
6411: Stereo phono preamp
6445: Audio console
7116, 7213, 7116: Audio distribution amp
6510: Audio console, 10-channel series
TF1: Telefile
New products
See at booth
Circle (625) on Reply Card

Microwave Associates
See *M/A-COM*

Midwest Corporation
Booth 1710
Established products
M1ENG: Mobile unit for ENG and microwave relay
M20: Mobile unit
New products
M30: Mobile unit with 4- to 6-camera capability for sports and special events coverage
Mid-Press: Electronic newspaper system for CATV, LPTV or MDS
Insert: Automated commercial insertion system
Circle (627) on Reply Card
see ad on page 1

Minolta Corporation
Booth 1113
Circle (952) on Reply Card

Modular Devices
Modular Audio Products (MAP)
No booth at press time
Established products
4003: Mic preamp
4004: Line amp
4006: Line/mix amp
4088: MOSFET switcher cards
4102: VCA cards
4820: Distribution amp
7821: Rack-mount distribution amp series
4000: Power supplies series
3000: Equalizer/compressor series
New products
7102: Rack-mount compressor/limiter
7301: Newsroom switcher
4824: Distribution amplifier
4300: Line/mix/switching card series
Circle (1124) on Reply Card
see ad on page 190

Modulation Associates
Exhibiting with Allied Broadcasting
Booth 639
Established products
Analog earth stations for radio network broadcasting via satellite
New products
See at booth
Circle (1125) on Reply Card
see ad on page 112

Mole-Richardson Company
Booth 1006
Circle (908) on Reply Card

Keith Monks Audio Ltd.
Booth 512
Established products
Series: Range microphone stands
RCM II: Professional record cleaning machine
RCM III: Professional record cleaning machine
LS18: Powered monitor loudspeaker
CR501: RCM for radio station-production
MT 2: High triped microphone stand
New products
See at booth
Circle (629) on Reply Card

Moseley Associates
Booth 301
Established products
MRC-2: Microprocessor remote control system
MRC-1: Microprocessor remote control system
PCL-505: Studio-transmitter link system
PCL-606: Studio-transmitter link system
TRL-1: Telemetry return link
TFL-280: Audio limiter
SCD-9: Stereo demodulator
SCG-9: Stereo generator
SCD-8/SCG-8: Subcarrier demodulator and subcarrier generator
New products
MRC-1600: Microprocessor remote control system
Circle (630) on Reply Card
see ads on pages 302 and 303

Motorola C&E
Booth 411
Circle (909) on Reply Card

Multi-Track Magnetics
Booth 1712
Circle (910) on Reply Card

Music Directors Programming Service
Booth 217
Circle (911) on Reply Card

The Musicworks/Solid State Logic
Booth 209
Established products
SL4000E: Master studio
Multi-track music production console and computer
New products
SL6000E: Audio console/studio computer
Package design for applications including live teleproductions, outside broadcasts and video post-production
Circle (912) on Reply Card

NEC America
Broadcast Equipment Div.
Booth 1415

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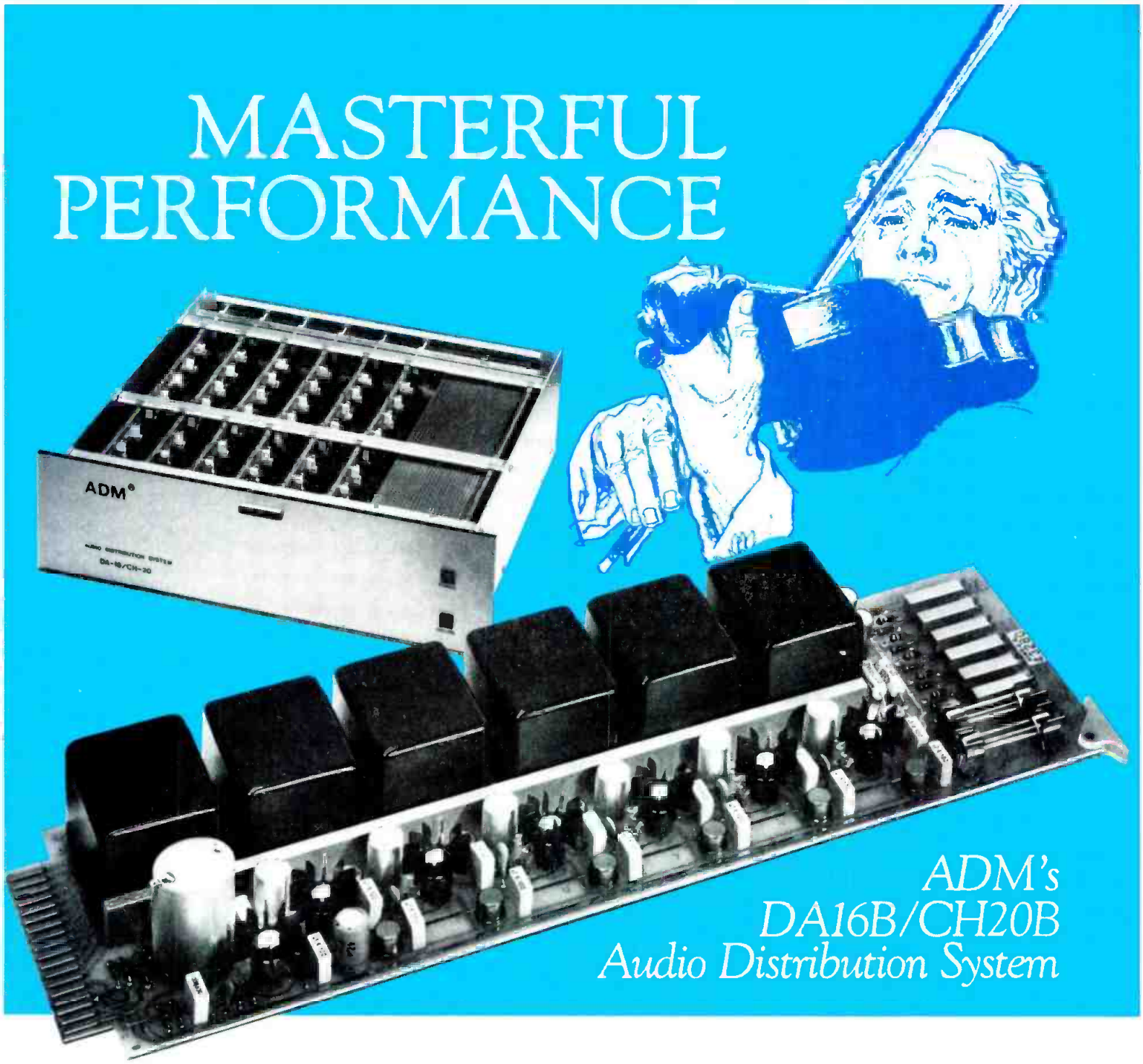
MASTERFUL PERFORMANCE



ADM's DA16B/CH20B Audio Distribution System

You are assured of one masterful performance after another because the DA16B/CH20B provides audio distribution of unquestioned reliability. It offers a unique combination of features for exceptional versatility.

- Each amplifier is a one-input, six-output plug-in card.
- The input, and each output is individually transformer coupled.
- Input levels up to +27 dBv; output levels up to +27 dBm before clipping.
- Output amplifiers have individual, front accessed gain adjustment, and a test point.
- Each CH20B will house up to six DA16B cards, and has a complete set of redundant power supplies with automatic changeover.

But probably the most important feature of all is ADM's unexcelled built-in quality—quality backed by a five-year unconditional warranty.

Contact us today for the complete story about the unique DA16B/CH20B system.

ADM® The Audio Company

ADM TECHNOLOGY, INC.

1626 E. Big Beaver Road Troy, MI 48084
Phone (313) 524-2100 TLX 23-1114

West Central Sales: (817) 467-2990
West Coast Sales: (415) 945-0181
East Coast Sales: (313) 524-2100
Rocky Mountain Sales: (801) 486-8822

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NEC (1415)
Continued
Established products
FS-16: Digital frame synchronizer
DV-10: Digital video multiplex
E-Flex: Digital video effects generator
New products
TVL-807: 7GHz field pickup microwave
Digital audiodisc player and audio equalizer
E-Flex off-line editing system
E-Flex rotation/perspective adapter
E-Flex chroma-key generator
Anode pulser
MNC-1/10 3-chip CCD color camera
FM exciter
FM transmitter
Circle (1306) on Reply Card
see ad on page 75

NTI America
Booth 1105
New products
DSS-11: Digital still store
Circle (913) on Reply Card
see ad on page 261

Nady Systems
Booth 1133
Established products
Nady VHF: Wireless mics for film, video, and broadcast industry
New products
PRC-3: Full duplex personal radio communicator
RT-201: 1W intercom transceiver
R-1000: Mini intercom receiver
Circle (643) on Reply Card

Nagra Magnetic Recorders
Booth 1213
Established products
4.2: Portable mono sync recorder
1V-SL & IVSD: Portable stereo sync (SL) and stereo non-sync (SD) recorders
E: Portable mono recorder
SN and SNS: Mini recorders
IS LT: Portable 2-speed sync recorder
IS DT: Portable 2-speed non-sync recorder
New products
T-Audio: SMPTE system including synchronizer and control unit
Circle (637) on Reply Card

Nautel Maine
Booth 216
Established products
AMPFET: AM broadcast transmitter
New products
AMPFET 1: AM broadcast transmitter
Circle (914) on Reply Card

Rupert Neve
Booth 1410
Established products
5116/36: 36-input, 8-bus with multi-track option TV production and post-production console
5104/24/P: 24-input, 4-bus stereo production console
542 Series: 6- to 16-input editing consoles
DA90: Distribution amplifiers
33609: Limiter compressor series
New products
8128/32: Post-production multi-track audio console
NECAM: Post-production version compatible with existing systems
Circle (819) on Reply Card
see ad on page 111

Nurad
Booth 1426
Established products
20SQ3/PM4: 2GHz Superquad II receive antenna system
23SQ3/PM4: 2 + 2.5GHz Superquad II receive antenna system
45SQ3/PM4: 2 + 7GHz dual band Superquad II receive antenna system
20QP1/360: QUAD receive antenna system
20PR2: Power rod
70OR1: Mini-SQ 7GHz parabolic antenna
MC3: Digital remote control system
20ST1/PM4C: Supertrack automatic tracking receive antenna system
MINI POD: Airborne ENG/EJ system
New products
20AR2: 2GHz 21-channel central receiver
20PT1: 2GHz 21-channel portable transmitter
70PA2: 7GHz 2W power amplifier
70PA5: 7GHz 5W power amplifier
70AR2: 7GHz 30-channel central receiver
70FR2: 7GHz receiver
70FT2: 7GHz transmitter
Circle (644) on Reply Card

Nytone Electronics Corporation
Booth 1135
Established products

Circle (155) on Reply Card

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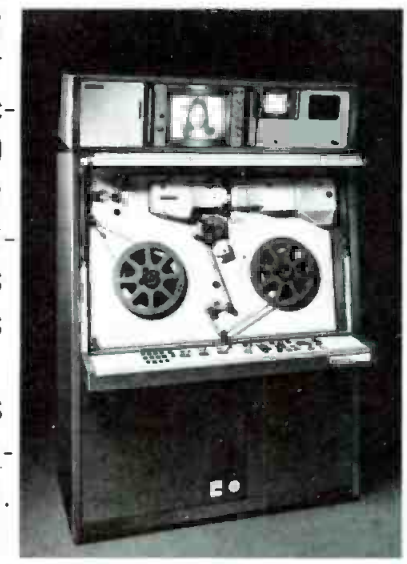
THE WORLD'S ONLY FULLY DIGITAL TELECINE IS NOW IN AMERICA!

It's the MARCONI LINE ARRAY TELECINE B3410—the telecine that not only delivers a new standard of quality for film-to-tape transfers but can appreciably add to your productivity and profits!

The reasons are simple. The Marconi B3410's fully digital processing and CCD image sensors deliver an extraordinarily true video picture. And the Marconi B3410 does not require time-consuming tweaking, day-to-day adjustments and set-up arrangements that rob you of valuable hours of productive work.

The Marconi B3410 delivers full performance within two minutes from the time you switch on. Moreover, there is no registration drift and no tubes to replace. It interfaces with all available color correctors, converts into all international standards and—by its very digital nature—is designed to have an exceptionally long life.



And, because the Marconi B3410 is distributed and supported by A.F. Associates—America's largest designers and builders of video systems—there is no lack of engineering backup and spares on both the East and West coasts!

For more information on specifications, costs and delivery, contact Richard Lunniss in New Jersey (201) 767-1000 or Noel Parente in California (213) 466-5066.

THE MARCONI LINE ARRAY TELECINE B3410

Now in America and only from

A.F. Associates

100 Stonehurst Court, Northvale, NJ 07647
1438 N. Gower St. Box 47, Hollywood CA 90028

Circle (156) on Reply Card

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On November 29, 1982, LOOK, the over 2 million dollar baby of WNEV-TV, Boston, came to life. This innovative 2 hour daily program was to be produced entirely on the new ½" Type M format. This required an editing system that no one else had yet developed: A/B roll capability, time code, full special effects, great speed and ease of operation; and all at a price affordable enough to set up seven complete editing suites—enough editing capacity to produce 10 polished hours of new programming every week.

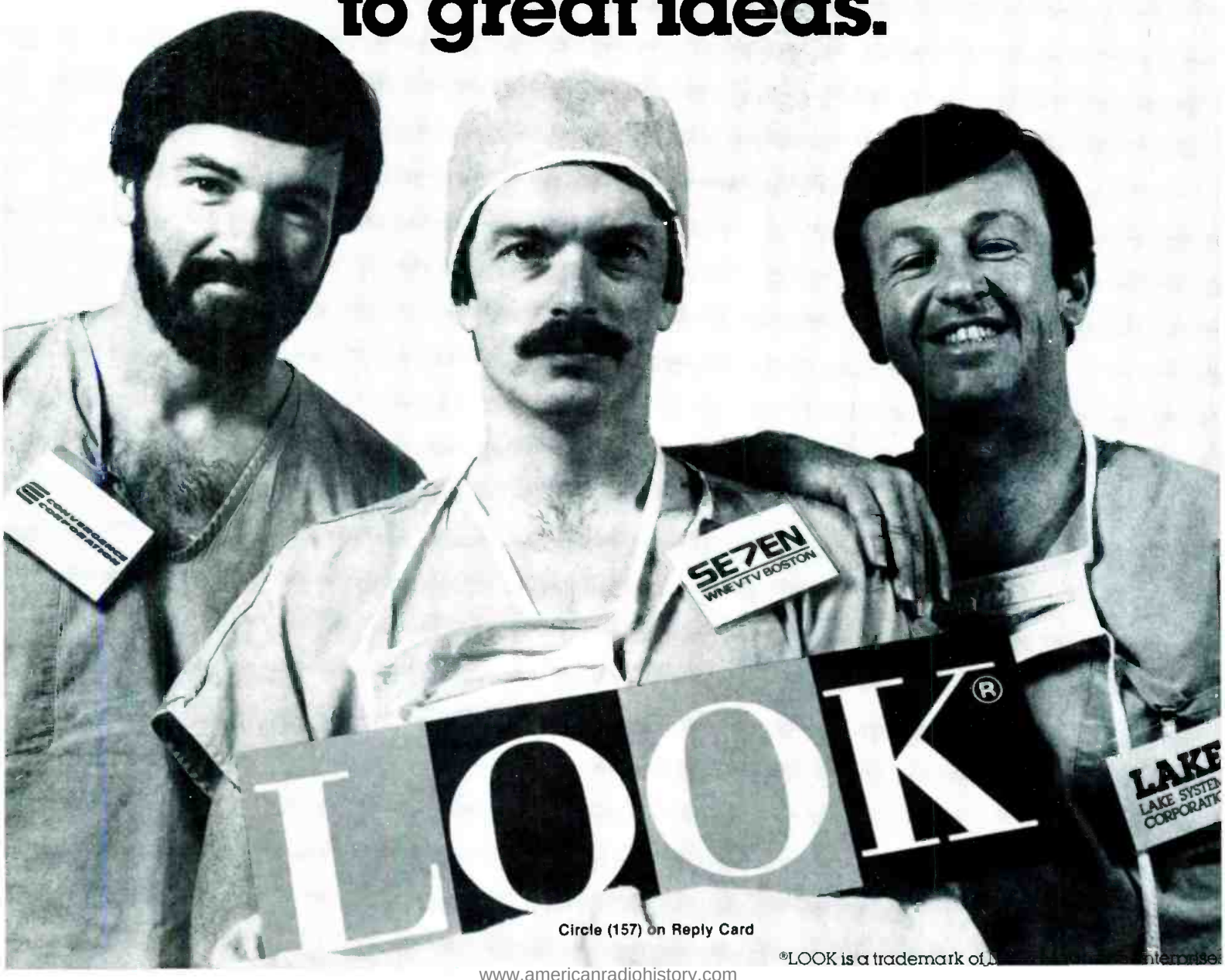
No wonder Karl Renwanz, Director of Engineering at Channel 7 called Dick Lipson at Lake Systems Corporation. The design problems of unique systems require people

Lake is an authorized dealer for Convergence Editing Equipment.

with Dick's broadcast knowledge and expertise. He called upon Convergence Corporation, leaders in the field of video editing, to solve the problem. Thirty days later the first system was in operation. Your baby may not be as tough to deliver as Karl's was, but wouldn't you like this team of specialists working with you? CONTACT: Lake Systems Corporation,
55 Chapel Street
Newton, Massachusetts 02160
(617) 244-6881

LAKE
LAKE SYSTEMS CORPORATION
The Systems Company

We help our clients give birth to great ideas.



Circle (157) on Reply Card

®LOOK is a trademark of [illegible] Enterprises

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Nytone (1135)
Continued
TSC-1: Flying spot scanner
TSC-2: Flying spot scanner
TSC-3: Flying spot scanner
TSC-4: Flying spot scanner system (broadcast quality)
New products
See at booth
Circle (645) on Reply Card

OKI Electric Overseas Corporation
Booth 1505
New products
LT 1210: Portable digital TV standards converter
Circle (915) on Reply Card

Oak Industries
Booth 1331
Established products
Satellite security systems (ORION), subscription TV services (ON TV), pay TV programming services and STV licensing services
Circle (646) on Reply Card

O'Connor Engineering Labs
Booth 1229
Established products
C: Fluid camera head
30-B: Fluid camera head
50-D: Fluid camera head
100-C: Fluid camera head
150: Fluid camera head
102-B: O'Connor Hydro-Ped
Series: Wooden tripods and accessories
Series: Metal tripods
Adjustable side-loading platform for model 50-D
Mechan-O-Ped (mechanical pedestal)
Adjustable spreaders for tripods
Adjustable spreaders with wheels for tripods
New products
See at booth
Circle (647) on Reply Card

Oktel Corporation
No booth at press time
Established products
DM 3000: Videodisc recorders and still stores
Circle (1127) on Reply Card

Olesen
Booth 1020
Circle (967) on Reply Card

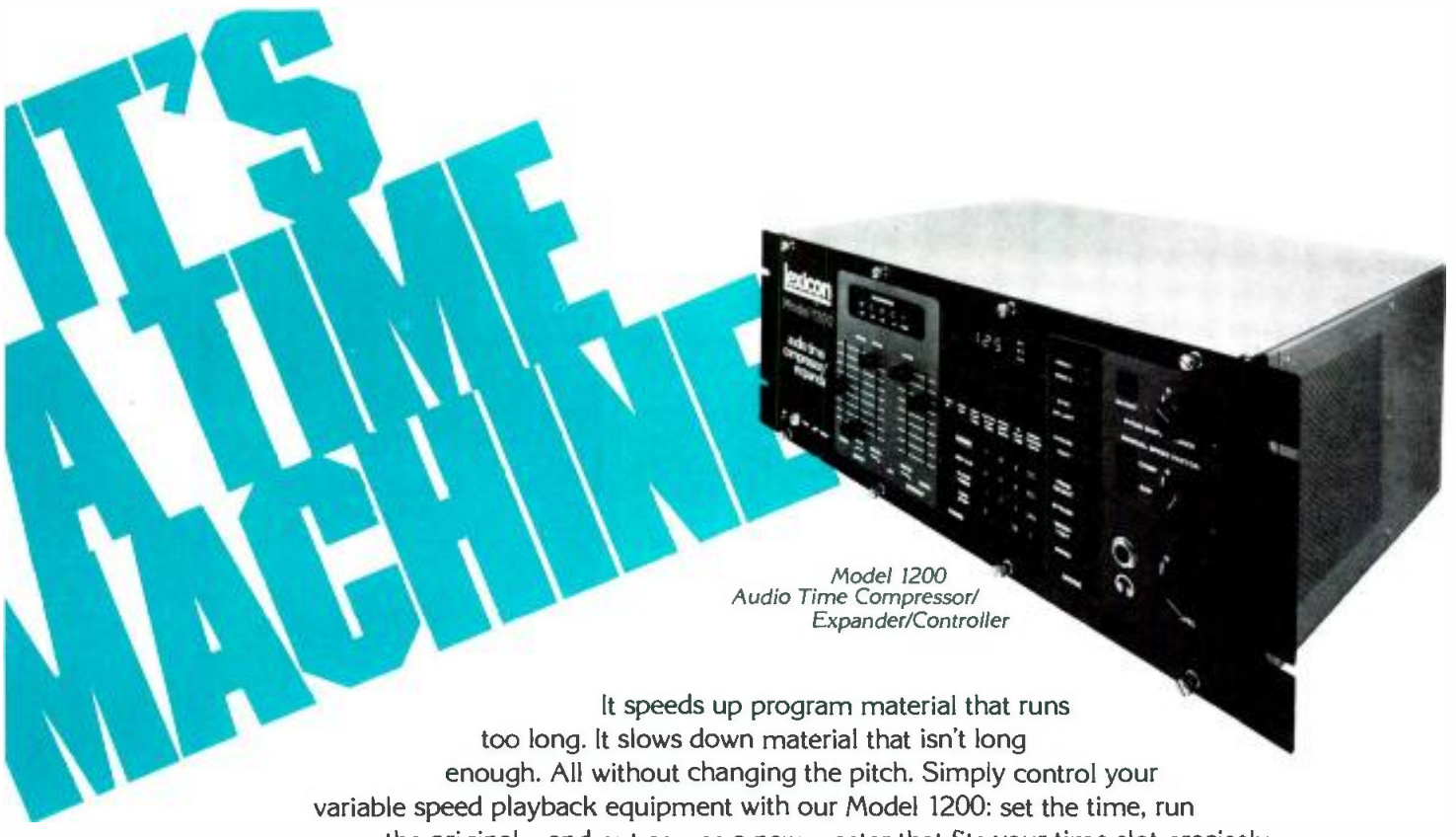
Omnimount Systems
Booth 510
Established products
50 Series: Wall and ceiling mounts for speakers, cameras, TV monitors
100 Series: Wall and ceiling mounts for speakers, cameras, TV monitors
Accessories: For adapting Omnimount products to tripod and microphone stands, plumbing pipe, etc.
New products
200A: TV monitor-mounting system
200B: TV monitor-mounting system
Circle (1126) on Reply Card

Orban Associates
Booth 607
Established products
8100A: Optimod-FM with stereo generator, live
8180A: Optimod-TV, live
9100A: Optimod-AM, either mono or stereo ready, live
111B: Dual spring reverb
418A: Stereo limiter
526A: De-esser
622B: Parametric EQ
674A: Graphic Parametric EQ
New products
Programmable parametric EQ
424A: Gated compressor/limiter/de-esser ("The Studio Optimod")
245F: Stereo synthesizer
536A: 2-channel de-esser
Optimod TV: With loudness controller
Optimod FM: Multiband
Circle (648) on Reply Card
see ad on page 87

Orrox Systems
See *CMX Orrox*

J. Osawa & Company
Booth 1716
New products
YEC/PHOTRON VS-1000: Video sync generator
Circle (968) on Reply Card
see ad on page 146

Allen Osborne Associates
Booth 339



Model 1200
Audio Time Compressor/
Expander/Controller

It speeds up program material that runs too long. It slows down material that isn't long enough. All without changing the pitch. Simply control your variable speed playback equipment with our Model 1200: set the time, run the original—and out comes a new master that fits your time slot precisely for film, disc, tape and videotape. Demonstration? Just write or call.

lexicon
60 Turner Street, Waltham, MA 02154/(617) 891-6790/TELEX 923468
Export Gotham Export Corporation, New York, NY 10014

See us at NAB Booth 1139

Circle (158) on Reply Card

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Allen Osborne (339)
Continued
Established products
NK 9: Pneumatic telescopic mast
NL 12: Pneumatic telescopic mast
NX 8: Pneumatic telescopic mast
NP5/53: Pneumatic telescopic mast
WTM Series: Winch-operated mast
New products
NY Series: Pneumatic telescopic mast
Circle (1307) on Reply Card
see ad on page 310

Otari Corporation
Booth 601
Established products
BF: ¼-inch full-track recorder
BQII: ¼-inch 4-track recorder
MK III-4: ½-inch 4-track recorder
MK III-8: ½-inch 8-track recorder
ARS-1000: ¼-inch 2-track playback only
BGM-1000: Automated playback only 2- and 4-track
MX 7800: 1-inch 8-track
MTR-90 8/8: 1-inch 8-track
MTR-90 16: 2-inch 16-track
MTR-90 24: 2-inch 24-track
MTR-10-2: ¼-inch 2-track
MTR-10-2: ½-inch 2-track
MTR-10-4: ½-inch 4-track
DP 4050 OCF: Reel-to-cassette duplicator
DP 4050 C2: Cassette-to-cassette duplicator
DP-1010: High speed tape duplicator 16:1
DP-7000: High speed tape duplicator 32:1 or 64:1
DP-1610: Audio monitor for cassette tape
DP-2700: Automatic cassette winder
VL-600: Automated loader for VHS tape
VL-500: Automated loader for BETA tape
VL-100: VHS/BETA loader to the hub
New products
B Series II: ¼-inch 2-track recorder
MK III-2: ¼-inch 2-track recorder
Circle (649) on Reply Card
see ads on pages 40 and 41

Otis Conner Productions
Booth 414
Circle (916) on Reply Card

Pacific Recorders & Engineering
Booth 113
Established products
BMX: Audio control console
TOMCAT: Broadcast cartridge machine
SDA-8: Distribution amplifier
Custom cabinetry
New products
ABX: Ultra production console
SLX: Compact broadcast console
Circle (653) on Reply Card
see ad on page 139

Panasonic Industrial Company/AVSD
Booth 1019 and 437
Established products
AK-1090: Gen-lock camera/VTR adapter for the AK-100 camera
SPS-3: Anton-Bauer ac adapter for AK-100 cameras
AK-100SK: 3-tube Saticon SM type color camera, 1.5 viewfinder, tripod mounting plate, microphone, ½-inch VTR and battery-mounting base
AK-100PLK: 3-tube low capacitance diode gun Plumbicon (XQ3427) M-M type color camera
B-100S: Recam ½-inch M Format in-camera VTR portable
B-100PL: Recam ½-inch M Format in-camera VTR portable
AU-100: ½-inch M Format portable VTR includes rain cover and operating and manuals
AU-300: ½-inch M Format studio VTR
AU-A30: Editing controller
AU-S100: NTSC adapter for AU-100
AK-100 Series: 13x(9-118mm) f/1.6 servo zoom lens with auto/manual iris, 2X extender
AK-100 Series: 12x(9-108mm) 4/1.7 servo zoom lens with auto/manual iris, 2X extender
AK-100 Series: 14x(10-140mm) f/1.6 servo zoom lens with auto/manual iris
AK-100 Series: 10x(11-110mm) f/1.6 servo lens with auto/manual iris
AU-200: In-field recorder, M Format with playback capability
AK-100 Series: 15x(9.5-143mm) f/1.8 servo zoom lens with auto/manual iris
AT-H190G: 19-inch NTSC/RGB high resolution color monitor
AT-H130G: 13-inch NTSC/RGB high resolution color monitor
RECAM: Camera-recorder combination
AU-300: RECAM studio VCR
AU-A30: RECAM editing controller
RAMSA WR-8616: 16-channel broadcast post-production/recording console
RAMSA WR-8118: 18-channel recording/post-production mixer
RAMSA WR-8112: 12-channel recording/remote mixer
RAMSA WR-8210: 10-channel recording mixer
New products
See at booth
Circle (665) on Reply Card
see ads on pages 88, 89 and 137

PEP
Booth 1208
Circle (919) on Reply Card

Perrott Engineering Labs
Booth 1729
Established products
Series: Silver zinc nicad and lead acid battery packs for cameras and VTRs; portable power for lighting equipment and video analyzers
Series: Minichargers for silver zinc and nicad systems. Fast chargers for single or multiple nicad packs
New products
PE52: Dual nicad belt for camera or light equipment
PRB Series: Red baron series Kwik-Klip battery packs
Circle (666) on Reply Card
see ads on pages 186 and 190

Peters Productions
Booth 315
Circle (920) on Reply Card

Phelps Dodge Communications Company
Booth 1007
Established products
Rigid coaxial transmission line, patch panels, FM antennas
Directional couplers, harmonic filters and mobile communications antennas
Circle (656) on Reply Card
see ad on page 95

Philadelphia Resins
Booth 126
Established products
Phillystran HPTG, electrically transparent, maintenance-free tower guys
Circle (657) on Reply Card
see ad on page 36

Philips Television Systems
Booth 1409A
New products
LDK-6: Production model of automatic studio and field camera
LDK-25B: Field studio multicore camera
LDK-14S, LDK-14SL: ENG/EFP studio camera
LDK-44: EFP/ENG/studio economy broadcast camera
Mobile van: Mobile TV production
LDH-6200: 14-inch color monitor
LDM-3001: Adaptive digital noise reducer
LDK-4210: Sync pulse generator
LDM-1742: 25kW UHF transmitter
Remote control and telemetry system
Annular beam control high efficiency klystron system
Circle (1308) on Reply Card
see ads on pages 152 and 153

Philips Test & Measuring Instruments
Booth 1408
Established products
PM3263X: 100MHz oscilloscope with TV triggering
PM3310: 60MHz digital storage oscilloscope
PM3215: 50MHz dual trace oscilloscope
PM3217: 50MHz delayed sweep oscilloscope
PM3543: Logic scope
PM5565: Waveform monitor
PM5567: Vectorscope
PM5539: Color analyzer
PM5533: Color signal generator
PM5560: TV demodulator
PM5570: Video test signal generator
PM5580: IF modulator
PM5581: VHF converter
PM5582: UHF converter
PM5583: Converter base unit
New products
See at booth
Circle (659) on Reply Card
see ad on page 23

Pinzone Communications Products
Outside Exhibit
Established products
RCD-100: Diagnostic system for the RCA TCR-100
M IV: Miralite 3.7m satellite antenna
3115-DXA: Dexcel 100° Kelvin LNAs
FLC 7850: Cablewave ⅞-inch Heliax transmission line
PM3263X: Philips 100MHz scope/waveform monitor
New products
8250: Auto expander format satellite receiver
8250R: Wire remoted auto expander format satellite receiver
8250D: BCD remote satellite receiver
8250T: Uplink-controlled satellite receiver
RCD-100 P: Computer and printer accessory for the RCD-100 diagnostic system
Circle (1128) on Reply Card
see ad on page 217

Portable Energy Products
No booth at press time
Established products
Series: Sealed lead-acid battery packs →

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Portable Energy
Continued
and belts for video cameras, recorders and portable lights
New products
30V 10Ah pack that provides 50 minutes of extended running time for operating portable 250W lights
BP90: Nicad replacement battery
Solar chargers for charging 12V to 30V sealed lead acid or nicad batteries
Circle (661) on Reply Card

Porta-Pattern
Booth 1427
Established products
001 Series: TV test charts and chart systems
002 Series: Telecine slides, transparencies and films
006 Series: 8x10 test transparencies
008 Series: ENG test chart system
010 Series: Spherical transparency illuminators
014 Series: EFP test chart systems
018-10: Video microscope alignment slide
New products
020 Series: Duochart test chart systems
001-44: 11-step log gray scale chart
001-45: BBC #62P colnr bar chart
016-10: High resolution color calibration test chart system
017-10: Waterproof test chart system
021-10: Pocket test chart system
Circle (662) on Reply Card

Potomac Instruments
Booth 100
Established products
ATS-11: Automated transmission system
AT-51: Audio test system
AM-19: Antenna monitor
DAP-11: Data acquisition
FIM-21/41: AM field strength meter
FIM-71: VHF field strength meter
FIM-72: UHF field strength meter
SMR-11: Professional broadcast receiver
SD-31: Synthesizer detector
New products
MPC-11: Modulation and power controller
Circle (921) on Reply Card
see ad on page 136

Power Pack Systems
Booth 206A
New products
Aural studio transmitter links, transmitter remote control systems, remote pickup equipment, FM translators, FM stereo exciter and generator.
Circle (1309) on Reply Card

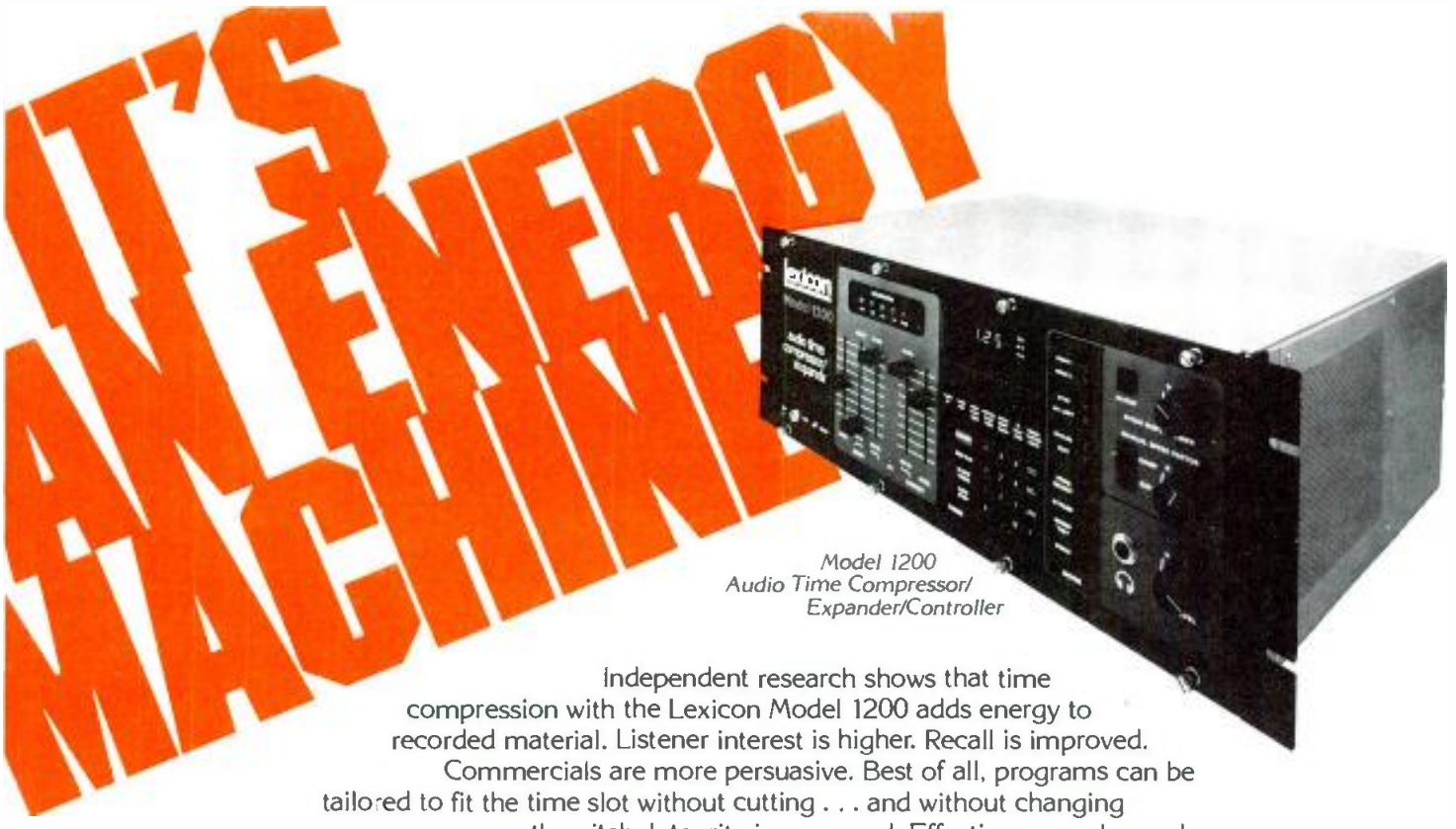
Precision Echo
Booth 1417
Established products
Frame Bank: Video-discassette recorder
Frame Bank P/S: PAL/SECAM frame BANK
New products
Squeezer: Video image compression system
Circle (1129) on Reply Card

Procart
Booth 115
Established products
Procart AA: Tape cartridge
Circle (664) on Reply Card

Products International
Booth 430
Circle (1130) on Reply Card

QEI Corporation
Booth 307
Established products
695: Low distortion FM exciter with automatic modulation control and demod facility
695T1kW: Solid-state 1kW FM transmitter with ATS facility and remote control unit
695T3.5kW: Single-tube FM 3.5kW transmitter with ATS facility and remote control unit
New products
675: FM exciter
675T500: 500W FM transmitter
691: FM stereo monitor
7775: Automatic transmission system (ATS)
Circle (669) on Reply Card
see ad on page 73

QSI Systems
Booth 1325
Established products
TVL2400: Off-air 24-hour audio-video logger
VSID-81: Video source identifier
6x1: Utility video distribution amplifier
CB 7000: Color bar identifier →



Independent research shows that time compression with the Lexicon Model 1200 adds energy to recorded material. Listener interest is higher. Recall is improved. Commercials are more persuasive. Best of all, programs can be tailored to fit the time slot without cutting . . . and without changing the pitch. Integrity is preserved. Effectiveness enhanced. Demonstration? Just write or call.

lexicon 60 Turner Street, Waltham, MA 02154/(617) 891-6790/TELEX 923468
Export Gotham Export Corporation, New York, NY 10014

See us at NAB Booth 1139

Circle (159) on Reply Card

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QSI (1325)
Continued
CB 7100: Color bar identifier
VALID: Video identifier system
600: Video time date generator
VFF6030: Frame/field counter
CB 7300: 12Vdc/115Vac color bar identifier portable
CB 7400: 12Vdc/115Vac color bar identifier
CB 7005: Color bar identifier
CB 7105: Color bar identifier
CB 7405: Color bar identifier
TALLY-ID: Routing switcher input identification
NVS-8: Numeric video slate
DEMOD400: TV demodulator
CLK 81: Master clock system
VT-7: Video leader countdown generator
New products
See at booth
Circle (670) on Reply Card
see ad on page 227

Q-TV/Telesync
Booth 1206
Established products
VPS-100: Console transport videoprompter system
VPS-300: Conveyor transport videoprompter system
Mini Q prompter system
Circle (671) on Reply Card

Quad-Eight
Booth 1636
Established products
248: Component series audio mixing console
New products
System 5 LC: Locally controlled digital reverberation processor
Circle (672) on Reply Card
see ad on page 166

Quanta
Booth 1432
Established products
Quantafont Q8: Teleproduction graphic titler
Quantafont QST: Automatic subtitling system
Microgen MG100: Teleproduction graphic titler
Quantanews: Computer-assisted newsroom
Quantatrak: Videotape evaluator
New products
Quantafont Q7S: Teleproduction graphic titler series
Circle (1310) on Reply Card

Quantel
See *MCI/Quantel*

Quantum Audio Labs
Booth 134
Established products
Series 22: Professional audio mixing consoles for broadcast production
Circle (924) on Reply Card

Quickset
Booth 1009
Circle (925) on Reply Card
see ad on page 322

R-Columbia Products Company
Booth 1111
Established products
TR-50: FM wireless intercom headphones
System 50: Interface from wireless intercom to wired intercom systems
T4/IC: 2-way intercom headphones operated on single wire
New products
52/TM: Tele Headphones
TR50/2: Single ear FM wireless intercom headphones
System 10: Instant hook-up wired intercom system
Circle (675) on Reply Card
see ad on page 54

RCA Commercial Communications Systems
Booth 1000
Established products
Hawkeye: With in-camera VTR, studio setups that include integration with TR-800 1-inch and CMX editing systems
TK-47B Triax: Automatic studio camera on triax cable
TKP-47: Portable automatic designed to complement system of TK-47s
TK-761: Studio/field camera
TK-710: Low-priced ENG camera
TK-290: Automatic telecine
TR-800: 1-inch type C videotape
TCR-100: Quad cartridge machine videotape
TH-50: 1-inch portable videotape
TTG-50H: 50kW VHF highband transmitters
TTG-30L: 30kW VHF lowband transmitters
TTG-12H: 12kW VHF highband transmitters
TTU-30D: 30kW UHF transmitters
TCL-16: Tetra Coil CP
TDM Model: Dual-mode VHF CP
UHF CP Model: UHF Pylon Model
THP Panel Model
Transmission Line Display
Wave Guide Display
Circle (673) on Reply Card

RF Technology
Booth 1306
Established products
RF-201: 1W, 2GHz transmitter-portable
RF-200: 2GHz portable receiver
RF-203: 2/10W 2GHz transmitter
RF-212: 12W 2GHz transmitter
RF-701: 7GHz 1W portable transmitter
RF-700: 7GHz receiver
RF-204C: Central receiver-2GHz
RF-206: Repeater-2GHz
RF-212: 12W 2GHz transmitter
New products
See at booth
Circle (676) on Reply Card

ROH Corporation
Booth 1634
Established products
Series 300: Intercommunications system
Series 190: Audio monitor/switcher
Series 200: Audio terminal equipment
371: Intercom telephone coupler
372: Intercom 2-way radio coupler
New products
See at booth
Circle (926) on Reply Card

RTS Systems
Subsidiary of Compact Video
Booth 1142
Established products
Conference line, multifunctional, 1-way and point-to-point intercommunications systems
New products
See at booth
Circle (683) on Reply Card

Radiocom
Booth 637
Circle (1148) on Reply Card

Radio Systems
Booth 341
Established products
PA-1: Stereo phono preamp
DA-8: Mono, 8-output distribution amplifier
DA-16: Stereo, 8-output distribution amplifier
PW-100A: Stereo, 50W power amplifier
TM-1: Studio timer
New products
ESA: Audio console
Circle (1312) on Reply Card

Radio Television News Directors
Booth 1501
Circle (928) on Reply Card

Ramko Research
Booth 415
Established products
DC3810S: Stereo audio mixing console
ARA1612: Audio router (electronic patch panel)
DA2080: 20-in, 80-out audio distribution amp
LA5S/10M: 5-channel stereo line amp
MA 20: Stereo monitor amp
ESP38: Stereo turntable preamp
DC5MS: Stereo audio mixing console
SL 1200MKII: Technics direct drive turntable
MLA 2/E: Mic/line amp
PS 1: Phasemaster stereo play cart machine
RPS 1: Phasemaster stereo rec/play cart machine
DC-38: 5- to 10-channel mono/stereo console
DC-12: 2- to 12-channel mono/stereo console
Phasemaster: Stereo, real time phase correcting tape cartridge machine
New products
P-93: Lab standard turntable preamps
P-21: Dual input mic/line amp and mixer
P-42: 4-in, 2-out mic/line amp
P-2M: Dual solid-state peak or VU reading meter
P-35/16M: Dual 1-in, 3-out audio DA
P-85/16M: Dual 1-in, 8-out audio DA
P-2EQ: Dual high/low shelving equalizer and line amp combo
P-4M: Miniature 8-in, 4 mixer audio console
P-5MX: 5-mixer, mic/line
P-VGZ: Voice Gard combo compressor/limiter and noise gate with metering
P-RPM1: Tape cartridge equipment record/play and play
Circle (678) on Reply Card
see ads on pages 63, 194 and 195 →

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Rank Cintel Ltd.
Booth 1219
Established products
MK IIIC: Flying spot telecine for quality film/tape transfer. Operates on NTSC, PAL and SECAM and changes quickly between 35mm, 16mm, Super 8, Super 16 and slides.
FeRRIT: 16/17.5/35mm record/replay sound follower for telecine, VTR and dubbing applications
New products
Amigo: New generation VDU-based program system for use with all MK III series telecines. Innovations include simplified installation, faster response, new control panel design for easier operation and powerful editing at three levels.
Slide File: Digital still picture store with own processor and integral Winchester disc drive
Circle (1311) on Reply Card
see ad on page 305

Real World Technologies Group
Booth 1637
Established products
VUer: Audio bar graph level indicator
New products
See at booth
Circle (679) on Reply Card

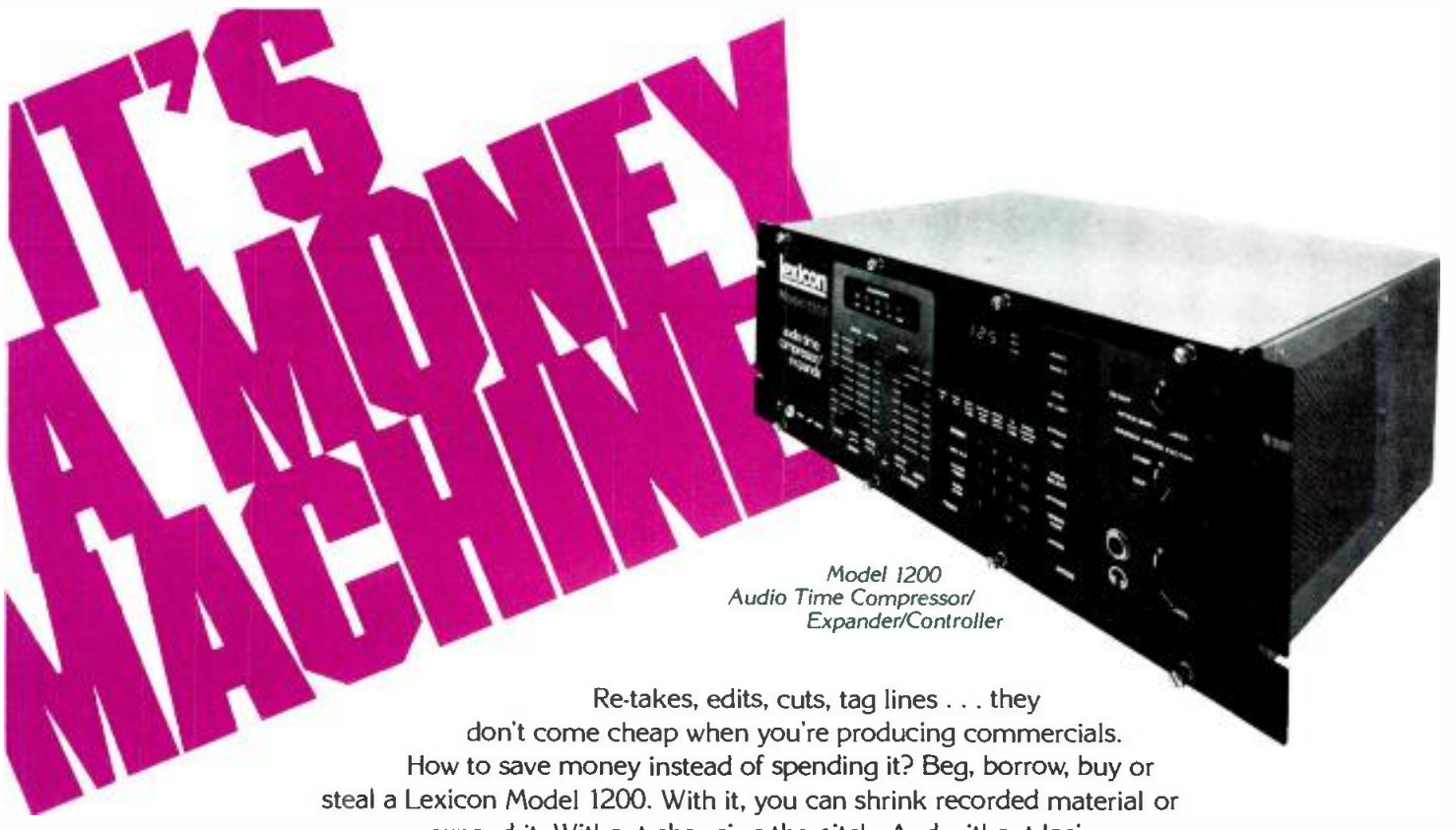
Recortec
Booth 1209
Established products
VTE-210: 2- and 1-inch combination video tape evaluator/cleaner
VTE-101: Low cost 1-inch videotape evaluator/cleaner
VTT-211: Replacement electronic videotape timer for Ampex 2-inch VTRs
VTT-212: Replacement electronic videotape timer for RCA TR70
VTT-221: Replacement electronic videotape timer for RCA TR60
RMOD: Automated reel servo modification for Ampex and RCA 2-inch VTRs
HBU: High band U-matic VTR
New products
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 ½-inch VTRs tape
Circle (680) on Reply Card

Rees Associates
Booth 1727
Circle (998) on Reply Card

Research Technology
Booth 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: CineScan high speed 16mm film viewer/previewer
New products
TV-2000: Complete film editing system
Data-Film 820: Computerized information reporting system
VT3100: Professional videotape evaluator/cleaner for U-matic
Retec-410: Self drive liquid film cleaner/conditioner
Circle (681) on Reply Card
see ad on page 124

Restoration
Booth 705
Established products
Audio, audio for video and still storage tape head refurbishing
Audio and video and maintenance accessory products
BASF audio/videotapes
Still storage accessories
Distribution of Minneapolis Magnetics, Nortronics, Saki and TEAC replacement.
broadcast and audio magnetic heads
New products
Light plus: Heads from Minneapolis →

Use Reader Service Numbers



Re-takes, edits, cuts, tag lines . . . they don't come cheap when you're producing commercials. How to save money instead of spending it? Beg, borrow, buy or steal a Lexicon Model 1200. With it, you can shrink recorded material or expand it. Without changing the pitch. And without losing your shirt. Demonstration? Just write or call.

lexicon
60 Turner Street, Waltham, MA 02154/(617) 891-6790/TELEX 923468
Export Gotham Export Corporation, New York, NY 10014

See us at NAB Booth 1139

Circle (160) on Reply Card

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Restoration (705)
Continued

Magnetics. Three to five times the life of conventional heads from Ampex and Scully reel-to-reel recorders.

Circle (1313) on Reply Card
see ad on page 240

Richardson Electronics Ltd.
Booth 1751A
Established products
Electron tubes (camera and transmitting) and RF-powered transistors
RF power transistors

Circle (1314) on Reply Card
see ad on page 205

Rohde & Schwarz Sales Company
Booth 1203
Established products
Series: Barco precision color monitors, chroma decoders featuring complex comb filter, precision demodulators, video noise meters, noise generators, signal generators, precision modulators for test purposes
Series: Broadcast quality monitors; lower priced monitor that still has all the specs for broadcast quality master control monitors
Optional crosshatch and white field built in all monitors
American Standard phosphors now available for Barco master control monitor
EKFZ/D: Precision demodulators
UPSF/2: Video noise reducer
New products
LFM2: Automated group delay measuring system
MUF2: TV sweep analyzer system

Circle (684) on Reply Card
see ad on page 155

ROHN
Booth 110

Circle (1131) on Reply Card
see ad on page 140

Rosco Laboratories
Booth 1235

Circle (930) on Reply Card

Ross Video Ltd.
Booth 1110
Established products
RVS 508: 20-input video production switcher
Ross Scene Store Memory System
New products
RVS 524: 12-input video production switcher

Circle (685) on Reply Card
see ad on page 91

Rupert Neve
See Neve

Russco Electronics Mfg.
Booth 413
Established products
Cue-Master: 3-speed broadcast turntable
Studio Pro: Deluxe 2-speed broadcast turntable
Mark V: Electronic speed control—deluxe 2-speed turntable
RTA-12: Broadcast tonearm
Phono-Mate Series: Phono preamps
Fidelity-Pro Series: Phono preamps
505 Series: Audio consoles
421: Broadcast mini-mixer
2418 and 4428: Audio distribution amplifiers
T-411: Dial-up remote mixer
T-112: Telephone to line/equalizer-coupler
MA-220: Monitor amplifier
New products
See at booth

Circle (682) on Reply Card
see ad on page 116

Sachtler Corporation of America
Booth 1648
Established products
Panorama 7 + 7: Lightweight fluidhead for newsgathering
Video 20: Lightweight fluidhead
Video 25: Medium-sized fluidhead for ENG and field production
Video 30: Medium-sized fluidhead for field production and studio work

Circle (687) on Reply Card

Saki Magnetics
Booth 416
Established products
Series: Long-life ferrite tape heads for Ampex, MCI, Scully, Studer, Otari, TEAC.
Series: Metal audio posts for 2-, 1- and ¾-inch VTRs
New products
Long-life heads for MCI, Otari, Revox and Technics machines
Long-life ferrite audio posts for Sony 1-inch VTRs
Long-life metal heads for cart machines

Circle (688) on Reply Card

Howard W. Sams
Booth 1751

Circle (931) on Reply Card
see ad on page 311

SATT Electronics
Booth 212

Circle (932) on Reply Card

Scientific-Atlanta
Booth 1017

Circle (933) on Reply Card
see ad on page 315

Scribe Newscorders
Booth 214

Circle (972) on Reply Card

Selco Products Company
No booth at press time
Established products
Series: Control knobs and accessories
Meters: Spec meters in VU and PPM configuration
New products
NPR: Special scales
Driver board for use with Selco/Sifam PPM meters

Circle (1132) on Reply Card

Sennheiser Electronic Corporation
Booth 1137
Established products
Series: Electret microphones, condenser microphones, professional microphones
MKE40: Directional lavalier microphone
HD 40: Ultra-lightweight monitor headphones
HMD 410: Lightweight electret headphone-microphone combination
New products
See at booth

Circle (690) on Reply Card
see ad on page 102

Sescom
Booth 112
Established products
ENG-1 MKII: 3-channel mixer
MLD-1 MKII: Mic-line driver
SB-1 MKII: Stereo balance box
ADA-1 MKII: Audio distribution amplifier
AVM-1: Voltmeter
AFM-1: Audio frequency meter
PAG-1: Portable audio generator
THD-1: THD analyzer
New products
See at booth

Circle (691) on Reply Card

Sharp Electronics Corporation
Professional Products Div.
Booth 1102
Established products
XC-800: Broadcast video camera for ENG/EFP and studio applications
XC-80RPA: Digital microprocessor-controlled remote operations panel with serial data transmission and black stretch
XC-870VF: 7-inch high resolution studio viewfinder with zebra pattern and adjustable peaking
XC800KIT-0001: Complete spare parts kit for Sharp XC800 camera
Series: Broadcast grade lenses, camera cables, rechargeable batteries, battery chargers and other related accessories for Sharp broadcast video cameras
New products
See at booth

Circle (934) on Reply Card

Shintron Company
Booth 1421
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
New products
390: YIQ switcher
646: Time code reader
647: Time code generator
200 Series: Distribution amplifiers

Circle (692) on Reply Card

Shively Laboratories
Booth 623
Established products
6814: Very high power circularly polarized FM antenna
6810: High power circularly polarized →

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With EMCEE® TV transmission equipment, you'll have to find something else to worry about

You won't have to worry about reliability

TV transmitters and translator /transposers serve towns and villages, not test benches surrounded by engineers. So we design and build for reliable performance. With straight-forward, proven circuitry descended from EMCEE equipment on the air for more than twenty years.

You won't have to worry about support

To help keep you on the air, EMCEE provides complete training for technicians at your station. In most cases, we can also provide needed spares within twenty-four hours. And even design, build, install and thoroughly check-out a complete transmitter or translator site in as little as thirty days.

You won't have to worry about selection

EMCEE TV equipment includes 10, 100, 1000 and 5000 watt Band I and III VHF transmitters and 10, 100 and 1000 watt Band IV and V UHF transmitters. All EMCEE equipment is available for either NTSC or CCIR standard applications. And is a sure way to take a lot of worries out of your operation.

You won't have to worry about anything

Transmitters
- •Television
- •Instructional Television Fixed Service Microwave
- •Multipoint Distribution Service
- •Operational Fixed Service

Television Translators/Transposers
Tower Erection
Complete Turnkeys

For more information, including data sheets in English or Spanish, please contact:

EMCEE

BROADCAST® PRODUCTS

a division of
ELECTRONICS, MISSILES & COMMUNICATIONS, INC.
P.O. Box 68
White Haven, PA 18611 U.S.A.
Call toll free: 800-233-6193
(In PA: 717-443-9575)
TWX: 510-655-7088
Ans: EMCEE WHHV

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

See us in Las Vegas, Booth #1621

Equipment manufactured in U.S.A.
®EMCEE Broadcast Products
©1983 EMCEE Broadcast Products

Circle (161) on Reply Card

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Shively (623)
Continued
FM antennas
6813: Medium power circularly polarized FM antenna
6811: Low power circularly polarized FM antenna
6812: Educational power level circularly polarized FM antenna
1203-28: Coaxial patch panel
1313-3F: Unflanged and flanged coaxial transmission line
2577: Pressurization equiment
5700: RF reflectometer
6810D: High power directional FM antenna
6010PB: FM panel antennas, model for antenna pattern optimization range
5836: Directional coupler
New products
UTV-01: UHF TV broadcasting panel antenna
VTV-01: VHF TV broadcasting panel antenna
6815: Broadband FM sidemount antenna
Circle (693) on Reply Card
see ad on page 134

Shook Electronic Enterprises
Booth 1310
New products
22-foot mobile TV production system
Circle (694) on Reply Card

Shure Brothers
Booth 1602
Established products
SM80: Omnidirectional condenser microphone
SM81: Unidirectional condenser microphone
SM85: Unidirectional hand-held condenser microphone
M267: Professional broadcast mixer
SC39 Series: Professional broadcast phono cartridges
New products
SM63L: Omnidirectional dynamic "interview" microphone
AMS 22: Automatic microphone system
AMS 26: Automatic microphone system
AMS 4000: Automatic microphone system
AMS 8000: Automatic microphone system
AMS 880: Automatic microphone system
Circle (710) on Reply Card
see ad on page 99

Sigma Electronics
Booth 1125
Established products
System 500: Modular distribution line
CSG-365A: Color synchronizing generator
CSG-360A: Color synchronizing generator
VDA-100A: Self-contained video DA
ADA/105/110/210: Audio distribution amplifiers
VPA-100: Video processing amplifier
New products
CSG-350A: Color synchronizing generator
CSG-355A: Color synchronizing generator
BBG-144: Blackburst timing module
Circle (695) on Reply Card

Singer Broadcast Products
Booth 309
Established products
1kW AM transmitter
New products
FM exciter with phase-locked loop synthesizer, broadband RF amplifier, 30W output
25kW FM transmitter
3kW FM transmitter
5kW AM transmitter
Circle (712) on Reply Card
see ads on pages 66 and 76

Skirpan Lighting Systems
Dilor Industries, parent company
No booth at press time
Established products
K Series: Multichannel rack-mounted dimmers
Astral: Single-channel rack-mounted dimmers
Auto Cue: Light Pen oriented memory control system
M7220: 72-channel 2.4kW touring dimmer rack
New products
DMR 1220: High density plug-in dimmer system
RM 610: 6-channel 1kW OEM series dimmer chassis
Circle (711) on Reply Card
see ad on page 252

Skotel Corporation
Booth 1126
Circle (935) on Reply Card

Solid State Logic
Also see Musicworks
Booth 1723
Established products

RTW
Peak Meter

Stereo Peak Program Meter
Model 1206

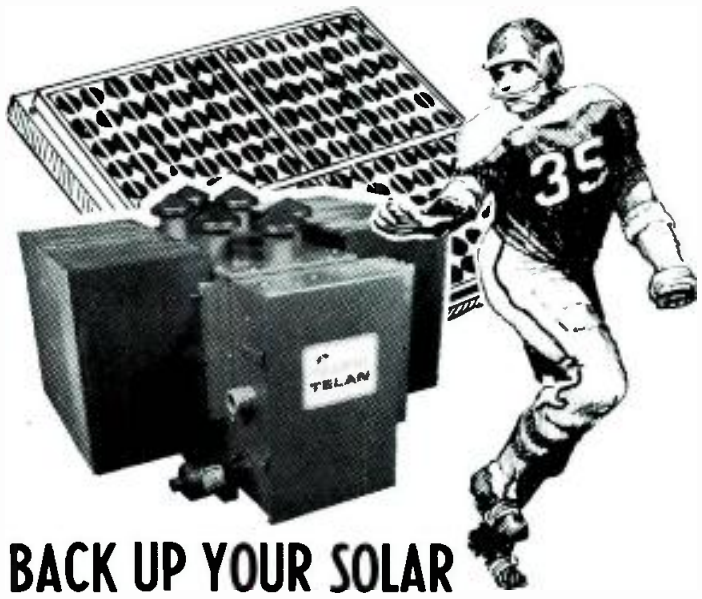
- 101 segment display permits precise peak level metering
- Automatic ON/OFF switching dependent on signal presence
- Auxiliary input for full scale metering of low level inputs

Available exclusively through

auditronics. inc.
3750 Old Getwell Rd.
Memphis, TN 38118, USA
Tel.: (901) 362-1350
Telex: 533356

Circle (162) on Reply Card

LINEBACKER



BACK UP YOUR SOLAR
WITH TELAN AUTO CONTROL
GAS FUELED THERMOELECTRIC GENERATORS
WEATHER PROOF—NO MOVING PARTS
CURRENT AND VOLTAGE AS NEEDED
TELEDYNE ENERGY SYSTEMS
110 W. Timonium Rd., Timonium, Md. 21093-3163 Phone: 301-252-8220 Telex: 8-7780 (Teledyne Timo)
Cable: TELISES

Circle (163) on Reply Card

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Take a close look at Harris SX Series solid-state AM transmitters...

When you add up all the benefits, the choice is clear.

Available in 1 kW, 2.5 kW and 5 kW, the field-proven Harris SX Series transmitter is packed with advanced technology to bring you the utmost in operational efficiency and performance. Compare overall specifications with any competitive transmitter.

MAXIMUM OVERALL EFFICIENCY

MOSFETs (Metal Oxide Semiconductor Field Effect Transistors) in the modulator and PA stages give you significant benefits over older bipolar transistor and tube technology. For example, MOSFETs incorporated into the Harris design result in higher overall efficiency — typically 70% or better.

ENHANCED AUDIO QUALITY

PDM Harris' patented Polyphase Pulse Duration Modulation is a highly efficient 4-phase system. The audio input is sampled four times during each PDM cycle. Your listeners will notice the marked improvement in audio quality.

PUSHBUTTON DIAGNOSTICS

Here is your centrally located monitoring point for a vast number of useful operating parameters — all right up front — all at fingertip command.

AM STEREO COMPATIBLE

Harris is the only transmitter manufacturer with extensive AM Stereo experience. That's a plus, as special consideration is given to incidental phase modulation...audio input to RF envelope output phase linearity...and RF channel phase response.

DIRECT POWER SAVINGS

SX Series transmitters save you up to 46% more power than other transmitters currently in use. A definite edge when there's a premium on every kilowatt consumed.

So add up all these benefits. Today you simply can't afford to be without a Harris SX transmitter. For more information, contact Harris Corporation, Broadcast Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.

HARRIS

Visit Harris at the 1983 NAB, Las Vegas, in the North Hall.

Circle (164) on Reply Card

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Solid State Logic (1723)
Continued
SL 4000E: Master studio system
SL 6000 E: Stereo video system
Circle (973) on Reply Card

Solutec, HA
No booth at press time
New products
SOL 6800: Automated broadcasting system
SOL 8200: Co-channel filter
Circle (1315) on Reply Card

Sono-Mag Corporation (SMC)
Booth 202
Established products
Series: Broadcast automation systems and related equipment for radio
New products
See at booth
Circle (696) on Reply Card

Sony Video Communications
Booth 1200
Established products
RUP-460: 46-inch rear screen projection system
SLO-420: Front load, slim profile Betamax
SMC-70: Microcomputer
BVW-1: Betacam camera/recorder
Circle (1316) on Reply Card

Sony Broadcast Products Company
Booth 1200
Established products
BVH Series: 1-inch format VTR
BVH-500: Portable EFP unit
BVH-1180: 3-hour mastering unit
BVP Series: ENG/EFP cameras
BVP-330: Diode-gun Plumbicon EFP color camera
BVP300A: Midrange 3-tube EFP color camera
BVP-250: ENG Saticon low cost color camera
BVP110: High quality HBST single ⅔-inch tube color camera for newsgathering
BVE-800: Low cost flexible time code editor for U-matic and 1-inch C Format VTRs
Digital products:
BVX-30: Video processor
BVP-800: Low cost TBC
Series: Broadcast monitors including BV-1900 studio monitor
Betacam Systems: Full BVW1/BVW10 and accessories for VTR in camera combined 1-piece ½-inch tape recorder/camera unit
Updated BVE5000
Significant new advances in 1-inch C Format VTR and accessories
Others to be announced
New products
Introduction of a new product based on the BVH-200VTR and an optional accessory product designed to improve the picture quality of the ¾-inch U-matic VTR
Expanded Betacam line
Audio products from MCI/Sony and Sony Professional
Circle (713) on Reply Card
see ads on pages 34, 35, 200 and 201

Record booth size

Assuming that the NAB map layout is accurate, Sony will win the all-time record for size of its booth at NAB-'83/Las Vegas. The main Sony booth scales out at 14,485 square feet, with MCI/Sony in a separate booth at another 1685 square feet.

Soundcraft USA
Booth 1724
Established products
Series 1S: Portable audio mixing console
Series 800: Post-production audio mixing console
Series 1600: Post-production audio mixing console
Portable 1-inch 8-track audiotape recorder
New products
See at booth
Circle (714) on Reply Card
see ad on page 135

Soundcraft Electronics
Booth 1724

When YOU want
NICKEL CADMIUM
PE 52
Lighting or Camera
dual output belt
See us at NAB Booth 1729
28.8 volt 4 AH
or
14.4 volt 8 AH
in one unit

Versatile • Rugged • Economical
YOU want
PERROTT
a name you can depend on
7201 Lee Highway, Falls Church, Va. 22046 (703) 532-0700
Circle (165) on Reply Card

Great Picture...Stereo Sound...Easy To Use and It's MADE IN USA
See the new JVC 19 inch and the entire line of JVC 3" 5", 9", 13", and 19" color video monitors and monitor-receivers at Comex/NAB.
All JVC monitors and monitor-receivers have audio amplifiers and speakers built-in making them ideal for editing systems
See the complete line at Comex Booth 1508 at NAB
COMEX CORPORATION
P.O. Box 17011
Dulles International Airport
Washington, D.C. 20041
Telephone 703-661-8132 Telex 248892 COMX UR
Circle (166) on Reply Card

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No surprises.

© 1981 Fuji Photo Film U.S.A., Inc., Magnetic Tape Division, 350 Fifth Avenue, NY, NY 10118

Available in 2", 1", ¾" and ½" Beta and VHS.

See us at NAB booth #1413

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Soundcraft (1724)
Continued
Established products
400B: Video post-production audio console
1600: Video post-production audio console
SCM 762: 24-track tape machine
New products
BC-1: On-air broadcast console
Circle (1432) on Reply Card
see ad on page 135

Sound Genesis
Booth 331
Established products
Series: Equipment geared to audio production and reproduction
New products
See at booth
Circle (820) on Reply Card

Sound Technology
Booth 502
Established products
1710A: Distortion measurement system
1500A: Tape recorder test system
1501A: Balancing system
TR-150: Technical test record
New products
1510A: Tape recorder/audio test system
Circle (697) on Reply Card
see ad on page 241

Spectrum Planning
Booth 128
Circle (974) on Reply Card
see ad on page 102

Stainless
Booth 1347
Established products
Series: Antenna support structures for the broadcast industries ranging from 20 to 200 feet
New products
See at booth
Circle (822) on Reply Card
see ad on page 236

Stanton Magnetics
Booth 102
Established products
Series: Magnetic cartridges, high performance professional series 980LZS, 981LZS, 980HZS and 981HZS, the model 310 preamplifier and a line of record care products
RC5 Plus: The all-in-one record care cleaner
New products
Announcer's Earset: Designed for inconspicuous listening on camera
Circle (699) on Reply Card
see ad on page 126

Stantron
Div. of Wyco Metal Products
Booth 1133
Established products
Modular electronic cabinets and consoles for TV and radio stations
New products
Video center and audio center modular consoles, modular cabinets and modular racks for duplicating, editing and post-production services
Circle (700) on Reply Card

Station Business Systems
Booth 311
Established products
BAT 1700: Computerized financial and management control system
New products
See at booth
Circle (936) on Reply Card

Stephens Electronics
Booth 1757
Established products
821B-104A-24P: 24-track portable tape recorder/reproducer with QII Autolocator
824-103-2: ½-inch 2-track mastering analog recorder portable with QII Autolocator
Circle (709) on Reply Card

Strand Century
Booth 1418
Established products
Light palette: Lighting control console
Mantrix 2S: Lighting control console
CD80: Dimmers, portable and permanent
Ianiro: HMI fresnels
Ianiro: Pole-operated studio lighting fixtures
Ianiro: Portable lighting kits
New products
Mantrix Memory: Lighting control console, 4.5-inch LEKOLITE
3380: 6-inch Fresnel, 1000W
3480: 8-inch Fresnel, 2000W
Circle (823) on Reply Card

Storeel Corporation
Booth 1008
Established products
Series: Modular rapid transit storage systems for videotapes, cassettes and film
Series: Cabinets, storage VTR and film, reel storage/retrieval systems, films and VTR. Setup trucks, tape racks, cartridges
Series: Room stretcher high density storage for RCA and Ampex cassettes
New products
See at booth
Circle (708) on Reply Card

Straight Wire Audio
Booth 130
Established products
UA-2: Universal audio amp card-mic to-line level with eight outputs
PH-2: Phono preamp with passing EQ and balanced input
MTX: L + R/L – R line amp for matrixed cart recording
UPS-3: Power supply board optimized for audio op-amp applications
MF: Mini file card cage—holds 3 SWA cards. All of the above are available as kits
High-Com noise reduction system
VCF: Vertical card frame
HCF: Horizontal card frame
UMB: Universal mount
New products
HCS-2: High-Com companding noise reduction on a single card
ITC-2: Replacement preamp board for ITC 3D and RP series cart machines
Circle (702) on Reply Card
see ad on page 44

Studer Revox America
Booth 201
Established products
PR99: Compact professional recorder
A80: Multichannel and stereo mastering recorders
169/369: Mixing consoles
900 Series: Mixing consoles
B710: Microprocessor-controlled cassette deck
B77: Open reel recorder
TLS 2000: SMPTE synchronizing system
Telephone hybrid systems
New products
A810: Broadcast stereo recorder with center channel SMPTE code
A800 MKIII: Totally transformerless multichannel recorder
A710: Balanced +4 in/out professional cassette deck
Circle (703) on Reply Card
see ad on page 11

The Superior Electric Company
Booth 1755
Circle (1133) on Reply Card

Swintek Enterprises
Booth 1345
Established products
SM85/dBS: Hand-held radio microphones
MK 200: Full Duplex VHF/UHF wireless headsets
RFSD: RF switching diversity antenna systems
MK50A/dBS: Lavalier VHF/UHF radio microphones
MKQ/dBS: VHF/UHF/dbs receivers
New products
RFSD multi-antenna RF switching diversity system
Circle (704) on Reply Card
see ad on page 80

Sylvania
Booth 1204
Established products
Tungsten Halogen studio lamps, bright arc studio lamps, bright beam studio lamps and Halogen PAR lamps.
Circle (937) on Reply Card

Symetrix
Booth 641
Established products
501: Peak-RMS compressor/limiter
SF-400: Stereo parametric equalizer
A-220: Stereo amplifier
Patch-32: Patchbay system
SG-200: Dual signal gate
TI-101: Telephone interface
New products
DCS-16: Remote control/status monitor/alarm
511: Stereo noise reduction system
Circle (938) on Reply Card
see ad on page 256

System Associates
Booth 1121
Established products
Service: Brokers of used broadcast TV equipment
New products
See at booth
Circle (705) on Reply Card

TDK Electronics Corporation
Booth 1707

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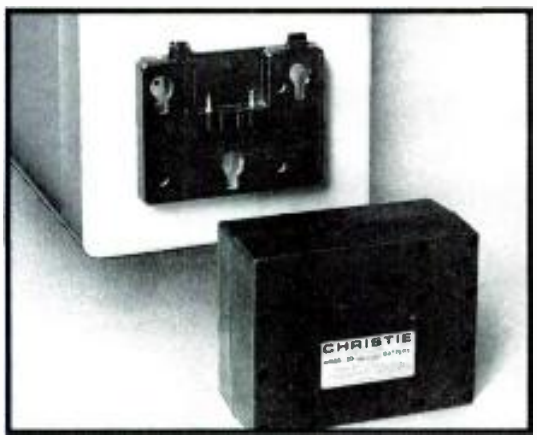
NO OTHER BATTERIES EVEN COME CLOSE!

ReFLEX®-20—the only battery charging system that gives a full charge in 20 minutes with longer battery life and requiring fewer batteries to buy—now brings you 4 more vital reasons to use Christie camera-mounted, belt-mounted, and VCR batteries.

NEW Batteries Fit Most Mounts

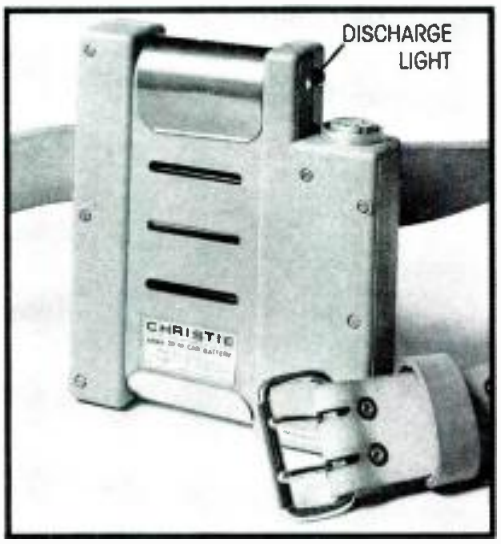
Christie "burping" KS and KR batteries now fit virtually all factory camera battery mounts.



NEW Slow-Charger and 20-Minute Burp Charger

Every Christie battery can now be fully charged in 20 minutes on the patented ReFLEX-20 "burping" charger (now available from under $1,000) or when on the road with our inexpensive, compact, lightweight slow-charger. Meet minimum battery order requirements and receive our slow-charger *free.*

NEW Extra Reliability, Convenience, and Ruggedness



Most of our batteries now feature *overload protection* with automatic reset *(no thermal fuses to blow).* No flimsy shrink tubing on our BP90 equivalent batteries—you get a *rugged hard case.* And now you won't be caught dead with a Christie battery because our new *discharge indicator light* tells you when to recharge.

NEW 12-Month Super-Warranty

Incredible but true. Under normal use, Christie will repair or replace a defective battery free of charge for a full year. (Copy of complete warranty available on request.)

LIMITED WARRANTY
(ABSTRACT)
ReFLEX-20 BATTERIES

Any battery pack which becomes defective, or has permanently lost more than ⅓ of its rated capacity, under proper (normal) use within one (1) year of delivery to the user, but not to exceed eighteen (18) months from the date of shipment from Christie, will be repaired or replaced at no charge upon return to the Christie factory, transportation paid and properly insured. Batteries must not have been tampered with or cells replaced.

For the complete Christie battery story, contact Steve Heller today at Christie Electric Corp., 20665 Manhattan Place, Torrance, California 90501, 800-421-2955 (in California 213-320-0808), TWX 910-349-6260.

You Can Depend On Us

CHRISTIE

Since 1929

See the new Christie batteries and the industry's most powerful bulk tape degausser at NAB Booth 1016.

Circle (167) on Reply Card

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TDK (1707)
Continued
Established products
GX-LX Series: ½-inch open-reel tape
PT-120 Series: VHS videocassettes for all educational/industrial broadcast applications
New products
Extra high grade T-120 VHS, L-500 Beta videocassettes and TC-20 extra high grade compact videocassettes
Circle (715) on Reply Card

3M
See "Three" M

TFT
Booth 109
Established products
753/754: AM modulation monitor with frequency readout
763/764A: FM modulation monitor with frequency readout
7610/7830: Remote control
7900: Microprocessor remote control with IBM personal computer
7700: STL—aural studio-transmitter-links
8100: TSL—transmitter-to-studio link
New products
8300: STL systems for congested RF regions
RC-82: Radio-controlled load management switches
8350: Satellite downconverter remote control unit
834/835: TV aural and SCA modulation monitor
Circle (716) on Reply Card

TVI Theatre Vision
Booth 1730
Established products
Chroma-key, lino, scrim, velour curtains, curtain track and accessories and studio and location lighting instruments
New products
Strand-Century CD 80 dimmer packs and Strand-Century Mantrix memory lighting control console
Circle (1134) on Reply Card

Taft Broadcasting
Booth 629
Circle (1135) on Reply Card

Tamron Company Ltd.
Booth 1640
Circle (941) on Reply Card

William B. Tanner
Booth 410
Circle (942) on Reply Card

TASCAM Production Products Div.
TEAC Corporation of America
Booth 1304
Established products
35-2B: ½-track recorder/reproducer for studio masterings
44: ¼-inch 4-track recorder reproducer for heavy-duty use
80-8: 8-track multichannel recorder/reproducer
22-2: ½-track recorder/reproducer
MM20: System 20 master mixing module
MU20: System 20 meter unit
PE20: System 20 parametric-type sweep equalizer module
EX20: System 20 expander module
22-4: 4-channel recorder/reproducer
M16: 24-input, 16-track mixing console
85-16B: 16-track tape recorder/reproducer
244: 4-track mixer with built-in 4-track "Sync" Cassette Recorder/Portastudio
M35: 8-track mixer
M30: 8-track mixer
32: 2-track tape recorder
34: 4-track tape recorder
38: 8-track tape recorder
New products
See at booth
Circle (732) on Reply Card
see ads on pages 20 and 219

Tektronix
Booth 1601
Established products
690SR: Color picture monitor
Demodulators, waveform monitors, vectorscopes, sync and test signal generators and spectrum analyzers
New products
110-S: Synchronizer
1910: Digital generator/inserter
1980 ANSWER: Option 04 NTSC video monitoring software
2235: Portable 100MHz oscilloscope
2236: Portable 100MHz oscilloscope with CTM multimeter
2445: Portable 150MHz oscilloscope
2465: Portable 300MHz oscilloscope
Circle (718) on Reply Card
see ads on pages 12, 13, 15 and 17

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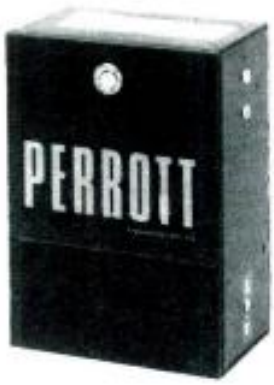
See us at NAB
Booth 1729


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IMPAC SERIES FRAME 4900 FOR:
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Continuous Computer Control of Your Stereo Sound is Now a Reality.

Inovonics Lives Up to Its Name with the First Computer Controlled Programmable Audio Processor.

As long-term listenability and sound quality become more of a factor in broadcast audio, computer control of your station's sound is a must.

Inovonics has made your stereo or mono programming predictable with unlimited digital management of your sound.

The new 250 stereo audio processor, with full digital programmability, permits you to adapt processing parameters to best suit changing station formats and listener profiles over the course of the broadcast day.

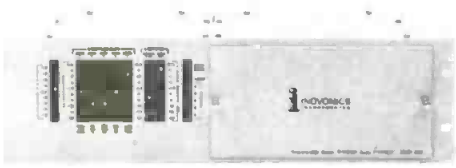
With our standard 250 you can pre-program four remotely selectable manual presets. The optional dynamic programming card allows you to program the 250 on a continuous basis with on-line control by any of several small computers with RS-232C serial data interface.

The 250 can make its own judgements of dynamic material, or can be told what kind of music is coming and be adjusted accordingly. The computer control will even provide the means to the correct balance between music and commercials.

The 250 is the only signal conditioner required ahead of the transmitter. It performs the multiple task of a slow, gain-riding A.G.C., Multiband Compressor, Program Equalizer and final Peak Controller.

The 250 is ready now. It's perfect for today's FM requirements and for upcoming stereo AM and TV broadcast applications. Priced at under $3,000, it's half the cost of other audio processors that do not even offer digital control.

The new 250 from Inovonics.The days of tweaking and fiddling are over. Check with your broadcast equipment distributor .



Inovonics Inc.

503-B Vandell Way
Campbell, Calif. 95008

Telephone
(408) 374-8300

Circle (170) on Reply Card

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Tektronix 110S synchronizer to be unveiled in Las Vegas

In preparing for the NAB-'83 show, representatives from Tektronix stopped to meet with the **BE** staff and demonstrate one of the new instruments to be unveiled in Las Vegas: the model 110-S frame synchronizer. With this unit, Tektronix has entered the studio operations side of television for the first time in its history. With 10 bits of resolution and accuracy, the 110-S is claimed to have a competitive advantage in the NTSC market because of its quality and reliability. Designed to fulfill a variety of operational needs, the series of frame synchronizers ranges in price from about $13,000 to $18,000. Availability for these instruments will be about 12 weeks after their first public showing at NAB-'83/Las Vegas.

The new frame synchronizer is designed to allow TV broadcasters to secure a variety of video choices as standard on all units, including signal pass through or creation of RS-170A sync burst and, for noisy signals, field or frame freeze, go-to-black or pass-on-through. Adaptive or notch decoding and 2-field or 4-field memory are available as options. Including quantizing effects, the 110-S has the following specifications: 1% differential gain; 1° differential phase; 60dB signal-to-noise; 1% frequency response; and 0.5% 2T K-Factor. Physical features include 89mm (3.5-inch) height; 480mm (19-inch) width; 510mm (20.1-inch) depth; and 14.8kg (32.7-pound) weight.

The 110-S synchronizes the incoming signal with little degradation to the signal. Operationally, the 110-S digitizes an incoming signal, stores the digital data temporarily, and converts the digital signal to an analog signal that is locked to the reference synchronization. The 10-bit architecture introduces negligible quantization error, an important feature when the signal will be passed through several frame synchronizers. The 110-S will also track noisy signals such as those that result during a microwave fade. The benefit to users is that important picture segments will not be lost during these periods of operational difficulties.

Visitors to the Tek booth at NAB-'83/Las Vegas can see the power of the 10-bit architecture in the 110-S in a side-by-side comparison with an 8-bit system. Plan to see it, because it is impressive.

Tektronix will also be exhibiting its new 1910 digital test signal generator and VITS inserter. It has some impressive specs, but we have not seen it in operation yet.

Telcom Research
Booth 1318
Established products
T 5010: Master SMPTE/EBU time code generator
T 6010: High speed SMPTE/EBU time code reader
TCG-550: SMPTE/EBU time code generator
TCG-660: SMPTE/EBU time code reader
T-5000: Rack-mount SMPTE/EBU time code generator
T-10,000: The Time Code Centre
T-7,000: Portable hand-held SMPTE/EBU time code generator
Circle (1318) on Reply Card
see ad on page 225

Tele-Cine Corporation
Booth 1403
Established products
Series: Schneider TV zoom lens
ENG/EFP lenses for state-of-art camera VTR systems
Diascope lenses for auto setup cameras
Long focal lens for ENG/EFP
Rentals and service custom designed remote control systems
Circle (733) on Reply Card

Telemet
Division of Geotel
Booth 1003
Established products
3705-A1: Envelope delay test set with internal sweep generator
3706-A1: TV transmitter sideband analyzer
3709-A1: Sideband/spectrum analyzer
3710-A1: Broadcast demodulator
4400-D1: Modulator
4501-A1: Precision/demodulator
4503-A1: Demodulator tester
4504-A1: Synchronous detector
4210-B2: Fiber-optic transmitter and receiver with audio multiplexer
New products
7934-A1: Routing switcher
Circle (734) on Reply Card
see ad on page 106

Telescript
Booth 1407
Established products
MPS: Monitor prompting system featuring 15-inch and 17-inch 1000-line resolution monitors
New products
MPS-E: Electronic prompting that provides complete text processing facilities for writing, editing and storing scripts.
Circle (719) on Reply Card

Telesource Communications Services
Booth 1616A
Computerized election reporting system and a newsroom management and editing system
Circle (1136) on Reply Card
see ad on page 308

Telestrator
See *Interand*

Television Equipment Associates
Booth 1216
Established products
Racal headsets in intercom and sportscaster applications
Elcon tape cleaners/evaluators for 2-inch and 1-inch tape
Elcon tape cleaners/evaluators for ¾-inch cassette
V G zone plate generator
Matthey low-pass phase-equalized video filters
Link video DAs
I R T color monitor comparator
New products
Matthey dip delay boxes and rack packages
Matthey passive cable equalizers
Elcon tape cleaner/evaluator for 1-inch tape
V G teletext system
Link audio DA
Circle (721) on Reply Card

Television Technology Corporation/ Wilkinson Electronics
Booth 305
Established products
XL20 MU: 20W UHF LPTV transmitter
XL100 MU: 100W VHF LPTV transmitter
XL1000 MU: 1000W UHF LPTV transmitter
MATVF-10: 10W VHF LPTV transmitter
XL1MU: 1W UHF LPTV transmitter
TL1VU: 1W UHF transmitter
XL10 FM: 10W FM translator
FM 250: 250W FM transmitter
FM 2500: 2500W FM transmitter
FM 25000: 25,000W FM transmitter
TF10J: FM exciter
Circle (723) on Reply Card

Telex Communications
Booth 600
Established products
NAB cartridge recorders/reproducers
Reel-to-reel recorders/reproducers
Audiocom intercom system
Turner professional microphones
Reel-to-reel loggers
Headphones and headsets →

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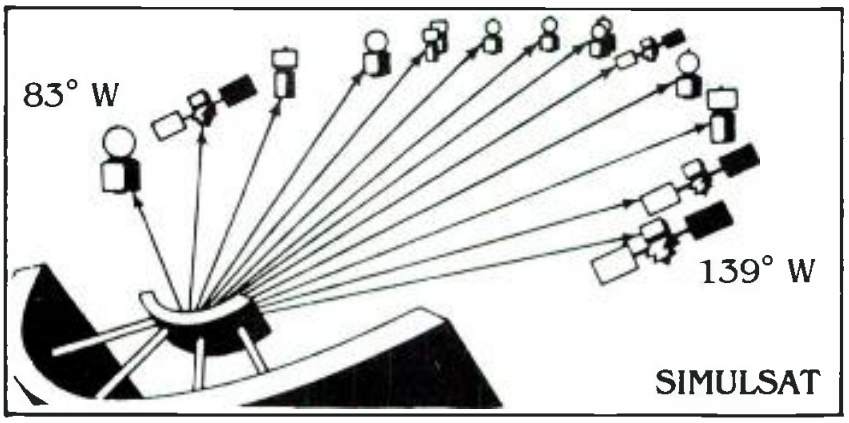


SIMULSAT-7 SEES ALL SATELLITES SIMULTANEOUSLY WITH 7 METER PERFORMANCE

Simulsat can give you a new freedom in program selection and access. With Simulsat, your programming decisions are never affected by your hardware's limitations. This flexibility allows you to be more competitive in your market, more responsive to your customers needs.

SIMULSAT GIVES YOU FLEXIBILITY FOR TODAY AND TOMORROW.

As programs shift to different satellites and new satellites are launched, the need for your station to access any combination of satellites simultaneously, increases. Simulsat's technology gives you the flexibility to deal with these changes efficiently and economically. When it comes time to organize a teleconference or supply audio feeds for the radio station next door, Simulsat paves the way for these new profit opportunities.

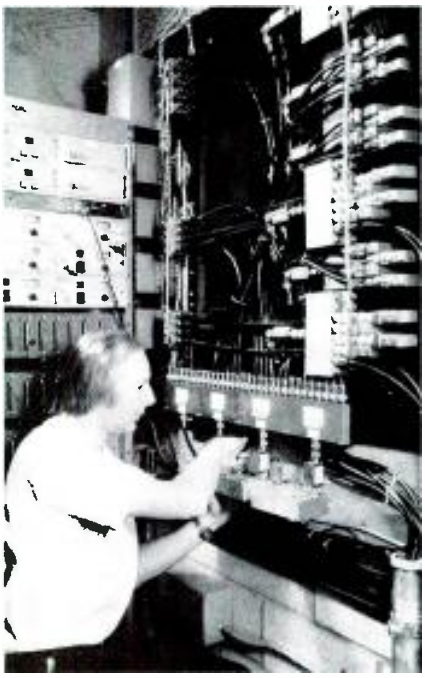
SEVEN METER PERFORMANCE

Our new Simulsat-7 will give you 7 meter performance on every satellite. Consider the equipment expense and maintenance headaches associated with conventional steerable antennas compared to one fixed Simulsat.

SIMULSAT-5

CHOOSE THE SIZE THAT'S RIGHT FOR YOU.

Simulsat-3 ..... 41 dBi gain
Simulsat-5 ..... 44 dBi gain
Simulsat-7 ..... 47 dBi gain



TURNKEY INSTALLATIONS

Antenna Technology can provide you with a completely installed and engineered system specifically designed for your unique situation. Whether you require a remote switching system from your antenna site to your studio or a standard electronics package with your Simulsat, our engineers can design a system to meet your needs. Let our Broadcast Specialists show you how we can save you time and money with a Simulsat installation.

ANTENNA TECHNOLOGY CORPORATION

8711 East Pinnacle Peak Road Suite C-103
Scottsdale, Arizona 85255
(602) 264-7275

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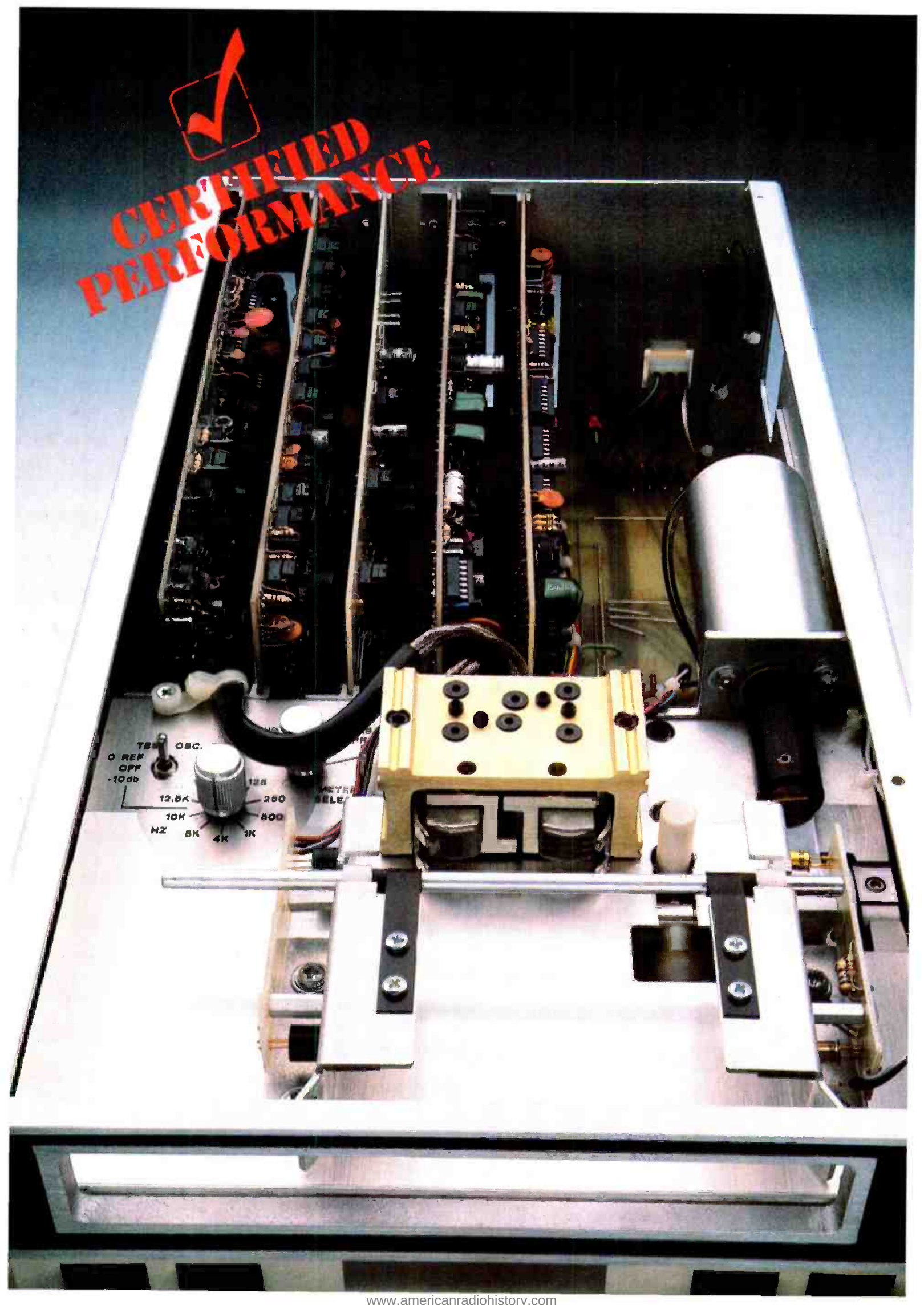

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SEE PRIMUS AT NAB BOOTH 415

TAKE A CLOSE LOOK AT THE NEW PRIMUS™ CART MACHINES.

Introducing the PRIMUS (prē-mŭs) cartridge recording/reproduction system from Ramko Research.

These new cart machines are engineered to be demonstrably and dramatically better than any other cart machines in the industry. They deliver signal-to-noise, distortion and frequency response specifications that are unrivaled. They set a new standard for the lowest wow and flutter. They're built rugged throughout to guarantee adherence to specifications.

COMPARE THESE SPECIFICATIONS: YOU BE THE JUDGE.

	PRIMUS™	ITC RP SERIES	AUDICORD #126	BE SERIES 3200
Signal-to-Noise Ratio:	−60 dB	−50 dB	−47 dB	−52 dB
Distortion (System):	0.9%	2.0%	1.0%	2.0%
Frequency Response: 50 Hz - 16 kHz	±1.5 dB	±2.0 dB	±2.0 dB	±2.0 dB
Wow & Flutter:	0.095%	0.2%	0.15%	0.15%
Price:	$2,550	$2,810	$1,979	$2,450

All measurements referenced to 160 nWb/m, distortion is THD @ 1 kHz.
All models are R/P stereo, priced with three cue tones.
All prices are based on latest available manufacturers' information 3/83.

	PhaseMaster	TOMCAT	ITC SERIES 99B	ATR-800* (Reel-to-Reel)
Signal-to-Noise Ratio:	−65 dB	−59 dB	−56 dB	−60 dB
Distortion (System):	0.9%	0.9%	0.8%	0.3%
Frequency Response:	40 Hz - 16 kHz ±1.5 dB	40 Hz - 16 kHz +.5, −1.0 dB	31.5 Hz - 16 kHz ±1.0 dB	40 Hz - 16 kHz ±2.0 dB
Wow & Flutter:	0.08%	0.09%	0.15%	0.06%
Real-time Phase Correction:	locks to 5° @ 16 kHz	none	none	none
Price:	$3,850	$5,280	$5,330	$6,230

All measurements referenced to 250 nWb/m, distortion is THD @ 1 kHz.
All models are R/P stereo, priced with three cue tones (excepting ATR-800).
*measurements referenced to 370 nWb/m.

A CLOSER LOOK AT BETTER ENGINEERING

Mono or Stereo, R P or playback, here are more reasons why the PRIMUS cart machines are the industry's most advanced.

The PRIMUS transport deck is ⅝" thick cast alloy for superior stability. It's covered with stainless steel for wear resistance and EMI shielding. The machined headmount allows easy and precise adjustments. In addition, the heads are internally illuminated for cleaning and inspection. For smoother insertion and withdrawal and to prevent distortion, carts are securely held at the edges by spring-loaded rollers, rather than friction springs. To prevent tape skew, pinchroller parallellism is adjustable with the motor running. The pinch roller is engaged by an adjustable air-dampened solenoid with a Teflon-coated plunger for friction-free, quiet operation. Optical sensors start the motor when a cart is inserted. This not only eliminated start-up wow, but it means there are no mechanical switches to break or jam. Bearings have a longer life too because the motor doesn't need to run continuously. A crystal-controlled, brushless D.C. servo motor insures timing accuracy to within 0.05%. The minimal motor heat is kept away from your tapes by a high traction, ceramic capstan. Tape speeds (7.5 & 15 ips) are field selectable.

With PRIMUS, you have three cue tones with sharp, error-free digital sensing. Solidstate bar graph meters and dynamic noise reduction are standard. An automatic 4½ digit timer is optional. All electronics are on plug-in modules and rear panel connectors are quick disconnect type.

In summary, the PRIMUS cart machines have been engineered to be the most sophisticated broadcast reproduction system you can buy for under $3,000.

COMPARE THE PHASEMASTER™: YOU'RE THE JUDGE AGAIN.

If you're in the market for the ultimate Stereo phase-correcting cart machine, look to our PhaseMaster, the broadcaster's premier phase-correcting, stereo cart machine.

The PhaseMaster has all the features as PRIMUS plus, the advantages of consistently repeatable, accurate electronic phase alignment. A front panel phase meter and internal diagnostics are added for operating ease.

PhaseMaster works flawlessly with any cartridge and eliminates the compromise of unreliable and inconsistent electromechanical schemes. The trade-offs imposed by noise-inducing and non-compatible matrixing approaches are now history. Complex, inexact cross-correlation techniques have been discarded. With PhaseMaster you're positively guaranteed compatibility with all your previously recorded carts. Here's a cart machine truly ready for superior FM & AM Stereo applications — a machine that rivals the performance of an open reel recorder.

THE CERTIFIED PERFORMANCE GUARANTEE

Whether you invest in PRIMUS or PhaseMaster, you'll receive a two year warranty* and a *Certified Performance Gold Card* that instantly puts you in contact with our Technical Assistance Department over our toll-free hotline.

To put PRIMUS or PhaseMaster to task call (800) 821-2545 or contact your nearest Ramko Research sales representative or distributor. Ask about our two week free trial.

Take a close look at how the Certified Performance of PRIMUS or PhaseMaster can make your job a whole lot easier.

PRIMUS

PRIMUS is a division of Ramko Research, Inc.

Ramko Research, 11355-A Folsom Blvd., Rancho Cordova, CA 95670 (916) 635-3600 Telex: 176493 RAMKOSAC *Heads are warranted for one year.

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1983 Ramko Research

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Telex (600)
Continued
Professional wireless microphones
Copyette 1 & 1 and Copyette 1 & 3
Copier I and Copier IV
New products
Wireless headsets
6120 duplicator
Caramate 4000 audiocassette slide projector

Circle (724) on Reply Card
see ads on pages 30 and 130

Telfax
Booth 635

Circle (946) on Reply Card

Tennaplex Systems Ltd.
Booth 1127
Established products
Kathrein: Broadband TV and FM panel antennas
Kathrein: TV and FM multiplexers
Elcom: Network analyzer
Spinner: Coaxial hardware
New products
Kathrein: TV and FM panel antennas

Circle (725) on Reply Card
see ad on page 64

Tentel Corporation
Booth 1613
Established products
T2: Tentelometer tape tension gauges
TSH: Tentel spindle height gauges
New products
THP: Tentel head protrusion gauge

Circle (735) on Reply Card

TESS
Knowledge Industries
Booth 1720

Circle (976) on Reply Card

Theatre Service & Supply Corporation
Booth 1513
Established products
Series: Studio cyclorama curtains and tracks
Series: Studio and portable lighting equipment
New products
See at booth

Circle (726) on Reply Card

Theatrical Services
Booth 1759

Circle (949) on Reply Card

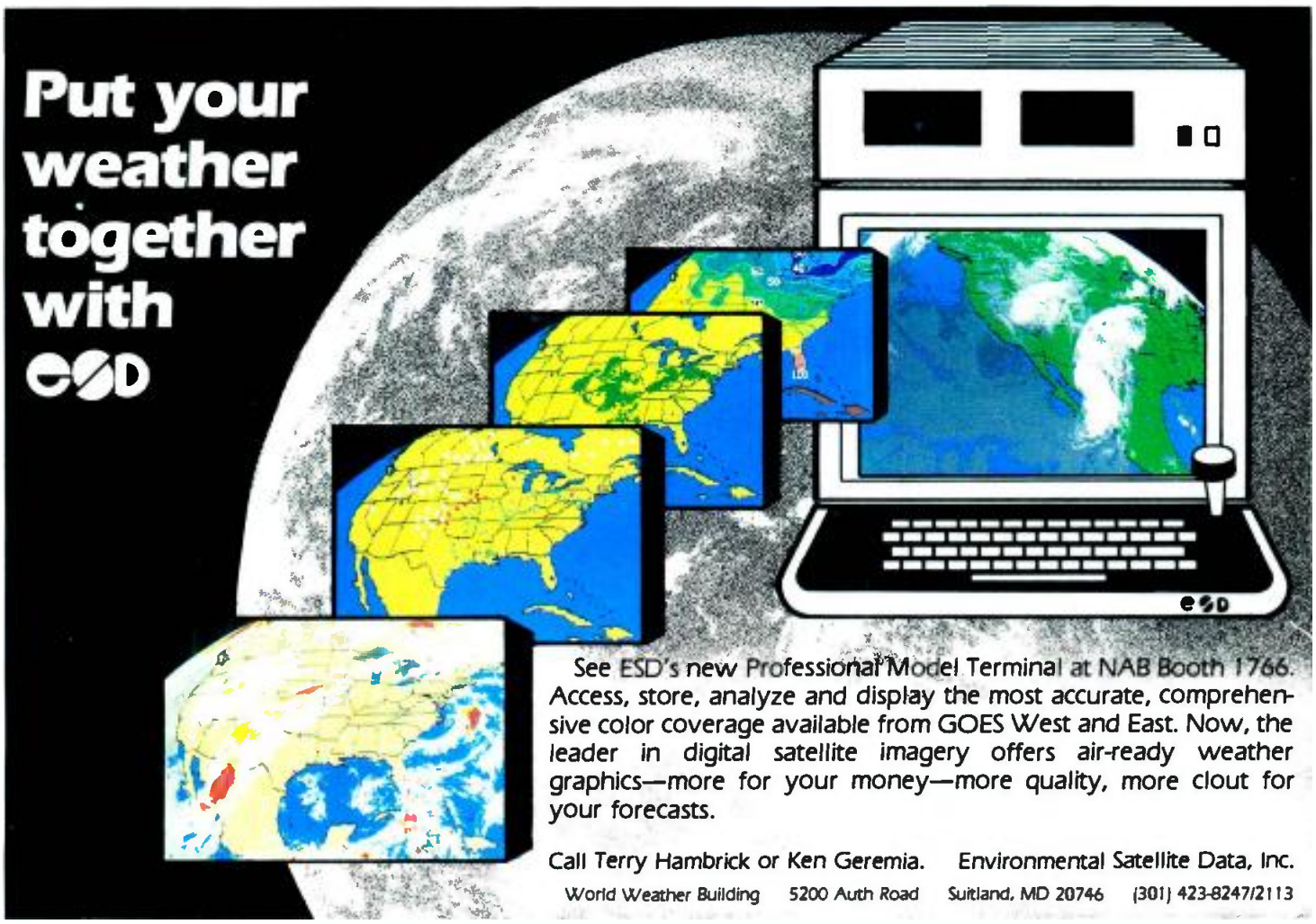
Thermodyne International
Booth 1637
Established products
Shok-Stop: Shipping and storage cases
Rack-Pack: Shipping storage and operating cases
New products
Rack-Pack: With new 3-tiered sliders

Circle (727) on Reply Card
see ad on page 233

Thomson-CSF Broadcast
Booth 1001
Established products
4101/4111: FM Volumax, automatic peak controller
4440A/4450A: Audimax, automatic level controller
4300: AM Volumax, automatic peak controller
1602: Dual audio distribution amplifier
MC-501, MC-601A and MC-701A: Microcam, portable TV cameras
TTV-1525B: Color studio camera
TTV-2705: Color slide scanner
Vidifont IVA: Character generator
Vidifont Graphics V: Character/graphics system
8010: Image enhancer
5500B: Color correction system
9100: Digital video processor
9010: Vidiplex, multiplexing encoder
9020: Vidiplex, multiplexing decoder
Transmitters: 20kW, 1kW UHF and 100W VHF
New products
MC-611: Microcam, 1-tube with ½-inch VTR
MC-613: Microcam, 3-tube with ½-inch VTR
VT-615: Videotape player and editing systems

Circle (736) on Reply Card
see ad on page 249

Thomson-CSF Electron Tube Division
Booth 1145
Established products
TH-328: 100W common amplification UHF power tetrode
TH-393: 2.2kW common amplification UHF power tetrode
TH-361: 5kW common amplification VHF power tetrode
TH-298: 1kW common amplification VHF

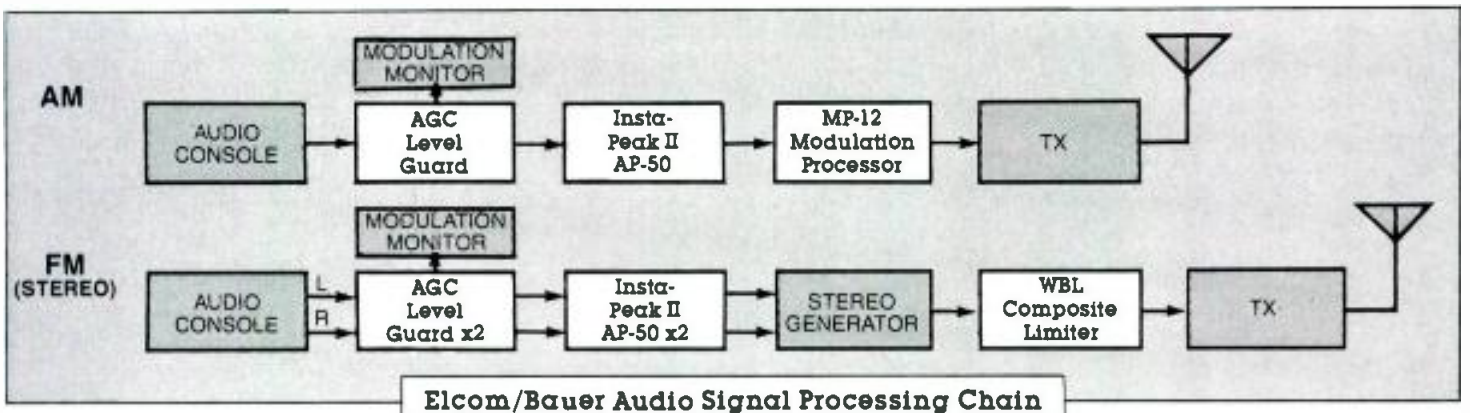


Circle (173) on Reply Card

www.americanradiohistory.com

ELCOM/BAUER AUDIO SIGNAL PROCESSING

A System of Engineered Components which combines Simplicity, Reliability and Stability for Superior Sound Quality and Unexcelled Control.



Elcom/Bauer Audio Signal Processing Chain

Any broadcaster dedicated to improving the station's sound with the right combination of audio processing knows that the desired results are difficult to achieve and often harder to control. A sensible solution for the sound and control you need is to select from Elcom/Bauer's full range of audio signal processing components.

An Elcom/Bauer system is engineered with a versatile common sense design approach that delivers a smooth range of inaudible level control. Whether your application is AM or FM, the right combination of Elcom/Bauer audio processing will make your sound more competitive—without the problems of excessive compression and loss of dynamic range.

The AGC Level Guard™

Is an advanced automatic level controller. It utilizes a switchable time constant optical attenuator for unnoticeable, wide-range level control and low distortion. The AGC Level Guard meets the FCC requirements for automatic transmitter systems and incorporates a unique electronic servo which continuously maintains precise, legal modulation levels.

Two front panel controls—gain and gain reduction—makes installation and adjustment simple and reliable; a prerequisite for automated stations.

The AP-50 Insta-Peak II

Incorporates a dual-spectrum, audio processing technique to achieve a smooth, full-range control of peak levels. The split-spectrum processing employs independent gain control of upper and lower portions of the spectrum and eliminates audible "pumping" effects. Positive and negative "fast spikes" are controlled by circuitry which augments the optical attenuator response. A proprietary "anti-ring" circuit (which operates only during hard limiting) prevents overshoot and ringing. Adjustments are straightforward with LED's indicating peak ceilings.

The MP-12 Modulation Processor

Increases the positive modulation from an AM transmitter by means of controlled negative feedback which yields low distortion, asymmetrical modulation. Negative modulation peaks are held below 100%, eliminating the need for peak clipping.

The MP-12 also includes a switchable audio equalizer which assures maximum utilization of the assigned channel and provides superior sound quality. High levels of modulation can be obtained with less transmitter overload and sideband splatter.

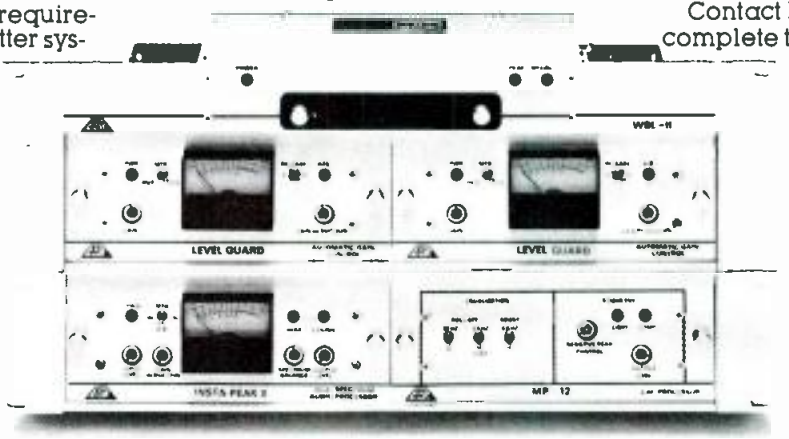
The WBL Composite Limiter

Can be adjusted to provide continuous 100% modulation with any existing transmitter combination and eliminates all filter and preemphasis overshoot. It provides long term stability and complete agreement between the modulation meter and peak flasher while increasing FM modulation up to 40%.

With the combination of the Insta-Peak II and the WBL Composite Limiter, it's now possible to sound competitively louder without excessive compression level and loss of dynamic range.

With over 1,000 Elcom/Bauer audio signal processing components in operation, the broadcaster can be assured of an engineering commitment to reliability and performance.

Contact Elcom/Bauer today for complete technical information on a system of components that will guarantee superior sound quality and control.



THE HERITAGE OF THE FUTURE

Elcom/Bauer Broadcast Products
6199 Warehouse Way
Sacramento, California 95826
Tel: (916) 381-3750
Telex: 377-331

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Circle (174) on Reply Card

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Thomson-CSF (1145)
Continued
power tetrode
TH-3591 B: 600W TWT KU-Band satellite ground station
TH-3640: 3kW TWT C-Band satellite ground station
TH-2416: 3kW C-Band Klystron-satellite ground station
New products
TH-347: 1kW UHF tetrode for LPTV
TH-18363: 1kW UHF cavity for LPTV
TH-382: 6kW-UHF aural tetrode
TH-582: 13.5kW-UHF aural tetrode
THX-31133: 576 x 384 element CCD
THX-31135: 288 x 208 element CCD
TH-320: 50kW FM tetrode
TH-371: 20kW VHF tetrode common amplification
Circle (728) on Reply Card
see ad on page 249

3M
Booth 1002 for Mag A/V
Booth 203 for Scotchcart
Established products
Scotch: Video and audiotapes
Scotchcart: State-of-the-art radio broadcast cartridge
Circle (1319) on Reply Card
see ads on pages 100, 101, 113 and 279

Tiffen
Booth 1422
Established products
Filters, filter cases and assorted vinyl cases, lens, shades, lens caps, and universal matte box
New products
445 filter carrying case, sofnet filters, soft contrast, combination color-grad, color grad filters
Circle (950) on Reply Card
see ad on page 48

Townsend Associates
Booth 1420
Established products
Phaestar: 100W low-power UHF transmitter-antenna system. Plug-in vacuum contactor for klystron beam voltage power supplies.
TMP-3-10: All solid-state mod anode pulser for UHF klystron transmitters.
TA-10NTH: 10kW high-band UHF transmitter
PE-250: Perveac klystron beam voltage control system
TMP-2-10: Solid-state pulser
TMC-10-XT: 10W MDS/ITFS transmitter
New products
TA-55TE: 55kW UHF TV transmitter
TA-10ATH: 10kW VHF TV transmitter
TA-100ASU: 100W UHF TV transmitter
TMD-100XT: 100W solid-state MDS/ITFS transmitter
TC-800: 800A vacuum contacter
TA-5ATU-M: 5kW UHF TV transmitter
Circle (731) on Reply Card
see ad on page 169

Trident (USA)
Booth 633
Established products
Series 80: Production/recording console
Trimix: Expandable portable/studio console system
Limiter/compressor: 2-channel limiter/compressor
Parametric equalizer: 3-band fully parametric equalizer
Trimix: Expandable portable/studio console system
New products
See at booth
Circle (954) on Reply Card

Trompeter Electronics
Booth 1211
Established products
Series: Patching and patching accessories, coax, twinax and triax BNC-type connectors
New products
See at booth
Circle (738) on Reply Card

True Time Instruments
Booth 643
Established products:
468-DC: Satellite synchronized clock with talking clock option
468-FPC: Satellite synchronized clock with RS-232 interface
60-DC: WWVB synchronized clock with simplex interface option
WVTR MKV: WWV time and frequency receiver
TF-3: WWV time and frequency receiver
WWVT MKV: Portable WWV receiver
RD-B: Remote time display, synchronized to 468-DC, 468-FPC, and 60-DC
60-TF: WWVB receiver-phase comparator
New products
468-EMV: Satellite synchronized clock, externally mounted
Circle (978) on Reply Card
see ad on page 242

Turner Program Services
Booth 125
Circle (953) on Reply Card

Tweed Audio USA
Booth 313
Established products
Service: Specialize in custom-designed systems for radio and TV broadcasting studios
New products
See at booth
Circle (1149) on Reply Card

UMC Electronics Company
Booth 114
Established products
Type 100: Beaucart record/reproducer stereo cart machine
Type 200: Beaucart record/reproducer stereo cart machine
Type 300: Beaucart triple deck reproducer
BC-16: Beau-Master stereo on-air console
Type 40: Beaucart II record/reproducer economy model
Type 40: Beaucart II reproducer-economy model
Type 40: Monitor II reproducer with built-in speaker and headphone jack
New products
SFE-100: Splice finder
Circle (760) on Reply Card
see ad on page 76

UREI
See *United Recording Electronics Inc.*

US JVC
See *JVC Company*

US Tape & Label Corporation
Booth 602
Established products
Series: Bumper strips and window labels for the broadcasting industry
New products
See at booth
Circle (762) on Reply Card

Ultimatte Corporation
Booth 1624
Established products
Ultimatte: Video compositing device for commercials and productions
Newsmatte: Video compositing device for live news, weather and live interviews
New products
Postmatte: Video compositing device for post-production
Circle (1137) on Reply Card

Unidyne Technologies
Booth 616
Circle (955) on Reply Card

Uni-Set Corporation
Booth 1023
Established products
Modular studio staging system
Rear screen/chroma-key module
Graphic design cart
Riser blocks/tops/ramps
New products
See at booth
Circle (742) on Reply Card

United Media
Booth 1300
Established products
Commander II: 2-8 VTR electronic videotape editor
Director: 2-4 ATR/VTR looping editing controller
Translator: Decision lister for later use on Director
305: EBU/SMPTE time code reader with user bits and character generator
310: EBU/SMPTE time code reader with user bits
205: EBU/SMPTE time code generator for 24, 25 and 30 frame rate with character generator
210: EBU/SMPTE time code generator with user bits
215: Character generator for time code
425: 9-input audio router/dissolver
New products
Commander II B: Improved Commander II
Circle (763) on Reply Card

United Press International
Booth 1015
Circle (956) on Reply Card

United Recording Electronics Industries (UREI)
Booth 513
Established products
6150: Power amplifier 80W/channel
6250: Power amplifier 150W/channel
6300: Power amplifier 225W/channel →

www.americanradiohistory.com

New Gould portable video monitor/ oscilloscope lets you select by number any line of composite video.

Meet our new OS3350/5. It's the first-ever NTSC 525-line waveform monitor, complete picture monitor, and 40 MHz oscilloscope combined in a single, portable package.

Through an onboard time-base generator, it lets you examine each of the composite video signal's 525 lines—one at a time. PAL plug-in available.

Or you can display complete pictures, highlighting any line selected for inspection to show the relationship between waveform and picture.

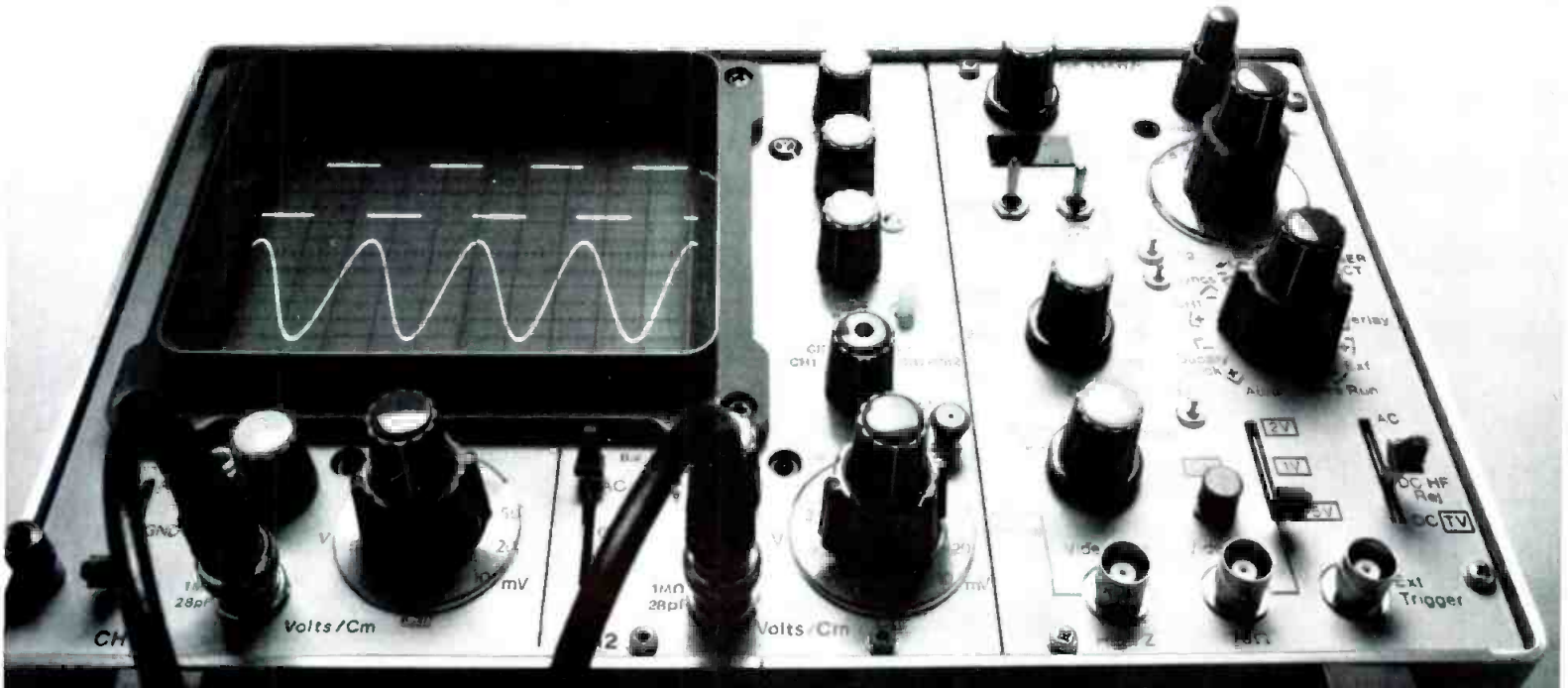
And finally, our OS3350/5 functions as a general-purpose 40 MHz, 5mV/cm dual-trace scope.

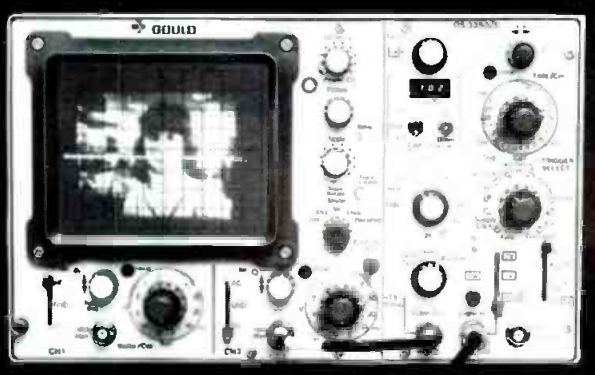
Our compact monitor/oscilloscope is suited for testing and troubleshooting TV, CATV, CCTV, video recorder/playback and other equipment in mobile TV, microwave repeater, broadcast station, institutional, military, plant and production-line applications.

For more information, contact Gould Inc., Instruments Division, 35129 Curtis Boulevard, Eastlake, OH 44094. Phone 800/321-3035.

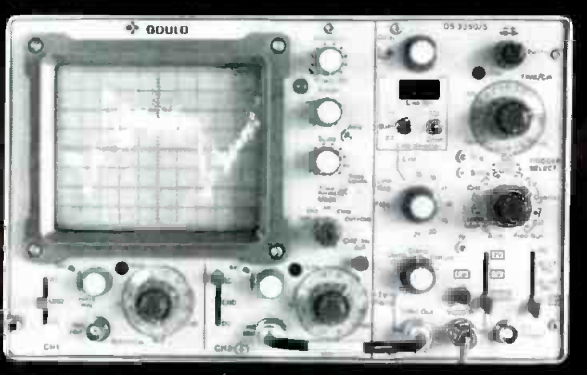
GOULD

Electronics & Electrical Products





Gould's monitor/oscilloscope can display a complete picture with a bright line indicating the line under examination.



Or it can look at a video signal line-by-line.

Circle (175) on Reply Card

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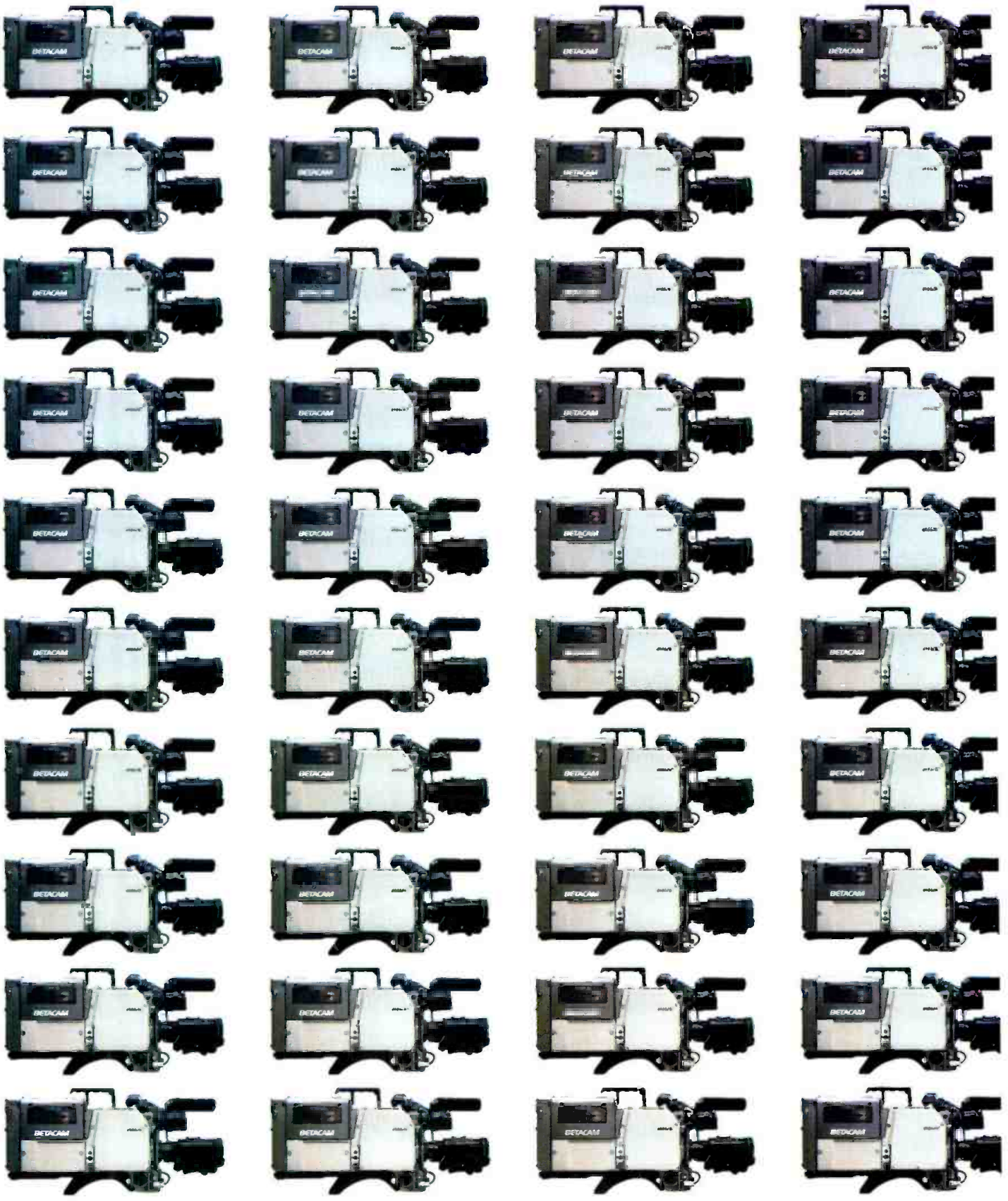
"TO RELIEVE MY CAMERAMEN'S BACKACHES AND M



Art Biggs coordinates major engineering purchases for the six Corinthian stations. After careful evaluation of all the ½-inch camera/recorders on the market, he made a multi-million-dollar purchase of the Sony Betacam™ system.

"Betacam has several pluses. The most obvious of them are size and weight. We have one-man camera crews at all our stations. The camera/recorder that they take into the field is right at 54½ pounds. Betacam will reduce this load by more than half—a significant reduction.

"As for quality of playback, you can see the difference wi the naked eye. Its superiority is most apparent in scenes of ful saturated colors, particularly reds. It's cleaner. It doesn't have quite as much of the heavy, stringy-type noise we've grown to tolerate over the years.

©1983 Sony Corp. of America, 9 W. 57th St., New York, NY 10019. Sony is a registered trademark and Betacam is a trademark of the Sony Corp.

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:ONTROLLERS' HEADACHES, I TOOK ALL OF THESE."

—Art Biggs, Vice President, Engineering, Corinthian Broadcasting Corporation

"Another Betacam plus is that it's not a patchwork approach. It's a total Sony system developed from the camera to the recorder to the player.

"Then there's the bottom line. Betacam is at a very attractive price. It would have cost me hundreds of thousands of dollars more to get the same amount of camera/recorders that even approach this kind of quality from someone else.

"I'll definitely be back for more."

For more information on the Sony Betacam system, and there's a lot more to know, contact Sony Broadcast in New York/New Jersey at (201) 368-5085; in Chicago at (312) 860-7800; in Los Angeles at (213) 841-8711; in Atlanta at (404) 451-7671; or in Dallas at (214) 659-3600.

SONY®
Broadcast.

www.americanradiohistory.com

UREI (513)
Continued
6500: Power amplifier 275W/channel
LA4: Compressor/limiter (RMS)
1176LN: Peak limiter
1178: Dual peak limiter
533: Octave graphic equalizer (MONO)
535: Octave graphic equalizer (stereo)
537: ⅓ octave graphic equalizer
539: ⅓ octave room equalizer
546: Dual parametric equalizer
562: Feedback suppressor (5 bands)
565 T: "Little Dipper" filter set
525: Electronic crossover
501: Sub-sonic processor
1122: Transcription preamplifier (stereo)
811A: Time Align studio monitor system
813 B: Time Align studio monitor system
815 A: Time Align studio monitor system
315: Passive direct box
325: Active direct box
200: Frequency response X-Y plotting system
New products
1651: Broadcast console
1652: Broadcast console
1653: Broadcast console
1681: Broadcast console
1682: Broadcast console
1683: Broadcast console
1620: Music mixer stereo
Circle (761) on Reply Card
see ads on pages 68 and 69

United Research Laboratory Corporation
Booth 406A
Established products
C-5: Auto-Tec conversion amplifier

Ampex: Audiotape recorders
Complete line of motors and replacement parts for Ampex recorders
Ampex and MRL alignment tapes
Auto-Sense: Electronic motion sensing TapeStrobes
Crown power amplifiers
Orban products
New products
MP-1: Solid-state microphone preamp
Circle (743) on Reply Card

Ursa Major
Booth 418
Established products
SST-282: Space station-digital reverberation and special effects system
8X32: Digital reverberator
8X32: Digital reverberator remote unit
New products
See at booth
Circle (744) on Reply Card

Utah Scientific
Booth 1114
Established products
AVS-1: Switching system and various party line control panels. Numerous alphanumeric display devices and control panels will also be demonstrated.
PLMC-1: Machine control system.
New products
New line of software based on master control switchers, featuring numerous innovations designed to provide greater flexibility and reduce errors on air. Each model features single keystrokes, execution of preset events, full stereo capability and audio over/under while matrices accommodate 30 video inputs, 28 fixed and two assignable, plus eight audio-only inputs
MC-502 panel provides three buses while MC-501 provides preset and program buses only.
A new station automation system will be demonstrated with master control switchers
High performance 8-output video and and audio distribution amplifiers
Circle (764) on Reply Card
see ad on page 77

Utility Tower Company
Booth 200
Established products
Actual tower sections, lighting equipment, galvanized hardware
New products
See at booth
Circle (745) on Reply Card

VSC Corporation
Integrated Sound Systems
Booth 327
Circle (1300) on Reply Card

Valentino
Booth 1231
Established products
Production music library
New products
Production sound effects library
Circle (746) on Reply Card

Valley People
Booth 318

EDITORS:

Only Datatron Gives You HELP™

Only the **Vanguard Video Tape Editing System** gives you HELP,™ the software feature that answers your operating questions **right on the CRT.**

No more fumbling with the User Manual in the middle of a session. Just press the HELP key, and **Vanguard** prompts you with the correct procedure.

USER-FRIENDLY SOFTWARE

Vanguard frees you to be an editor instead of a computer programmer. Just decide what you want, and our software makes it happen.

Like rolling up to five VTRs in synchronized play. Controlling the switcher for cuts, wipes and dissolves in one edit poss. Getting precise animation automatically.

And edit list management includes list cleaning, block moves, and sorts. It's the last word in simplicity and flexibility.

PLUS SMARTSCAN™

Our SMARTSCAN slow-motion editing option gives you learning and replay of VTR speed and direction sequences; flexible freeze-frame control; forward and reverse motion over a broad range of speeds; expansion or compression of sequences . . . to name a few.

WAIT NO MORE

Vanguard is the reliable, sophisticated system the industry has been asking for. Highly competitive because it really works. Send today for our full-color, fact-filled brochure.

Datatron, Inc.
Video Systems Division
2942 Dow Avenue,
Tustin, California 92680.
(714) 544-9970.
TWX 910-595-1589.

datatron, inc.
FREEDOM AT YOUR FINGERTIPS

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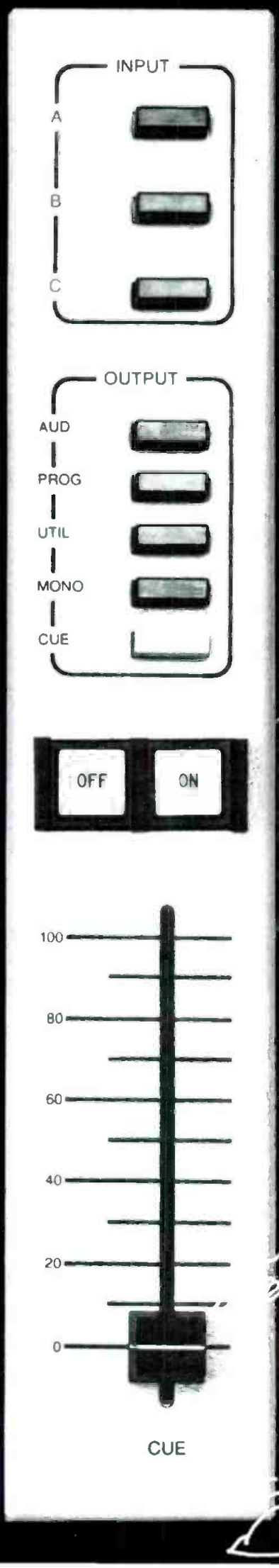

CUSTOM CONSOLES

Broadcast mixers are our only product. Each one is custom built, with your call letters assigned the day production begins. After installing your new Broadcast Audio mixer you will actually *hear the difference.* THD and IM distortion are negligible; frequency response is absolutely flat well beyond the audio spectrum.

Sensible engineering design, thoughtful operator conveniences, rapid delivery and reasonable prices are good reasons for choosing Broadcast Audio. We have 7 models with 5-20 mixing positions all with P&G slide pots, starting at just $1850.00. *Let us mix you up!*

BROADCAST AUDIO CORPORATION

See us at NAB booth #213

11306 SUNCO DRIVE RANCHO CORDOVA, CA 95670 (916) 635-1048

Circle (177) on Reply Card

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Valley People (318)
Continued
Established products
810: Kepex II expander/noise gate/keyer
811: Gain Brain II limiter/compressor/voice over
812: Maxi Q parametric equalizer
813: QLZ quad low impedance mic preamp
814: QHZ quad high impedance instrument preamp
TR804/TR805: Metal rack frames for above
TR806: 10-position 1-piece rack
Series 400: Dyna-Mite multifunction processor
HH 2 x 2: Level matching interface
New products
610: Dual compressor/expander
Circle (1138) on Reply Card

Varian Associates
EIMAC Div.
Booth 1605
Established products
8990: Tetrode
4CX3500A: Tetrode
3CX10000U7: Tetrode
4CW300000G: 300kW graphite grid tetrode
4CW100000G: 100kW graphite grid tetrode
4CW40000G: 40kW graphite grid tetrode
Large pyrolytic grid display in plastic case (50kW)
SK-2400: Socket
SK-2450: Socket
AM-2215: Amplifier
CV-2225: FM cavity
CV-2240: VHF TV cavity
CV-2250: VHF TV cavity
CV-2800: Cavity
New products
X-2251: Klystron with hardware
4CX20000B: Tube tetrode
4CX20000C: Tube tetrode
4CW25000G: Tube tetrode
3CX800A7: Hi-Mu triode HF and VHF
Circle (1320) on Reply Card
see ads on pages 45, 109, 253

Varian Associates
Microwave Equipment Div.
Booth 1605
Established products
VPW-6700 P1: Klystron test set
New products
VZJ-2700G: GEN II Klystron high power amp
VZU-2701G: GEN II Klystron high power amp
VZU-6995A2: 14 to 14.5GHz 500W power combined TWT HPA
Circle (1321) on Reply Card
see ads on pages 45, 109, 253

Varian Associates
Microwave Tube Div.
Booth 1605
Established products
VA-287: 10.7 to 13.2GHz studio transmitter communications reflex Klystron
VA-220: 5.9 to 8.1GHz studio transmitter communications reflex Klystron
4KM-LH: External cavity UHF TV Klystron
VKU-7791: KU-Band satellite uplink Klystron
VA-953: UHF TV Klystron
New products
VTV-6393 C1: 14.0 to 14.5GHz 300W CW Communications uplink traveling wave tube
VKC-7936: 24-channel C-Band satellite uplink Klystron
Circle (1322) on Reply Card
see ads on pages 45, 109, 253

Video Associates Labs
Booth 1303
Established products
VB-1: Microkeyer device to be used with a microprocessor
VB-3: Microkeyer device to be used with a microprocessor
New products
See at booth
Circle (758) on Reply Card

Video Data Systems
Booth 1506
Established products
VITL: Vertical Interval Transmission Link
TPT-2500: Titler for production and broadcast use
MCG-2500: Character generator for stand-alone message display
New products
See at booth
Circle (749) on Reply Card

Videomedia
Booth 1308
Established products
Z6000-E: A/B roll editing system with disc operating system
KR 6000: Post-production character generator
MSTC-2: Universal remote control system
New products
Eagle II: VTR editing system with 250 events and list management
VMC-200: Station automation and sequence controller
VMC-800: Dual digital TBC with digital keyer/colorizer and special effects
Circle (750) on Reply Card

Videotek
Booth 1633
Established products
TSM-5A: Waveform monitor
VSM-5A: Vectorscope
VM-8PRD: Dual 8-inch professional rack-mount ac/dc color monitor
VM-15PRO: 15-inch professional rack-mount color monitor
VM-17PR: 17-inch professional rack-mount color monitor
VM-26P: 26-inch professional color monitor
APM-8R: 8-channel rack-mount audio program monitor
DM-40R: Professional rack-mount demodulator
New products
RS-10A: 10XL AFV routing switcher with audio breakaway
VDA-16: 1 in/6 out video DA
PDA-16: 1 in/6 out pulse DA
ADA-15: 1 in/5 out audio DA
SDA-14: 1 in/4 out subcarrier DA
Studio 12A: 12-inch color monitor
Circle (751) on Reply Card
see ad on page 117

Vital Industries
Booth 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
New products
250P/N: Production switcher
SAM: Station Automation System
SANDI: Serial Access Network Data Information
PSAS: Production Switcher Automation System
Circle (766) on Reply Card
see ad on page 39

Ward-Beck Systems Ltd.
Booth 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
L3242: TV audio console
Custom designed audio consoles
New products
See at booth
Circle (753) on Reply Card
see ad on back cover

Wavetek Indiana
Booth 1763
Circle (1139) on Reply Card

Weathermation
Booth 1179
Circle (979) on Reply Card

Western Union Telegraph
Booth 1307
Circle (959) on Reply Card

Whirlwind Music Distributors
Booth 329
Established products
Medusa: Multiwiring cables
MK Series: Microphone cables
New products
Director Direct Box
Line of video interface cabling and related accessories
Circle (1323) on Reply Card

Winsted Corporation
Booth 1238
Established products
Editing consoles for ¾- and 1-inch tape formats
Videotape and film storage systems
Videotape and film trucks
19-inch equipment racks
Dubbing racks and post-production consoles →

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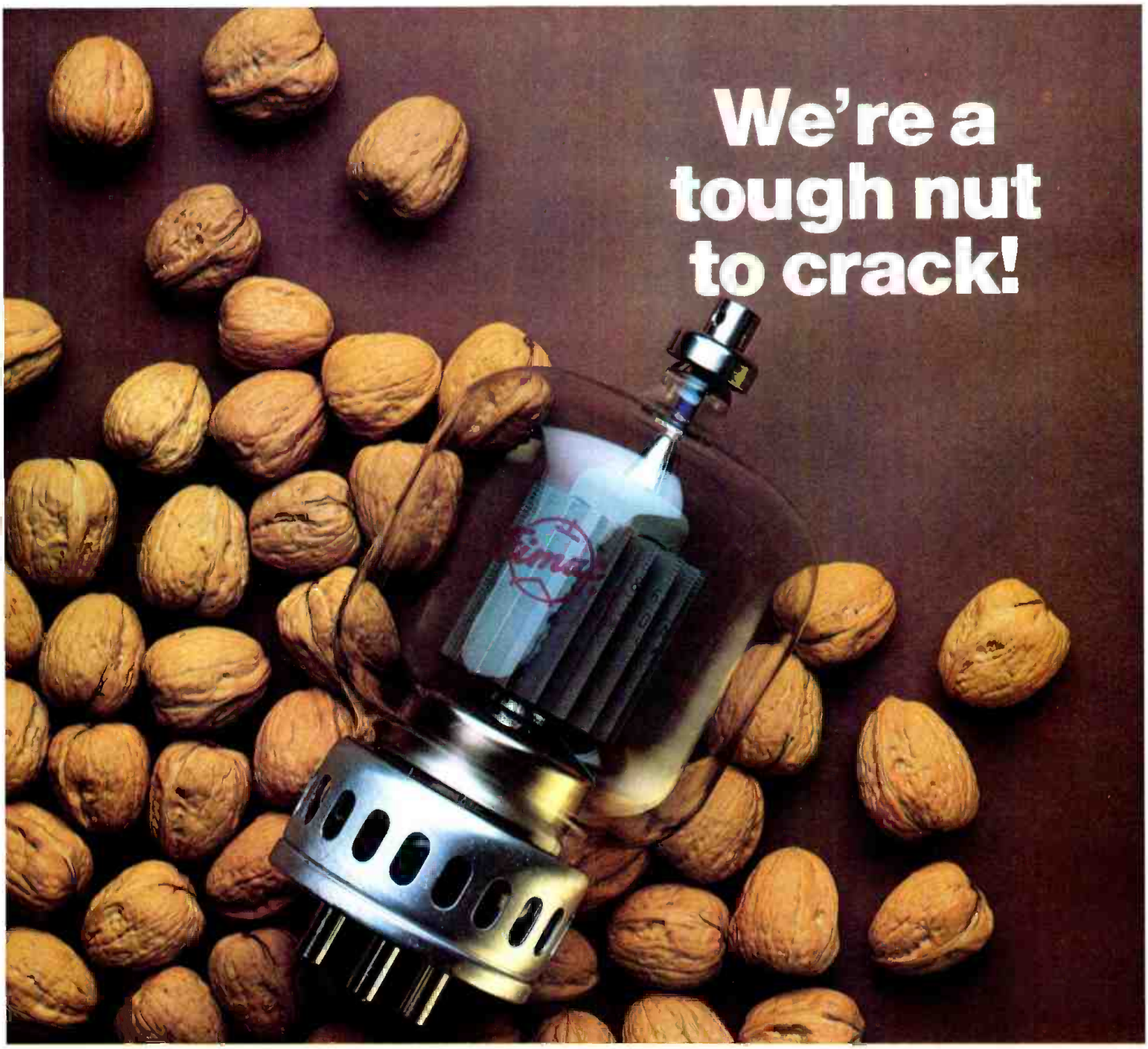

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System/85: Corner editing consoles for frontloading VTRs
1-inch VTR console.
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see ads on pages 234 and 254

Wireworks Corporation
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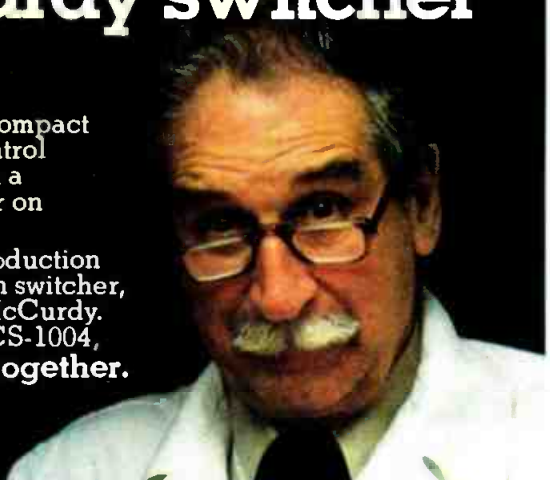
This new compact McCurdy switcher is some big production.



You're looking at the McCurdy MCS-1004. The biggest production in compact, small production switchers available.

The McCurdy MCS-1004 is a ten-input, 4-bus unit with broadcast performance quality and a host of standard features including mix and key functions, on-air tally, momentary pushbutton controls, auto mix/auto key with adjustable rate, and color background generator.

And it all fits snugly into a compact 19" x 7" x 3.5" separate control panel which you can use in a standard equipment rack or on a desktop.

Now, when you want big production quality in a small production switcher, you know who to come to: McCurdy. For all the details on our MCS-1004, just call us. **We put it all together.**

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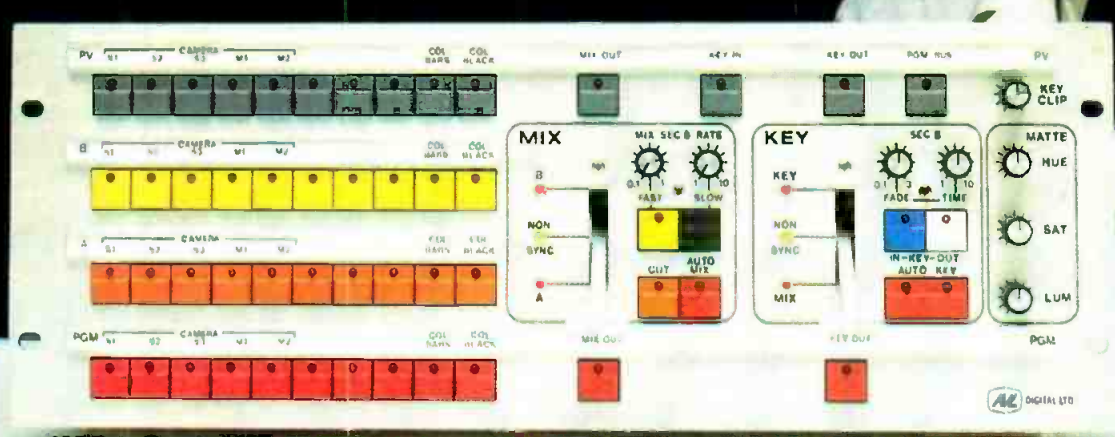

See us at NAB — Booth #207

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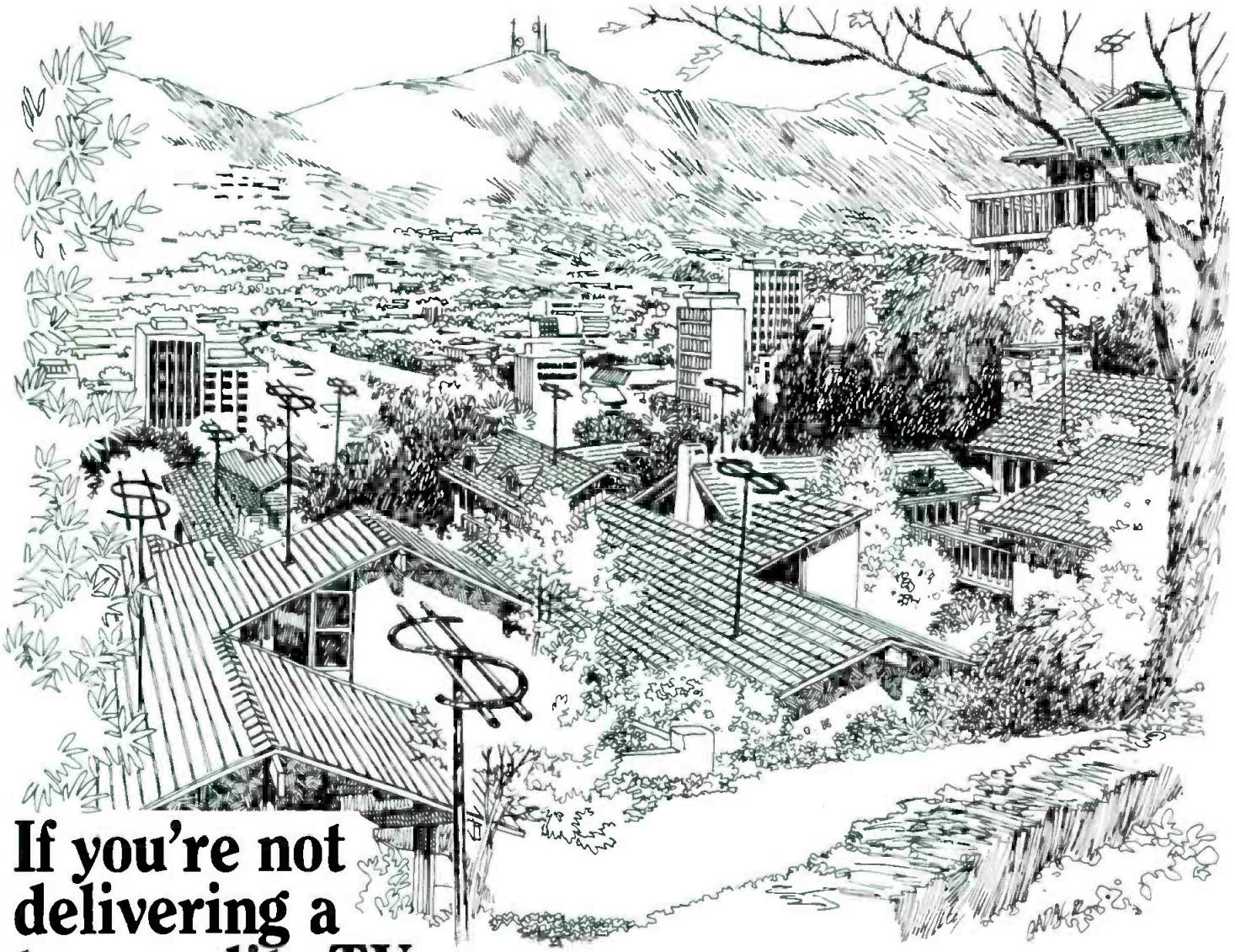

If you're not delivering a top-quality TV signal into every corner of your service area, you could be missing the picture.

CETEC CP/TV ANTENNAS PAY HANDSOME DIVIDENDS WHERE IT COUNTS: MARKET SHARE. By now there shouldn't be any argument about the superiority of CP/TV. In less than three years, nearly 100 stations have quietly converted their horizontal signals to CP. That's important to tens of millions of Americans who were receiving a second or third-rate TV picture. It's a critical fact-of-life to the broadcaster who recognizes the competitive advantages to delivering the highest quality video signal in his market. To all of his market.

IN CP/TV, CETEC IS THE LEADER. Nearly a decade has passed in the refinement of CP technology. Cetec Antennas has clearly become the recognized leader in this refinement.

- Starting in 1973, we pioneered the design in CP/TV.
- Cetec's first Spiral design was on-the-air in 1976.
- A Cetec CP/TV Spiral recently went on-the-air at superstation WLS-TV.

And there's three patents that are licensed to us from the world-renowned authority on CP/TV antenna design—Dr. Raymond DuHamel.

From channel 2 through 70, Cetec Antennas is the only company that covers the entire VHF/UHF spectrum in one design.

IN CP/TV, CETEC'S NUMBERS MEAN AUDIENCE NUMBERS. Cetec's patented Spiral CP/TV antenna has a proven axial ratio: less than 2 dB: and real azimuth circularity: less than 1.5 dB.

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IN CP/TV, WE DELIVER—FAST. We deliver our CP/TV antennas, customized for any service area, in about 150 days. That includes full-scale testing. By a wide margin, that's the shortest lead-time in the industry We guarantee competitive pricing for a true CP/TV antenna, and we back every one with the best warranty—two full years, parts and labor.

GET THE PICTURE? Get Cetec Antennas' experience in design and manufacture of CP/TV. You could be missing the picture if you're not delivering the best reception to every corner of your service area. It's more than a fringe benefit that's involved. It's a downright smart investment that will payoff handsomely to the broadcaster who sees more than just antennas in the sky.

See Us at NAB Booth 509

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This is why we have supplied all OB vans needed to cover The World Footbal Champion ship '82, held in Spain, and we are going to supply all OB and ENG vans required for the next IX Panamerican Athletic Games'83, in Venezuela.

For more information about our complete product line contact us and ask for a brochure.

For OB Vans talk to PIHER Electronica

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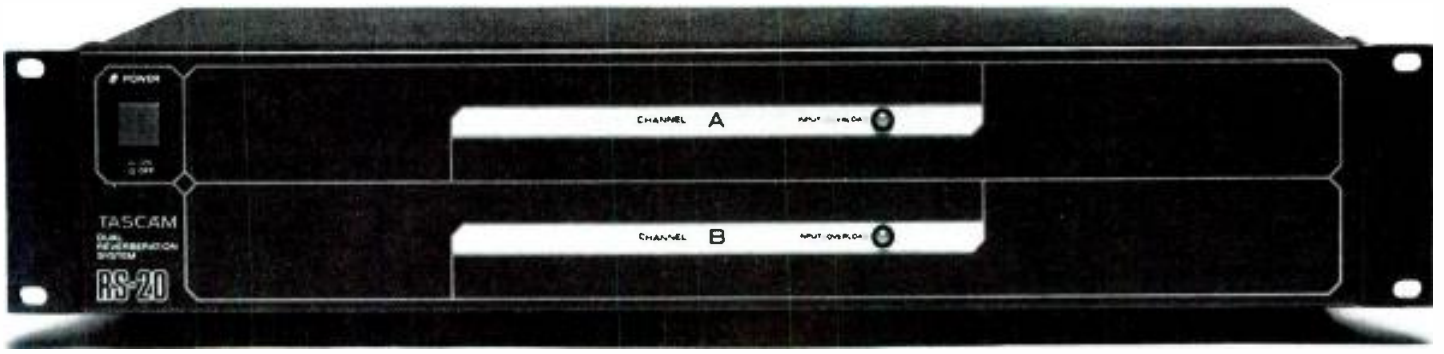

TWEAK FREE REVERB. REVERB. REVERB.

Many reverbs come with level controls, but not the RS-20—it's tweak free. After all, your mixer has echo send and return controls, so why pay twice for the same thing. Just set the rear panel sensitivity switch, and a pair of bi-color LEDs on the front panel help you set the mixer's send level. That's it.

Limiters ahead of the RS-20 drive amps then prevent overdrive or "twangy" spring sounds caused by high energy transients inherent in plucked guitar strings, etc., so the RS-20 remains "squeak free."

This exciting new unit incorporates a proprietary design with three different sized springs on each channel. Here's why: Most conventional single-spring reverbs have poor high frequency response, and those that don't usually compensate by "shunting" high frequencies directly through their reverb with a capacitor, a short-cut that cheats you of high frequency delay. The RS-20's multiple springs extend the frequency range at least an octave above conventional units (without a shunt). Also, three springs let us scale the decay time to the frequency for superbly natural sounding reverb.

You've got to hear it—sound that rivals high quality plates and digital systems, for a whole lot less. Even at twice the price, nothing beats the RS-20 Dual Reverb.

For additional information, see your TASCAM dealer, or write TASCAM Products, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

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What you will find is rock-teady, pin-sharp detail. Even on panning.

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But then the best never is.

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Please send me further details on the GEC McMichael ACE Digital Standards Converter.

Name_____

Title_____

Company_____

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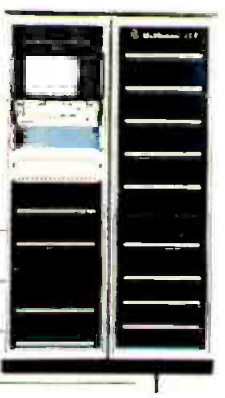

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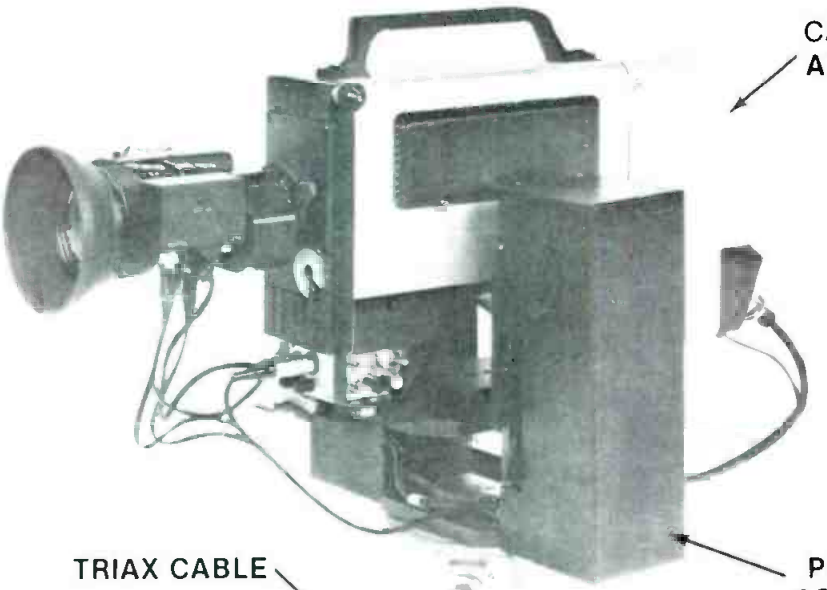

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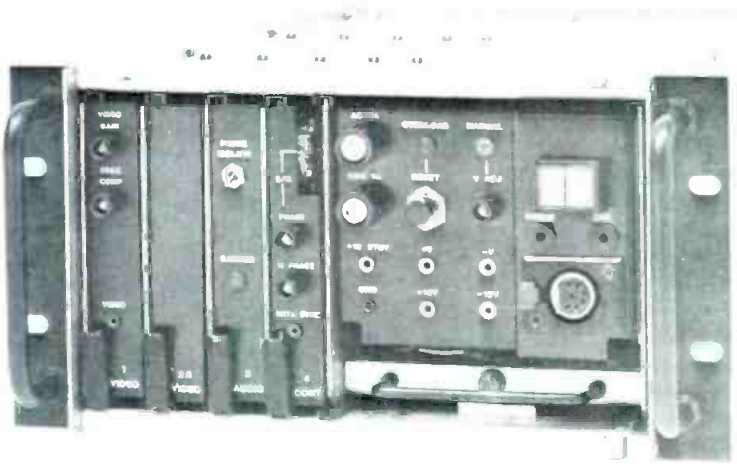

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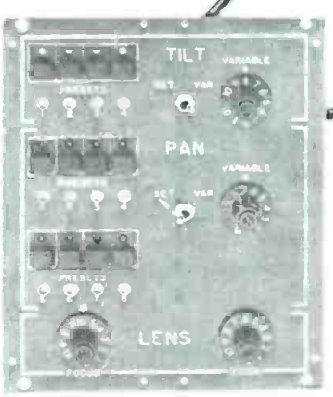

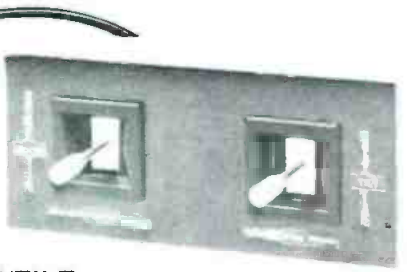

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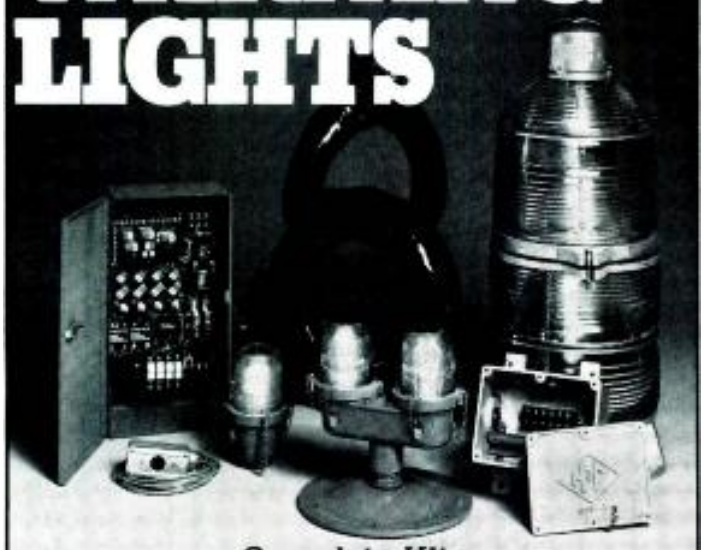

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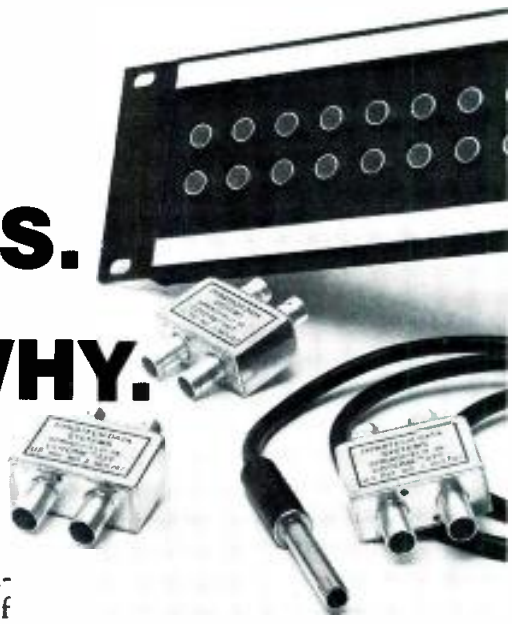

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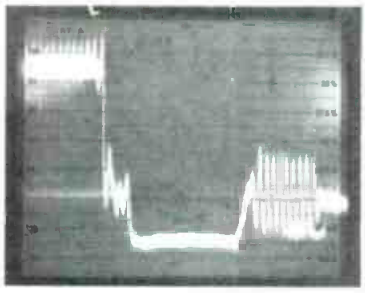

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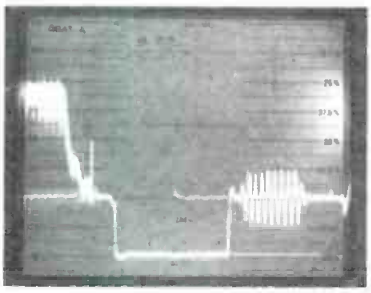

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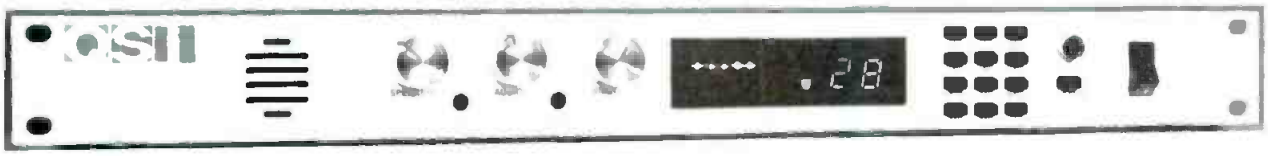

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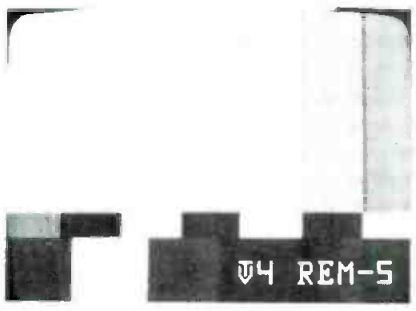

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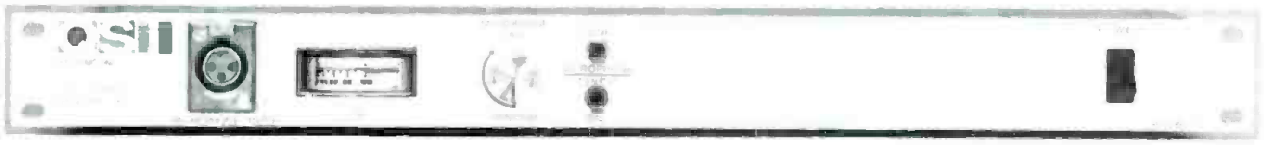

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Caption contest

"Mind if I join the game? I brought my own cards..."

Last year at NAB-'82/Dallas, we caught Vince Wasilewski, then president of the NAB, in this interesting pose. Because our business can have a lighter side, we ran this photo in our September 1982 issue with an invitation for readers to submit humorous captions.

To all of you who sent in entries, our thanks. The winning caption for the photo repeated here was submitted by Guy Welch, KTVU, San Francisco-Oakland: "Mind if I join the game? I brought my own cards..."

Casio SL-80

The winner of our Caption Contest has received the new SL-80 calculator from Casio, a credit card size calculator with touch-sensitive keys located in the wallet of the unit. Because the calculator uses a 501x solar cell, it never needs a battery, can be used in any light, and has no off/on switch.

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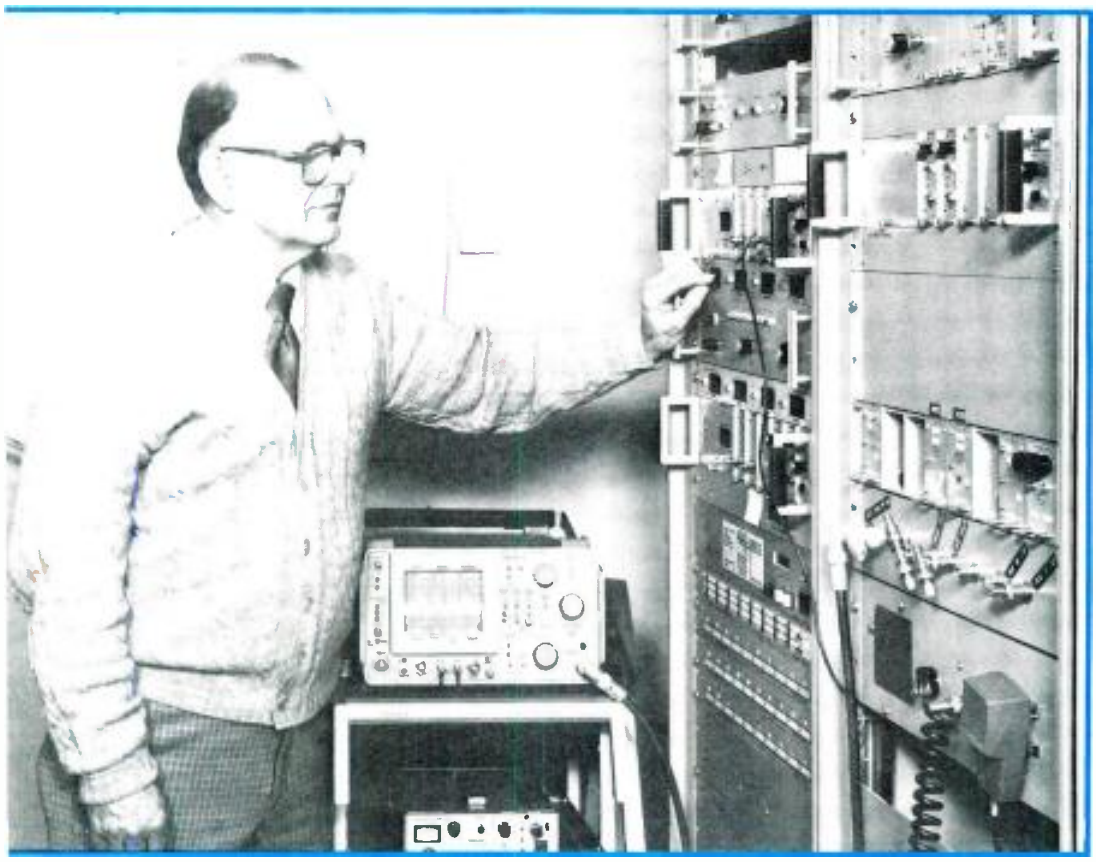
The spectrum analyzer and the earth station

By Archie F. Brusch, assistant chief engineer, KATU, Portland, OR



The author, checking out part of KATU's installation.

It has been my good fortune the past several years to act as project director for the installation of the earth station at KATU-TV, Fisher Broadcasting, Portland, OR. As one of the first to use a remotely controlled dish for a downlink, KATU also pioneered the use of uplinking directly to satellites, being the first TV station in the Northwestern United States to have both transmitting and receiving facilities serving the TV broadcast video needs of the area.

The success of this installation has been phenomenal. Some 200 uplinks have been handled through the KATU facility. Because KATU offers the only uplink operation in the region, there has been a great demand for the service. Transmissions via satellites have been furnished to many organizations, including the following: ABC, CBS, NBC, ESPN, CNN, SNC, ITNA, Westinghouse and other Portland stations. Special feeds have been furnished as well to San Francisco, Los Angeles, Atlanta, Denver, New York, Hawaii, Alaska and numerous other places. The principal uses of uplinks are for news, sporting events, Mount St. Helens activities and other happenings of national interest. The downlinks are used several times daily by KATU for receiving various programs. Also downlinks can serve other stations in the Northwest by special network interconnects.

Installing, operating and maintaining the 10m Scientific-Atlanta dish antenna, the receiving equipment and the 3kW 6GHz high power amplifier has provided both rewarding and tense moments. During the transition in at last becoming *professional satellite communicators*, there has been (from an engineering standpoint) one bright spot in our array of test equipment: our spectrum analyzer, the Tektronix 492.

Routine use, service and maintenance of equipment used to access the geostationary satellite system is greatly facilitated by the presence of this dominant test instrument. An instrument such as the 492 is essential in siting the antenna; performing system tests on low noise amplifiers (LNAs) and receivers; identifying the transponders on the many satellites; locating the satellites themselves; uplinking; aligning downlinks; accurately determining antenna polarization; locating and determining interference levels; and performing the required power measurements when illuminating the transponders.

Locating a usable site

The authorized bandwidth of the downlink frequencies used (from 23,000 miles in space to earth) is about 500MHz and extends from 3700MHz to 4200MHz on 24 individual channels, beginning with 3720MHz and stepping in 20MHz separations to 4180MHz. (This is generally referred to as the 4GHz receive band.)

Because of limited spectrum space, a tremendous amount of activity is

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found in the 4GHz terrestrial service band generated by point-to-point microwave paths. The band is used by many services, primarily telephone companies. The point to be made here is that *interference* is a real problem in the 4GHz band. Terrestrial and space-to-earth transmissions will be seen as interference. Therefore, when siting an antenna for minimum interference, the services of reliable frequency coordination research companies such as Comsearch, Compucon or others are usually obtained. Basically, the companies proceed by accomplishing two things.

First, they plot all known sources of emission geographically, showing the proposed site in the center of the plot. Information on frequency, ERP, decibel losses, obstruction losses and orientation of antennas involved, patterns of antennas involved, etc., are fed into a computer. Charts are generated to show all sources that will interfere at the proposed location, along with the expected interference level in dBm and type of modulations.

Second, they visually confirm the results of the computer search by observing each interfering signal on the spectrum analyzer. This is done using a microwave horn antenna feeding an LNA of known gain that establishes the maximum measurement system sensitivity in decibels. The signals at the output of the LNA must be detected and identified as to level and individual frequency. This is most conveniently done by using the Tek 492 or similar instrument as the detector and visual display device.

The Tek 492 spectrum analyzer is an instrument of considerable internal complexity coupled with a front panel set of controls that allows simple, down-to-earth operator control. It makes an almost impossible job easy.

Several functions of the Tek 492 are of particular interest to the broadcast engineer. The capability for displaying a spectrum of RF signals visually with 5MHz accuracy in the microwave region is probably most important. Not only does it display the band of signals of interest, the Tek 492 screen also shows, at a glance, the dBm level of any of the many signals displayed. The push of a button on the front panel can change it from 10dB/div. to 2dB/div. and resolve amplitude differences in 0.25dB steps, when necessary.

When searching for a site, the controls are set to display 50MHz/div. (horizontally) so that the entire 500MHz band will be displayed. Center frequency should be set to 3950MHz with the attenuation controls adjusted to make the top display line read out at -30dBm.

Using the gain in decibels of the horn antenna plus the LNA gain, you now are able to read an incoming signal's dBm level from the front panel display. In Figure 1, the interfering signals are arriving at the 492 at approximately – 74dBm and – 77dBm. If you subtract the gain of your antenna and LNA system, you have the actual dBm level of the interfering signal. By comparing this to the calculated interference level from the initial paper survey computer-generated chart, you may: (a) validate the chart data; (b) discover any field variations that can be used to your advantage; and (c

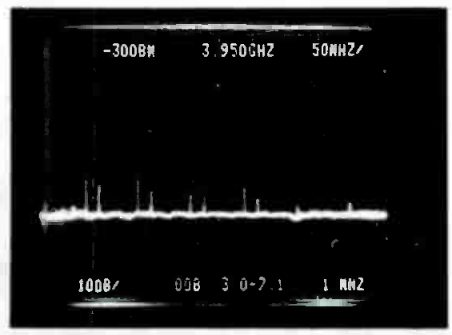
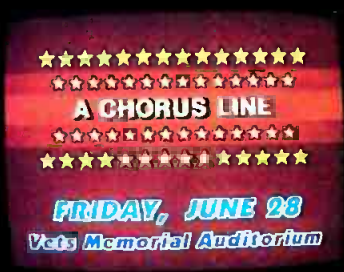
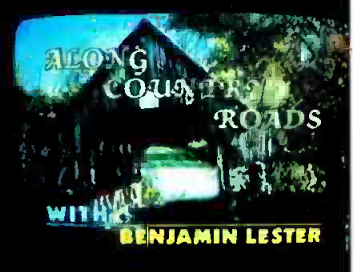


Figure 1. Interfering signals arriving at approximately – 74dBm and – 77dBm.

7200 COMMUNICATOR





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discover field variations that are detrimental.

Directional characteristics of the horn antenna and the readout of dBm level of the 492 enable you to discover paths and usable obstructions on the terrain between your site and the source of interference. The antenna is used to slowly scan the horizon a full 360° in azimuth, first using vertical polarity, then horizontal.

Photographs may be easily taken for documentation and study. Because both the antenna and spectrum analyzer are portable, all that is needed is a source of power and the LNA. This verification search is usually performed between midnight and local sunrise when conditions are optimal. Figure 2 is a block diagram of the equipment used in the site analysis.

We have used the Tek 492 several times to identify frequency and azimuth of interfering signals as well as modulation type. In one situation, a neighboring station about 200 feet higher in elevation was experiencing strong interference to one of its downlink feeds. By using the station's 7m dish and built-in LNA, with the 492 as a detector/visual display, we were able to pinpoint the azimuth and type of interference. Needless to say, the narrower the interfering signal, the easier it will be to trap out with minimum damage to your own received signal from the satellite.

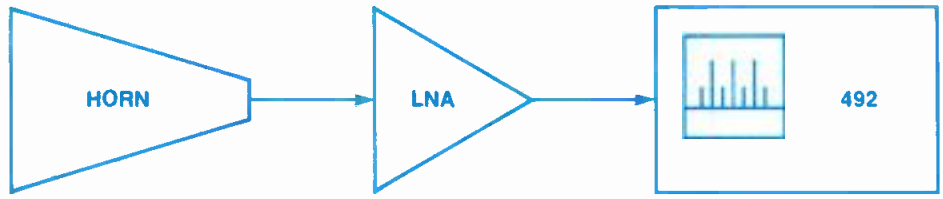

Figure 2. Block diagram of the equipment used in the site analysis.

Servicing microwave receivers

Servicing downconverters is greatly simplified with the 492 because, basically, you must measure dBm level and frequency of the PLL output of the incoming RF signal and their resulting mix. Should there be any spurious products generated, they can be seen at once. By following the IF frequency from the downconverter through the IF system, proper level buildup and proper band shaping can readily be observed on the 492. Outputs of LNAs, photographed and placed in the maintenance log, can serve as reminders of what the normal sky noise and beacon strengths are, thus checking the LNA for proper operation or showing need of repairs/-maintenance.

The use of the proper waveguide/N-type adapter, combined with the portability of the 492, makes direct observation and measurements at the antenna feedhorn output possible.

Locating satellites using the 492

If you use the Tek 492 to locate transponders, or even satellites, keep in mind that on satellites using only 12 channels, all transponders will be peaked on horizontal polarity. These will all null out with a 90° rotation of the feedhorn in either direction. On newer satellites using 24 channels, the odd channels will be of one polarity and the even channels will be 90° away. Figure 3 is a photograph of such a satellite with one polarity nulled out.

To maximize visibility of the individual transponders on a search for a satellite, the optimal position of the feedhorn would be half way between the two polarities, or 45° away from any null condition. This will make all 24 transponders visible, providing

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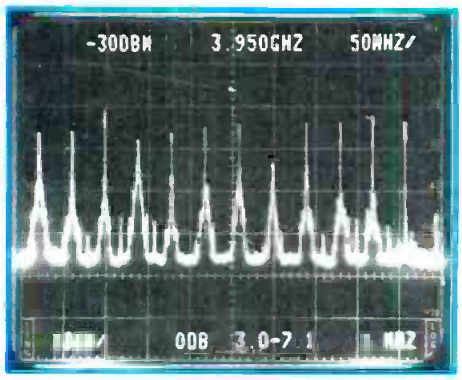


Figure 3. The newer satellites, with one polarity nulled out.

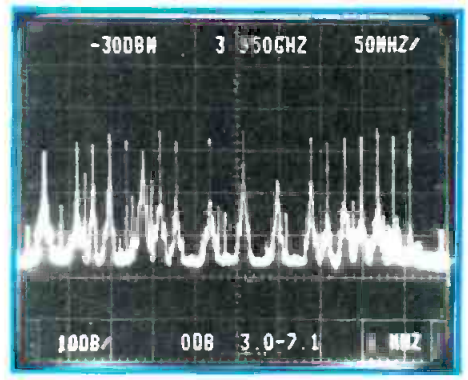


Figure 4. Optimized position of the feedhorn makes all active transponders visible.

that they are active, and at least will maximize your chances of seeing one or two if the satellite is not busy at that time. Figure 4 shows such a *maximized* condition.

At 10° to 15° (in either direction) from proper polarization of the received downlink signal, a fairly decent and clean picture will still show on your monitor. However, in the uplink mode, you *must* be as close to optimal polarization as possible.

Some typical questions

Why not just use the video monitor to help locate the bird or the transponder?

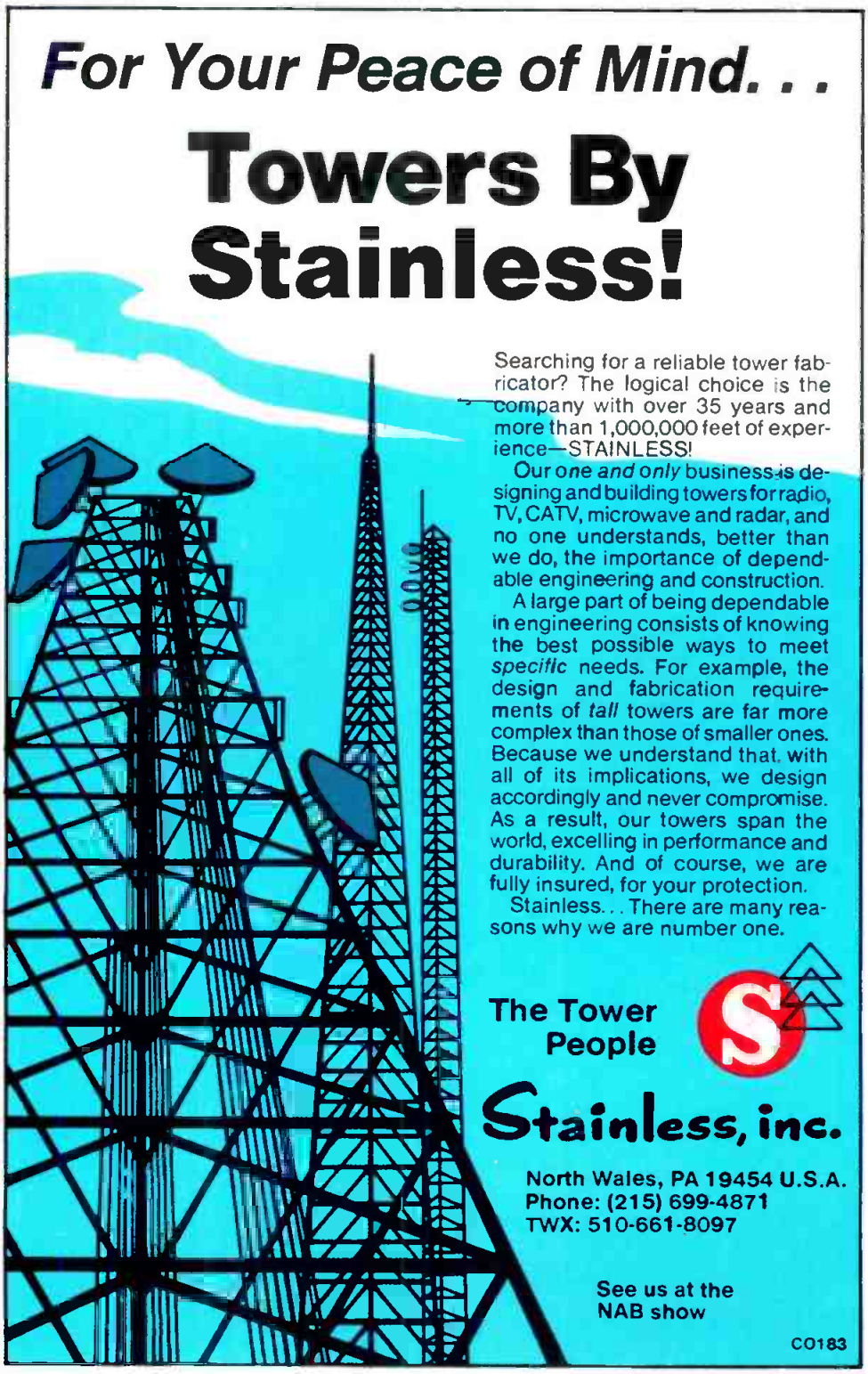
There are two major reasons for use of the Tek 492 instead of the video monitor. First, you would have to *know* which transponders were active so that you could tune the receiver to that frequency in order to display any received video. With the Tek 492, you are *by-passing* the entire receiver and its tuning mechanism, making all 24 channels visible at one time. Second, it is almost impossible to satisfactorily orient the polarization using only the video (picture) monitor. With the spectrum analyzer, it becomes a simple procedure to *null* every odd visible transponder. Once a proper null is obtained on *any* set of transponders (or beacon), odd or even, you have all the polarization information needed. The opposite polarity is always 90° away. Many of the new feed systems have instant polarity changeover, using multiple ports.

But what if no signals are on the satellite; all transponders inactive? Then how do we locate the target, and how can we set polarization?

This can be done by searching for the beacons that are located at approximately 4199MHz on each Westar satellite or 3700.5MHz on Satcom and Comstar satellites. Beacons are always present on the satellites, and occasionally are the only signals present. A beacon consists of two small CW signals, closely spaced at about one-third the amplitude of a normal transponder signal. Figure 5 shows a beacon in the presence of three received transponder signals.

Note that the beacon appears to be just one signal when first located. However, adjusting the resolution and expanding the frequency displayed per horizontal division, as shown in Figure 6, separates the beacon into two signals that are stable and can be used either as a *locator* or as a null-out signal for polarity setting. The 492, serving as a wideband receiver, is sampling the output of the LNA in Figures 5 and 6 through a resistive splitter. This splitter also feeds the actual receiver in the system.

The rough search for satellites is done by setting the azimuth and eleva-



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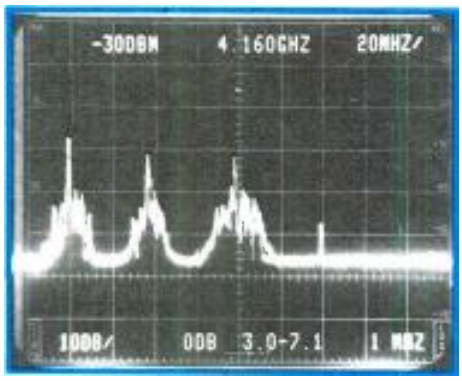

Figure 5. A beacon (right) in the presence of three transponder signals, at about one-third of their amplitude.

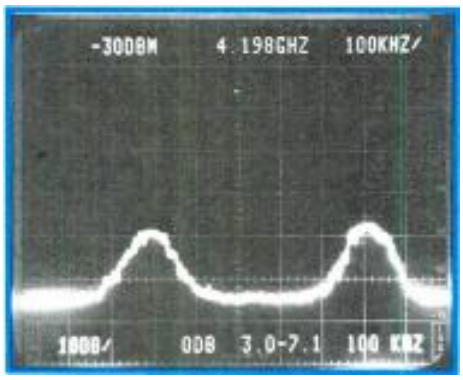

Figure 6. The beacon signal can be separated and used as a locator or for a null-out signal.

tion to the published *look angle*, placing polarization 45° off normal and carefully tweaking azimuth and vertical until you spot the beacon (or a transponder). A normal signal from a transponder at the KATU location (approximately the 45th parallel on the Pacific Coast), is about +30dB above noise level, which is about −60dBm at output of the LNA. For the beacon, it is only about +10dB above noise level. Final touchup is done using the receiver system's carrier/carrier plus noise meter on a live transponder.

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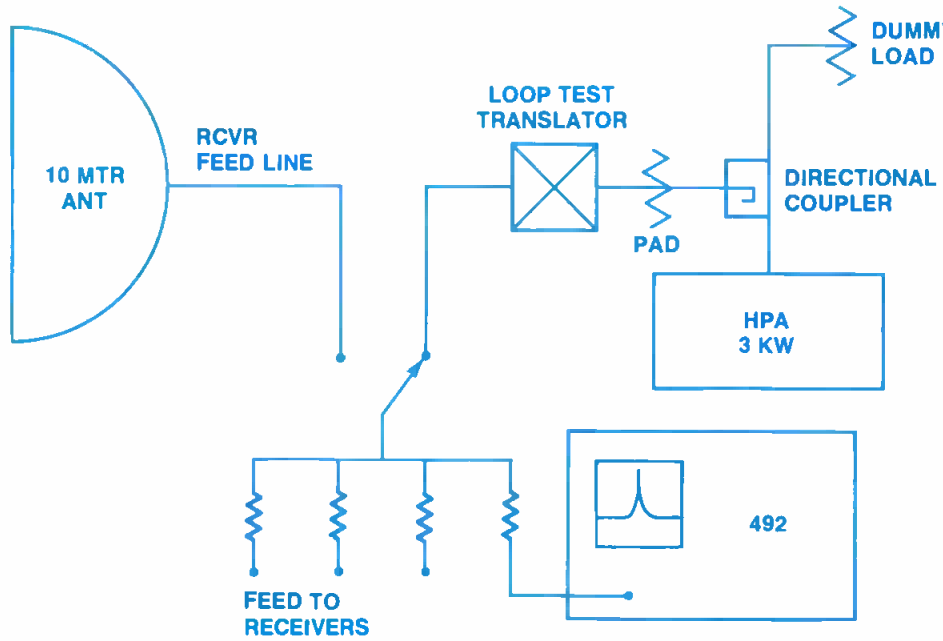

Figure 7. Observing the signal through a *loop test translator*.

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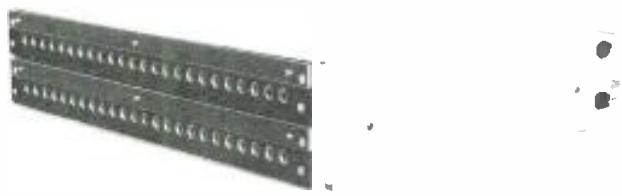

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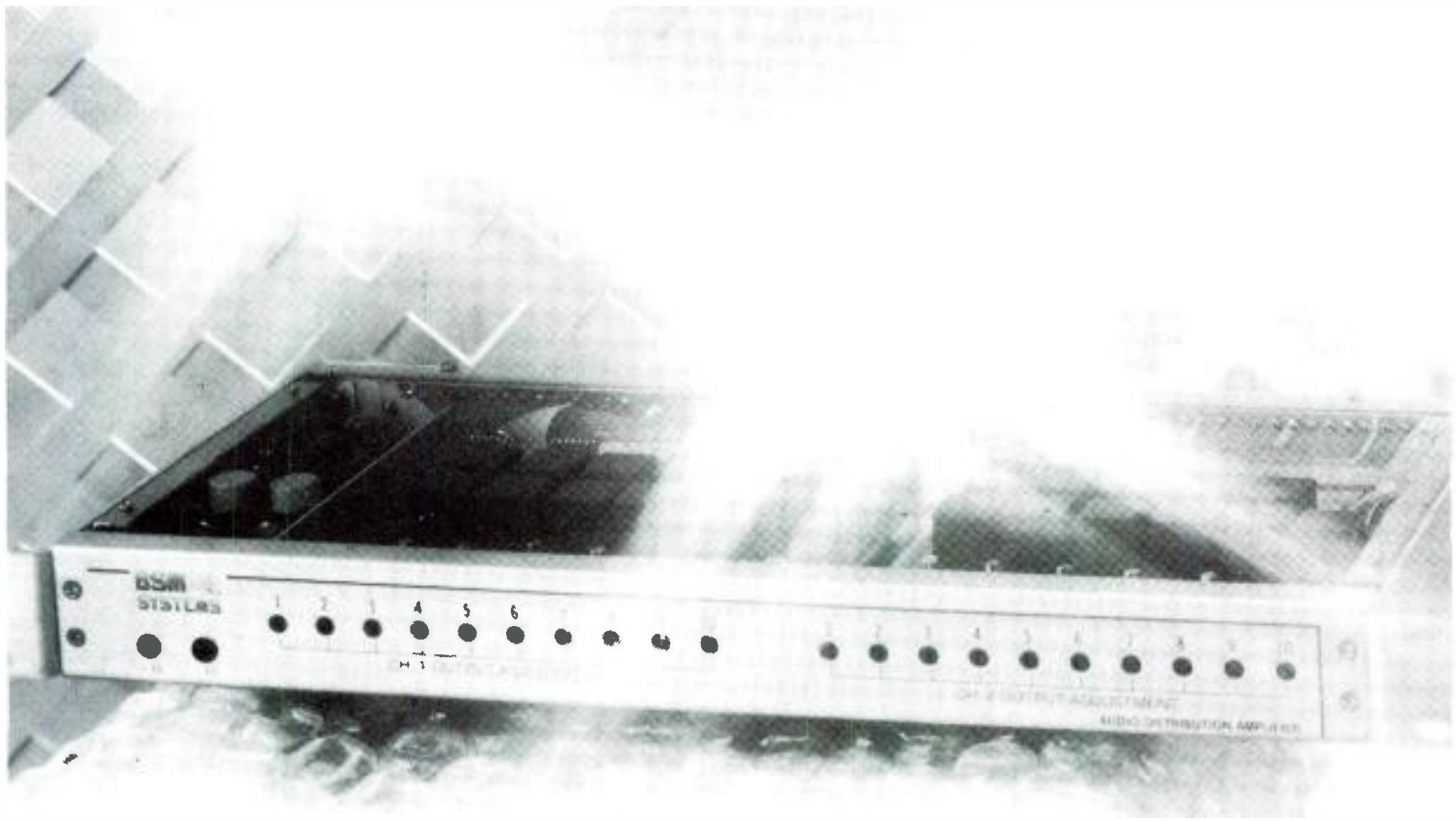

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cupancy (deviation) for 100% modulation. This is achieved using the Tek 492 with the *frequency span-per-division* set for 5MHz, *center frequency* set to observe the incoming channel in the 4GHz band and *attenuation* set for easy viewing of our received signal, as observed through a *loop test translator*, shown in Figure 7.

With the transmitter operating normally into its dummy load, a sample is taken through a directional coupler from the power amplifier output. This 6GHz sample is routed to a superheterodyne-type mixer, called a loop test translator, which treats the sampled 6GHz signal as a real transponder would. The 6GHz transmitter signal is heterodyned down to the 4GHz band and the signal routed to the receiver system and to the spectrum analyzer. We could observe the same thing by sampling directly with the 492 at the output of the directional coupler, viewing it directly at 6GHz.

With a full-field color bar signal being transmitted as in Figure 8(a), if we now depress *maximum hold* on the 492, the display rapidly builds a solid pattern showing occupancy of the channel. In Figure 8(b), if you count up the horizontal divisions and multiply by 5MHz, you can see at a glance whether you are spilling over your ± 18MHz deviation area. A full 36MHz width is normal for 100% modulation. This is a quick, easy check.

During the earth station transmitter installation, and yearly performance checks, the Tek 492 should be used to

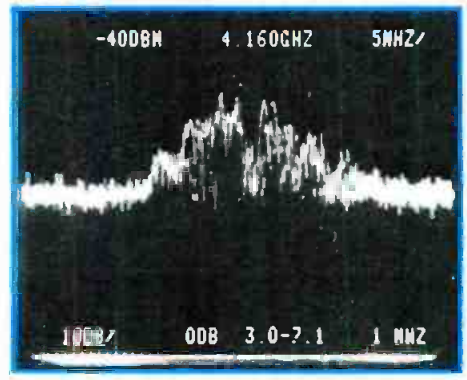

Figure 8(a). Depressing *maximum hold* builds up a solid pattern showing channel occupancy.

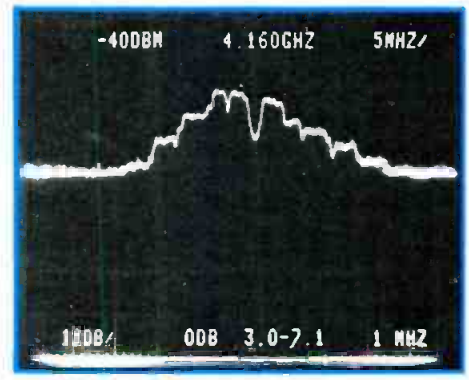

Figure 8(b). A quick computation pinpoints whether or not you are spilling over the ± 18MHz deviation area.

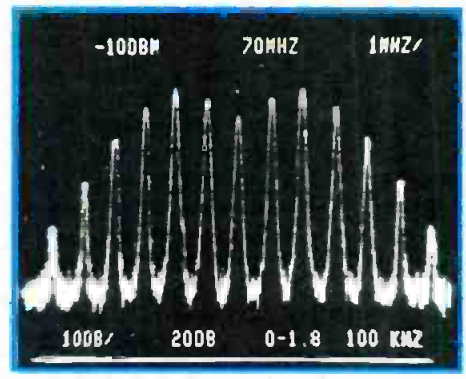

Figure 9(a).

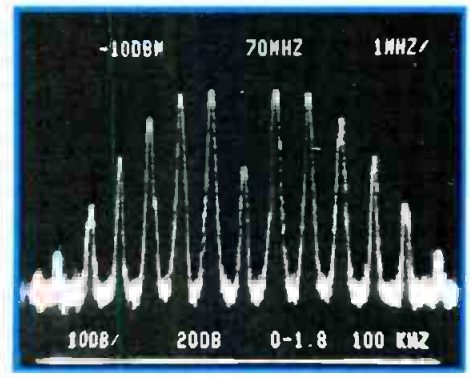

Figure 9(b).

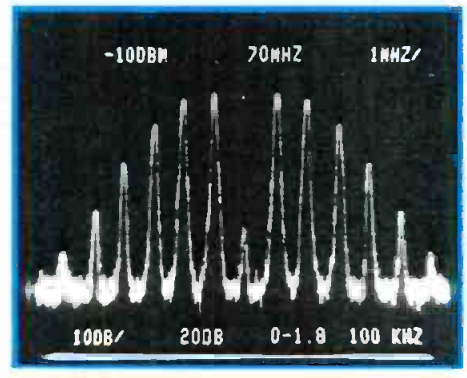

Figure 9(c).

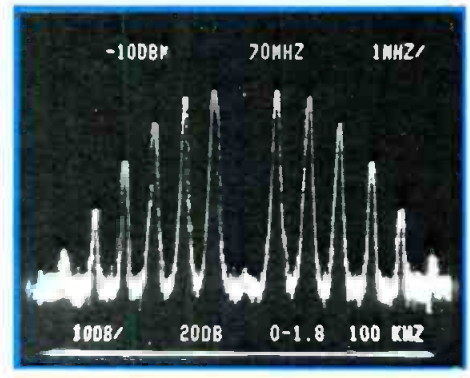

Figure 9(d).

Figures 9(a)-9(d) are a series that shows the nulling of the 70MHz carrier (in this case) as the deviation (modulation) control is adjusted on the monitor.

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set modulation level at precisely 100%. The manufacturer will inform you of the video frequency to use and the absolute level input to the modulator, and will identify the proper takeoff point. At this takeoff point, the Tek 492 will see, typically, a 70MHz intermediate frequency signal or other modulated signal. (The white dot in Figures 9(a), 9(b), 9(c) and 9(d) identifies center frequency.)

Figures 9(a)-9(d) are a series showing the nulling of the 70MHz carrier, as the deviation (modulation) control is adjusted on the modulator. In the case of the Scientific-Atlanta modulator model 461WB, the injection frequency is 0.7616MHz at an exact level of −20.68dBm. The deviation control is carefully adjusted for the complete disappearance of the 70MHz IF signal at the first null. This coincides with a typical video signal containing 100 IRE units of white and 40 IRE units of sync pulse, for peak-to-peak video of 1V.

When measuring carrier power, as displayed on the Tek 492, turn off the *dispersal* control. Figure 10(a) represents the main carrier, plus two audio subcarriers, viewed with *dispersal* off. Figure 10(b) shows why you must turn the *dispersal* off to obtain a stable waveform; with *dispersal* on, the waveform jitters.

Dispersal is applied to the carrier and sidebands to protect the transponder by dispersing the energy content of the signal illuminating it. In the absence of modulation (video), the dispersal unit sweeps the entire signal back and forth over a 2MHz wide sweep at the rate of 30Hz. If sync is applied as video, the dispersal drops to about 1MHz.

Figure 11 illustrates the difficulty in measuring the dispersal signal. It is taken with the *maximum hold* button depressed about one second before opening the camera shutter. Should you wish to measure the actual dispersal deviation, hold the *maximum hold* button down for several seconds (Figure 12) so that you can measure (roughly) just short of 2MHz deviation.

A more accurate measurement of deviation of the main carrier is shown in Figure 13 with each horizontal division representing 0.5MHz. The 3.8 divisions multiplied by 0.5 equals 1.9MHz.

In Figure 10(b), it appears, at first glance, that the two subcarriers are being deviated too much. However,

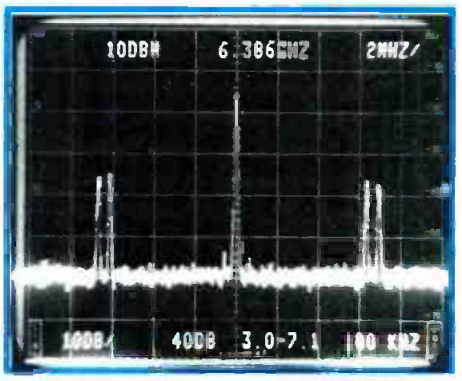

Figure 10(a).

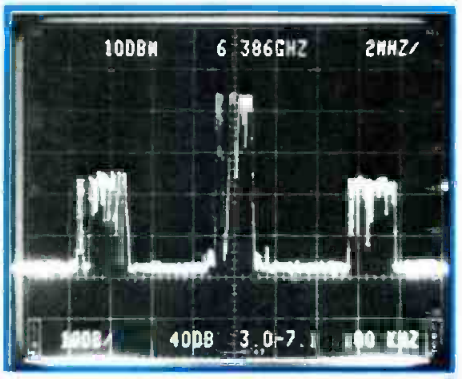

Figure 10(b).

Figures 10(a) and 10(b) show the effect of dispersal. In Figure 10(a) the main carrier and two audio subcarriers are viewed with dispersal *off*. In Figure 10(b), with dispersal *on*, the waveform jitters.

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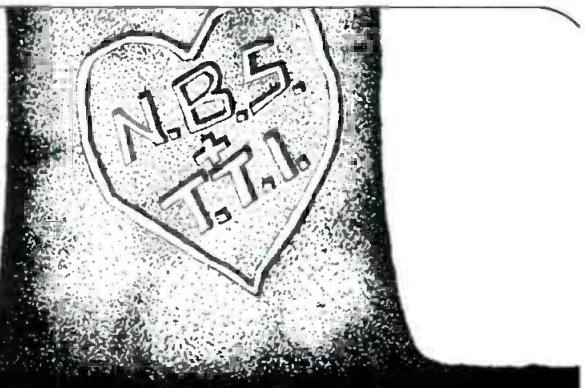

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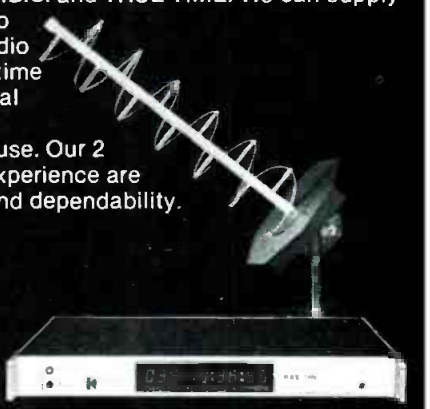

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there are two of them, and they merge into one large, indistinct pattern. This method of measuring dispersal deviation of a carrier is only valid if one separate carrier or subcarrier can be separated on the analyzer.

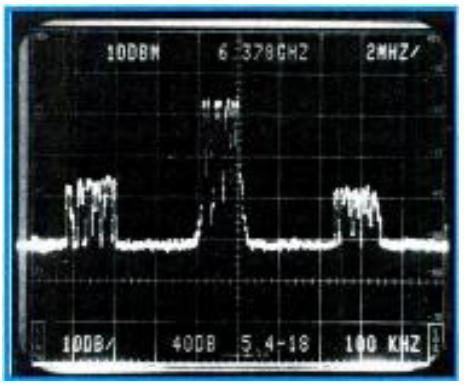

Figure 11. Measuring the dispersal signal, with *maximum hold* depressed only about one second.

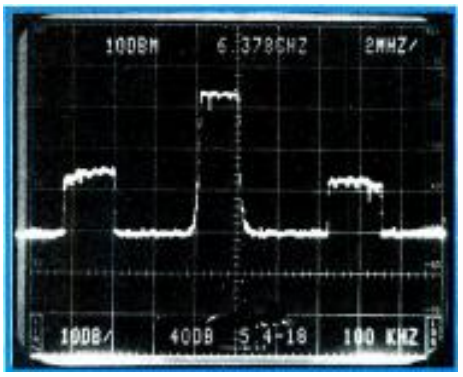

Figure 12. Measuring the dispersal signal, with *maximum hold* depressed several seconds.

If we remove all modulation and dispersion so that our carrier is reduced to a CW carrier—with the aural subcarriers at 6.2MHz and 6.8MHz—we will be able to use the 492 as an accurate power meter. Figure 14 shows a block diagram of a typical earth station uplink system including power amplifier, directional coupler for sampling the signal as it is delivered into the waveguide, and the 10m dish. In this case, the 492 is sampling the waveform and reading the power directly in dBm.

Figure 15 shows the top of the main carrier touching the top graticule line, which is labeled as –6dBm.

Now, we tabulate known losses:

Loss in directional coupler	= –36.1dB
Loss in fixed pad	= –20dB
Loss in coax between 492	= –9.9dB
Total losses	= –66dB

With a reading of –6dBm, and known losses of –66dB, there must be 60dBm at the amplifier output. This is 1000W

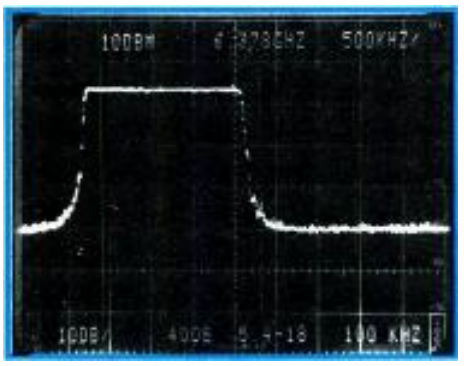

Figure 13. A more accurate measurement of deviation of the main carrier.

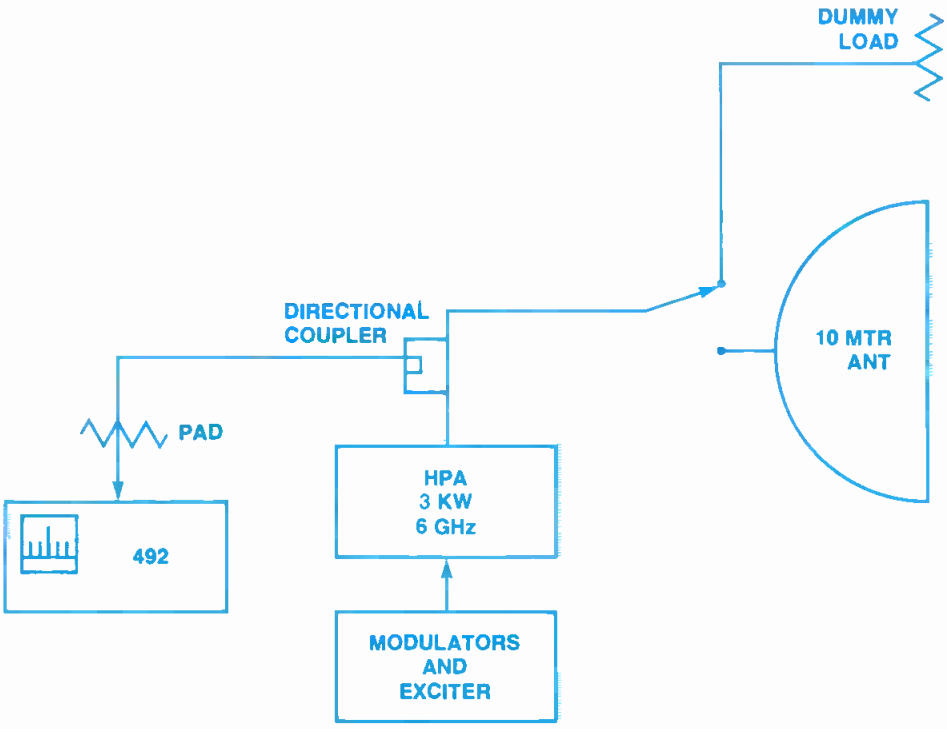

Figure 14. Block diagram showing power measurement for a typical earth station uplink.

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of carrier.

In calculating the effective radiated power(ERP) of the dish, we start out with +60dBm at the input to our waveguide feed line. There is 3dB loss in the feed system, leaving +57dBm arriving at the feedhorn. The antenna is rated at 53.5dBi gain, so the center of the radiated beam, as observed from a point far out in space, will be 110.5dBm, which is slightly more than 100,000,000W of power.

Two practical achievements are involved in the previous discussion: First, we can arrive at the dBm output for proper illumination of the transponders by considering the total space losses to and from the satellite, the dB gain of the receiver and LNA, our system losses and the safety margin desired. Second, we can also use the information to accurately set the front panel wattmeter on the Klystron amplifier to read 1kW output. Obviously, if we were interested in calibrating the meter exactly at, say, 260W (a practical level), we could do that also. All without leaving the security of the dummy load and the convenience of the Tek 492! (If these numbers seem large, please note that the 2-way path loss *is* in the order of 200dB!)

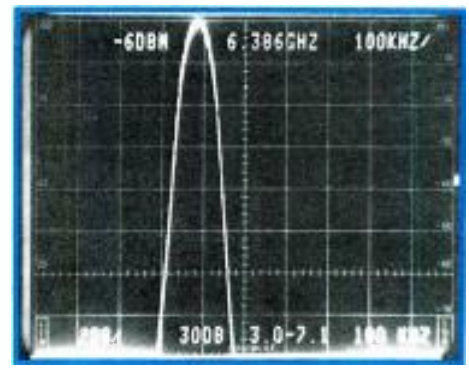

Figure 15. The peak of the main carrier touches the top graticule, labeled at −6dBm.

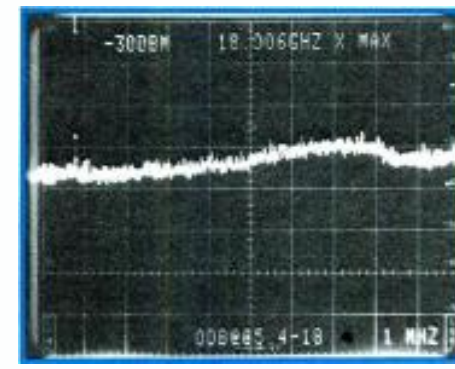

Figure 16. Checking the base line to detect presence of any spurious emission or intermodulation products.

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While the Tek 492 is sampling the power amplifier output, we should take a look at the surrounding base line at least up to and including 12GHz, to detect the presence of any type of spurious emission or intermodulation products. Seeing none, as in Figure 16, we are confident that we will not be asked to cease transmitting for causing interference to other transponders on this satellite or its neighbors. If something spurious *is* seen, then remedial action is required at once.

By expanding the unmodulated signal with the frequency span-per-division and resolution controls, as in Figure 17, you can observe the main carrier at 6385MHz. The noise of the base line is down about 55dB from peak-of-carrier. However, note the disturbance about 40dB down on the carrier itself. Expanding this as in Figure 18, you observe what is probably mechanical noise giving some AM modulation at about 600kHz from center of carrier. This could be fan noise. Without the Tek 492, we would not be aware of such items of interest.

Sweeping the Klystron amplifier

Our particular Klystron has 12 cavities that must be tuned to 12 preselected transponder channels. Sweeping these cavities is a chore because the average station does not have the proper equipment. Leasing

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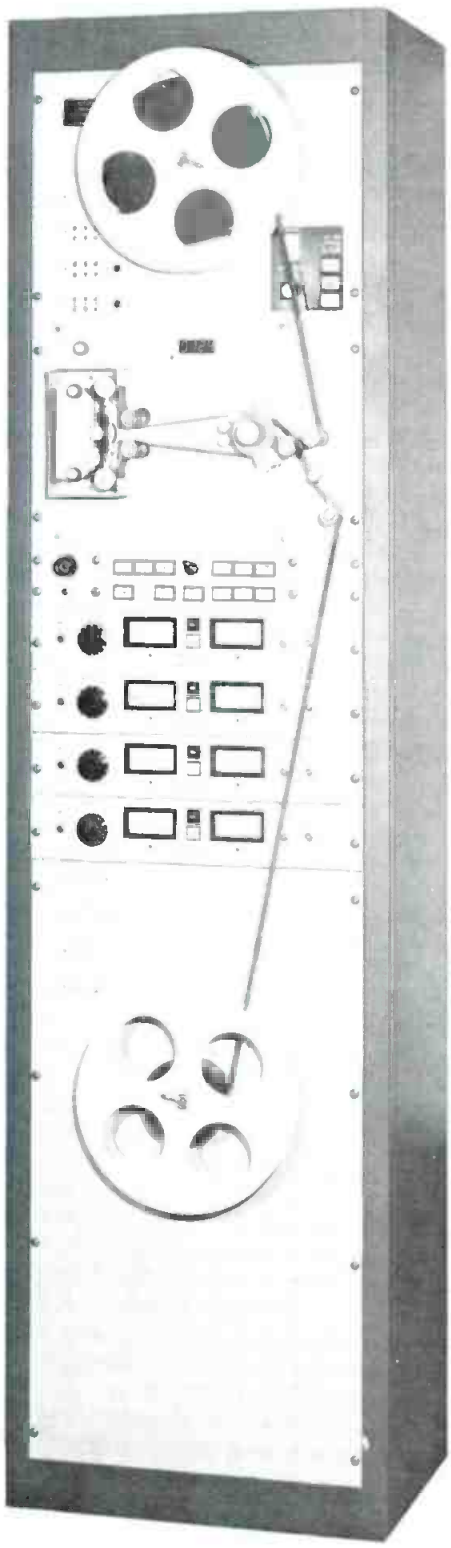

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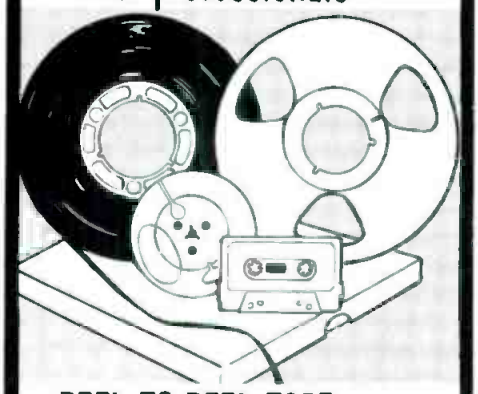

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Figure 17. Expanding the unmodulated signal to observe the main carrier at 6385MHz.

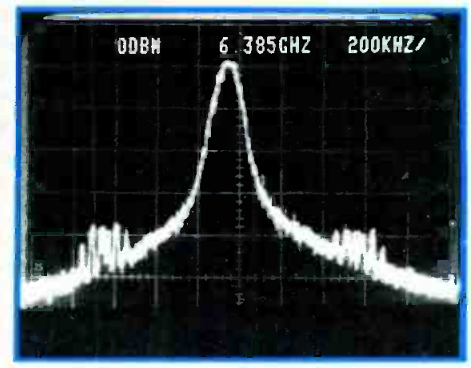

Figure 18. Expanding the carrier shows what is probably mechanical noise giving some AM modulation at about 600kHz from center of carrier.

equipment is one answer, but takes several days to a week before you can set up.

With the Tek 492 in the station and a good microwave sweep generator, you can do an acceptable job of sweeping individual cavities, using the *Save A* and *Max hold* functions with a moderate sweep rate.

First, record the signature of the cables and fittings involved by feeding the sweeper directly into the spectrum analyzer through those cables. Capture this trace with *Save A* near the top of the screen (use 10dB/div. at first). Then, inject about +5dBm of sweep into input of amplifier under test, with amplifier running into dummy load, and run one swept cable from the 492 input to the directional coupler takeoff point at output of the amplifier. Adjust trace to be lower on screen than that you saved at *A*. (See Figure 19.)

Adjust for usable sweep rate and you will be able to do major surgery to the waveform by adjusting the cavity controls. When you have the lower trace as close as possible to the top (*Save A*) trace, the cavity will be usable at that frequency.

For final adjustment, switch the 492 to *2dB/div. log* for an expanded view of each cavity in band ripple.

Figure 20 (upper trace) is a swept display of cables and connectors only in the 2dB/div. expanded log mode. The lower trace is a swept response display of one cavity before final adjustment.

With a little patience, frequency response measurements may be made to +0.5dB using this procedure.

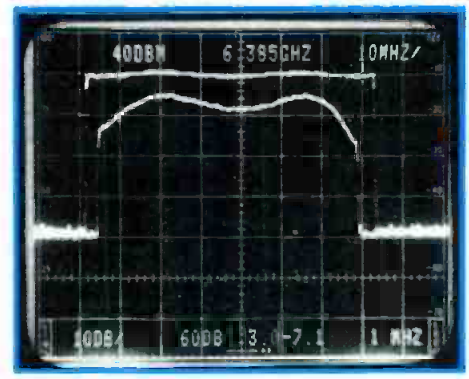

Figure 19. Swept frequency response of cables and fittings (upper trace) and cavity including cables (lower trace) in *10dB/div.* log vertical mode.

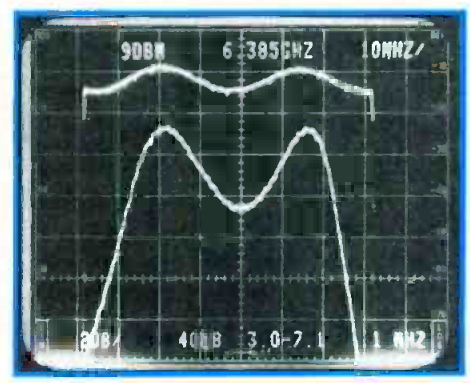

Figure 20. Swept frequency responses in *2dB/div.* vertical log mode. Upper trace shows cables and fittings only. Lower trace includes cavity.

Summary

I have presented some practical uses of the Tek 492 as used in our earth station facilities at KATU. The capability of the instrument for displaying and measuring dBm over a wide frequency range; displaying same on the screen for off-the-screen measurements should, by now, have stirred your imagination to other uses. By combining a good low capacity probe designed to feed a 50Ω input, such as the Tektronix P-6056/P-6057 or equivalent, with the 492 instrument, you can use it directly in microwave circuitry and intermediate frequency amplifiers of any bandwidth. Distortions, spurious emissions and intermodulation products can be seen, for the first time, on the service bench.

Acknowledgement

The preparation of this article and the success of this earth station project would not have been possible without the assistance and cooperation of William Vandermay, manager, engineering, KATU.

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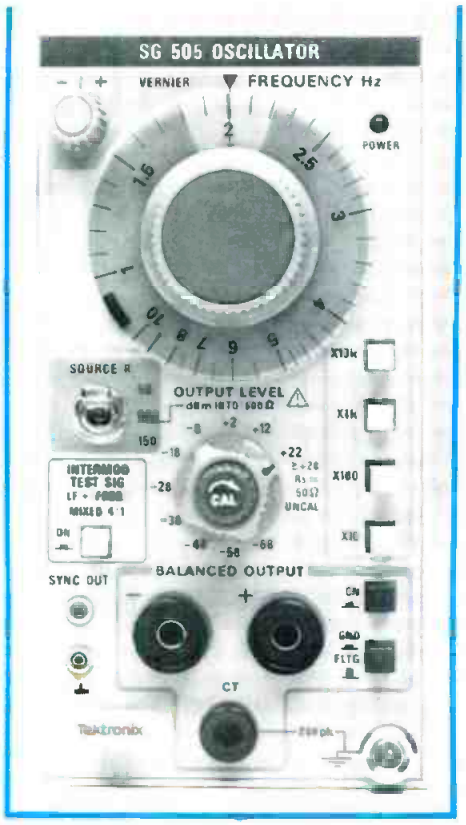

The recently introduced SG 505 Option 02 generator offers a balanced output signal with a greater level (up to +28dBm) for tests such as headroom. Source impedance of the oscillator module may be switched between 50Ω, 150Ω and 600Ω. Generator distortion remains less than 0.0008% from 20Hz to 20kHz.

Field report: Tektronix SG 505 generator & AA 501 distortion analyzer

By Donald L. Markley, facilities editor,
D. L. Markley & Associates, Consulting Engineers, Peoria, IL

As a consulting engineer, I have had the opportunity to evaluate a set of test equipment for audio measurements on broadcast system proofs. The system, as furnished by Tektronix, contained an SG 505 Option 01 audio generator with a DM 502A digital voltmeter, a DC 508A frequency counter and an AA 501 distortion analyzer. These units were contained in a single carrying case with power supply. A second carrying case and power supply was provided that would hold the distortion analyzer for those measurements made where studio and transmitter were separate.

For one who is accustomed to considerable "knob tweaking" to perform an audio proof-of-performance, this entire system is a joy. The audio

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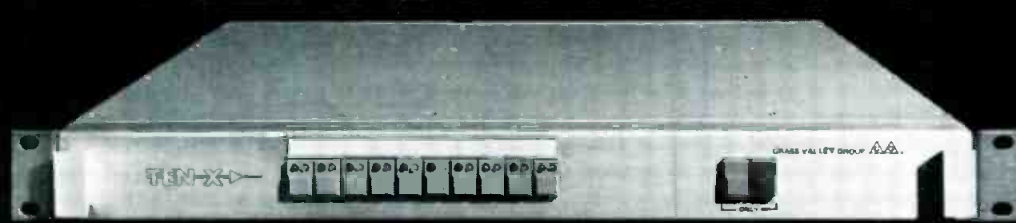

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analyzer, in particular, is extremely flexible and easy to operate. One of its nicest features is that it is fully automatic...there is no level setting, tuning or nulling required on the entire instrument. It is simply necessary to provide a signal to the input of the device and press a *little bitty* button to select the desired mode. These tiny buttons are a minor problem to aging engineers with overly large fingers, but one rapidly adjusts to using them.

One of the handy functions is a *dB-ratio* position. In this position, you supply an audio input to the analyzer at a desired level. For the purpose of a broadcast proof, this level might be the output of the modulation monitor at a given level of modulation. Once everything is stable, you press a second button that establishes that level as 0dB reference. From that time on, all that is necessary is to glance at the display to measure your frequency response directly in decibels. Tektronix has an excellent application note (AX-4485) that explains how to do this work with its distortion analyzer, as well as how to use the multitude of built-in filters and weighting circuits.

The SG 505

The mating signal generator is the SG 505. This generator has an output from −60dBm to +10dBm in eight ranges and covers from 10Hz to 100kHz in four bands. The frequency selection is via a rotary control with the unique characteristic of permitting 360° rotation. In other words, if you are at 1kHz and desire to go to 5kHz, you can go the short way by tuning back through 10kHz down to 5kHz. This saves a lot of knob twisting when running a proof. The frequency multiplier is push-button selected and the output level is via a rotary control with vernier.

The SG 505 Option 01 furnishes an IM test signal. A low frequency is internally selectable at either 60Hz or 250Hz, with the high frequency being that to which the signal generator is adjusted. Therefore, IM measurements with this system may be done by pressing the IM button on the distortion analyzer and the IM button on the signal generator. The high frequency signal is selected on the generator, and IM is read from the distortion analyzer. If that sounds like a ridiculously easy way of doing a measurement, it is, because the measurement is actually that simple.

The operation of the system is characterized by the ease of adjustment. There are no little *sneaky tricks* that one needs to watch out for that would cause your measurements to be seriously disturbed.

The AA 501 Option 02 distortion analyzer eliminates the need to buy both a specialized voltmeter and a separate distortion analyzer in locations where CCIR recommendation 468-2 or DIN 49405 are in effect.

By incorporating a Tektronix DC 508 frequency counter system, it is possible to keep a running check on the output frequency of the oscillator. The system applies the oscillator signal to an internal bus in the back of the cabinet. The counter then can be used to measure the frequency from the internal bus without any external wiring. In a similar fashion, the out-

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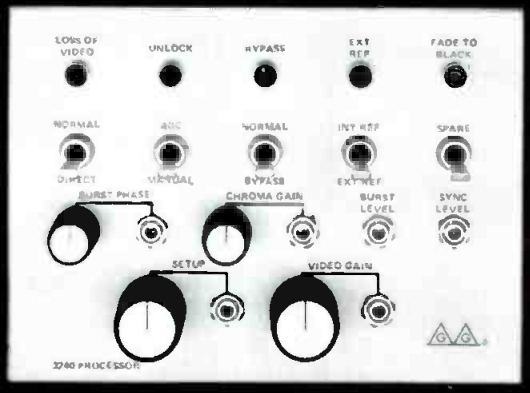

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put level of the signal generator can be monitored from the internal bus without external wiring. This can be done by the distortion analyzer or by using a meter such as the Tektronix DM 502A, which was included with the system.

The DM 502A is a useful meter with dc ranges from 200mV to 1000V full scale, with automatic or manual ranging and true rms ac voltmeter ranges of 200mV to 500V with automatic ranging. This unit will also perform temperature measurements from −55°C to +200°C. The only complaint that I had with this unit is that it

A technician uses the AA 501/SG 505 system to check performance of a small audio mixing system. For his tests, the system includes an SC 503 10MHz storage oscilloscope.

The AA 501/SG 505 oscillator system reduces measurement time. THD measurements can be made quickly, without operator assistance. The AA 501's internal circuitry automatically performs level setting, tuning and nulling functions.

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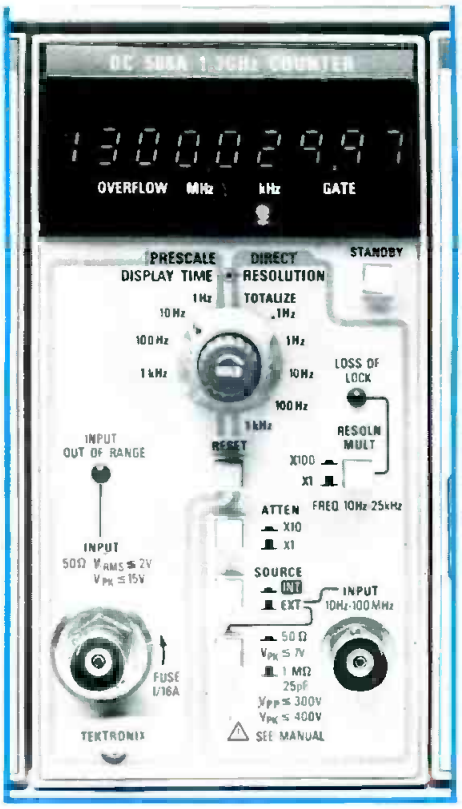
did not have the automatic dB ratio provisions that the distortion analyzer provides. However, the many other functions made it a useful addition to the overall system package, if for no other reason than the fact that one is usually involved in some trouble-shooting in the broadcast system when running a proof-of-performance. It is rare that everything is working beautifully in a system when the proof is started. It is almost as rare to have everything in the system working perfectly when the proof is finished but, hopefully, some faults will have been corrected, or at least identified, during the proof process.

Before the reader is led to believe

Any one of the DM 502A, DM 501A and DM 505 autoranging DMMs may be selected for use with the distortion analyzer/signal generator set.



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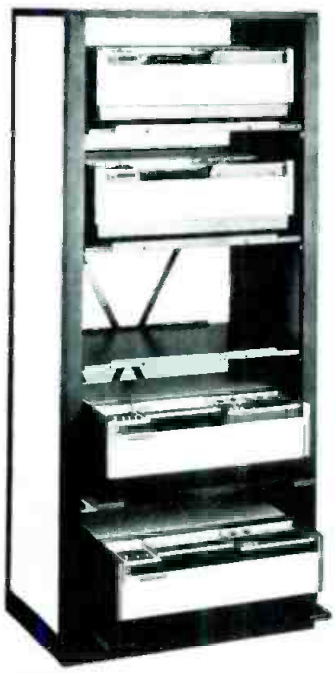

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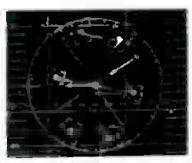

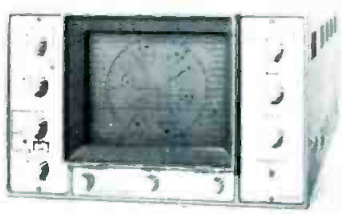

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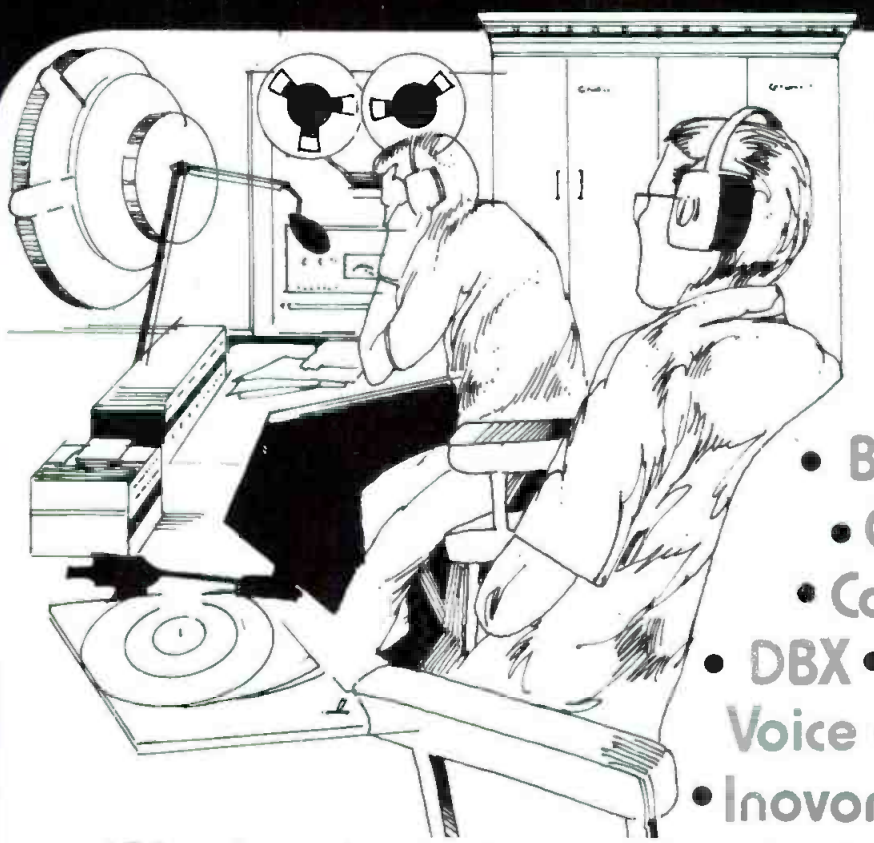

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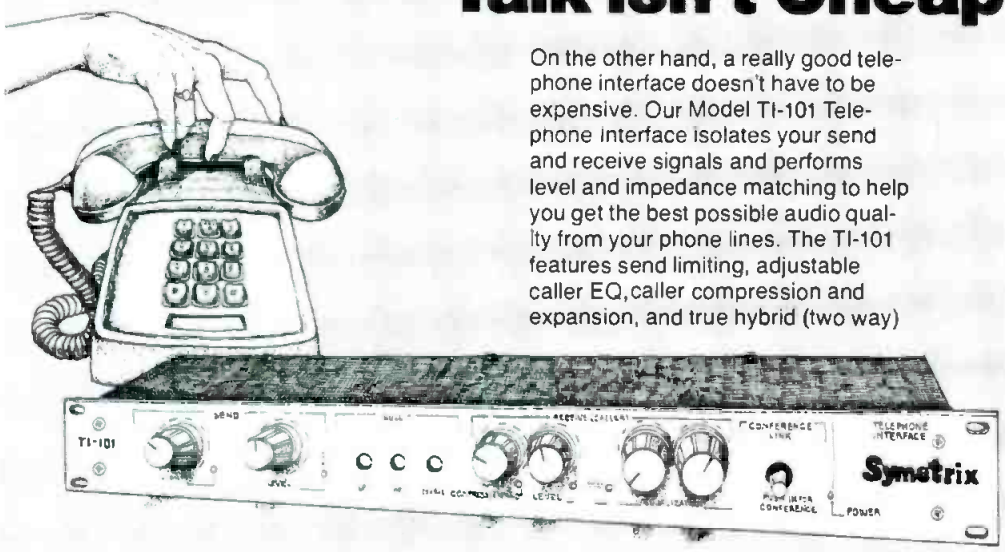

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Manufacturer's specifications: Tektronix SG 505 oscillator

Option 01 – IM test signal
Option 02 – balanced output

For communications and broadcast applications Option 02 provides a fully balanced output with a maximum amplitude of +28 dBm into 600 ohms from 50 ohms. A ten-position (10 dB per step) attenuator and a variable attenuator with a minimum 10 dB range reduce the SG 505 Option 02 output to below −78 dBm into 600 ohms. These output signals appear on the front panel at ¾ inch spaced banana jacks with a third banana jack providing a "CT" center tap. A pushbutton switch allows grounding or floating the center tap.

A front panel switch enables selection of three different source resistances: 50 ohms for low impedance applications (improves measurement accuracies on long cable runs and reduces loading effects), 150 ohms for matching microphone circuits, and 600 ohms for complying with audio/communication industry standard and general purpose applications. In the 50 ohm position the SG 505 Option 02 delivers +28 dBm into a 600 ohm balanced load, or typically +30 dBm into 150 ohms. In the 600 ohm position, the SG 505 Option 02 delivers a calibrated +22 dBm into a 600 ohm balanced load.

The Option 02 retains the ultra-low distortion of the SG 505 through 50 kHz and includes the Option 01 intermodulation test signal.

CHARACTERISTICS

MAIN OUTPUT

Frequency Range — 10 Hz to 100 kHz in four overlapping bands. Accurate within 3% of dial setting (with Vernier at center). Vernier Range is at least ±1% of frequency setting.

Calibrated Output — Selectable from +22 dBm to −68 dBm into 600 Ω in ten 10 dB steps. Accurate to within 0.2 dB at +22 dBm and 1 kHz. Step accuracy is ±0.1 dB/10 dB step or 20 dB step change. An uncalibrated control provides continuous variation from <−10 dB to +0.3 dB from calibrated position.

Amplitude Response — Level flatness ±0.1 dB from 10 Hz to 20 kHz (1 kHz ref), within 0.2 dB from 20 kHz to 100 kHz (excluding >50 kHz on −58 dB and −68 dB output level ranges).

Harmonic Distortion — <0.0008% (−102 dB) THD from 20 Hz to 20 kHz (typically 0.0003%); 0.0018% (−95 dB) THD from 10 Hz to 20 Hz, and from 20 kHz to 50 kHz; 0.0056% (−85 dB) THD from 50 kHz to 100 kHz (R_L ≥600 Ω).

Output Impedance — Selectable 600 Ω ±2%, 150 Ω ±2% or 50 Ω ±3% floating or grounded through ≈30 Ω. Output impedance does not change with Output On/Off selection. Impedance to CT is ½ the selected impedance. Maximum floating voltage ±25 V peak.

Maximum Output Voltage — At least 21 V RMS open circuit; 19.45 V RMS (+28 dBm) into 600 Ω from 50 Ω.

Balance — ≤0.5% mismatch of output open-circuit voltages referenced to CT for f ≤20 kHz with output Grounded.

OPTION 01 IM TEST SIGNAL

Selecting the IM Test Signal causes a LF sinewave to be mixed with the normal oscillator signal in a 4:1 amplitude ratio.

LF Frequency — Internally selectble 60 Hz (±1 Hz) or 250 Hz (±3 Hz).

Main Output — Composite peak-to-peak output within 0.2 dB of normal oscillator mode output.

Residual IMD — Typically <0.0005% from 2.5 kHz to 10 kHz.

Sync Output — LF signal component only, 200 mV RMS ±20%.

Editor's note:
For complete specs, see Tek's 1983 catalog.

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For those that require a more flexible or compact monitor, we've created the 4411 and 4401. These loudspeakers incorporate our most advanced component and design technologies. Both the 4401 and 4411 utilize newly developed transducers arranged in a tight cluster to provide outstanding coherency of sound for close monitoring. This design also minimizes off-axis variations in the far field. Additionally, the 4411s are mirror imaged for improved stereo perspective.

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For additional technical data and a complete demonstration of the 4312, 4401, or 4411, contact your local JBL Professional Products dealer. And discover the next generation of compact monitors. From the refined to the redefined.

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Manufacturer's specifications: AA 501 distortion analyzer

CHARACTERISTICS

The following electrical characteristics are common to the standard AA 501, Option 01 and Option 02 unless otherwise noted:

THD

Complete automatic Total Harmonic Distortion (THD) measurements to specified accuracy in 7 s or less.

LEVEL

Autoranging digital voltmeter displays input signal level in volts, dBm, or dB ratios

IMD
(OPTION 01, OPTION 02)

Fully automatic SMPTE, DIN, and CCIF difference frequency test measurements

OPTION 02

Noise measurements to CCIR recommendation 468-2 and DIN 45402 True RMS or quasi-peak response. Total system THD + N = 0.0032% (90 dB) RMS response. Balanced input.

DISTORTION FUNCTION

Fundamental Frequency Range — 10 Hz to 100 kHz automatically tuned to input frequency

Distortion Ranges — Auto (100%), 20%, 2%, 0.2%, and dB (auto-ranging)

Accuracy (readings ≥4% of range) — 20 Hz to 20 kHz ±1 dB, 10 Hz to 100 kHz +1, −3 dB. (Accuracy is limited by residual THD + N and filter selection.)

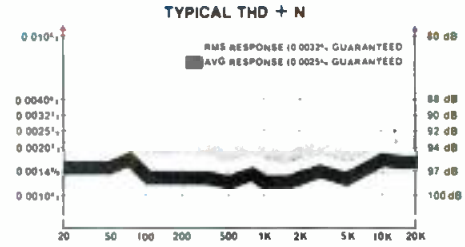
AA 501/SG 505 System Residual THD + N — V_{in} ≥250 mV. (all distortion, noise, and nulling error sources combined).

20 Hz to 20 kHz
≤0.0025% (−92 dB) Average Response with 80 kHz filter (standard and Option 01 only).
≤0.0032% (−90 dB) RMS Response with 80 kHz filter.

10 Hz to 50 kHz
≤0.0071% (−83 dB) RMS Response

50 kHz to 100 kHz
≤0.010% (−80 dB) RMS Response

TYPICAL THD + N



Typical Fundamental Rejection — At least 10 dB below specified residual THD + N or actual signal THD, whichever is greater.

Minimum Input Level — 60 mV (−22 dBm).

LEVEL FUNCTION

Modes — Volts, dBm (600 Ω), or dB ratio with push to set zero dB reference.

Level Ranges — 200 μV full scale to 200 V full scale in ten steps, manual or autoranging.

Accuracy

Frequency	Volts	dBm or dB ratio
20 Hz to 20 kHz	±2%	±0.3 dB
10 Hz to 100 kHz*	±4%	±0.5 dB

(Vin ≥100 μV, level ranging indicators extinguished).

Bandwidth — ≥300 kHz.

Residual Noise — <3.0 μV (−108 dBm) with 80 kHz and 400 Hz filters
<1.5 μV (−114 dBm) with "A" weighting filter.

On the 200 μV range, accuracy above 50 kHz is +4%, −6% (±0.5 dB, 0.7 dB)

INTERMODULATION DISTORTION FUNCTION
(OPTION 01/02)

SMPTE and DIN Tests — Lower frequency range: 50 Hz to 250 Hz

Editor's note:
For complete specs, see Tek's 1983 catalog.

that this system is absolutely faultless and provides everything that the broadcaster might desire, it shculd be pointed out that there are a few little changes that might be desirable. For example, the SG 505 has a maximum output of +10dBm. For those people desiring to perform work on audio consoles and audio amplifiers, a higher output level would be desirable to test for headroom. Also, the output is 600Ω, unbalanced, to a BNC connector. There are many in audio who would prefer to see a balanced output. However, since this report was finished, Tektronix has announced a new Option 02 for the SG 505 that eliminates both of these minor problems. The SG 505 Option 02 has switch-selectable output impedances of 50Ω, 150Ω or 600Ω. The output impedance is balanced, and there is a maximum of +30dBm available.

The only other problem in using the system was found in attempting to make level measurements off of the internal bus while operating at −30dBm output from the signal generator. When the levels are down in the microphone level, there is a bit of noise on the internal bus that influences the readings slightly. It is a minor problem that can be eliminated simply by using the front panel inputs to the distortion analyzer instead of

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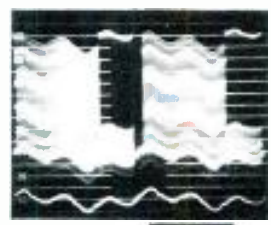

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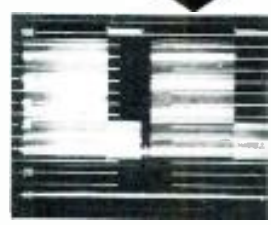

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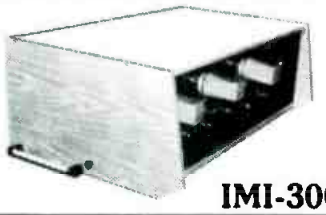

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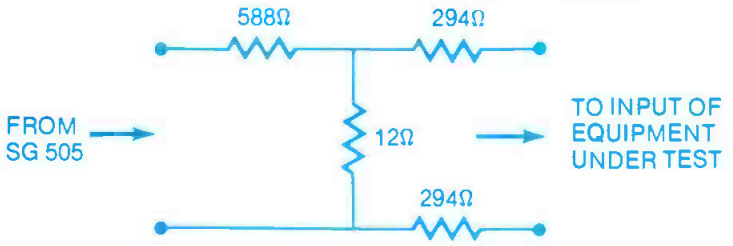

Figure 1. A 40dB isolation pad, with 600Ω-600Ω impedance match, uses precision resistor values.

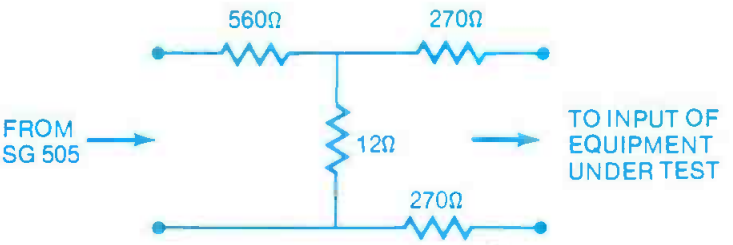

Figure 2. Use of standard 10% tolerance resistor values provides a 40dB isolation pad with an approximate 600Ω-600Ω match. Actual impedance values may be measured, but are not significant for proof-of-performance measurements.

the internal bus. In fact, Tektronix points out in its application notes that this is the more desirable method.

Tektronix also claims in its application notes that microphone inputs to audio consoles typically approximate a pure resistance. The company has been taken to task on this by John DeMuth, maintenance supervisor at KFTY-TV in Santa Rosa, CA. DeMuth believes that console mic input transformers have a significant reactance at audio frequencies that will distort somewhat the apparent frequency response as measured at the output of the SG 505.

It is DeMuth's recommendation, and one with which I heartily agree, that a high loss matching pad be constructed and placed between the output of the SG 505 and a microphone input. Two such pads are shown in Figure 1 and Figure 2. The pads shown are for 600Ω. They could easily be changed to match 600Ω to 150Ω. Also, the pads, as shown, attempt to correct the unbalanced-to-balanced situation. Although the output is not a totally balanced signal, it will be close to balanced because of the resistances involved. There should be no significant error in the frequency response readings.

The use of such pads will provide 40dB of isolation between the signal generator and the microphone input. This still gives more than an adequate range of adjustment for audio proof-of-performance measurements, as the normal output of the signal generator will be at -10dBm to -20dBm level. By operating the generator at this higher output level, measurements may be taken from the internal bus without any problem with noise, or the front panel inputs to the distortion analyzer may be paralleled with the SG 505 output without causing any harmful influence to the system.

Final notes

In summary, the Tektronix system is easy to operate and flexible in its capabilities. Coupled with the DC 508A frequency counter and the DM 502A digital multimeter, it is a useful set of equipment for any broadcast operator. The quality is that typical of Tektronix. Basic measurements may be performed by a minimally skilled operator with little instruction. It is recommended that the system be purchased with Option 01 and Option 02 for the signal generator, permitting a selection of IM and output impedance measurements to be performed.

Editor's note:

The field report is an exclusive **BE** feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations—if any.

In essence, these field reports are prepared *by* the industry and *for* the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by **Broadcast Engineering** for or against a product.

The equipment used by the author for this report was loaned to him directly by Tektronix for making field measurements in preparing this report. For more information on the equipment, contact: Tektronix, Box 1700, Delivery Station 53-077, Beaverton, OR 97075.

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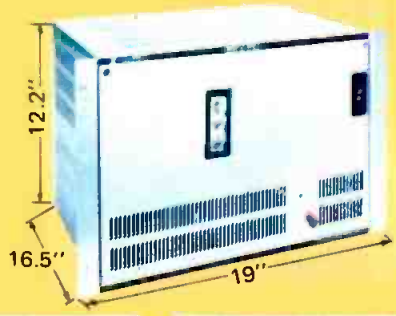

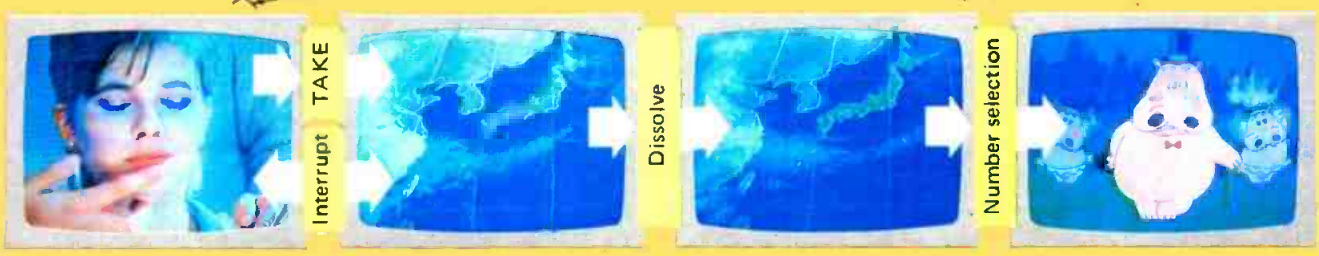

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  3. Operate with the on-air image output, next preview output and comment output connected respectively to the on-air monitor, next monitor and monochrome monitor.
- The operation panel is small enough (1/2 letter size) to be installed anywhere.
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Anglia Television expands its technical facilities

By H.A. Cole, British correspondent, United Kingdom

Anglia Television, which is one of Britain's oldest TV companies, was established in 1959 shortly after commercial television was introduced in the United Kingdom. From its modest beginning with only 230,000 potential viewers, it now serves an area of more than 3500 square miles and a viewing population of nearly 4.5 million.

The company's growth over more than two decades culminated recently in its most ambitious expansion program, which is likely to cost more than £6 million* and has added substantial studio and control room space, as well as administrative and technical accommodations.

The United Kingdom, which consists of England, Scotland, Northern Ireland and Wales, has an area of 93,000 square miles and a population of about 56 million. (By comparison, the state of Texas covers 267,000 square miles and has a population of 13 million.) The United Kingdom, like Japan, is a small country with a high population density, and with special problems as far as radio and TV broadcasting is concerned.

The first regular transmissions of HDTV programs in Britain were made on Nov. 2, 1936, using a 405-line monochrome system owned and operated by the BBC. The service was halted in September 1939 at the outbreak of World War II, but was resumed shortly after the end of the hostilities, using the same system.

In 1954 the British government authorized the setting up of a second TV network independent of the service provided by the BBC. This new network, known as Independent Television (ITV), was funded entirely from advertising and was administered by the newly formed Independent Television Authority. The latter became the Independent Broadcasting Authority (IBA) when commercial radio was introduced.

The area covered by Anglia Television.

The first commercial TV station began broadcasting from London in 1955 and was quickly followed by similar stations serving other densely populated areas of England and Scotland. All of the commercial stations operated in the VHF band, using the same 405-line system as the BBC, but transmitted from different locations.

In 1964, in common with the rest of Europe, Britain opted for the 625-line system for the eventual introduction of its color transmissions and used the opportunity to introduce a second BBC TV channel. In 1967 it became the first color TV service in Europe. At the same time, the phasing-out of the 405-line system was initiated, which today is almost complete. In 1969 both the BBC and ITV began transmitting regular programs in color using the PAL system, which is now the European standard.

All 625-line transmitting stations operate in the UHF band and adopt what is known as co-channel siting. Under this arrangement, a single transmitting station, using one transmitting antenna, simultaneously transmits two BBC programs and one ITV program, and the viewer requires only one receiving antenna pointing

*Editor's note: This amount translated to approximately $9 million, as of Feb. 22, 1983.

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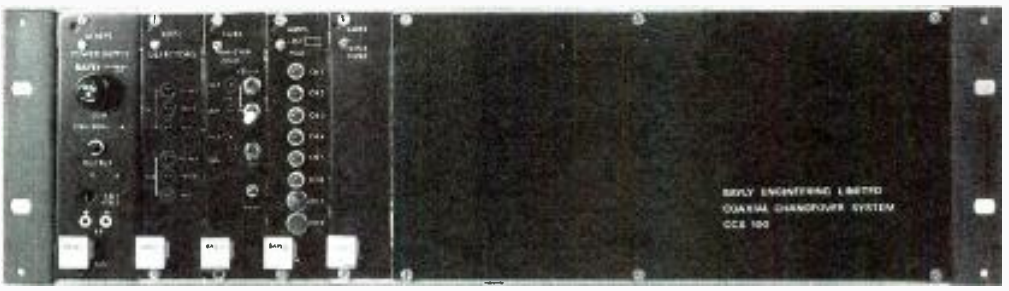

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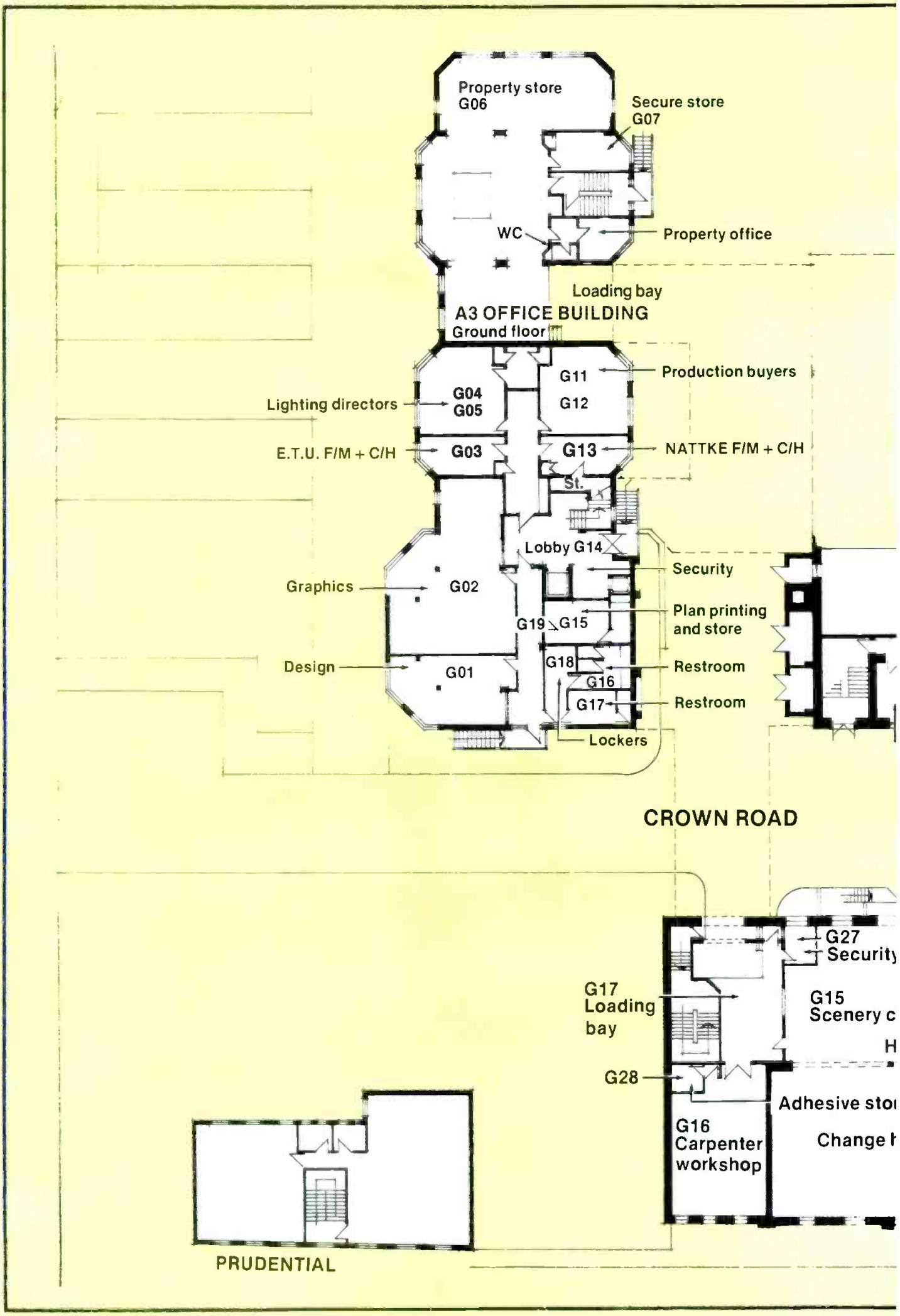

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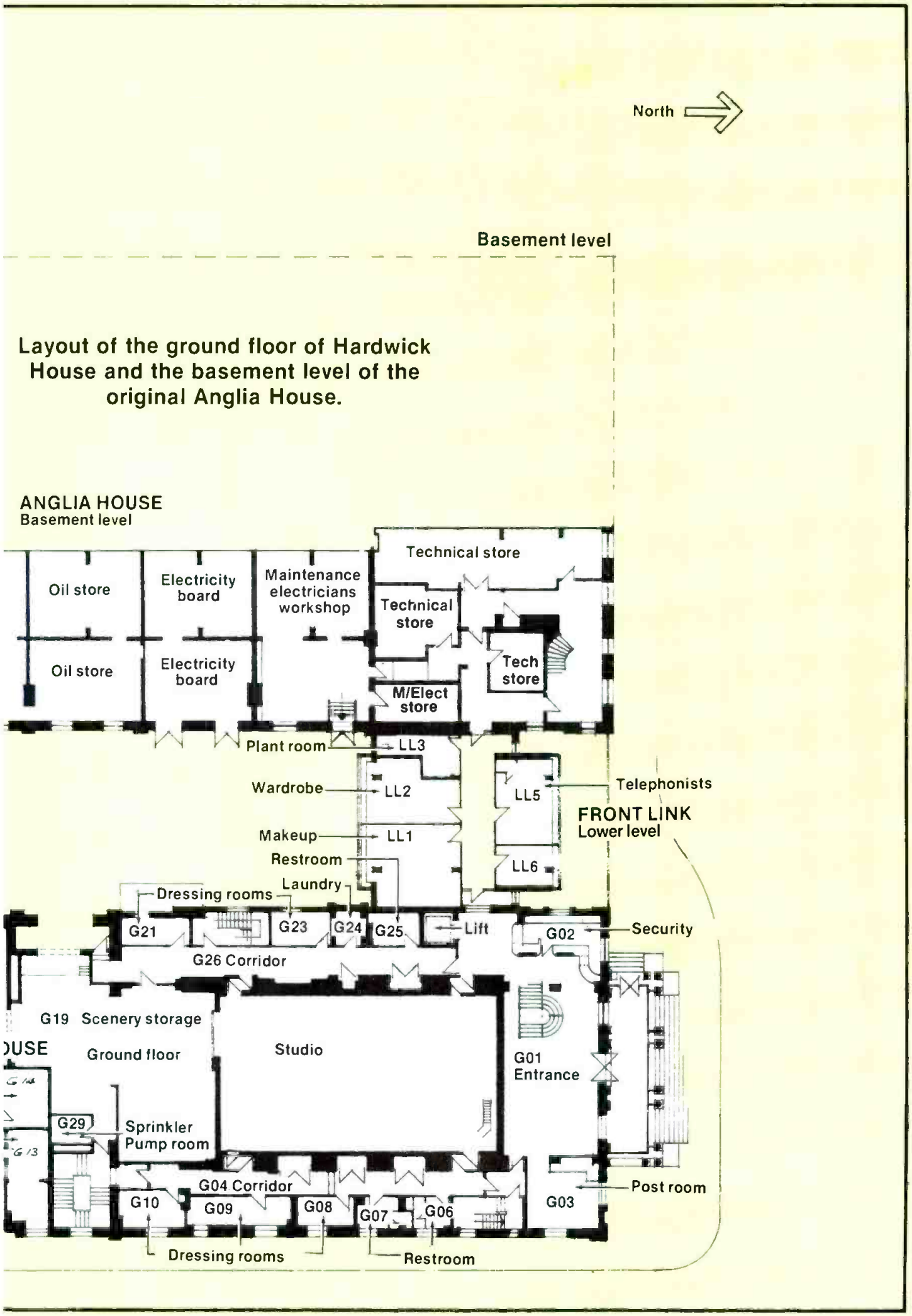

Layout of the ground floor of Hardwick House and the basement level of the original Anglia House.

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The areas served by the ITV companies.

toward the transmitter serving the area. A second ITV channel will be launched this month.

There are now more than 500 UHF transmitting stations in the United Kingdom, as well as numerous repeater stations, and approximately 99% of the population can receive TV programs in black-and-white or color.

The IBA owns and operates all the ITV transmitters. It also chooses and appoints the program-making companies, supervises their program planning and advertising, and is responsible ultimately for the content and quality of everything transmitted.

Each company derives its revenue from the sale of advertising time in its own transmitting area, and from the sale of its programs in Britain and overseas. Advertising is limited to six minutes an hour, averaged over the day, with no more than seven minutes in any "clock hour."

As might be expected, there are a few giants among the 15 companies that make up ITV. They serve the large, densely populated regions—principally London, the midlands and north of England, and central Scotland—and tend to produce the more expensive programs, which are then networked by the smaller companies.

Anglia, which serves the area to the northeast of London known as East Anglia, is a good example of regional television. The word Anglia originates from Anglo-Saxon (fifth century) times, when England was known as Angleland. East Anglia embraces the counties of Bedfordshire, Cambridgeshire, Essex, Norfolk, Suffolk, much of Northamptonshire and parts of Buckinghamshire.

Although predominantly rural, the area includes the giant Vauxhall (General Motors) car assemply plants at Luton and Dunstable, the university city of Cambridge, large electronics factories in Chelmsford, and the ports of Harwich and Felixstowe. The area is one of the most affluent and fastest growing regions in England. Its population has increased by more than 25% since Anglia was launched, and it has eight new towns and 15 expanding towns. There is an above average number of people in the 25 to 34 age group, and almost 25% of the housewives are under 35. The region thus is attractive to the advertiser.

When Anglia Television started broadcasting in October 1959, it had a staff of 300. Today the company has more than 700 employees. The management board of Anglia Television reflects the deliberate regional nature of the company and is made up of local industrialists, farmers, newspaper editors, film producers, theater managers and academics. The shareholding structure ensures that 55% of all voting shares are held by people, organizations or companies residing or based in the region.

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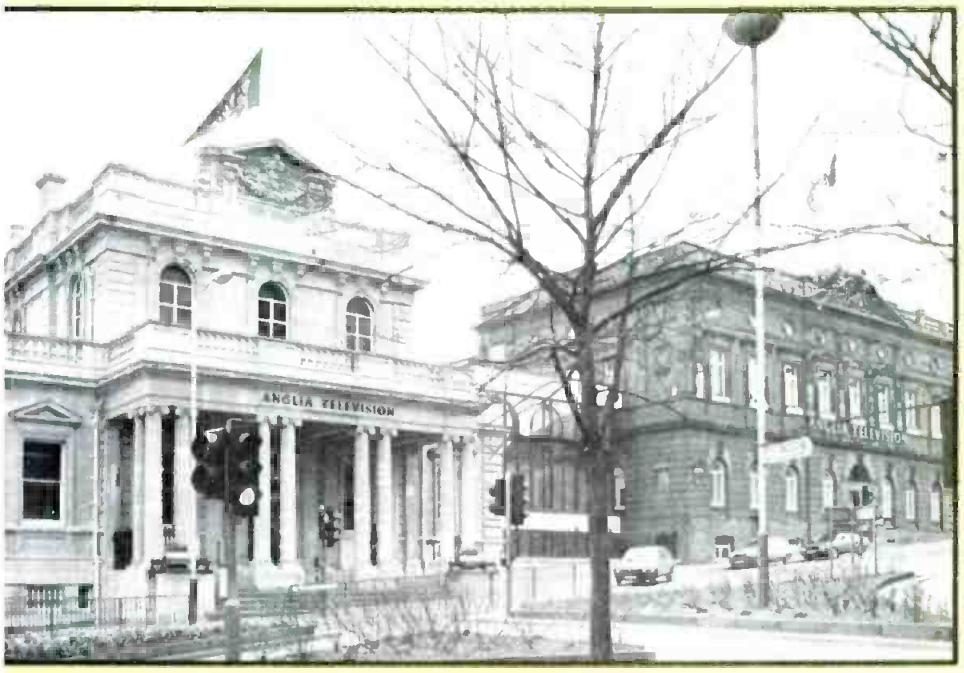

ıe new entrance to Anglia Television's studio and office complex in Norwich, showing ardwick House and the modern link with the company's original headquarters.

Anglia Television has received many national and international awards for its programs—54 since 1963—and is the leading ITV contractor in the United States, with two series—*Survival* and *Tales of the Unexpected*—running simultaneously nationwide.

Anglia's production studios are in the ancient city of Norwich, which is the county town of Norfolk. It has a population of about 120,000. The original studio complex ws located in a building known as the Agricultural Hall, built in 1882 for cattle shows and the sale of grain. With its acquisition by Anglia Television and its conversion to production studios and offices, the building became known as Anglia House.

Three studios were constructed. The main one, used for drama production, has 3224 feet of floor space and is equipped with four cameras. The second, with three cameras, is about 1000 feet. The third is a small studio equipped with a single camera and used for continuity announcements. In 1978 additional studio space was made available by the acquisition and conversion of a former bowling center. This is now used as a TV theater, with plenty of seating for audiences.

With the continued expansion of the company and the ever increasing need for more studio space and equipment, a new studio and office complex was planned. This involved a nearby building known as Hardwick House and the addition of a 4-story wing at the rear of Anglia House. The new facilities would add an extra 2000 feet of studio and control room space, with additional news rooms and offices for management and production staff.

The work involved three distinct operations: converting Hardwick House; closing and building over the road that separated the two buildings;

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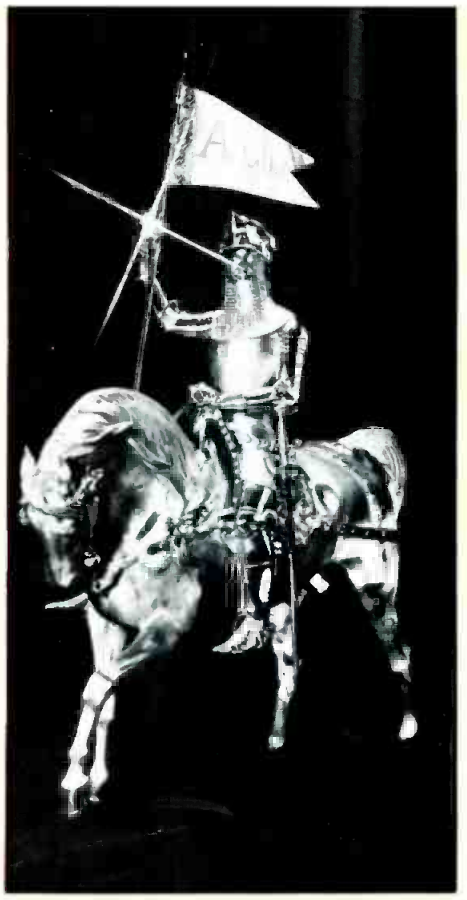

The silver statue adopted by Anglia Television as its symbol.

and constructing the new wing. The first two operations were completed, and the new accommodation officially opened on April 30, 1982, and Hardwick House has now become the main entrance to Anglia Television.

In view of Norwich's history, Anglia Television sponsored an archaeological dig before work began on building the new wing, and was quickly rewarded by the discovery of an unknown Saxon church dating from about 300 A.D., with the remains of 130 graves.

Hardwick House began in 1866 as a bank, but from 1875 until 1969 it was used as Norwich's main post office. After that it had been unoccupied. Anglia's expansion not only has saved this fine old building from possible decay, but has allowed it to be used for the application of modern technology without defacing its attractive exterior.

As if to provide a constant reminder of the historical importance of East Anglia, the symbol adopted by Anglia Television is that of a flag depicting a knight in armor on horseback. The symbol is taken from a silver statue—now in the foyer of Anglia House—that was commissioned in 1850 by the King of the Netherlands for use as a sporting trophy. The Anglia pennant was added to the knight's lance by a London silversmith 109 years later.

The many additional facilities made available by the acquisition of new equipment, and by the conversion of

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Hardwick House, include a nearly 2000-foot production studio with associated sound, lighting and production control rooms, and two editing suites for 1-inch videotape.

The facilities of Hardwick House are spread over the four floor levels, including a basement. The new studio, a scenery block, dressing rooms and a joinery workshop are on the ground floor, while a film store, a lighting workshop, a stills studio, a darkroom, an outside broadcast electronics workshop and a library are at basement level. The remaining floors are devoted to a graphics studio, crew rooms and offices.

The blueprint on page 264 shows the layout of the ground floor of Hardwick House and the basement level of the original Anglia House. Also shown are the interconnecting link between the fronts of the two buildings, and the layout of the new wing under construction at the rear of Anglia House. The differences in floor level numbering are caused by the sloping ground between the two buildings.

The new studio—Studio F—is equipped with three Marconi MK 9 color cameras mounted on Vinten pneumatic pedestals and fitted with Angenieux 42X or 12X lenses. The camera control units, with associated equipment, are housed in a central apparatus room along with pulse generators, distribution amplifiers, phase-locking and slaving equipment. Studio F can be phase locked with any of the other Anglia studios or with the station master pulse system. Picture monitoring facilities in the various control rooms are provided by Barco 2/51 color monitors and Cotron monochrome monitors. Vision signal mixing is done with Grass Valley 1600-3F equipment.

The sound studio mixing equipment takes the form of a 24-channel Neve mixer desk. Other sound equipment associated with the new complex includes two EMT 900 gram desks, three Ferrograph—two Logic 7 and

The production control suite of Studio F.

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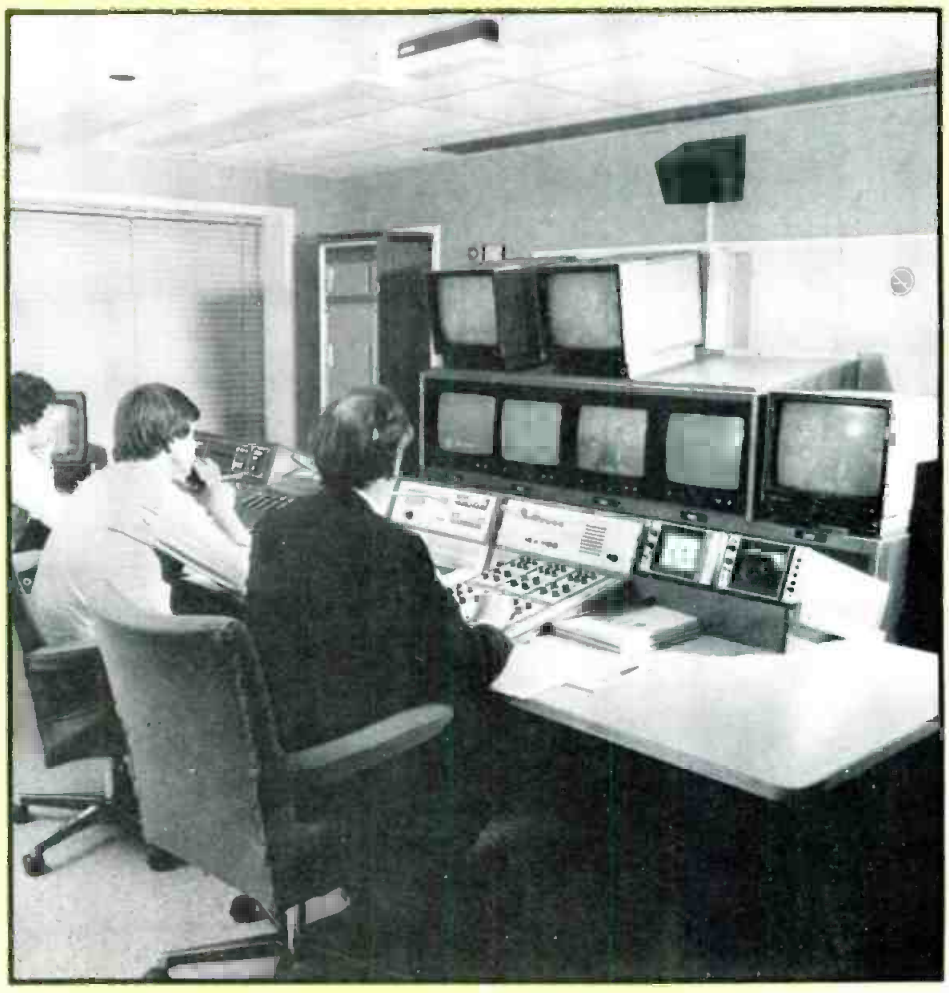

The lighting control suite for Studio F.

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The editing control computer operating the VPR2 machines in the new editing suite, showing the sound and picture control consoles.

one Studio 8—sound recorders, an AKG sound reverberation plate and three Cue-Master cartridge tape recorders.

The lighting control suite is equipped with a Dataline 1985 control system, a 100-memory magnetic core store, 150 channels and 126 dimmers. In normal use, the lighting system is operated from the control desk in a split-group—A and B—arrangement, with such facilities as auto-fade, stop, auto-fade start, B into A selective up-down faders, as well as the usual operations of cut, add, subtract and so on. A portable remote control panel is also available for use on the studio floor as a "setting and lighting" facility. A 126-circuit, 10-group, pin matrix panel allows the main control memory to be overridden in the event of a system failure.

The lighting installation in Studio F consists of a high level track grid supporting a large number of motor driven monopoles carrying the illumination lanterns. The monopoles have a telescopic action for vertical adjustment and can be set anywhere from floor level to grid level using controls on the studio floor. The same controls can be used to make limited horizontal adjustments for fine positioning.

Additional TV monitors in the lighting control suite are used to provide mimic displays of the lighting program.

The two videotape editing suites are virtually identical. Each contains three Ampex VPR2 1-inch, reel-to-reel tape machines, with integral time base correctors. These have facilities for stop and slow motion replay, and are used for the transmission and recording of all local programs. For editing purposes, the machines operate under the control of Datatron Tempo systems, and there are facilities for frame accurate editing, program and event duration displays, slow motion, reverse and freeze-frame viewing and auto search. Other features include a 300-word event memory and separate or simultaneous video and audio editing.

Suite 1 is equipped with Datatron 7650 equipment, with the capacity to control up to six VTRs, while Suite 2 has Datatron 76 equipment able to control up to three machines. The two suites are interconnected so as to allow the control of all six machines from the 7650 equipment and to provide a 6-machine editing facility. Both suites are equipped with Barco color and Cotron monochrome monitors, as well as full time code facilities, station pulse generators and associated distribution equipment.

Suite 1 also contains a 32-input sound and vision switcher, which acts for both suites, and separate sound and vision mixing systems. Vision mixing is by way of Grass Valley 1600 1L equipment, and sound mixing by Neve 8-channel equipment. Suite 2 is equipped with a Cox 420 videotape edit mixer, operating with married sound and vision signals.

The considerable and costly expansion in Anglia Television's production and technical facilities is an indication of the way in which this once small company has grown into one of the best known British programmakers. The new studio and technical facilities brought about by the recent expansion auger well for the company's future.

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Field report:

ITC/3M Delta series cartridge machines

By Andy Laird, chief engineer, KDAY, and broadcast audio consultant, Los Angeles, CA

If your station uses cart machines, you have heard of International Tapetronics Corporation/3M. In December 1969, ITC began shipping its Premium Line cart machines, which have become, by far, the most popular series of cart machines the company has produced.

In mid-December 1982, Chuck Kelly of ITC called me with incredible news. The Premium Line series, soon to be discontinued, would be replaced by a new series called Delta, he said. He said that he had four pre-production machines to loan us for an in-depth field evaluation. We could have them for at least a month, and should put them on the air for the jocks to beat up. We were to subject them to the hardest possible daily use to catch any possible weakness before ITC finished the final production model.

We agreed to do the tests after we found out that 12 of these machines had been constructed, that they had already been under test in several other stations since October and had been debugged.

The Delta series

The new Delta series consists of three different tape transport configurations and a record electronics package. The Delta 1 replaces the SP. It is a single-play deck and is narrower than the old SP, allowing three Delta 1s to be mounted side by side in one rack width. The Delta 1 handles a size A cartridge. The Delta 2 is twice as wide as a Delta 1 and accommodates all cart sizes: A, B and C. It replaces the WP. Both the Delta 1 and Delta 2 have high speed cue standard.

The 3D is replaced by the Delta 3, a 3-tray, vertically stacked machine. We did not see a Delta 3; however, I'm told that it is also one-third of a rackwidth wide and only twice as high as a Delta 1. It also has a unique servomotor design to eliminate bearing alignment problems. The Delta 4 replaces the Premium Line record electronics and can be used with any of the three transport packages to make a cart recorder.

For our test, we received four Delta 1s and the Delta 4 record electronics.

The transport

The Delta series continues to use, as in ITC's past, an extremely strong machined, milled, tool plate aluminum deck for a basic foundation. To this deck is attached the motor, head block, cart guides, pinch roller assembly, etc. This assembly is mounted within a cast aluminum frame and front panel, and is bolted together for easy disassembly and maintenance.

The cart positioning guides use the same basic scheme as those found in the series 99 and the SP retrofits. The cart is held down by springs in the top of the edge guides, with a spring in the left-hand guide pushing the cart snug against the right-hand guide.

The head block is similar to the series 99 with the exceptions that it is narrower and the azimuth arms are crossed. The narrowness is necessary to fit it into a machine that is only one-third of a rackwidth wide. The crossed arms allow fine high resolution azimuth adjustments. The block is removable with five screws and can be reinstalled with only minor touchups of aximuth required.

The pinch roller: mechanical assembly: and dc. air-damped. teflon-coated, plunger pull-in solenoid are designed similar to past Premium Line machines.

From this point on, the Delta series is all new, and a great improvement over the Premium Line.

The Delta series has a new capstan motor drive system, a direct drive dc servo motor system with ceramic drive shaft. Two things make this drive system different from others. First, the mechanical parts of the tach sensing system—the toothed wheel,

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nagnet structure and sensing coils—ire set up in a fashion that cancels out iny eccentricity problems of the ring, or any problem with one particular ooth in the ring. This design greatly reduces tach flutter. Second, the motor-over-speed conditions are detected off the phase/frequency comparitor, and the motor is braked by reversing the commutation sequence. This provides a quick reduction of speed after ending the high speed wind mode. (Tape speeds of 15ips, 7½ips and 3¾ips are jumper-selectable, and the fast forward wind speed is three times the selected speed. This new drive motor system is a major improvement over the Premium Line motors. Flutter is audibly reduced. Songs such as Joe Jackson's *Steppin' Out* sound much more stable.

Lower flutter greatly improves the clarity of music. Unfortunately, flutter is one of the tape cart medium's major defects. The Delta series features an improvement in flutter that is audible through all radios, AM and FM.

The power supply is built around a toroidal power transformer that reduces magnetic flux leakage compared to a traditional power transformer. This design greatly reduces the hum field around the playback head, and the reduced hum level is audible. The system runs cooler because toroids are more efficient.

The Delta series cartridge machines.

The electronics: Playback

The playback amplifiers are designed using op amps. The NE5534AN is used for the head amplifier and for the EQ. It is followed by a level control, then a CMOS switch for muting. Each output amplifier consists of two 5532s, one for drivers and one to form a balanced output drive to a 1:1 output transformer. A unique feature of this circuit is that, if you want to remove the output transformer, you can. Also, when an unbalanced output feed is used, rather than a balanced output, there is no 6dB drop in level. The

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overall headroom of the playback preamp section is 13-14dB above a 250 nanoweber reference.

I have no detailed information on the cue detector circuits at this time; however, there are no inductors, and the cue detectors work.

Both the left and right playback amplifiers and the four cue detectors are on the same card. All adjustment pots are 20-turn. The capacitors used in the audio path are polystyrene, polypropylene and one low leakage electrolytic. The card also uses 15 resistor packs or *sips*.

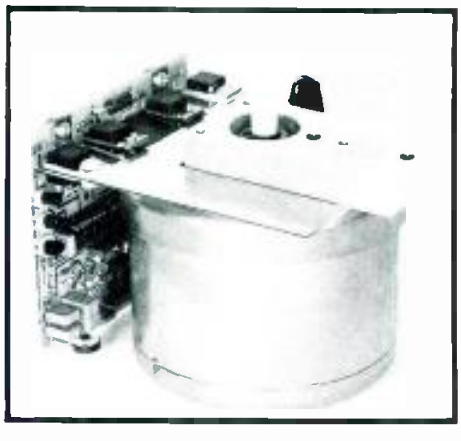
The new playback amplifier design has improved high note clarity and the nature of the noise is different, containing much less hum.

The electronics: Control

There's one other plug-in circuit board in the machine, and its function is *control*. Gone are all the control relays of the Premium Line. Control in the Delta is totally electronic via an 8048 microprocessor. The same logic board works in all three of the Delta machines, but only one of these boards is required in the Delta 3. The Delta 4 record electronics also has a logic control board using the same 8048 microprocessor. Both *play* and *record* logic programs are programmed at the factory into the memory of each 8048 microprocessor. Depending on whether you install it in either the *play* or *record* logic board, the microprocessor recognizes which board it's in and calls up the correct program. The end result is that you only need to stock one microprocessor for emergencies, and each one contains all the programs needed for control logic functions in all machines.

The control logic boards are actually simple. However, with the control functions microprocessor-controlled, new control modes are provided. Included are a slow flashing of the stop button light when a cart cues itself and a fast flashing if someone stops it manually. Replay, of the same cart without removing it, can be locked out. High speed recue can be selected from the end of both, or either, of the secondary and tertiary tones. The high speed cue mode can be entered directly from the stopped mode, never unmuting the output or resetting the timer clock. But muting during high speed cue can be defeated by pressing and holding the high speed cue button while in high speed mode.

Full remote control of all record and transport functions is available with common collector ties (30V, 200mA) for each remote function indicator. The secondary and tertiary tone detectors provide a normally open floating relay closure rated at 1A. The relays, when unplugged and jumpered, convert the remote contacts to open collector circuits as previously mentioned. These relays, by the way, are the only relays in the machines. An auxiliary *start* pulse (also open collector) is provided for timer clock resets. And 5V at 240mA max is available for your use.



The motor assembly for the Delta series cart machines.

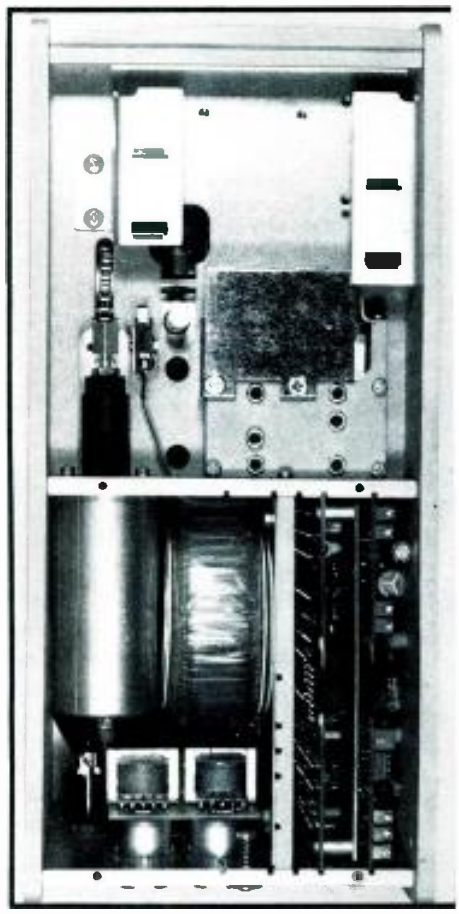
The electronics: Record

All new record electronics are used. The cue tones are all digitally generated. From the crystal reference for the recorder microprocessor, dividers are used to arrive at each of three frequencies. These are square waves which, after a switch gate, are passed through a low-pass filter to get sine wave tones with harmonics below 1%. Division of the reference frequency is also done to generate the bias frequency. An external cue track input and remote cue-bias-on is provided for recording FSK onto the cue track.

The front panel has two momentary push-buttons for 1kHz tone *defeat* and *add*. The record set light begins flashing when the *defeat* is armed and continues to flash until the stop button is pressed. The *add* button is timed for perfect tone burst length.

The metering circuits are well-thought-out, from a human engineering standpoint. There are two meter push-buttons on the front panel. Pressing the *record* button gives you record level metering when the machine is in the record mode. The metering automatically switches to playback when the machine is in the playback mode. Pressing the *play* button holds the meters in the play mode while recording. If both push-buttons are out, the meters enter a *test* mode. A 2-position slide switch on an internal circuit board selects between two test modes. One position displays left and right bias levels. In the other position, one meter displays cue *play* with the other meter displaying cue *bias*.

The audio inputs are transformer-isolated (removable), bridging into a balanced differential amplifier. Because no great amount of gain is needed in a record amplifier, the TL074 series of op amps are used throughout the audio section. Also, there is a unique circuit that totally eliminates the need for a bias trap. It uses a 5534 in a summing amp configuration so that the bias is summed at a virtual ground null, giving perfect isolation. A group delay compensation circuit is also included to help improve square wave response of the total tape recording/playback system.



A top-down view of a Delta 1 cart machine.

KDAY's experiences with the Delta

KDAY is in the process of redubbing its library to stereo, and we elected to use a series 99B record center and Scotchcarts for that purpose. When the Delta machines arrived, the fast music rotations had been dubbed, and they comprised about 85% of the music played in an hour. Only two machines in the control room are stereo at this time, with the other four still mono for the spots and remaining mono music. All of our playback machines are SPs.

After aligning, setting EQ and output levels of the four Delta 1s, two adapter interface cables were built to plug into our remote control configuration. Then two Delta 1s were installed for playback of almost all the music heard on KDAY for the following month.

I left the other two Deltas standing

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by in case one of the Deltas on the air failed and required immediate replacement. It turns out that I did not need standby machines. We had one month of 24-hour-a-day operation, with two machines playing back almost all of our music with not one missed cue, not one false start, not one false high speed, not one alignment error, not one cart jam and not one flutter problem—a perfect score.

All we did to machines throughout the test period was clean the heads, guides, capstans and pinch rollers. The output levels, EQ and stereo alignments were checked, but never required adjustment.

Day-to-day reliability is certainly there. And with the Delta's proven mechanical design, coupled with amplifier and control circuits that have a greatly reduced parts count, long-term reliability should be significantly improved. The control circuit is practical: there are no more relays. And should you ever have a problem with the microprocessor, throw away the bad one, plug in a new one and walk away.

But how do they *sound*? I think the greatest improvement in sound quality is the Delta's freedom from flutter. Sustained notes are stable, and the speed accuracy is right on. Next, the low end is fuller. The low end frequency response does not roll off as it does in our SPs. The high end is more clear and open, with obviously less distortion and smooth frequency response. The characteristic cart machine hum is gone, and the mute circuit is much deeper. So, when a DJ leaves a pot wide open on the air, you don't hear noise.

And last, but not least, there are no tape path or cart positioning problems. We are not operating in AM stereo yet, so everything we hear is a mono mix. We have not heard any alignment problems.

How easy are they to use? First, our DJs really like them. They feel *solid* and are very easy to use. During the tests, there were no operating errors. It is easy to tell how the Deltas work by looking at them. The insertion and removal of carts is positive and smooth. Our DJs also like the flashing light warning that a cart has been played and cued. The machines also are quieter and run much cooler.

Before seeing the new Delta series machines, we asked ITC why it was discontinuing the Premium Line series, considering its dominance of the cart machine market. ITC acknowledged that the Premium Line is obviously what the market wants, but technology has made it possible to provide more features, more performance and more reliability at a reasonable price.

The Delta series is indeed better, according to our tests. And the improvement is easily heard on an AM station—cleaner and smoother with much less audible flutter. *Bravo!*

A full, in-depth technical measurement test of the new Delta series is planned as soon as final production line machines become available.

Editor's note:

The field report is an exclusive BE feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations – if any.

In essence, these field reports are prepared *by* the industry and *for* the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by **Broadcast Engineering** for or against a product.

The equipment covered in this report was loaned to the author by ITC/3M. Look for more details on the system at NAB '83/Las Vegas or contact: ITC/3M, 2425 S. Main St., Bloomington, IL 61701.

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Field report:

Panasonic RECAM camera/recorder system

Panasonic RECAM, ready for field use

By Karl Renwanz, director of engineering, WNEV-TV, Boston, MA

The RECAM by Panasonic is a portable, single-piece M Format ½-inch integrated camera/recorder system*. It can be broken into two pieces with a multipin cable, similar to present ENG-operated systems, but this evaluation covers only the single-piece unit, the B-100.

The camera is made of a die-cast magnesium frame that houses a middle-index prism color dissector and three 18mm (⅔-inch) pickup tubes. The camera, AK-100, is available with diode-gun Plumbicons or Saticons. This report covers only the Saticon version. General features include feedback beam control, black stretch, knee circuit, modulated shading compensation, horizontal enhancement with comb filter, 2H vertical enhancement, variable matrix, dynamic focus and 8-bit digital auto black-and-white balance circuit.

The author (left) and Brian Lay, WNEV's engineering manager, testing the RECAM.

The camera provides separate, wideband luminance, and I and Q feeds for the recorder. The camera also generates composite NTSC, R, B, G and minus G for monitoring/registration purposes that are accessed through a BNC connector on the right side of the camera under a flip-down panel. Master pedestal, as well as red and blue horizontal and vertical centering, also are located behind this panel.

The VCR, AU-100, employs a relatively small scanner (62mm, 2.4-inch diameter) and an M-shaped threading pattern. The separate luminance signal is frequency-modulated and recorded on a dedicated track by one pair of video heads. A second pair records the parallel color track, which records I and Q as FM signals in separated parts of the spectrum. Therefore, phase noise associated with 2-phase color-encoded signals is avoided. The deck is record-only at this writing.

The deck provides two high quality audio channels. The Channel 2 audio channel is switchable between line and mic level and includes an XLR connector on the rear of the deck. A third channel is set up to record SMPTE time code, as supplied by either a built-in or external generator. (See Figure 1.)

The built-in SMPTE time code generator records time code on a separate track. The track is physically

*The terminology for these systems has not yet been clearly established. For simplicity, **BE** has referred to them as VRCs – Video Recorder Cameras.

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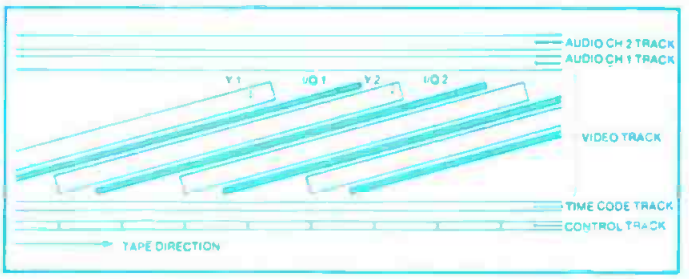
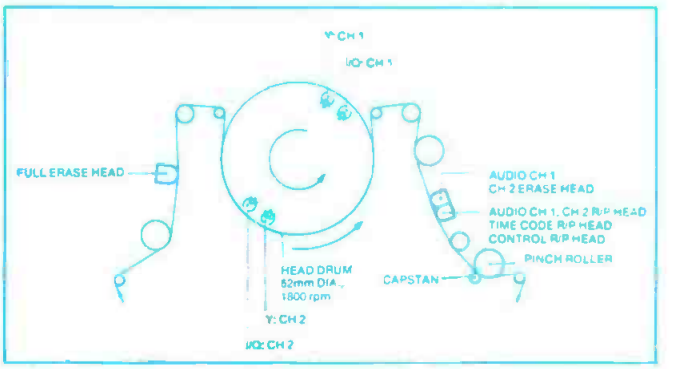
Professional quality results with RECAM are made possible by a special recording process that records Y(3.8MHz) and I/Q(1MHz) information on separate video tracks. This means that Y and I/Q signals are delivered directly from the camera to the recorder. Also, the I/Q signals are multiplexed for even greater freedom from intermodulation.

Also contributing to the outstanding picture quality are four video recording heads and the high tape speed of about 8ips with a recording wavelength of 27,000Hz. Although compact VHS tape is ony ½-inch wide, the M Format recording system delivers broadcast quality video, two high quality audio tracks, a control track and a time code track on this space-saving tape.

Manufacturer's claims:

M Format broadcast-quality picture with ½-inch tape





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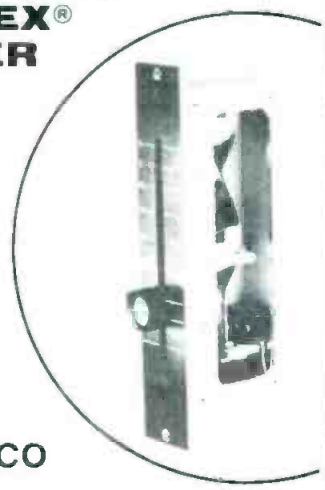

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separated from the video track as well as the two audio tracks. The generator can be operated in the drop-frame mode or switched for non-drop-frame operation. External time code generators may be used, with the recorder switching automatically when time code signals are applied to the rear panel jack. Time code readout is shown on an LCD at the rear of the recorder. Backup power will retain the displayed time code number for up to four days.

The microprocessor

The heart of the system control for the AU-100 deck is an 8-bi microprocessor. It includes a self diagnostic system with 34 mechanica and electrical system checks. Depress ing a switch located inside of the recorder, which can be accessed with the carriage in the eject mode, ac tivates the self-diagnostic system check. Releasing the switch at any point during the series automatically interrupts the sequence and resets the system for normal operation.

Operationally, the RECAM proved flexible, especially with all that is displayed in the 1.5-inch viewfinder Standard viewfinder features include

Dimensions and location of records for ½-inch broadcast ENG/EFP helical-scan videotape recording

	RECORD / DIMENSIONS, NOMINAL	MICRO-METERS (μm)	INCHES
A	Control Lower Edge	0	0
B	Control Upper Edge	500	.01968
C	Color Track Width	65	.00256
D	Y-C Track Pitch	141	.00555
E	Audio 3 Lower Edge	900	.03543
F	Audio 3 Upper Edge	1300	.05118
G	Video Track Lower Edge		
H	Video Track Upper Edge		
J	Audio 1 Lower Edge	10550	.41535
K	Audio 1 Upper Edge	11250	.44291
L	Audio 2 Lower Edge	11950	.47047
M	Audio 2 Upper Edge	12650	.49803
N	Y Track Width	175	.00689
O	Lead Signal Overlap		
P	Y-C Track Offset	3222.5 (9H)	.12685 (9H)
Q	Video Track Pitch	282 ref	.01110 ref
R	Video Track Length	93988 (262.5H)ref	3.70031 (2625H)ref
S	Control Track Lead Distance	185650	7.30904
Y	Vertical Start Y Odd Field	2160	.08504
Θ	Track Angle	4.7452 °ref	4.7452 °ref

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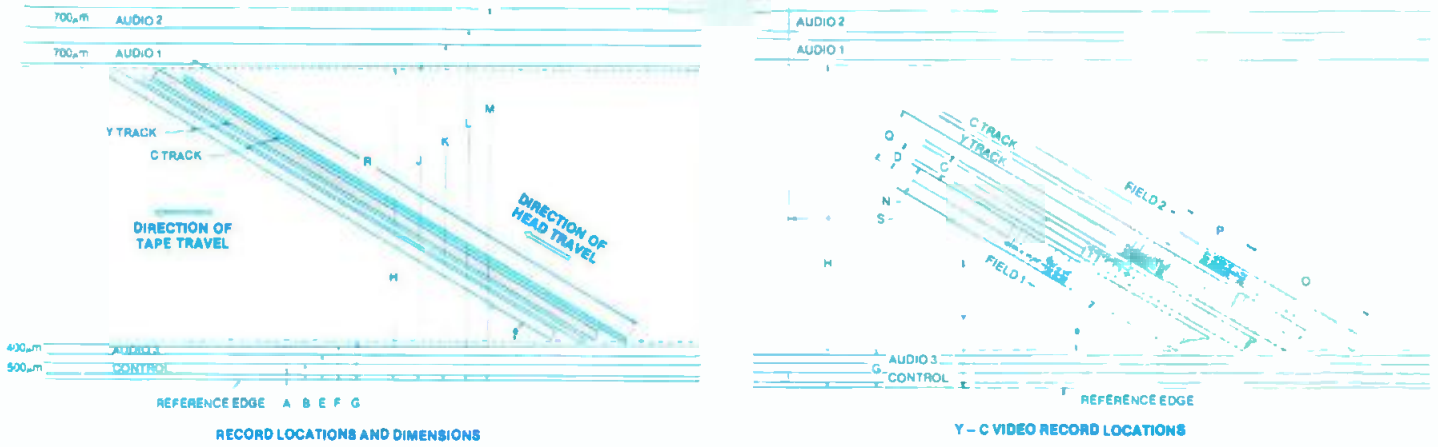

Figure 1. M Format specifications.

peaking for better focus control; zebra display at peak whites to alert the operator to excessive light input; green tally LED that lights when recording is in progress; red VTR warning LED that lights when the VTR malfunctions in cases such as servo unlock, tape slack, tape end or moisture condensation (dew); and a red battery LED that glows steadily in standby or color bar operation and during auto white/black balance operations, but that goes out under normal operation. The LED blinks if battery voltage falls to a minimum operating level of 10.7V.

Three red LEDs located below the screen area in the viewfinder give an indication of tape usage and time remaining. The microprocessor keeps track of tape consumption. Data from the microprocessor is turned into an analog signal that is decoded in the camera head to display tape usage information. An LED labeled 5 lights up when five minutes of tape has been consumed, and remains on; 10 lights when 10 minutes of tape has been consumed, and remains on; 15 lights when 15 minutes of tape has been consumed, and remains on. After 15 minutes all three LEDs glow. At 19 minutes of tape time, the 15-minut LED begins flashing. Just before tap end, all three LEDs flash.

Probably the most clever features i the viewfinder are bar graphs show ing Channel 1 and Channel 2 audi levels. These bar graphs are located a the top of the screen in the viewfinde running horizontally. Channel 2's ba graph is switchable to display batter voltage level. The viewfinder is busy but gives a technically competen camera operator monitoring capabili ty, allowing no excuses for improper audio or video levels. (See Figure 2.)

Gain controls for both audio char

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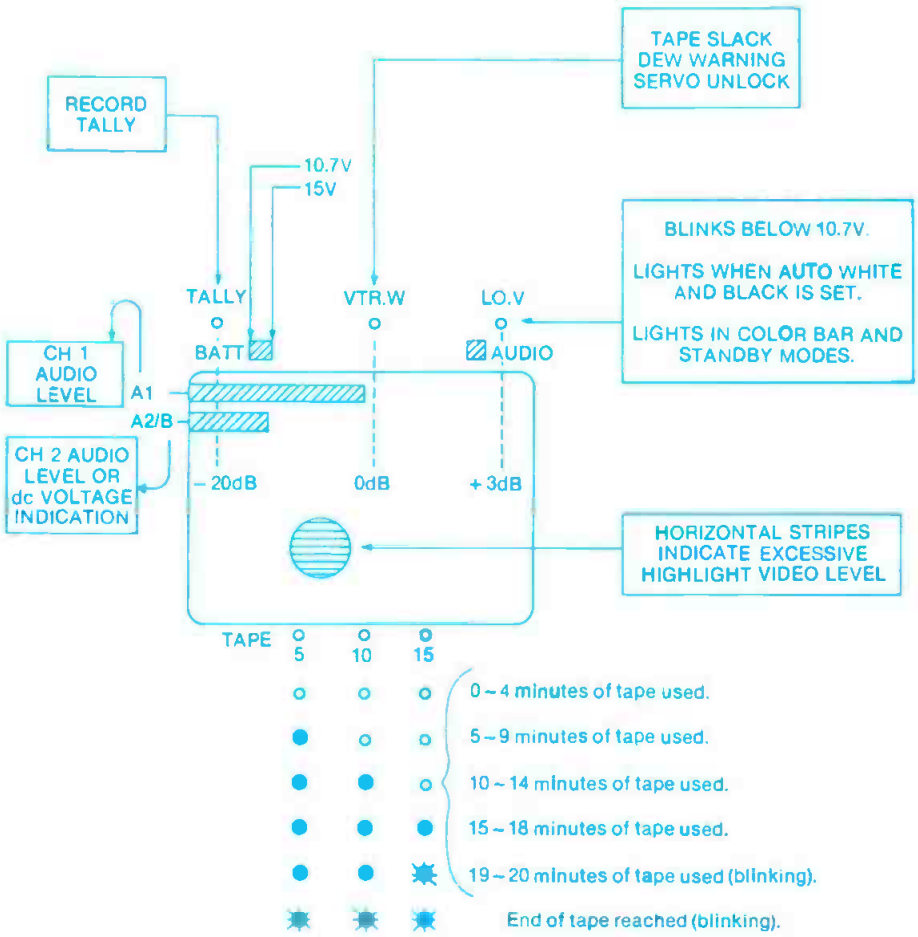

Figure 2. Explanation of viewfinder indicators for the RECAM AK-100 camera.

nels are located on the left side of the camera. These controls can be adjusted during actual shooting operation while viewing the audio modulation bar graph in the viewfinder. This feature helps overcome a major problem of 1-person shooting in the field, namely monitoring and controlling audio levels. Although we found the audio gain control to be a bit too sensitive when adjusting for a finite desired level, this should not diminish the importance or value of the control.

Those interested in FCC pulse widths will find an internal switch that permits variation of H-blanking from 10-11.5μs. V-blanking is variable from 18-21 lines.

The VCR locks to the camera-mounted docking plate easily and quickly. All electrical connections, except for the mic, are provided by the docking system.

The Panasonic RECAM system weighs 24 pounds, field ready. This includes a Fujinon 14:1 lens, an on-board microphone and the maximum life battery available. Camera operators found the physical balance of the camera to be pleasing. (Weighing older ENG units, such as the TK-76, we found that the camera alone, less battery, weighed in at one pound less than the complete RECAM.)

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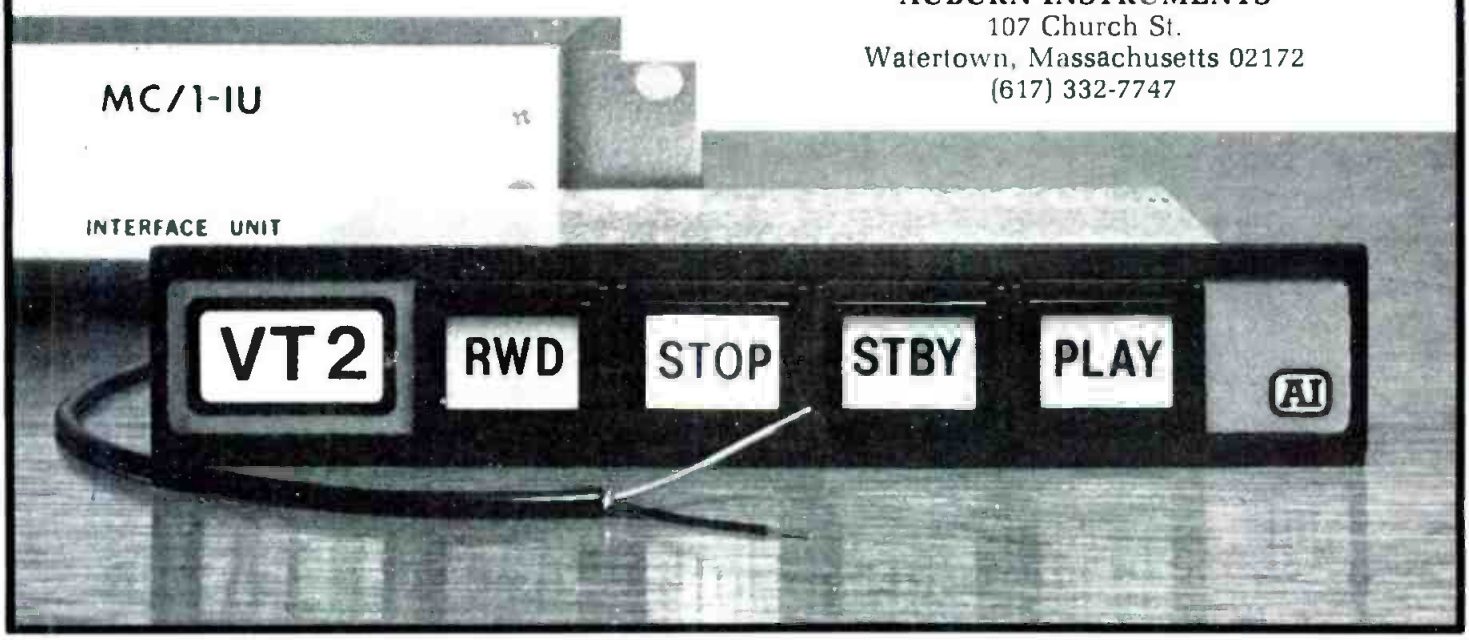

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Selected manufacturer's data for the RECAM

AK-100 portable camera (Plumbicon

Power Requirements:	DC 10.5 to 17.0V, 1.45A
Television System:	NTSC color signal EIA standard 525 lines, 60 fields, 30 frames
Optical System:	Middle index prism
Pick-Up Tubes:	Three ⅔" LOC diode gun Plumbicon
Signal-to-Noise Ratio:	Typical 59dB (luminance channel, aperture correction off, gamma = 1.0, 0dB gain)
Sensitivity:	200 footcandles, f/4.0, 3200°K, illuminant, 60% reflectance
Horizontal Resolution:	600 lines
Registration:	
Zone 1;	0.1% (circle in center = 0.8 picture height)
Zone 2;	0.2% (circle in center = picture height)
Zone 3;	0.5% (area outside zone 2)
Geometric Distortion:	Less than 2%
Encoder:	NTSC, Y/I/Q
Microphone Input:	−60dBm, balanced, XLR connector
Monitor Video Output (Switchable):	Composite, Red, Green, Blue, R-G, B-G
Blanking:	
Horizontal;	10.7 μsec, variable
Vertical;	19 lines variable
Gamma:	Adjustable from 0.4 to 0.55 Switchable to 1.0
Vertical Aperture Correction:	Self-contained 2-line type
Self-Contained Test Signal Generators:	EIA standard color bars, focus wobbling, sawtooth
Filter Wheel:	
Color Conversion Filter;	(A) Clear (B) 4700°K (C) 5600°K (D) 7500°K

*Plumbicon is a trademark of NV Philips.

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AK-100 portable camera (Saticon*)

Power Requirements:	DC 10 5 to 17 0V. 1 25A
Television System:	NTSC color signal EIA standard 525 lines. 60 fields. 30 frames
Optical System:	Middle index prism
Pick-Up Tubes:	Three ⅔ S-M Saticon
Signal-to-Noise Ratio:	Typical 58dB (luminance channel. aperture correction off. gamma = 1 0. 0dB gain)
Sensitivity:	200 footcandles. f/3.5. 3200°K. illuminant. 60% reflectance
Horizontal Resolution:	550 lines
Registration:	
Zone 1;	0.1% (circle in center = 0.8 picture height)
Zone 2;	0 2% (circle in center = picture height)
Zone 3;	0.5% (area outside zone 2)
Geometric Distortion:	Less than 2%
Encoder:	NTSC. Y/I/Q
Microphone Input:	60dBm. balanced. XLR connector
Monitor Video Output (Switchable):	Composite. Red. Green. Blue. R-G B-G
Blanking:	
Horizontal;	10.7 μsec variable
Vertical;	19 lines variable
Gamma:	Adjustable from 0 4 to 0.55 Switchable to 1 0
Vertical Aperture Correction:	Self-contained 2-line type
Self-Contained Test Signal Generators:	EIA standard color bars. focus wobbling. sawtooth
Filter Wheel:	
4 Positions;	(0) Cap 1) Clear (3200°K) (2) 4700°K (3) 5600°K + 0.25ND

*Saticon is a trademark of Hitachi Ltd

Performance measurements

Brian Lay, engineering manager, who was involved in the evaluating process, supervised the testing procedures and contributed much to this field report. Equipment used in the evaluation included a ShibaSoku 925D/1 color video noise meter, Sound Technology 1500A tape recorder test system and Leitch DTG1000 digital test generator. Also the Tektronix 1480 and 529 waveform monitors were used. All measurements were attempted no less than three times, many on two completely different occasions, to ensure a higher percentage of accuracy. Signal-to-noise measurements were taken on the rear of the camera on the NTSC video output connector, as well as on the output of the multipin connector, which is located between the camera and recorder (the AK-100/AU-100 interface). Measurements on the output connector on the rear of the AU-100 recorder showed better than 59dB signal-to-noise ratio.

Depth of modulation measurements, made with the lens set at f/4, showed green at 42%, red at 40% and blue at 32%. Measurements were made on a Tektronix 529 waveform monitor using the line selector feature.

Sensitivity measurements were

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The RECAM B-100 system comprises the in-camera VTR with AK-100 camera/AU-100 recorder; the AU-300 studio VTR; and the AU-A30 edit controller.

made using a General Electric type 214 light meter. The RECAM was equipped with a Fujinon A14, f/1.7 lens with no range extender. With the lens at maximum aperture, f/1.7, and the camera in the 0dB gain mode, we found 90fc gave us 100 IRE units of video. With the camera switched to 9dB gain and at f/1.7, 42fc gave us 100 IRE units of video. When the camera was placed in the 18dB gain mode and lens at f/1.7, 15fc gave us 100 IRE units of video. It is important to note that the noise is prevalent in the 18dB gain position, which is certainly no surprise.

Using a multiburst chart with the lens set at f/4, horizontal resolution measurements were made. Because these measurements are one of the least believed or understood measurements that manufacturers give users as a specification, we took care to make them as accurate as possible. Measurements were made at picture center as shown in Table I. The response would be defined as more than 550 lines of horizontal resolution.

Registration appears quite good, and certainly meets the specifications claimed. In addition to the normal registration controls (H/V centering, height, width, H/V linearity and skew), there are eight controls in the red and blue channels to improve color registration. These allow for correction of trapezoidal and pincushion errors. Controls to compensate for vertical and horizontal bowing are also provided.

Table I.

MHz	IRE units	Lines
1	100	80
2	80	160
3	55	240
4	37	320
5	23	400
6	14	480
7	8	560
8	(no response)	640

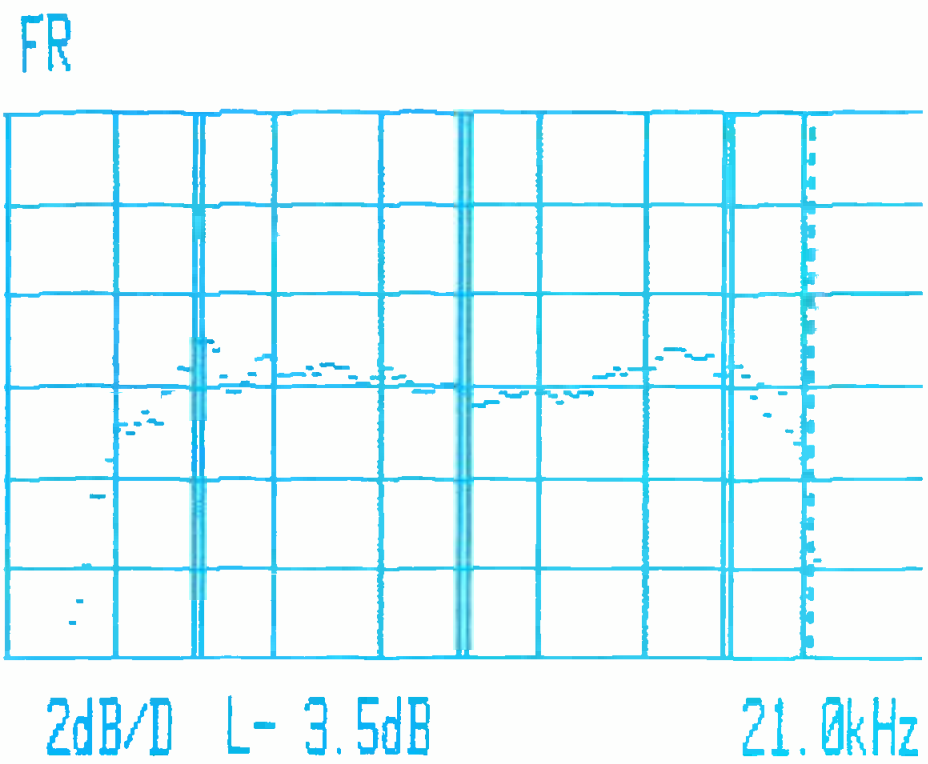

Figure 3. The RECAM audio frequency response displays 3dB points at 35Hz and 21kHz (scale: 2dB/div.).

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Black shading is accomplished with ne usual assortment of horizontal and ertical sawtooth and parabolic cor- ection voltages with the addition of ix adjustments that affect only the orners of the picture. The result of all his is better than average black hading compensation.

A black stretch circuit is provided to mprove detail in the dark areas of a icture of high contrast. It is switcha- le in or out, but the switch is located eep inside the camera, making it dif- icult to use in everyday shooting.

Audio signal-to-noise measurements vere made using a Sound Technology 500A tape recorder test system. Signal-to-noise measurements were reater than 50dB, and the amount reater than 50dB depended on the rand of tape used in the neasurements. We found that Maxell HGX tape lended us the best signal-to- oise with a measurement of 58dB. Unweighted signal-to-noise relative o a 3% distortion.) Audio frequency esponse also exceeded specifications. The measured 3dB points were 35Hz nd 21kHz. (See Figure 3.)

The recorder

RECAM, as other M Format ecorders, uses a VHS cassette. Tape peed is 8ips, offering 20 minutes rom a T120 cassette.

The AU-100 recorder includes a ackspace edit feature for starting and topping in the field that automatical- y backspaces the tape in the deck by 0 frames at the end of each cut. The eck prerolls those 30 frames when ecording is resumed and records in lace of the last two frames of the revious recording. All systems re- nain locked, giving a good assemble dit.

Banging the machine around sound- y can produce a few lines of time base nstability. Under normal operation, his error is correctable when played ack through a good quality time base orrector from the studio version of he deck, the AU-300. Normal time ase error is generally less than 10μs.

The clip-on battery used with RECAM is the Anton/Bauer QPY-9N. Field use has shown good battery life.

Final comments

The operating instructions and ser- vice manual are complete. Schematic nd circuit descriptions are accurate. However, alignment procedures seem o suffer somewhat from translation difficulty.

Many broadcasters have never real- y considered Panasonic a top-of-the- ine equipment manufacturer in the ndustry, including this author. Evaluating a piece of equipment from a company that has not been viewed as a top-of-the-line equipment sup- plier requires one to open his eyes wide in order to remain objective throughout the evaluation process. Panasonic, a division of Matsushita Electric Company, has always had the resources to build any product to fit any market. With its most recent product, the RECAM, Panasonic has finally entered the broad- cast market.

Editor's note:

The field report is an exclusive **BE** feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

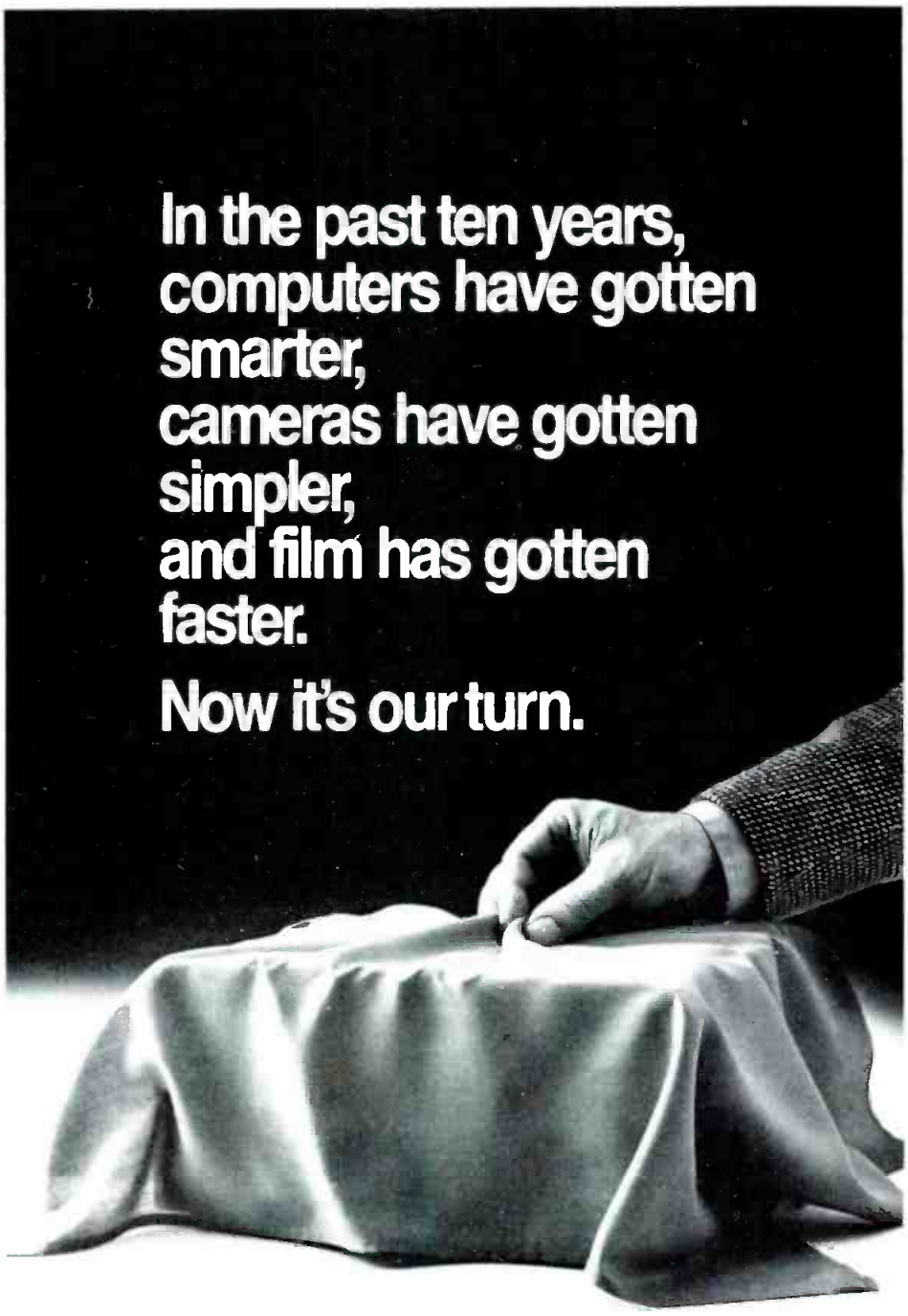
In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations—if any.

In essence, these field reports are prepared *by* the industry and *for* the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by **Broadcast Engineering** for or against a product.

The equipment used in this article was loaned to the author for the purpose of evaluations. Arrangements for this report were made after the equipment had been delivered.

For more information on the RECAM, contact Panasonic at the following address: One Panasonic Way, Secaucus, NJ 07094.



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NPR's Netcue system

By Bruce Wahl, project manager, National Public Radio, Washington, DC

In the late 1970s, National Public Radio (NPR) moved into the satellite era with the implementation of the Public Radio Satellite Interconnect System. The motivations for doing this were many: better audio quality, lower cost-per-channel, multiple channel capability and multiple points of origin. The system, now in place, has met all of these requirements with 12 15kHz audio channels, three data channels and 17 regional uplinks.

The system replaces the two older methods of distribution of public radio programming. A high speed tape duplication service, originally operated by the National Educational Radio Network, had been brought into NPR in 1971. The tape system was expensive to operate and slow in distribution, but it provided complete high quality audio radio shows to the members in a format that was extremely easy to use. Programming was also distributed on an AT&T 5kHz terrestrially interconnected network. Although the network suffered from poor audio quality and high cost, it did have multipoint origination capability, and it provided audio at all the member stations on a timely basis.

In addition to reconsidering all the problems of traditional program audio distribution, the mechanism for getting *teletype style* (TTY) traffic to the member stations was examined. Many of the difficulties of a terrestrial program network were shared with TTY. Among them, it was incredibly expensive to operate and very slow. An urgent message could take nine hours to reach all of the members, and normal traffic could take more than 24 hours. It had become desirable to route this traffic to the members via satellite.

Each public radio station entitled to receive an earth station was provided with a parabolic antenna, LNA, downconverter, four tunable demodulators and a coordination channel demodulator. In some cases, existing public TV earth stations' equipment was employed instead of a redundant installation being provided.

Although the satellite system provided a big improvement in audio quality and flexibility, it introduced unique operating problems that did not exist with the previous systems. Among these were the actions required by member stations' personnel to capture a program and record it for later broadcast and the requirement to monitor multiple channels for advisory information. Previously, tape machines at member stations were put into the record mode by tone signaling. With the introduction of multiple channels, as many as 12 tone decoders would have been required, a method we chose not to implement. It was determined that a low bandwidth, low power data channel would have more than adequate capacity for all of the necessary traffic.

NPR has responded to these problems by constructing the DACS/Netcue system. The system has two components: the Direct Access Communications System (DACS), which provides human direction, including program schedules, advisories, etc.; and the Netcue, which communicates with machines.

In late 1977, NPR Engineering began canvassing broadcasting networks worldwide to determine whether similar problems had existed and, if so, how they had been solved. The closest parallel was the multiple bus automation system in use by the Canadian Broadcasting Corporation (CBC). The new NPR system is an extension of that CBC system. What has been added is the automated control of uplinks, the automation assistance at the downlinks, and packet switching on the data channel that makes possible simultaneous use for time critical Netcue functions and the less timely DACS or software download traffic.

System architecture

The central controlling point for the entire Netcue system is the NPR Main Origination Technical Center (MOTC) located at NPR headquarters in Washington, DC. The system is controlled by two Data General Nova Three minicomputers. Each is equipped with a 10Mbyte disc drive. Either one can be used on air. One Nova drives video displays containing upcoming events, controls local audio switching in Washington, controls remote uplinks via a serial data stream, and generates a serial data stream that controls the Netcue system. The second computer is used for backup purposes, as well as for program development. The MOTC is the heart of the system.

Each of the 17 uplinks will ultimately be capable of being remotely controlled by the MOTC computer. Each uplink can original two audio channels on the satellite—either one or two mono programs or one stereo program. The functions controlled are the following: transmitter on and off; modulator on and off; modulator channel tuning; and audio source selection, causing tape machines to start when a crosspoint is taken. Precise timing in execution of these functions is required so that the Netcue messages will occur at the same time that events occur at the uplinks.

To originate the DACS traffic, NPR's Computer Services department has written custom software that runs on one of NPR's two time-sharing

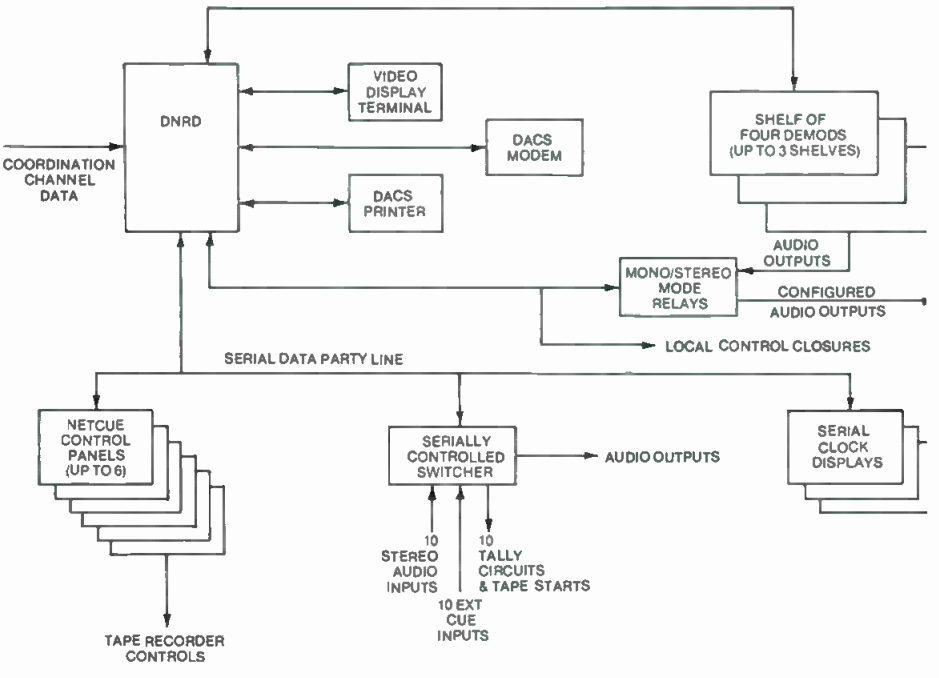

Figure 1. Block diagram showing fully configured DNRD (DACS/Netcue Receiver Decoder).

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Shown are two Netcue Control Panels, which contain the tape recorder controls and a DACS/Netcue receiver/decoder, which is the main unit for the station's system.

DEC PDP-11/70 computers. The function of this software is to take text files, add appropriate addressing headers and error detection codes, and transmit the data serially to the satellite. Ancillary functions include automatic logging of all DACS traffic and the capability for adding special headers to the messages to indicate an EBS alert or other advisories.

Software download data is also needed to make the system function. These messages, carried via the satellite, contain the actual operating software for the DACS/Netcue Receiver/Decoders (DNRD) at the member stations. These messages originate on the PDP-11/70, where a cross-assembler maintains the DNRD software.

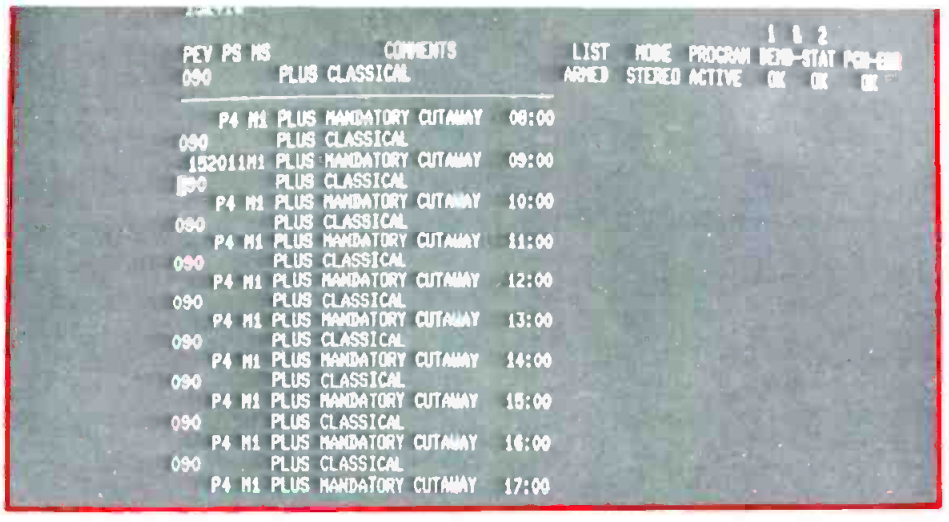
In order to control which data is being routed to the satellite data channel, a special Coordination Channel Modem Sharing Unit (CCMSU) was developed. This unit at MOTC accepts serial data from the 11/70 on one serial input, from the NOVA on another. In order to allow Netcue messages to occur quickly, a message protocol allows Netcue messages to interrupt DACS and software download. The CCMSU provides the special formatting required.

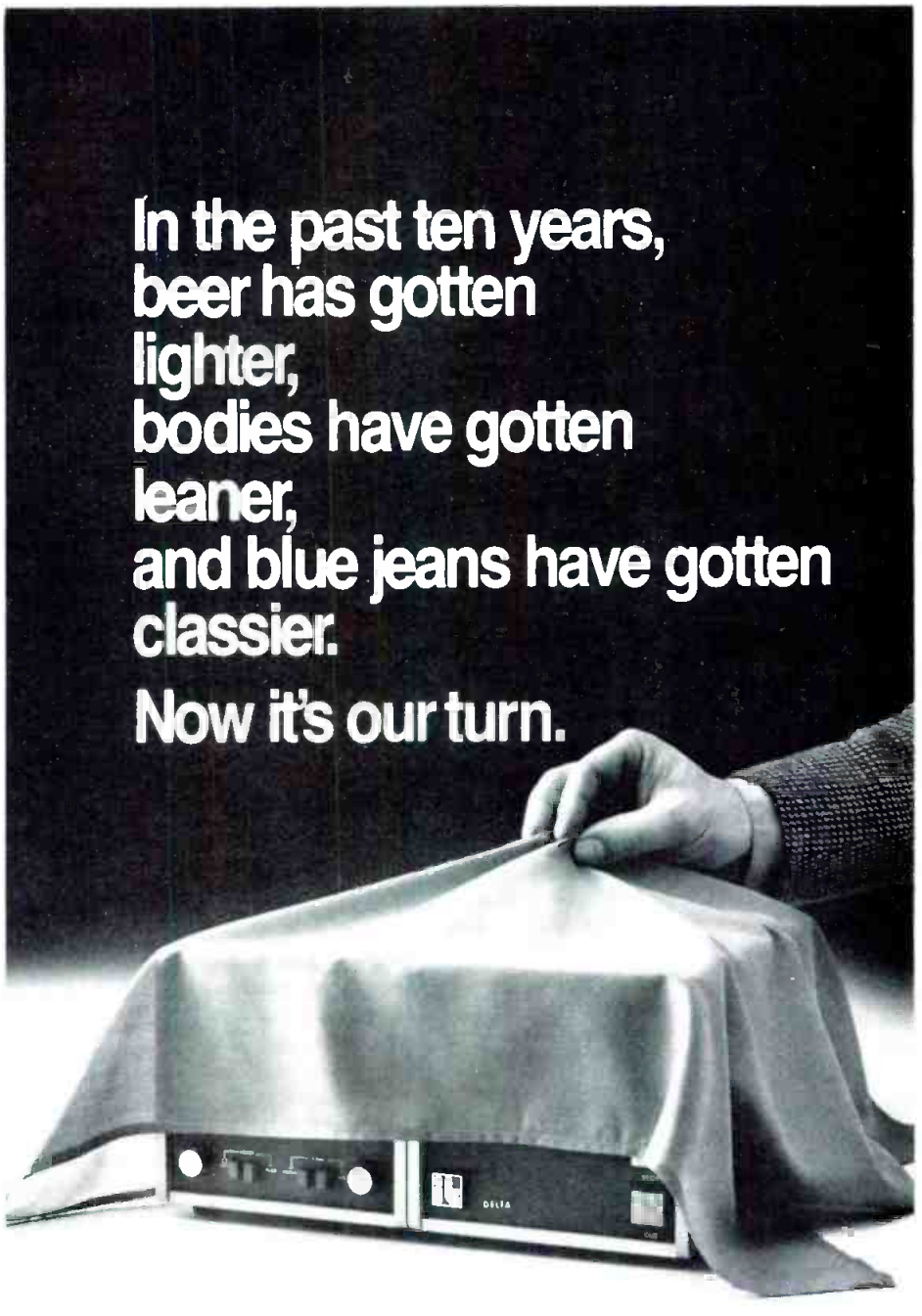
One more type of information is required for the system to work—a schedule of events. The 11/70 handles this task. The Distribution and Engineering Divisions interact with the schedule database to create two types of output. The first is an operating schedule that is loaded electronically in to the NOVA. The second is DACS traffic to the member stations to tell them what is available and which Netcue codes to use to capture the programs.

Station downlink equipment

A sophisticated system is required to accommodate all of these various functions at the member stations. An important design parameter was keeping the member station unit as low in cost as possible, putting the sophistication in the software. The motivation here was clear: we only had to buy the software once, but we had to buy the hardware over and over. The hardware, installed at member stations, included a DACS/Netcue Receiver Decoder (DNRD) panel and two Netcue Control Panels (NCPs).

The DNRD consists of a Motorola M6809 microprocessor, five serial I/O ports, 22 parallel I/O ports, 32kbytes of Dynamic RAM (expandable to 60k





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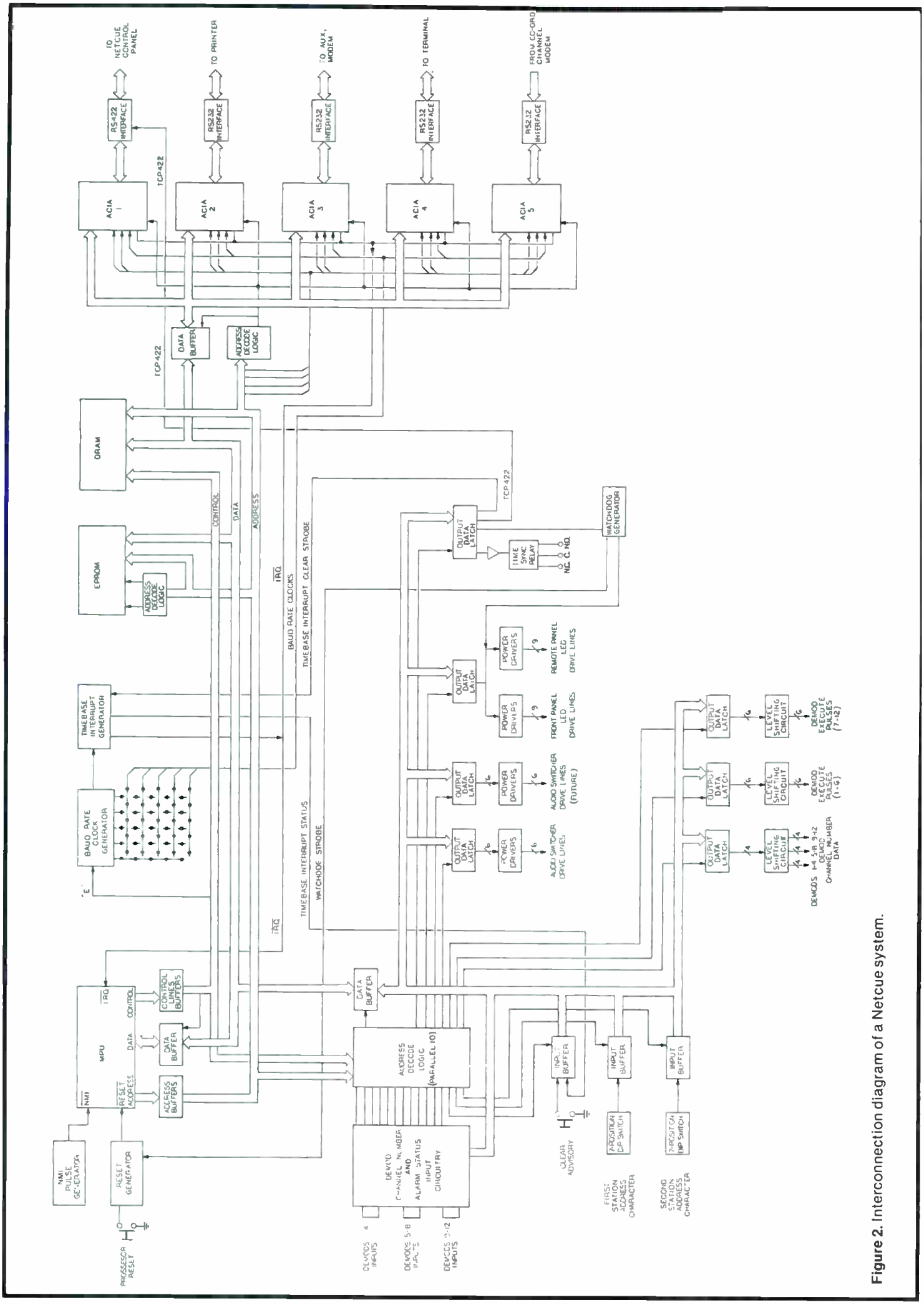

Figure 2. Interconnection diagram of a Netcue system.

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by adding a second PC board), a 2kbyte EPROM and a battery-backed power supply. Various indicators on the front panel display system status and receipt of advisories. The only controls provided are a processor reset control and an advisory lamp reset control. Figure 1 is a block diagram showing the DNRD design.

To make the system flexible and modular, a separate unit performs the data entry for operation of the Netcue system. The photo (page 287) shows the Netcue Control Panels (NCPs) and the DACS/Netcue receiver/decoder. Each NCP controls two demods, two tape recorders and one mono/stereo relay. To capture a specific program using the NCP, the user enters into the thumbwheel selectors on the NCP a 3-digit Program Event Code (PEV), which specifies the program, and then presses the *arm* button. An LED in the *arm* button lights to indicate that the unit is armed for the event.

At 10 seconds before the event's air time, a message from the NOVA computer causes the *play* relay contact to close, the demods to be tuned and the mono/stereo mode relay to be set appropriately. At precisely the start time of the event, another message is sent, causing the *record* relay contact to close, placing the PEV number into the *on-air* display and extinguishing the *arm* LED. At the conclusion of the event, a *stop* message is sent that causes the *on-air* display to go to *000* and the *stop* relay contact to close.

Design conflicts

One problem that we have wrestled with in the design is the achievement of maximized use of each demod. Information, included with each Netcue message, indicates which channel or channels will carry a program. If a mono program has been selected, only one demod is tuned. The mono/stereo relay is put into the mono mode, routing the demod's output to both the left and right inputs of the associated tape machine. In this case, the other half of the control panel, the second associated demod and the second associated tape machine are available for recording any other mono program.

To record a stereo program, the user enters a single PEV on one side of the NCP. The NCP tunes both of the demodulators associated with the unit to appropriate channels. A conflict arises if a second PEV is entered on the other side of the NCP, directing the unit to tune the demodulators to receive a program being transmitted on different channels than the event in progress. In this case, the second event requested will not occur, and the operator is alerted that a conflict has occurred.

The interconnection between the NCPs and DNRD is accomplished via a serial data party line. All units all connected in parallel on this single pair, simplifying installation. Future I/O expansion to the DNRD will occur on this party line.

A special Netcue message is sent over the network every hour on the hour by the MOTC switcher NOVA computer to synchronize station clocks. This results in a relay contact closure for the station's use and synchronizes an internal clock in the DNRD.

DACS traffic and Netcue messages are transmitted simultaneously, with Netcue messages always taking priority in the transmission queue, interrupting DACS messages as necessary. From the member station's point of view, the two operations are totally independent—DACS messages never appear to be interrupted as they are printed, although, in fact, the interruptions are frequent. This sleight-of-hand results from varying transmission speeds. The satellite data channel operates at 1200 baud, while the DACS messages are printed at only 300 baud. The difference in time between the two closes the gaps of interruptions.

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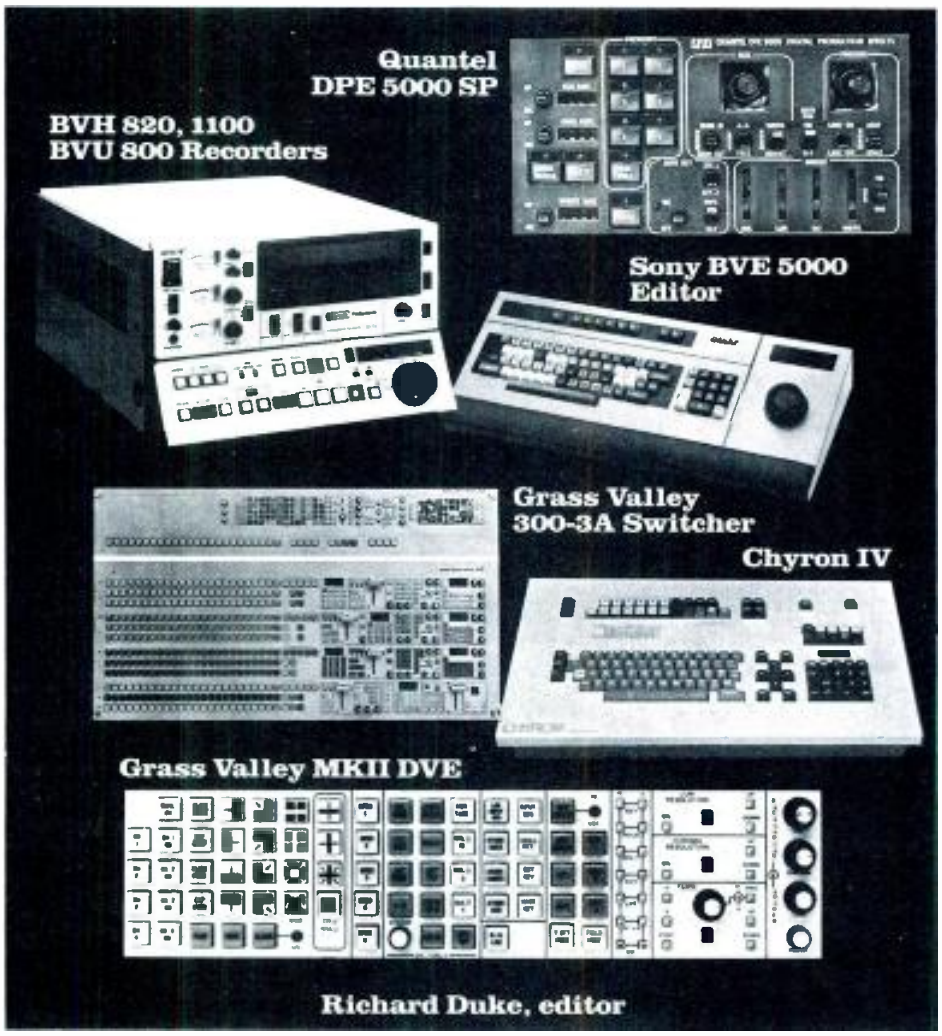
The video terminal display (VDT) contains the list of events to be executed sequentially. At upper right, the display shows status information.

DACS traffic also goes through a number of buffers before arriving at the printer. As the DACS messages are received, they enter a memory buffer in the DNRD. Once a complete packet (about 2048 characters) is received, it is checked for errors. If none are found, the packet is checked to see if addressing information is included. If there is none, the data is sent to the printer. When addressing is included, a test takes place to see if the message is addressed to this site. The message is queued to the printer if the address corresponds to the site; otherwise it is discarded.

In addition to the DACS capabilities, four levels of *advisory alerts* are provided. The difference between a DACS message and an advisory is that special characters occur in the message headers to indicate which advisory message it is. The four possibilities are *EBS alert, program advisary, engineering advisory* and *management advisory*. These show at the member stations as LEDs on the front panel of the DNRD, and are also available for remotely controlled lamps. A reset button, provided to extinguish the lamps, also may be remotely controlled.

As mentioned previously, the operating program in the DNRD is loaded via satellite. It was decided that the operating program in the DNRD should be maintained in read/write memory so that it could be altered if the need should arise. A small program, called the *off-line* program, was developed to be loaded into EPROMs (Erasable Programmable Read Only Memories). The program provides the routines for operation on power-up, and directs the DNRD to perform a simple system diagnostic and then waits for software to arrive via satellite.

When software data is received, it is error checked. If no error exists, it is loaded into the appropriate location in memory. When the end of the software download is received, an error test over the entire program in memory is performed. If errors exist, the program waits for the next software download. If there are no errors, the program is entered. This on-line program contains the routines for DACS, advisory and Netcue operation. It also will cause the off-line program to be re-entered if an error in memory is detected, or when an involuntary software download is sent out from Washington. This last mechanism is useful for providing updates to the system.



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Netcue plus

On Jan. 3, 1983, NPR inaugurated transmission of a program service that extends and supplements regular NPR programming. This service provides classical music 24 hours per day, overnight jazz music and a weekday half-hour news program. Also, the services' six hourly newscasts extend NPR's regular hourly newscasts to 18 hours per day. The operation of this service is closely tied to the Netcue system. When the new service was designed, a plan evolved that would use the Netcue system to provide automated operation at the receiving station. A new version of the DNRD software was developed specifically for subscribers of the service.

The new version of the software differs from the standard DNRD programs in some interesting ways. First, while the standard system allows PEVs to be entered only one event in advance, the new software allows lists of PEVs to be maintained using a low cost video display terminal. A subscribing member can thus program many hours in advance. A sample list is shown in the photo at upper left. The user of a computer terminal for data entry also has the advantage of allowing local contact closures to switch to and turn on local audio sources, such as cart machines. A subscribing station can use the system to insert local announcements at the top of the hour, switch to the mono news channel for the newscast and then switch to stereo music channels at the conclusion of the news. Further, provision is made for insertion of local 30-second cutaways during the music program and local funding credits at the end of the hour. By employing this system, a precisely timed continuous air signal can be produced without intervention by the operator.

Future work for the modified Netcue system has been specified and ordered for delivery in the fall of 1983. The additions will include software to operate a 10-input-by-two-stereo-output switcher with tally circuits, external (end-of-message) cue switching and machine starts. This unit will connect via the serial party line. A clock display will be available, driven by the internal clock. The unit will listen to the party line for the time information. New features to be added include capability for starting events by the time of day or PEV or both and capability for specifying the length of an event or using an external cue to terminate an event.

When these new features are added, the unit will be capable of operating as a 2-bus automation system with local and network sources. The system will be capable of standing alone from the network for extended periods of time. At that point each subscribing station will have its own automation system that will be almost as versatile as the first version of the MOTC switcher. Figure 2 shows an interconnection diagram of a Netcue system using every available option.

The NPR DACS/Netcue system has become a powerful, highly versatile and low cost answer to a number of operational problems within the NPR system. With flexibility designed into the system, Netcue has been able to meet the needs of the public radio network.

Acknowledgement

I would like to acknowledge key efforts responsible for implementing this system. Murray Porteous, president, AVL Digital Ltd., was the prime contractor. Ian Kerr and Susan Vayne, owners of Kerr-Vayne Systems Ltd., wrote the software for the NOVA computers in MOTC and for the DNRDs. Bill Lurie of AVL Digital designed the DNRD hardware. Steve Belter, president, Wintek Corporation, provided invaluable assistance in helping to specify the system and in monitoring the progress of the contract. Within the public radio community, Joe Dyer was the Corporation for Public Broadcasting contract administrator; Bill Lincoln, first at CPB and later director of engineering at NPR, provided great guidance to the project; and Jim McEachern of NPR supervised the deliveries and fielded hundreds of telephone calls from the stations to get the units working. In any project this large and complex, one is bound to miss someone's name in acknowledgement. To those, I extend my apologies and thanks.

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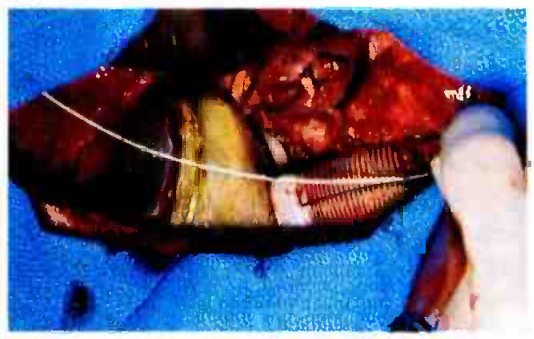
ENG records history:

Artificial heart implant

A giant step forward in medical science was taken last December when Dr. Barney Clark became the first human ever to receive a mechanical heart implant. The author goes behind the scenes to describe how broadcasters prepared to bring the details of this remarkable event to the world.

By Rick Lehtinen, KSL-TV 5, Salt Lake City, UT

Photos: Brad Nelson, University of Utah Medical Center



Jarvik-7 heart

Operating team at work.

- Dr. Barney B. Clark
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  61 years old
- Dec. 2, 1982
  Mechanical polyurethane heart implant
- University of Utah
  Medical Center
  Salt Lake City, UT
- Dr. William DeVries
  Head, surgery team
- Dr. Robert Jarvik
  Developer of the heart

The implantation of an artificial heart into the chest of Dr. Barney Clark made Salt Lake City the host to an exotic, medical history-making occurrence. Representatives from all three major networks, the independent networks and even foreign media placed a record load on the shoulders of local affiliates as they struggled to originate and disseminate the coverage to the world.

Clark, a 61-year-old retired dentist from Seattle, WA, suffered from cardiomyopathy, a progressively debilitating fatal disease of the heart. He endured 7½ hours of monumental surgery in which his diseased natural heart was removed and replaced by a Dacron and plastic wonder, dubbed the Jarvik-7 after its creator, 36-year-old medical prodigy Dr. Robert Jarvik. Next came a series of follow-up operations, one to locate an air leak that was suspected to be in the air driver tubes going to the heart, and a second in which the entire left side of the device was replaced.

From a makeshift conference room rigged in a corner of a cafeteria in the Medical Center of the University of Utah, reporters often maintained all-night vigils waiting for further word on the implantation and the follow-up operations.

Coverage of the heart implant story actually began long ago, because the search for qualified applicants was long and involved. Throughout the time-consuming process of screening candidates necessary to obtain Federal Food and Drug Administration approval to conduct the operation, reporters such as Ed Yeates, senior science editor for KSL-TV 5, researched background information on the device and its creators. Finally, on Tuesday, Nov. 30, KSL interrupted its late afternoon programming with

Courtesy of ABC

On *Good Morning America*, David Hartman (right) interviewed Dr. Robert Jarvik about the design and performance of the mechanical heart implanted into Dr. Barney Clark, the first human patient to receive such a device.

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the announcement that a recipient for the heart had been found.

Preparations under way

The next morning, Dec. 1, crews from CBS Los Angeles arrived in Salt Lake City, and while correspondents—including Linda Douglas, and later Jerry Bowen and Barry Peterson—went directly to the University Medical Center to begin coverage, Quint Neufeld, *Evening News* producer, and Gil LeVeque, editor, brought several flight cases, filled with equipment, to KSL, where they set up what was in effect a *minibureau*. A conference room was turned over for their use as a makeshift editing suite, and a spot on the floor in the equipment room became home for the feed pack, basically a remote truck in suitcases.

For editing, CBS used two Sony BVU-800 ¾-inch decks, with a small audio monitor set between them. Two 5-inch monitors, one for each BVU, rested on top of the machines, and a microphone was patched into one BVU for voice overs and narration. With footage obtained from the CBS camera crews or KSL, or courtesy footage released by university station KUED, Channel 7, LeVeque put together the stories and hand-carried them the short distance up to the equipment room and feed pack.

The feed pack, a compact assembly capable of producing two different feeds simultaneously, consisted of a BVU-800 tied into three flight cases of equipment. The TBC, a Sony BVT-800, was mounted in a flight case along with Datatek audio and video DAs, and a small video patch panel.

TBC output was fed into a second flight case, which conained the guts of the system: a 2-channel, 7-bus, audio-follow-video (AFV) switcher from Kaitronics. Tape machine audio was routed automatically through the first two channels of a 4-channel, switchable-impedance, line/mic level-input mixer. A switch on the front panel allowed a break in the AFV, thus enabling all channels of the mixer full time. In the same box with the video switcher and mixer was a QSI bar and tone generator, with the capability of generating 99 different programmable identifications over bars. An audio monitor and speaker and a small audio patch panel were included in the box.

In a third flight case, there were provisions for video and technical monitoring, a 5-inch Videotek color monitor and a Videotek combination waveform monitor/vectorscope. Each of the boxes measured about 24 inches wide by 18 inches high, and had equipment racks built in for the gear, with a stiff foam-rubber suspension isolating the racks from the sides of the box.

Interconnection between the various cases was via a numbered wire harness of cables fitted with BNC and XLR connectors. Each output from each device was clearly labeled by function and harness wire number, as were all the inputs: interconnection

Photo: Rick Lehtinen

Bob D'Alessio, KSL engineer, preparing to uplink feed on CBS feed pack.

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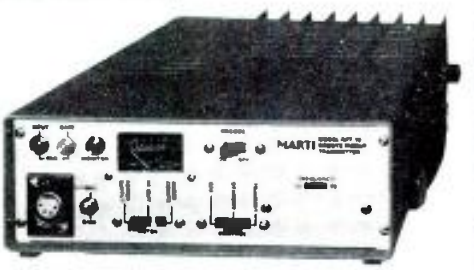

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was quick and non-ambiguous.

"That's something about the feed pack I liked very much," said Bob McIntier, KSL senior engineer, who handled interfacing the feed pack with KSL station equipment. "And, also, each device in it seemed to have numerous outputs available. They had used a distribution amplifier on everything, and that made it very handy to be patching up for a scheduled feed without disturbing something already in progress."

Surprisingly, some of the first footage fed from Salt Lake City was not of the heart implant. "That first day the equipment was set up and tested, well in time for the first scheduled feeds, but we didn't have that much happening at the hospital outside of the scheduled briefings, which we carried live and sent on to CBS live as well." Phil Secrist, staff engineer at KSL, said. "The barometer took care of the slack though. A record low brought down some cold air out of Wyoming, and brought down about two feet of snow on us, one of the worst storms we've had recently. Both ITNA and CBS took feeds on that story."

The record snowfall meant something else to McIntier though: wet sneakers. In back of KSL on a mezzanine roof are three satellite dishes for UPI and CNN, and a larger 5m dish from Scientific-Atlanta used for downlinking. "I like to monitor the satellite receiver whenever we are sending something to the uplink, just to make sure my signal is *up there*, and that meant that three times I had to go and shovel that thing out," he said.

Most uplinking from KSL is handled by Bonneville Satellite Corporation, a sister company under Bonneville Int'l, which is located a few doors down the street and connected to KSL by a fiber-optic link. Bonneville Satellite shoots from the office downtown to a secluded site in City Creek Canyon, four miles north of the city, via a microwave, bouncing once off a passive reflector mounted on a hill just north of the state capitol.

As it turned out, snow was not the only thing flying that day, and a sudden turn in the heart implant story led LaRene Rowley, director of operations for Bonneville Satellite, to report that she became so busy with cov-

Photo: Greg Mason

Previewing a story in a conference room converted to an editing suite are (left to right): Hunter Block, CBS News (Los Angeles); Judith Williams, editor; and Quint Neufeld, *Evening News* producer.

KTVX-TV 4's preparations

By Dave Parr, chief assignment editor, KTVX-TV 4, Salt Lake City, UT

When Dr. Barney Clark first arrived at the University Medical Center, he was a patient dying of congestive heart failure. On Tuesday afternoon, Nov. 30, 1982, the KTVX-TV 4 news staff found that Dr. Clark would become the first permanent artificial heart recipient in history. The sudden announcement threw Salt Lake media into a frenzy, but Clark's identity was protected until after the surgery that occurred late Wednesday night, Dec. 1, 1982.

That surgery began an event of news coverage that went around the clock for the following week. When the recipient was first selected, the news staff at KTVX notified our ABC Network in Los Angeles. ABC's staff began arriving late Wednesday night in what also began an around-the-clock vigil for them.

They depended on our news staff, engineering and production crews for all of their live coverage for *World News Tonight*, *Nightline*, *Good Morning America* and *The Last Word*.

Even though KTVX crews worked constantly during Clark's recovery, *KTVX Four News* still found time to feed live coverage to Seattle's KOMO and Portland's KATU (who had their own reporters and photographers in Salt Lake City).

Channel 4's live ENG van, which was stationed at the university, in essence became the hub of all electronic links regarding the transplant.

By the end of the first week following Clark's heart transplant, KTVX's crews had amassed 120 hours of overtime, but all were glad to have shared this historic event.

Karen Grange, reporter; and Mike Allen, photographer, plan logistics of upcoming media briefing on heart implant.

Photographer Mike Allen sets audio and video levels during live shot for media briefing.

KTVX-TV 4 mobile live unit set up for live shot with goldenrods pointed toward receiver in the Ocquirrh Mountains.

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STS tapes operation

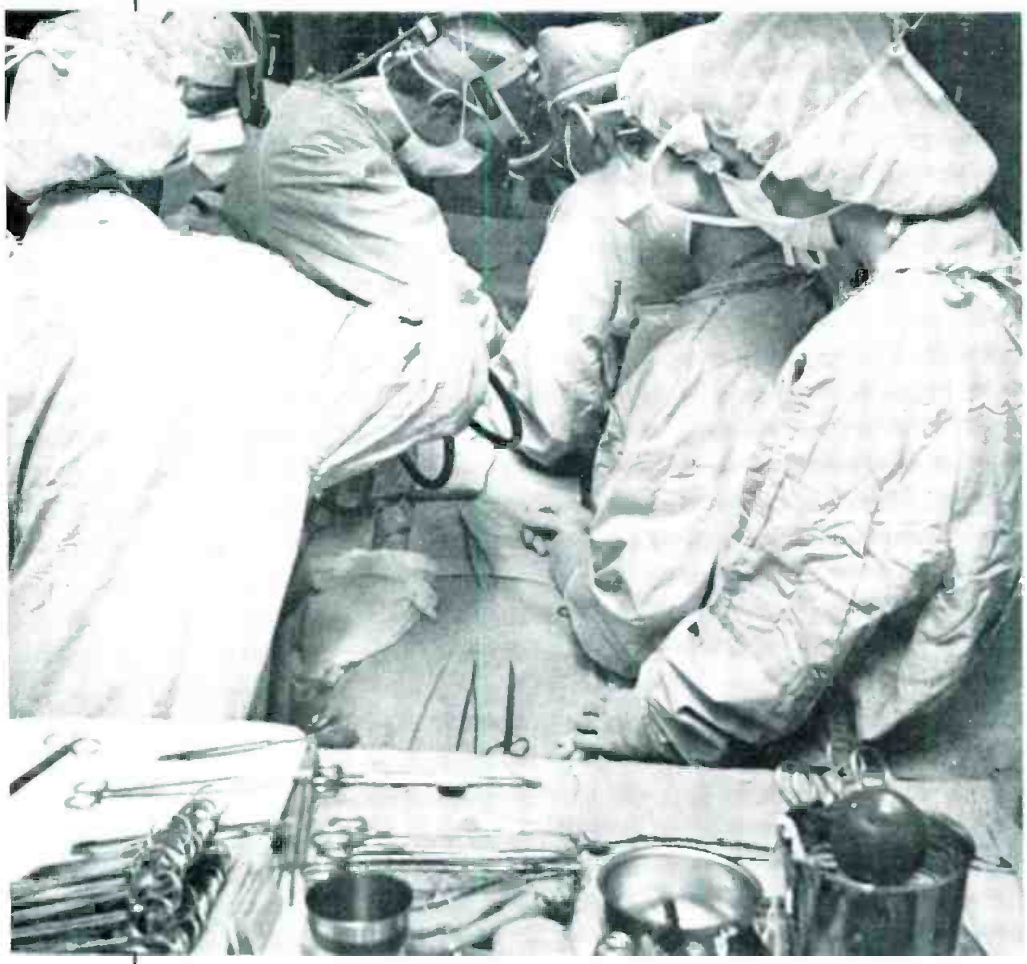

Photo: Brad Nelson, University of Utah Medical Center

STS provided support crew and equipment to tape the history-making artificial heart implant operation.

Skaggs Telecommunications Video Production Service of Salt Lake City had the opportunity to provide equipment and support crew to KUED-TV (PBS) for taping the University of Utah Medical Center's artificial heart implant.

STS sent one of its complete mobile video production vehicles, STS 1, with Jeff Harland, engineer, and Brian Wilcox, videographer, to the history-making operation.

Jonathan Mann, supervisor of client services at STS, said the crew had been on emergency call for three weeks before the operation. William C. DeVries, chief cardiologist, decided the evening before the scheduled date that his patient, Dr. Barney Clark, couldn't wait until morning for the heart. Harland and Wilcox were called from a shoot and sent to the medical center where they recorded the 7½-hour operation.

Al Cutler, KUED's production supervisor, said they have about eight hours of footage. A short segment was released to the media following the surgery. KUED is using the tape in a documentary on the operation that should air this month on PBS stations. Cutler said that the medical center will use the tape for medical science and instructional purposes.

Gil Leveque, CBS editor, checks footage on BVU-800s brought in and set up as a mini edit bay in KSL Public Affairs Conference Room. Quint Neufeld looks on.

erage and scheduling of satellite time that before it was over she brought not only her sleeping bag, but most of her wardrobe, to the office.

History begins

The startling turn of events: Clark began to die. When it seemed that he would probably not live through the night, doctors decided to operate at once, nine hours ahead of schedule.

Once it became apparent that Clark was heading to surgery, KSL interrupted programming to make the announcement, and the other area stations followed suit shortly thereafter. Immediately, a live ENG van, engineer, three camera crews and two reporters were sent to the University Medical Center. In its crowded parking lot, the ENG vans crawled into a sheltered area beneath an overhanging second story of the building, where they would not be interrupted by snow. Cables were run through a side door and around a corner into the cordoned-off press area, and the RCA TK-76 cameras were assembled on risers at the back of the room. Tables with phones sprouting out of them appeared on the right side of the room, and newspersons from the various networks commandeered tables and propped them against available pilasters and nooks in the opposite wall to form makeshift "anchor booths." To the front, over rows of seating, was the platform for the spokesmen and a white drawing board with markers. Someone later provided a Christmas wreath against the blue backdrop curtain.

Just after midnight, Helen Kees, nursing supervisor at the Medical Center, stepped behind a small podium, now decorated with microphones sporting a dozen logo collars, and gave the announcement—Clark's ailing heart had been removed and he was now living on the heart-lung machine preparatory to the implantation of the Jarvik-7.

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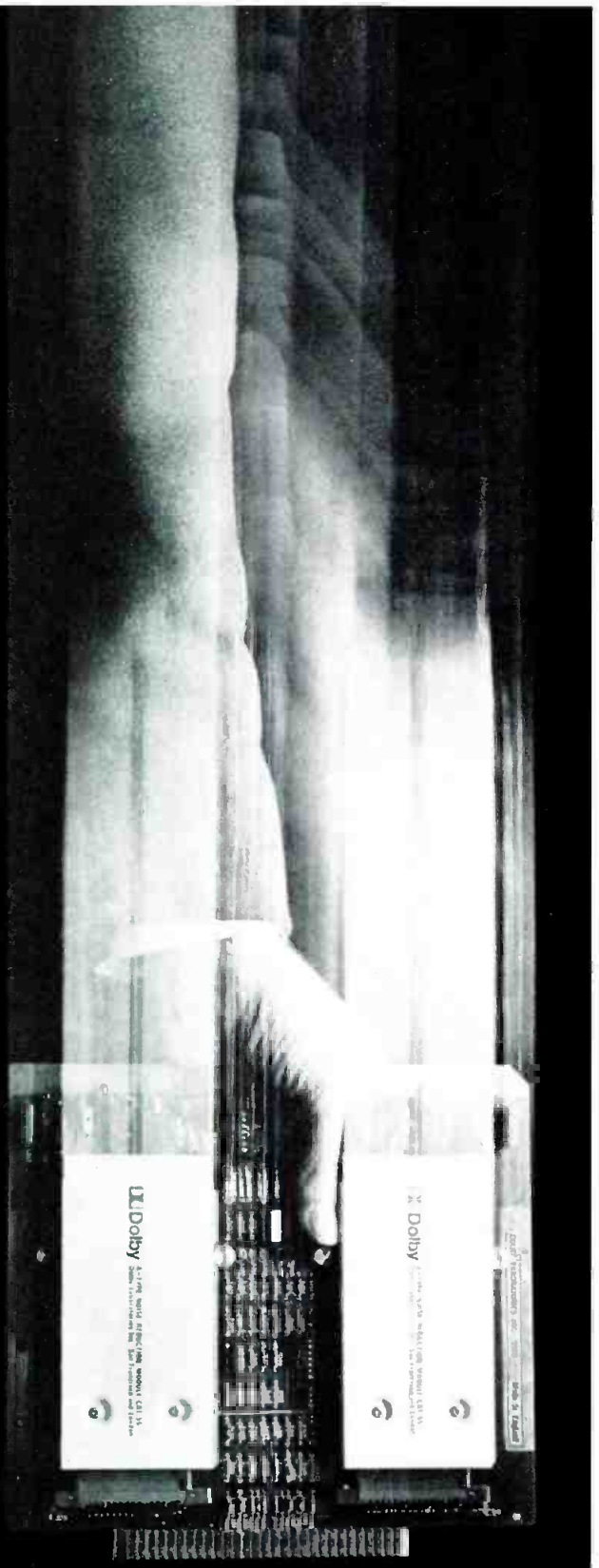

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KSL carried the announcement live, microwaving it back to the KSL studio via receivers on Farnsworth Peak, KSL's manned transmitter sight 9100 feet above sea level in the mountains 18 miles southwest of Salt Lake City. From there it was reshot to receiving gear atop the Beneficial Life Tower in downtown Salt Lake City and carried down 28 stories and one block through town on a balanced video line fed by Telemet line drivers and receivers. When it was necessary to originate two separate feeds for different users, KSL used a portable microwave, shooting through a plate glass window at the front of the medical center directly to a steerable dish array also mounted on the Beneficial Life Tower.

Meanwhile back in the station, Spencer Kinard, KSL news director, made arrangements to have LeGrand Young, an account executive for KSL (who also happened to be a friend of Clark's), appear on the 10 p.m. news and give some insights into the pioneering heart patient's personality. That story was aided considerably by a color photo of Clark, the first to appear in the Salt Lake market, which was beamed via satellite to KSL by sister station KIRO, Channel 7, Seattle. At 10:29 p.m. Salt Lake City time, the photo came down off the bird and KSL was able to display it as part of the 10 p.m. news within two minutes of its reception.

This cooperation between sister stations was to continue throughout the duration of the story, with KSL uplinking or transmitting via terrestrial microwave link the fresh-breaking details of the story.

A satellite link was also used to originate a segment of the *McNeil-Leher Report*, a PBS documentary/interview show, which originated out of KSL's production studio. Program video from the PBS network was fed via satellite and patched to a roll-around color monitor on the studio floor.

Jarvik, inventor of the heart, sat in a chair on the set and answered questions directed to him by the show's host. Interruptable feedback from the show's director was mixed into Jarvik's earpiece in the studio console, and the director in New York was able to speak with the KSL director who handled the local portion of the show.

"To rig that up in the midst of everything else we were doing—satellite uplinks, local news coverage, plus our commitments to CBS and others—required quite a bit of ingenuity and a healthy raid of KSL radio's engineering shop," Don Edvalson of KSL's engineering staff, said. (The radio station and TV station, although co-located, maintain separate engineering staffs.)

In addition to the CBS coverage, KSL also provided feeds to CNN and ITNA facilities. Independent Television News Association, KMGH, Denver, a German network, and FUJI-TV also received feeds of various parts of the coverage. "That was one of the fun parts," Ken English, KSL staff engineer, said. "It's exciting to originate bars and tone here in Salt Lake City and have an operator with a foreign accent call on the phone and tell you they have them in Tokyo."

A final, unique aspect of the coverage was the insertion into CBS Network news of live segments taken from the medical center. "I don't think anyone has done that from here in Utah before," Owen Smoot, supervisor of the KSL News technical support team, said.

All in all, it was quite an exciting time for the engineering staff at KSL. As a result of the coverage, laudatory memoranda and telex flowed generously from KIRO, CBS New York and station management. But the most exciting element of all was that now a small Dacron and plastic miracle softly clicks inside the chest of a previously doomed man, and that news gives life to all of us.

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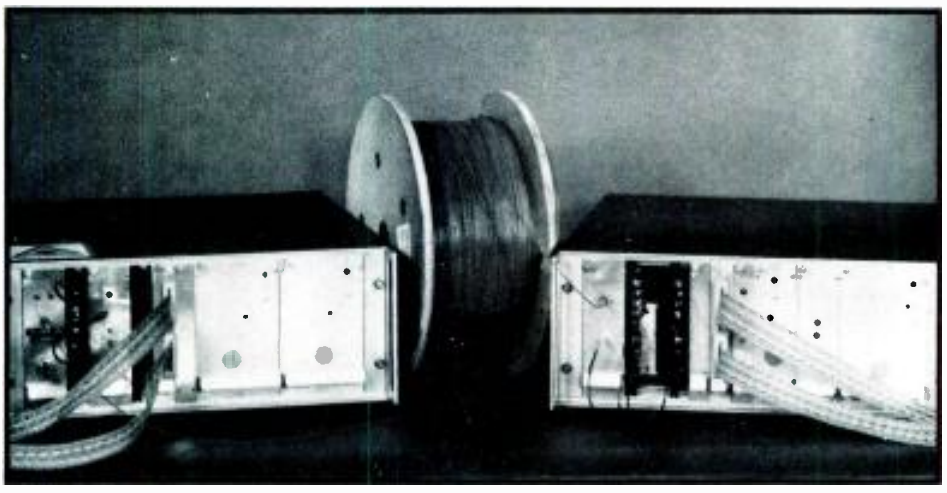
Optical fibers for digital studio interconnections

By R. P. Marsden, BBC Research Department, Tadworth, Surrey, England



An experimental YUV optical fiber link.

Optical fiber technology has developed rapidly in the last 10 years, with much of the impetus coming from the telecommunications industry. The national telecommunications organizations need the wide bandwidths of optical fibers to offer the range of services that their customers are now demanding. The increased repeater spacing on an optical fiber link is another valuable advantage.

The features most often taken advantage of are the small size and light weight of an optical fiber cable. The bandwidth of the fiber is not always fully exploited. The following describes a potential application that makes use of the bandwidth to provide interconnections between TV equipment in an all-digital studio. It is not intended to give a description of basic optical fiber technology, which can be readily obtained from any of the excellent sources of general review now available.[1,2]

Although digital techniques are widely used in TV signal processing, existing digital equipment retains analog interfaces at its inputs and outputs because it must fit into the present analog program chain. Direct digital interconnections would allow the analog interfaces to be dispensed with and would remove some limitations on quality imposed by analog representation.

The recent CCIR Recommendation[3] has established a coding standard that should ensure that types of future digital equipment are compatible in terms of sampling frequency and resolution. What is now required is a means of interconnecting equipment using this standard, over distances that may vary from a few meters to perhaps a kilometer in a large studio.

It is expected that a serial format will be preferred to a parallel format for long distances and instances in which complex matrix switching is required, because of the size and cost of multiway cables and connectors and the difficulty of instrumenting the matrix in parallel form. However, the basic bit rate for a signal complying with the CCIR Recommendation is more than 200Mbit/s, compared with bandwidths of 5-6MHz for analog signals.

If optical fibers and coaxial cables are compared, it is found that the coaxial cables used in studios to carry analog signals have a loss at 5.5MHz of only about 20dB/km, which can easily be compensated. At 125MHz, however, roughly the upper frequency limit of the digital signal, this has risen to about 125dB/km. Optical fibers, however, are able to carry high speed signals with ease. For example, one kilometer of graded-index fiber loses only about 1dB at 125MHz, relative to its zero-frequency loss.

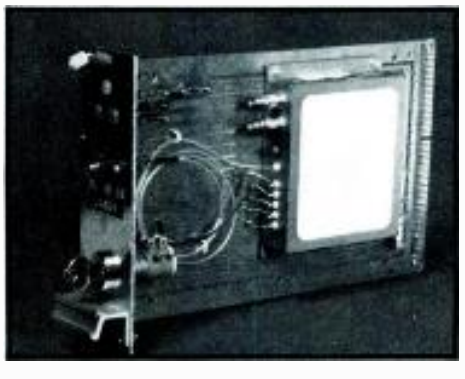
Crosstalk between close-packed coaxial cables is also significant at the higher frequency, whereas fibers suffer no crosstalk. Taking into account both crosstalk and high frequency loss, it is estimated that the maximum distance that could be achieved on coaxial cables at 250Mbit/s is about 250m (820 feet). This means that the longer runs in a studio center could not be achieved reliably without the use of intermediate repeaters. Better cables are available, but the improvement is accompanied by a rapid increase in size and weight. It is unlikely that these cables would be accepted in a studio installation, where the trend is to use thinner cable, which has an even greater high frequency loss and susceptibility to interference.

In contrast, a single-fiber optical cable is only half the diameter of coaxial cable. Also, there need be no metallic elements in the cable to cause earthing (grounding) problems.

An experimental YUV link

The BBC Research Department is presently completing equipment to transmit one YUV video signal, coded according to the CCIR Recommendation, along 1km of optical fiber. The distance was selected as being representative of the longest run to be found in a TV studio center. The link uses a standard multimode fiber, with a graded refractive index profile and a core diameter of 50 microns.

The transmitter uses a commercial laser module, emitting at an optical wavelength of 820nm. A laser was used because of the high data rate. The serial data signal modulates the laser output directly, by controlling the laser injection current. The depth of modulation is close to 100%. A block diagram of the complete transmitter is shown in Figure 1. Parallel-to-serial conversion is carried out in the transmitter, but first the parallel data is recoded to include a guaranteed number of data transitions for clock recovery and to eliminate the dc



The optical transmitter module used in the experimental link.

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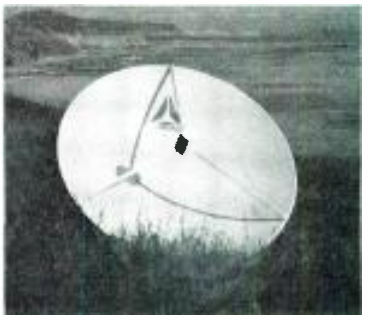

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component. The code used is a 16B20B code developed at the BBC Research Department for digital videotape recording. The term 16B20B means that for every 16 bits in the original signal, a 20-bit word will be transmitted. The use of this code therefore increased the data rate from the 216Mbit/s implicit in the CCIR Recommendation to 270Mbit/s.

Several types of codes were considered before this one was chosen. Codes with three levels or more were rejected because of the difficulty of switching a laser to an intermediate level, and the simple binary codes were believed to increase the bit rate excessively. 16B20B was chosen because it has slightly better characteristics, and because the 16-bit input block length is twice the length of two PCM video words, simplifying the design of the coder.

The receiver uses a commercial optoelectronic module. This is the small rectangular package slightly above the right of center in the photograph (below, right), with the fiber emerging from it. The module contains a PIN photo diode with an integrated, GaAs FET amplifier for good high frequency performance. The block diagram, in Figure 2, shows the complete receiver. After further amplification, the receiver signal is sliced to reconvert it to logic levels, and the 270MHz clock waveform is recovered by a tuned amplifier. The data is then converted back into parallel form and finally recoded into the original CCIR signals.

The performance of the link itself can be seen from the two waveform photographs (page 306), which show a short data sequence after amplification, but before slicing. The sequence contains a short burst of the

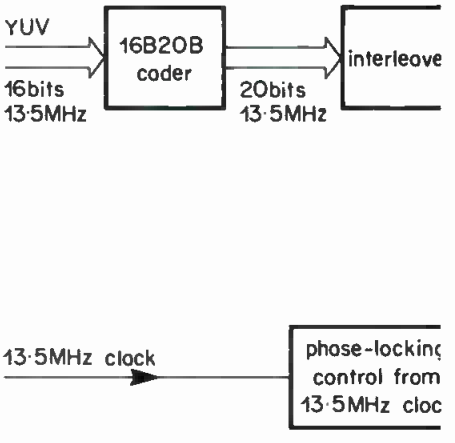

Figure 1. A block diagram of the experimental transmitter system indicates the interrelationship between the incoming digitized video signal, the clocking frequency and final application to the laser modulator before transmission over the fiber link.

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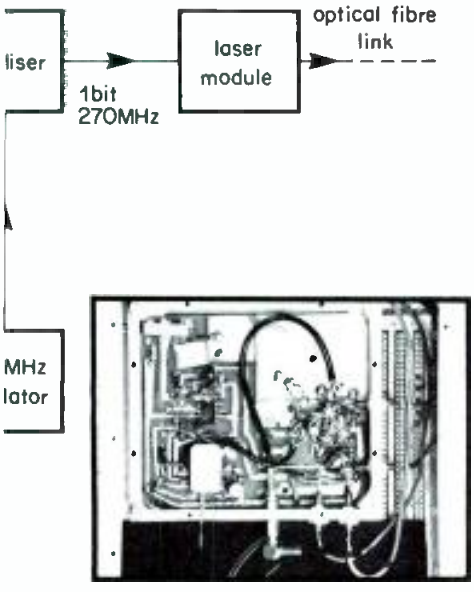
maximum pulse rate, followed by sustained high and low logic levels as a low-frequency reference. Reception over about 10m of fiber is shown. The length of fiber has been increased to 1000m. The high frequency loss is small, only about 0.5dB. (There is an overall power loss of about 5dB caused by the extra fiber, for which the display has been adjusted, but this is well within the dynamic range of the receiver.)

The loss is so small, particularly in a digital system, that equalization for line length can be dispensed with entirely. This is a valuable feature. In BBC studios, for example, every video line more than about 15m long is equalized, needing space to be found for the equalizer and its attendant amplifier. Also the equalization must be set up for each line individually.

Optical fibers in studios

It is clear that optical fibers are able to carry the video signals in a digital studio. However, before a commitment is made to optical fibers, there are other factors that must be considered.

The first of these is cost. For the length of links being considered, optical fibers cannot compete on cost, mainly because of the expense of the electro-optic interfaces. However, these are relatively new devices, and their current price includes a large element of development cost. As production rises and better methods of production are found, prices should become more competitive. Remember too that some of the cost and much of the complexity of the receiver and transmitter are due to the parallel-to-serial and serial-to-parallel conversion, and that this would still be needed in an electrical link.



The receiver module used in the experimental link.

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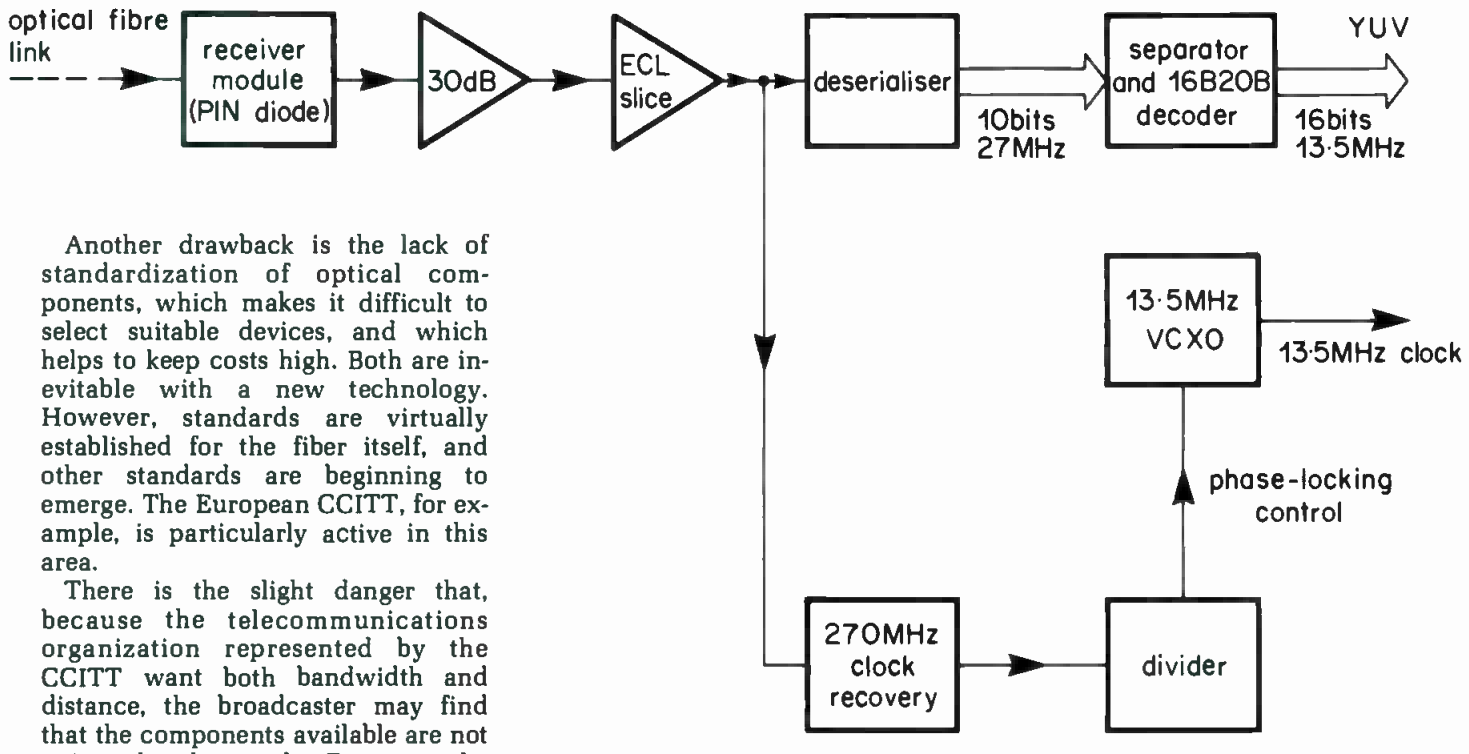

Figure 2. The block diagram of the link receiver, using a PIN diode, shows steps involved in recovery of the clocking signal and the 16-bit digital data stream for the YUV experimental link.

Another drawback is the lack of standardization of optical components, which makes it difficult to select suitable devices, and which helps to keep costs high. Both are inevitable with a new technology. However, standards are virtually established for the fiber itself, and other standards are beginning to emerge. The European CCITT, for example, is particularly active in this area.

There is the slight danger that, because the telecommunications organization represented by the CCITT want both bandwidth and distance, the broadcaster may find that the components available are not quite what he needs. For example, most lasers develop far more power than is needed for a 1000m link. This is reflected in their cost.

The third point, and possibly the most important, is to consider how optical fibers would be used in a studio installation. So far only point-to-point links have been discussed. To meet the day-to-day needs of program makers, and to follow long-term trends in program production, it is essential that any studio interconnection scheme allows signals to be rerouted at will. In BBC studio centers

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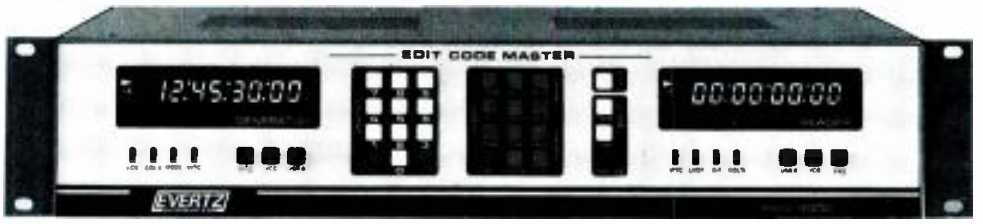

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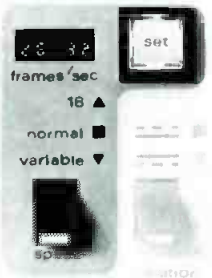
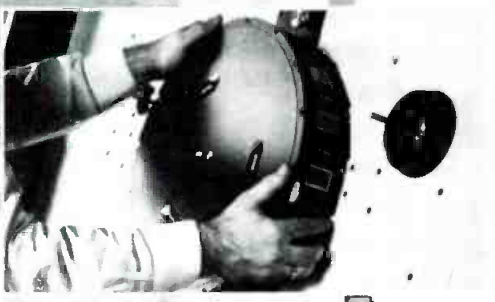


Varispeed - *Film speed is variable between 16 and 30 f.p.s. on 625 and 625. System is referenced to TV sync pulses for accuracy of 0.0001%. Essential for time compression or expansion.*



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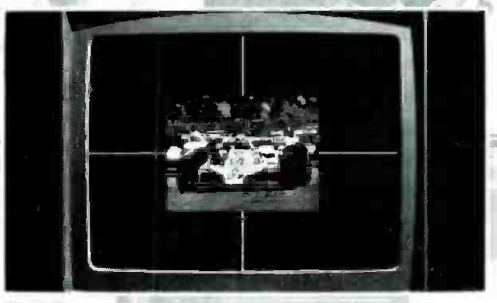
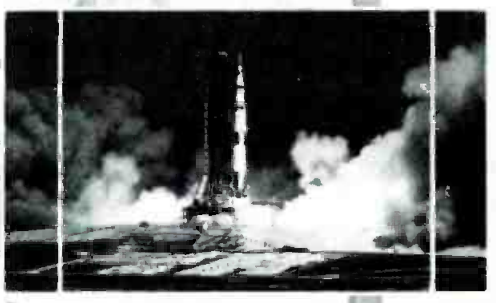


X-Y Zoom - *Overall ratio of 6:1. Joystick control for exact selection of picture area from within the frame or precise positioning of a reduced full-frame insert.*



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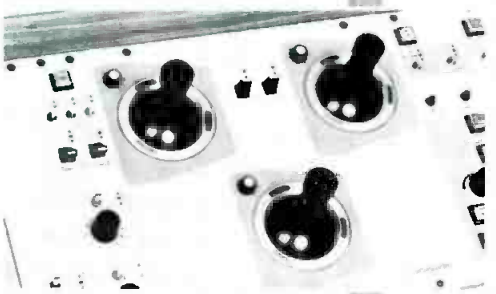

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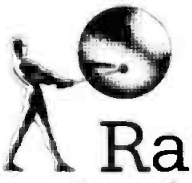

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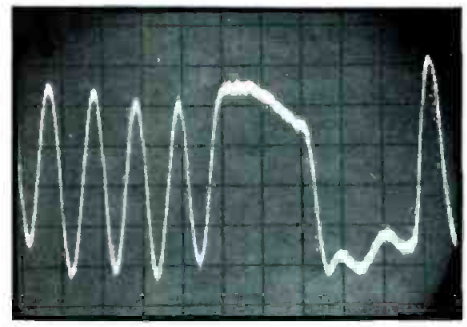
the signals are switched centrally, mostly in switching matrices that may have up to 100 inputs and 100 outputs, so a complete system will need switches, distribution amplifiers, connectors for patch panels and so on. How is this to be achieved if optical fiber transmission is used?

Optical connectors are some cause for concern, because there is as yet no completely satisfactory design available. It is necessary to make good optical contact between the fiber ends for low loss, but the end faces must be protected from dirt and damage when the connection is unmade. Several designs have been seen recently that are a considerable improvement on earlier connectors, so the signs are encouraging. For permanent installations, optical fibers can be spliced with a typical loss of 0.25dB.

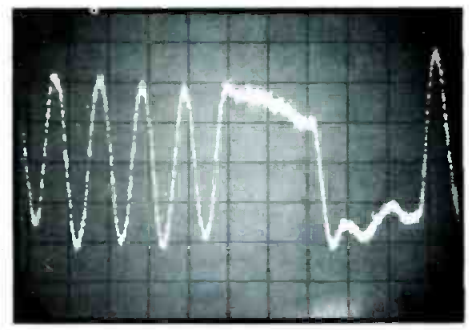
For switching, one method often demonstrated is electromechanical, with prisms or mirrors being moved into the optical path by a solenoid. Another arrangement moves the end of one fiber into and out of alignment with a series of output fibers. Admirable though these are for their simplicity, they would all suffer in service from the usual problems of mechanical operations, and a more promising approach is to use electro-optic or acousto-optic effects to make a solid-state switch.

This type of switching belongs to what is now being called *integrated optics*. Components, such as optical directional couplers, modulators and switches, are made by diffusion or deposition on small crystal substrates. The technology is similar to that of integrated circuitry, but with different materials and simpler patterns. Integrated optics has rapidly become a subject in its own right, and progress to date is encouraging. Although few integrated optical devices are likely to be in production for the first generation of digital YUV equipment, they could well form the basis of a second generation.

Amplification, that is, direct amplification of an optical signal, has recently been demonstrated for the first time in a laboratory, by NTT in Japan. Gains of up to 20dB have been reported. There seems to be nothing fundamentally difficult about direct optical amplification. NTT uses a semiconductor laser for which part of the excitation comes from direct current injection and the remainder from the optical signal to be amplified. The reason it has not been done before may be because the telecommunications industry is trying to eliminate



The received signal waveform shows reception over about 10m of fiber.



The received signal waveform shows reception over 1000m of fiber. Comparing this waveform and the waveform showing reception over 10m, one can see that little signal degradation is caused as fiber link length is increased.

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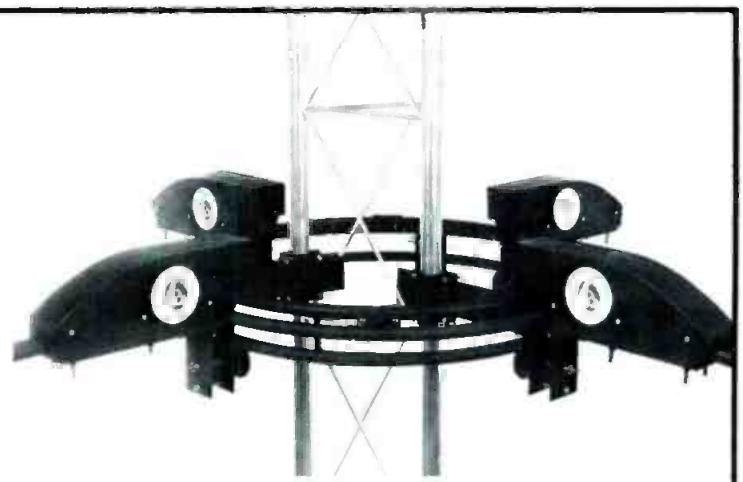

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repeaters, not invent new ones. Also, as has already been pointed out, a laser already has a margin of power for driving multiple outputs so the need for distribution amplifiers would not be as pressing as it is with electrical signals.

The technique known as *hybrid integration* allows optoelectronic devices and purely electronic devices to be combined on a single substrate. This technique is used, for example, in the receiver module used in the experimental link. If an entire transmitter or receiver, from parallel video data to serial optical bit stream, could be put into a few small packages, the future of optical fiber links for digital studio interconnections would be good.

Returning to the problem of standardization, the establishment of a digital video interconnection standard, preferably worldwide, will be of considerable help, because an integrated interface would be worthwhile only if it were produced in large quantities. With such a standard the broadcasters could avoid becoming reliant on telecommunications-oriented components. Optical interfaces could then be fitted as standard to every piece of digital equipment, and electrical outputs eliminated. The questions of whether or not there should be different interconnection standards for long and short links; converters between these standards; and outputs in both standards on some equipment, would simply not arise. Nor would it be necessary to provide equalizers or repeaters for the longer circuits.

Other arrangements

Although the experimental link carries a single video signal on a single fiber, this is not the only possible arrangement. A multifiber cable need be no larger than a normal coaxial cable and, apart from carrying several serial signals, this would be a compact way of providing a parallel interface. The cable and connectors and any switching arrangements would be more expensive, but this would be offset by the simpler interfaces at the ends of the link. Although eight or 10 transmitters and receivers would be needed, the lower operating frequency would allow LEDs to be used instead of lasers. The demands on the receivers would be less severe. There would be no parallel-to-serial conversion, and a simpler transmission code could be used. However, the success of this arrangement would depend on the development of a reliable multifiber connector.

Alternatively, it is possible by means of optical wavelength multiplexing to carry several optical signals on a single fiber. This would also be a way of avoiding an even higher serial bit rate, if it was eventually decided to send the chrominance components of the CCIR signal with the same time-resolution as the luminance component. Although difficult with today's technology, it would also be a way of sending the signal in parallel form over a single fiber, thus avoiding the multifiber connector.

Clearly, there is a long way to go before the all-digital studio is fully established, and the establishment of an interconnection standard is obviously an essential step. Optical fibers are a strong contender for such a standard, because of their capability of carrying wideband signals and especially in view of the potential they still have for development.

The author wishes to thank the director of engineering of the BBC for permission to publish this article.

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[2]Midwinter, J. E., "Optical Fibres for Transmission," John Wiley and Sons, 1979.
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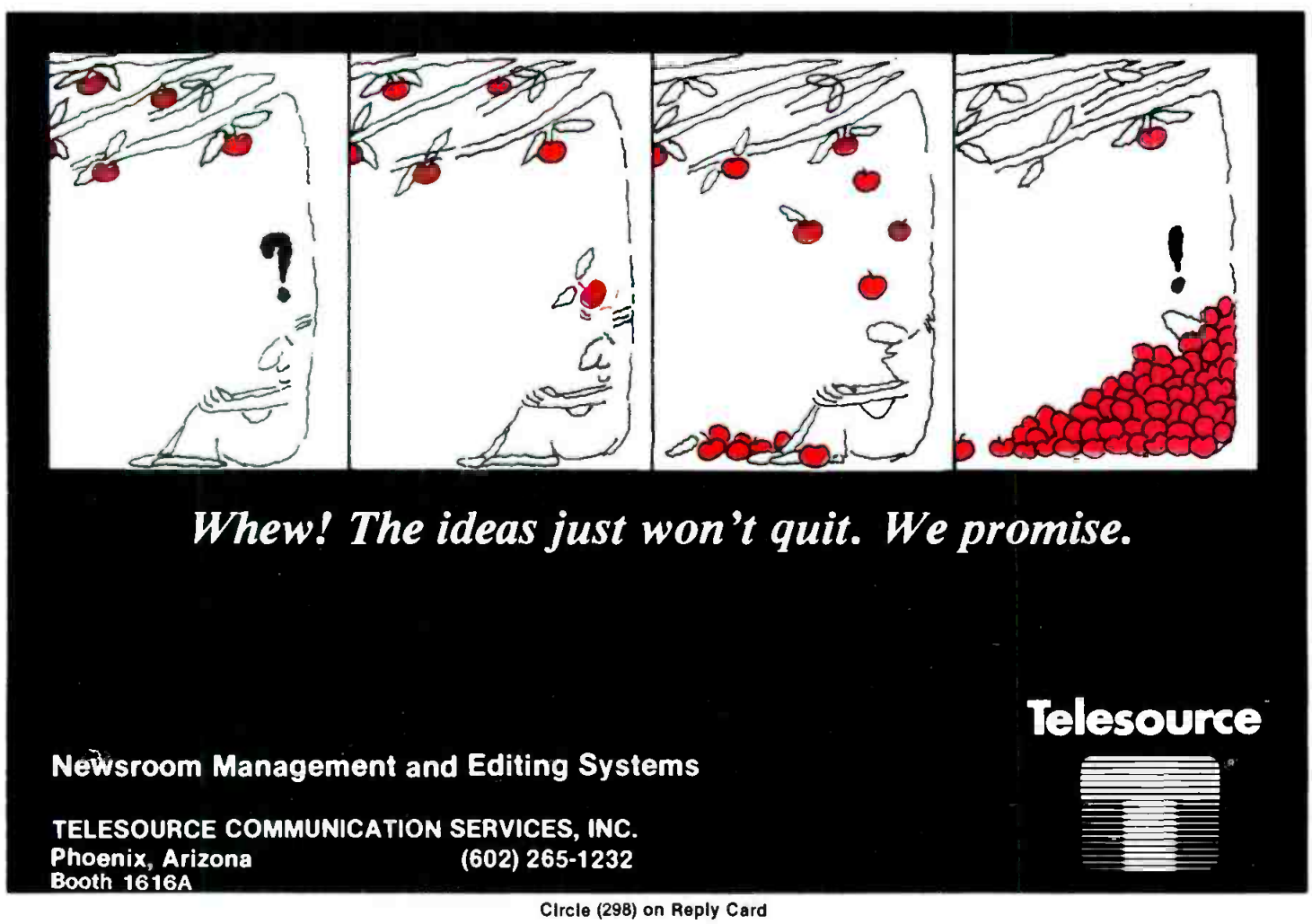

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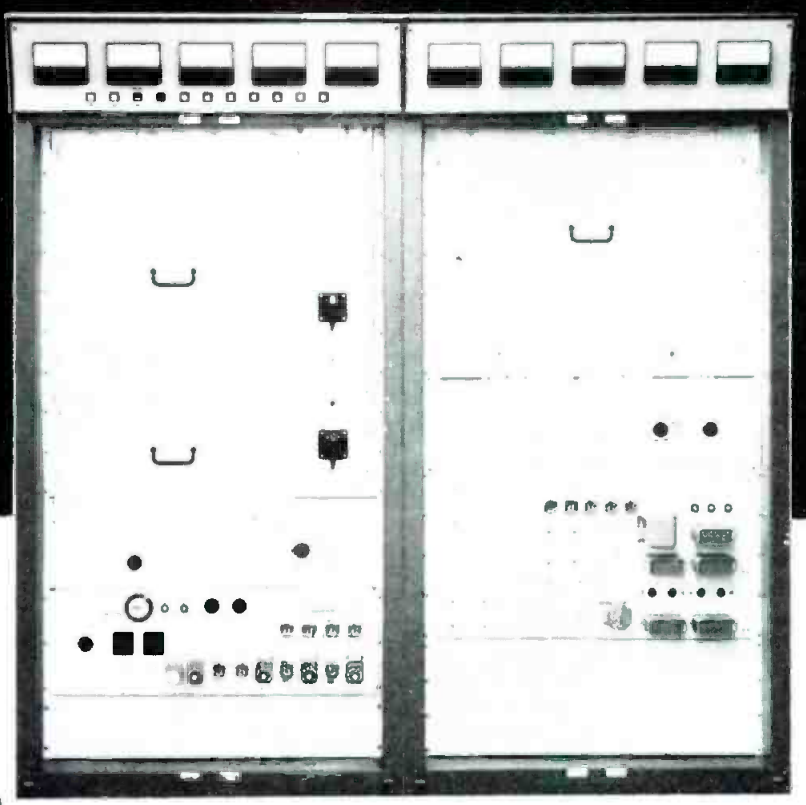

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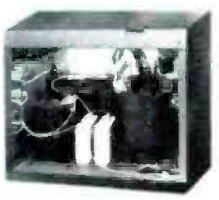

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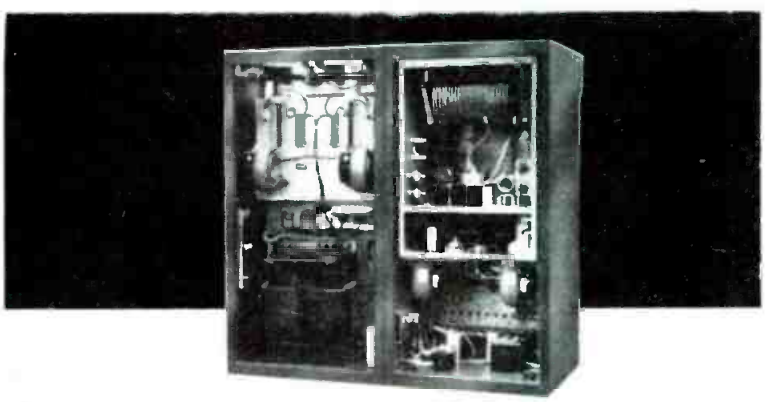

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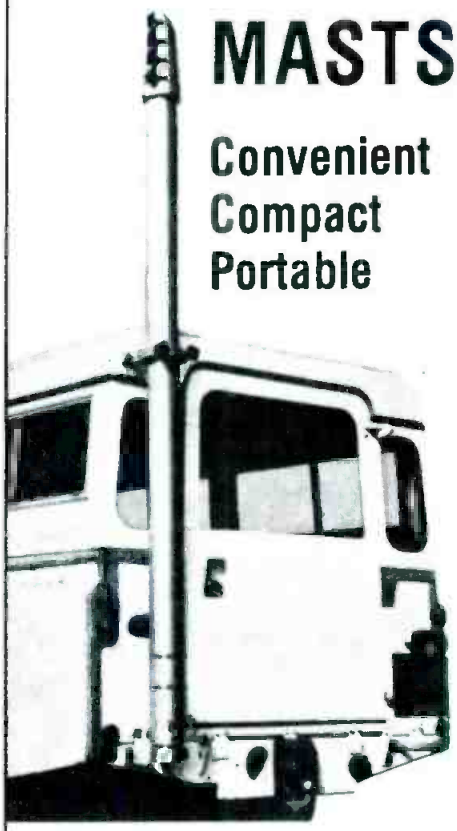

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The Ampex Museum of Magnetic Recording

By Bill Rhodes, editorial director; and Carl Bentz, technical editor

Post-World War II attempts to produce a modern audio recorder included experiments with wire recording. This Electronic Memory Module 80 was produced by the Webster-Chicago Corporation in 1947 and is currently on display in the Ampex museum. The introduction of a tape recorder in 1948 made wire technology obsolete.

On our way to the SMPTE Winter TV Conference in San Francisco, we took a side trip to see a historical first: the Ampex Museum of Magnetic Recording. Although far from being complete, it is an impressive undertaking—for any museum—and especially so for one spearheaded by a manufacturer. Before we go any further, let's be clear about one fact: This is first and foremost a historical museum, directed toward preserving the evolution of magnetic tape and equipment using magnetic tape. It is not a showplace for portraying the founder's leadership in its chosen fields.

As we saw it, Ampex has extended every effort to being thorough in coverage of the subject field and ob-

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jective in selecting technology that represents historical landmarks as they occurred, regardless of the originator.

We found no flaw in the Ampex plan to implement such a museum for historical purposes. But, we would like to point out that this facility is in its formative stage—it is impressive, but far from complete. For this reason, and because we feel comfortable with the discretion in which Ampex has handled this monumental project, we have an appeal for our readers. If you have a piece of historical magnetic tape hardware that needs a home, consider donating it to the Ampex museum.

If you're in the Bay area, the Museum of Magnetic Recording is easily accessible and worth seeing. It is open to groups, but by appointment only. Tours can be arranged by calling the Ampex PR department at 1-415-367-4151; weekdays from 8 a.m.-noon and 1 p.m.-5 p.m.

Museum details

This exhibit of magnetic recording technology has been assembled at Ampex Corporation's headquarters in Redwood City, CA. Equipment on display covers the technology spectrum from a rare 1911 Telegraphone model C wire recorder to today's sophisticated audiotape and videotape recorders. The museum, developed over a 2-year period under the direction of Petet Hammar, curator, represents an investment of more than $1 million.

"Our concept from the beginning was to tell the complete industry story," Hammar said. "We have made the museum as comprehensive as possible, from the earliest wire recorders at the turn of the century to today's state-of-the-art video recorders. Although Ampex is sponsoring this museum, we have included all of the pioneers in the industry."

Working as a consultant to Ampex, Hammar obtained assistance from such industry pioneers as the 3M Company, BASF, AEG-Telefunken, Agfa-Gevaert, Studer and Sony Corporation, as well as as CBS, ABC and NBC, in gathering information and locating equipment for the museum.

Hammar also was able to use the expertise available at Ampex. He worked closely on the project with the late Harold W. Lindsay, who designed America's first professional audio recorder, the Ampex model 200. (Lindsay died in April 1982, shortly before the museum was opened for a preview showing.)

Hammar's extensive research in the United States and Europe turned up rare pieces of equipment for the Ampex Museum, including the fol-

Peter Hammar points out the AEG Magnetophone FT-2 audio recorder, which inspired the modern audio recorders first produced by Ampex after World War II. The Magnetophone on display, produced in 1936, is believed to be the oldest tape recorder currently on display in the United States.

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Hammer reviews the features of an Ampex model 200, the first successful tape recorder produced in the United States. The machine, introduced in 1948, produced just one channel of audio.

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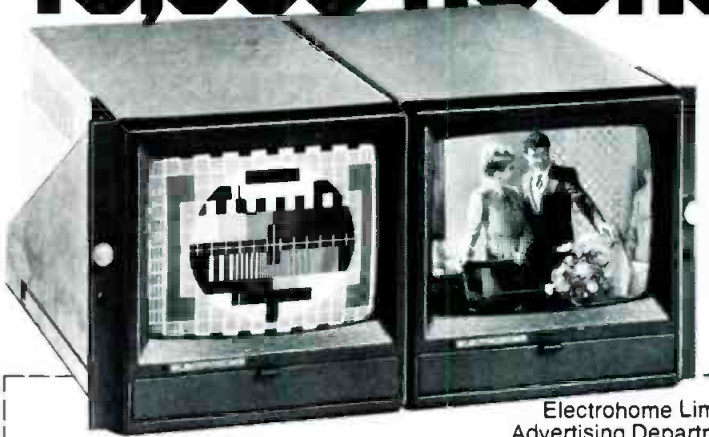

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NAB BOOTH 1767

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The Ampex Museum of Magnetic Recording recounts the history of the technology's development in 28 separate displays. On the left wall are examples of magnetic recording media – including wire, steel band and tape – covering the period from 1898 to 1965. Four examples of early portable and home audiotape recorders are shown at right.

lowing:

- a 1911 Telegraphone model C wire recorder, developed as an automatic telephone-answering device and one of the oldest magnetic recorders on public display in the United States;
- a 1936 AEG Magnetophon FT-2, the oldest tape recorder on exhibit in the United States, and the prototype for the modern audiotape recorder;
- an Ampex model 200 audiotape recorder, first marketed in the United States in 1948, the machine that proved the practicality of magnetic recording in the United States;
- an Ampex VRX-1000, America's first successful VTR, which revolutionized TV broadcasting when it was introduced in 1956;
- an RCA TR-22, America's first all-transistor professional VTR, introduced in 1961;

Hammar shows off one of the centerpieces of the museum, an Ampex VRX-1000 videotape recorder. This machine was the fourth one produced by the company and the first delivered to a customer, the CBS TV Network, in 1956. CBS kept the machine in operation for 22 years, before returning it to Ampex in 1978.

A product of years of refinement

Our well-known Model "F" VHF television transmitter is a sixth-generation design. With solid-state circuits, modular construction and our control logic bypass system, it has proven reliability and cost-effectiveness. Offered in power ratings from 250 W to the 30 kW model shown here, it's available from:

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A message for radio broadcasters from Scientific-Atlanta

Preparing for the next generation of radio

The age of digital satellite radio transmission is beginning now. Here's how to make sure you're a part of it.

Four radio networks are in the process of converting to digital audio program distribution.

In 1983, the networks will begin offering programs available only via satellite. In less than two years, you will lose almost all land-line distributed programming. You need to prepare for the change today.

Why the switch to digital audio?

The signal that can be transmitted by digital satellite to your station is crystal clear and dependable. Distribution is genuinely transparent. The use of a digital audio earth station gives you flexibility you've never had before. Because the earth station is yours, you can use it any way you like to pick up a whole new range of programs from any number of sources. You have, for the first time, full control and flexibility.

Why Scientific-Atlanta?

After carefully studying the options, the technical experts at ABC, CBS, NBC, and RKO independently chose Scientific-Atlanta as the best source for both sending and receiving equipment for digital satellite operation.

Scientific-Atlanta is the pioneer in this type of broadcast equipment. We're the largest manufacturer and installer of earth stations.

The familiar Scientific-Atlanta satellite dishes will soon be in use at network affiliated radio stations all over the U.S.

Because of our advanced technology, our system is also the most cost effective. At the same time, it's the one best suited to the current and future needs of the radio broadcast industry.

There's an added benefit. Because these major networks are all using Scientific-Atlanta equipment, you're guaranteed compatability. Several other networks are also evaluating the system for their own use.

Low cost

The cost of a digital satellite receiver is very reasonable when you consider the technology involved, and the vastly increased programming flexibility that comes along with it.

If you own or lease the station, you get the benefits of available tax credits and depreciation allowances.

Scientific-Atlanta and your affiliated network will help arrange the most advantageous payment plan for you.

What kind of programming?

There are network plans for TV simulcasts, music specials, remotes, overnight and weekend specials.

The effect on your network news coverage will be phenomenal. Because each network will be able to distribute multiple channels, you'll be able to carry live events, more on-the-spots, more extended coverage. You'll be able to receive long-form stereo programing without being interrupted by scheduled news broadcasts.

This is the first major advance in radio technology in thirty years, a chance to increase your program selection, the quality of your signal, your coverage of news events, your appeal and saleability to your public and your advertisers. It gives you the freedom to access and broadcast national programming of every description, something you've never had before.

Installation has started

Over 1000 stations have already made the commitment with Scientific-Atlanta and are planning the installation of their earth stations.

Call for details

For more information about the equipment, call Scientific-Atlanta now. You need to be a part of the next generation of radio. Contact Martha Schulte at (404) 449-2835.

Scientific Atlanta
Telecommunications

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Also included is a display of videotape recorders produced since 1956. The mannequin at the left is holding an Ampex VR-3000, the first portable VTR, introduced in 1967. The larger recorder in the center is an Ampex AVR-1, the industry's first modular system, and to the right is an Ampex VR-2000, the first high band color VTR, introduced in 1964. Not shown is an RCA TR22 VTR, the first all-transistor system.

- a Sony EV-210 helical-scan VTR, one of the earliest recorders in the US market (1964) to use videotape that was just 1-inch wide; and
- an Ampex VR-3000, the first portable VTR to produce a broadcast-quality color picture when it was introduced in 1967.

Also on display is an array of magnetic recording media—wire, steel band and tape—produced from 1898 to 1965.

The museum is arranged in a series of 28 stations, each with its own TV monitor. The traditional photos and text that accompany each piece of historic hardware are augmented by information on the TV screens. The large number of TV monitors sets the exhibit apart from other historic displays. Beginning in 1983, visitors will be able to *call* up on the TV screens computer-generated graphic information according to individual interests.

"Some visitors will want to read the story of how the Beatles became early users in England of multi-track recording when they produced their *Sergeant Pepper* album on an Ampex AG-440," Hammar said. "Others will be more interested in the specifications of recording equipment from that era. The museum-goer makes the choice."

A series of short videotaped mini-documentaries will be added to the TV monitor programming in late 1983. "A push of a button will bring to the screen in color and stereo sound the stories behind the development of audio, data and video recording," he said.

Editor's note:

Ampex is seeking donations of historical equipment related to magnetic recording for its museum. If you have something you wish to have considered, drop a note to Peter Hammar, curator, Museum of Magnetic Recording, Ampex Corporation, 401 Broadway, Redwood City, CA 94063. Describe what you have to offer. But, by all means, write, don't just ship something that may not be needed. Hammar will get in touch with you for further information or to make possible arrangements.

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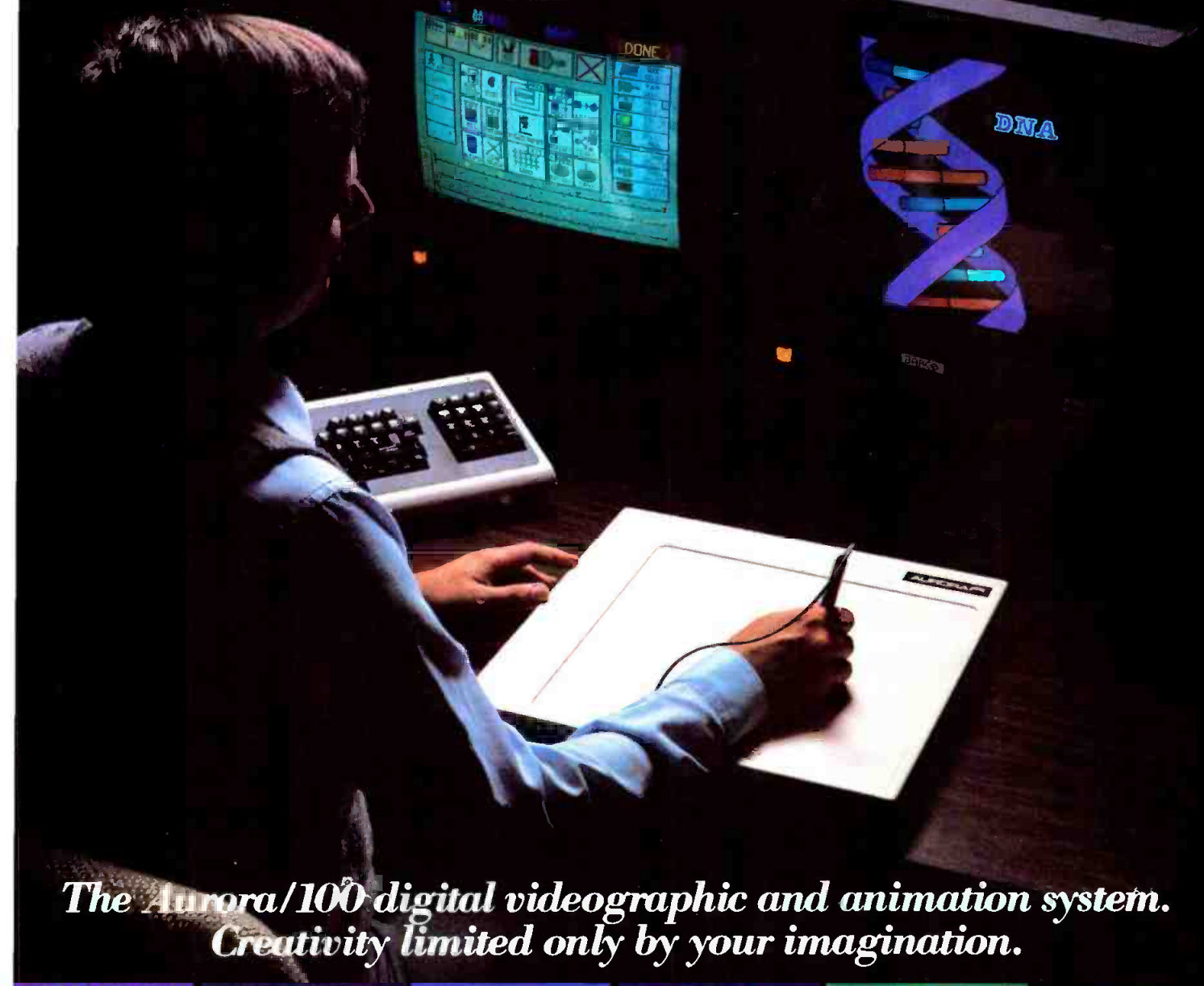

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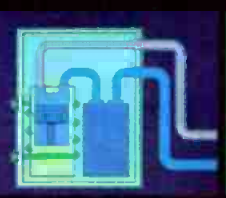

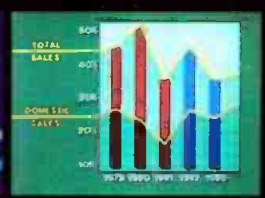

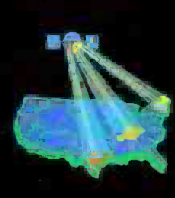

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Digital videographics has come of age. Aurora systems are already in use in NTSC and SECAM broadcast, post production and industrial applications in the U.S., France, Japan and Canada.

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1771 N. Street, NW
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1-202-293-3570

Additional royalty payment should be granted

After reaching a settlement agreement with other parties, the NAB has asked the Copyright Royalty Tribunal to award commercial TV stations 0.8% of the royalties allocated for syndicated programs carried by cable systems in 1980. The tribunal awarded the same share to commercial TV stations in the 1979 proceeding. The agreement is designed to shortcut litigation in Phase II of the 1980 proceeding.

In its motion, the NAB said all of the parties that will be participating in the Phase II royalty distributions support the association's request. It said that if the tribunal grants the motion, neither NAB nor any other party will present evidence regarding NAB's entitlement to royalties allocated for syndicated programming.

NRBA

National Radio Broadcasters' Association

1705 De Sales Street, NW
Washington, DC 20036
1-202-466-2030

FCC daytimer proposals supported

In comments filed recently on FCC Docket #82-538, NRBA supported the commission's proposals to relax certain restrictions currently imposed on the operation of daytime-only AM radio stations. NRBA reiterated its support of the agency's attempts in this proceeding to relieve the restrictions on the operation of daytime-only stations provided that no interference will result to stations operating on cofrequencies or on adjacent frequencies.

"NRBA believes that the elimination of the commission's restrictions on daytime-only operations would further promote the FCC's deregulatory measures by removing the barriers which currently impede daytime-only licensees from responding to their community's needs and interests," the comments stated.

NRBA also called the commission's attention to NRBA's 1980 petition to permit daytimers to obtain nighttime authority as long as the operation of their facility does not create any objectionable interference, prohibited overlap with other stations or conflict with some other principle of sound engineering.

NAB briefs

Susan Elisa Alvarado, assistant for Legislative Affairs to Vice President George Bush, joined NAB's Government Relations Department in February as director, Congressional Affairs. Alvarado previously was the vice president's legislative assistant and from 1976 to 1980 served in that capacity to the Senate's assistant Republican leader. From 1975 to 1976, she was staff assistant to Sen. Ted Stevens (R-AK).

A survey of commercial broadcast stations shows that only 3.1% editorially endorse legally qualified candidates for public office although more than 45% of the nation's broadcasters air other types of editorials. Thirty-five percent said they would endorse candidates if the FCC's political editorializing rule were repealed and an additional 7.7% said they would consider such a move following repeal.

Thomas S. Hayden has been named a regional manager of the NAB for Alabama, Florida, Georgia, Puerto Rico and the Virgin Islands. He succeeds Dan Valentine who will be retiring at the end of April. Hayden formerly was a sales representative for Midwest Corporation, Northeast US region, in the company's Communications System Division.

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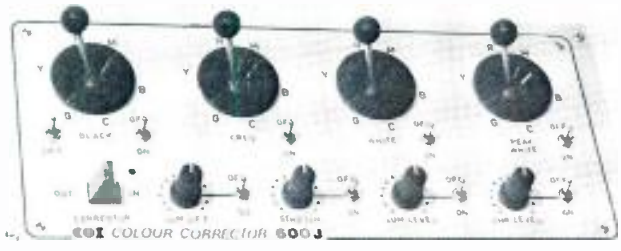

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SMPTE

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Sachtler, Panavision become Sustaining Members

Sachtler Corporation of America, Hauppauge, NY; and Panavision, Tarzana, CA, have become Sustaining Members of the SMPTE. Sachtler manufactures camera support equipment for video and film and equipment for ENG/EFP and small or light studio cameras. Panavision manufactures and supplies precision cinematographic equipment.

Hedlund named a Fellow

Lee V. Hedlund, manager of Electronic Recording Equipment Engineering, RCA Commercial Communications Systems Division, has been elected a Fellow of the SMPTE. Since joining RCA in 1959, Hedlund has held engineering and engineering management positions on projects for the first all-transistorized VTR, the first cartridge VTR and, most recently, the TR-800, RCA's 1-inch helical-scan Type C VTR. Hedlund holds seven patents and has published numerous articles and papers on various aspects of videotape recording.

Since 1977, Hedlund has been an active member of SMPTE's Committee on Video Recording and Reproduction Technology. He also has been an active member of the society's Technical Advisory Group since its inception in 1981. He was an active member of SMPTE working groups that developed standards for Type B and Type C helical-scan recorders.

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FCC update

Continued from page 6

ore-grant review by the FCC, will be used to ensure rule compliance.

In a companion proceeding, the commission has proposed categories of equipment for authorization under the new and expanded procedures. AM, FM and TV transmitters and AM phase monitors, which now require type acceptance, have been proposed for authorization by notification. Transmitters used in the fixed point-to-point microwave services also have been proposed for authorization by the new procedure.

At this point the commission plans to extend its use of the verification procedure only to TV and FM broadcast receivers, which now require certification before marketing. Although the commission would like to make the greatest possible use of verification—because it is the least burdensome authorization procedure—it said it initially would use verification only for equipment categories that seldom undergo major design changes, have no history of causing harmful interference, and for which no major changes are expected in the type of service offered. This will permit greater flexibility and eliminate unnecessary paperwork without jeopardizing the integrity of the authorization process, according to the FCC.

Satellite update

Continued from page 16

by the FCC plan a total of more than 30 channels when fully implemented. The total number of channels available via conventional satellites by 1987 could easily exceed 150.

Overview

The number of channels of satellite-delivered programming will exceed 100 by 1985 and will probably be in the range of 150 to 200 by 1987. Two major factors not discussed that could reduce this projected growth rate are the potential demand for satellite channels (transponders) by telephone networks, and the possibility of TV marketplace control by large corporations.

Several alliances between programming distributors and motion picture studios have been announced recently, with the Justice Department's antitrust division inquiring into agreements between CBS, Columbia Pictures and Time (HBO) to form a motion picture studio, and between MCA, Paramount and Warner Brothers, in a proposed ownership of The Movie Channel.

In future columns, more detailed examinations will be made of each of the major factors that will affect the growth of satellite programming.

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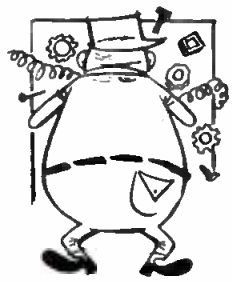

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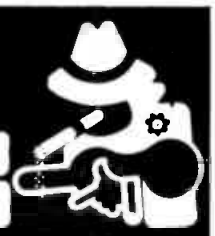

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business

Sony Broadcast to handle MCI in Europe

Following the recent acquisition of MCI by Sony Corporation of America, reorganization of sales and service support for MCI products in certain parts of Europe is taking place. Until all arrangements for local support have been made and finalized, all sales and service support for MCI products in the United Kingdom, Ireland, Yugoslavia, Hungary, Czechoslovakia, Poland and Bulgaria are to be the responsibility of the audio department of Sony Broadcast Ltd., Basingstoke, UK, under its manager, Mike Bennett. MCI customers requiring sales, service or spare parts should contact Bennett at Sony Broadcast Ltd., City Wall House, Basing View, Basingstoke, Hampshire, UK; (0256) 55 011 or telex 85 84 24.

RCA Astro-Electronics wins STC DBS contract

RCA Astro-Electronics has announced that it has been awarded a contract in excess of $100 million to design and build two Direct Broadcast Satellites (DBS) for Satellite Television Corporation (STC), a wholly owned subsidiary of COMSAT (Communications Satellite Corporation).

STC's initial DBS service, the first such system given an FCC permit, will use two satellites to serve an area approximating the Eastern time zone of the United States. STC will offer three channels of pay television beamed directly from the satellites, which will be several times more powerful than conventional commercial satellites, to individual homes equipped with 2- to 2½-foot receiving antennas. The satellites will be launched by either the Space Shuttle or the Ariane rocket. STC has launches scheduled for 1986.

Clear-Com relocates

Clear-Com Intercom Systems has moved to new quarters. The new address is 1111 17th St., San Francisco, CA 94107; 1-415-864-1199.

Taft Broadcasting orders third Harris satellite uplink

WDCA-TV, a Taft Broadcasting station in Washington, DC, has placed an order for a Harris SSL (satellite-to-studio link) video uplink from the Broadcast Division of Harris Corporation. This uplink valued at $475,000, represents Taft Broadcasting's third SSL Video Uplink order from Harris. Other Taft stations operating with Harris uplinks are WDAF-TV, Kansas City, MO, and WBRC-TV, Birmingham, AL.

With Harris TVRO systems in operation at WKRC-TV, Cincinnati, OH; WTVN-TV, Columbus, OH; WRG-TV, Buffalo, NY; and WTAF-TV, Philadelphia, PA, Taft Broadcasting has invested $2 million in satellite broadcast equipment from Harris.

Digital capabilities expanded

Scientific-Atlanta, recently announcing its joint venture with Plessey Company of Great Britain, has concluded agreements to purchase Digital Video Systems, Toronto. John D. Lowry will continue as chairman and chief executive officer of the Canadian subsidiary. The acquisition brings scrambling and other digital capabilities to Scientific-Atlanta.

Businesses acquired

Dynatech Corporation has announced acquisition of ColorGraphics Weather Systems and Weather Central, both of Madison, WI, to enhance the Dynatech presence in the broadcast market. Dynatech, which purchased

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Utah Scientific in 1982, now holds more than 20 companies in medical diagnostics, data switching and communications.

In a parallel acquisition, ColorGraphics Weather Systems has purchased Integrated Technologies Corporation of Kansas City, MO, adding computerized newsroom technology to the corporate organization.

Custom design service provided

IGM Communications now features its System Design Service, which allows stations to specify a custom system. The service offers design, manufacture, programming and installation of custom software/hardware control systems.

NBC to expand NEC switcher

NEC America has accepted a contract from NBC to expand the network's NEC TKA-105 routing switcher. Already the largest switcher in the world, featuring 150 inputs, 270 outputs and 270 controllers, the expanded switcher will have 210 inputs and 360 outputs (75,600 crosspoints) and 360 controllers.

Contracts for SSTS signed

Wold Communications has selected Modulation Associates to supply the SCPC R-SAT receivers and SX 710 SCPC modulators for the Wold Satellite Subcarrier Transmission System (SSTS).

Teletext magazine available

Continuing progress in establishing a teletext service was made in November 1982 when the *KEYFAX* National Teletext Magazine service was launched. In a joint venture, Satellite Syndicated Systems and KEYCOM Electronic Publishing began transmitting the teletext magazine in the vertical blanking interval of the WTBS Satellite Service. The satellite footprint covers more than 4200 cable systems and 22 million homes in the 50 states, Puerto Rico and US Virgin Islands.

KEYFAX is based upon the British-developed World System Teletext technology, with a documented track record of commercial success. Decoders for the service are somewhat limited in the United States at this time. However, WKRC, Cincinnati, and KIRO, Seattle, are both using the technology for magazine services. WKRC, a Taft station, provides *ELECTRA*, a 100-page magazine. KIRO is a member of the Bonneville International group.

Demonstrations of KEYFAX and the World System Teletext technology are available in New York City through British Videotex and Teletext. Appointments to view the demonstration may be arranged through Manning, Selvage & Lee at 1-212-599-6900.

Western CATV named distributor

The Simulsat-3 earth station antenna system by Antenna Technology Corporation, Las Vegas, NV, is now available through Western CATV, Los Angeles; 1-213-539-8030. The antenna, capable of a 60° capture angle, offers a 41dBi minimum gain and has found some popularity with radio and TV facilities requiring multiple satellite pickups.

Vidar Transmission Products acquired

California Microwave has acquired the TRW Vidar commercial digital products for T-carrier transmission, multiplex products for microwave radio and encryption systems for voice and data applications. Sales of the transmission products being acquired were in the $10 to

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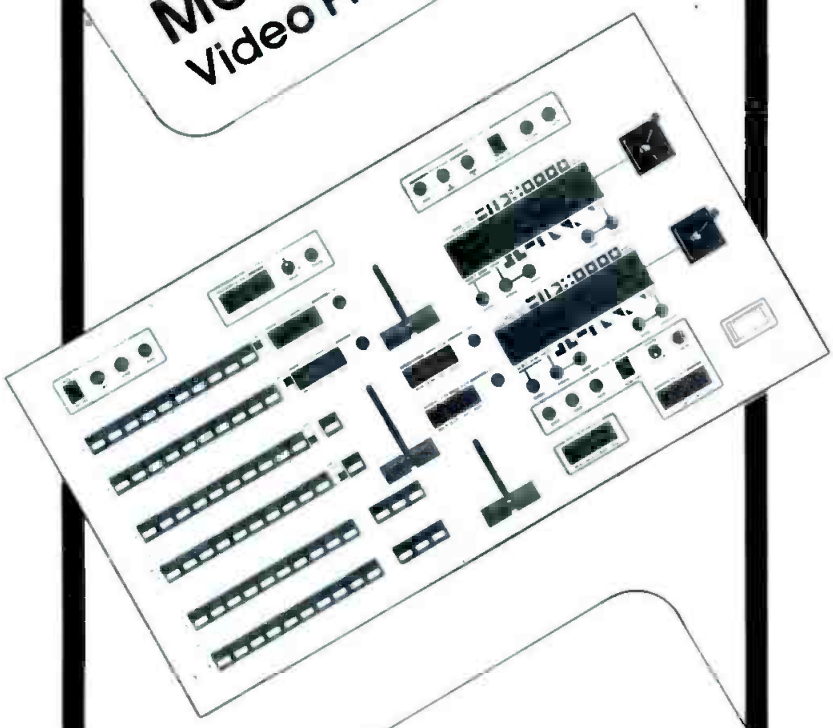

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$15 million range in 1981. TRW will continue in the government transmission business and in the digital switch support business.

US and English TV stations order Harris' IRIS II

Two US TV stations have recently installed Harris' IRIS II digital still-store system and another installation is scheduled to occur in England. The IRIS II, Harris' updated multiuser still-store system, has been installed by Group W Satellite Communications of Stamford, CT, for their Satellite News Channel. In Boston, WNEV-TV

business briefs

The Syracuse University Audio Archives has selected equipment from **MCI/Sony,** Fort Lauderdale, for the world's first sound preservation laboratory. The facility will be devoted to preserving and restoring recorded sound.

Satellite Television Corporation (STC) has purchased 39 acres of land near Las Vegas for construction of a broadcast center to operate with STC's direct broadcast satellite service scheduled to begin in 1986.

Wold Communications has introduced the Satellite Subcarrier Transmission System (SSTS) for a satellite-based delivery system of distant-origin radio programming, such as major league sports.

RCA has announced two new TV stations on the air with the TTU series UHF transmitters. WFSL-TV 47, Lansing, MI, and KCBR-TV 17, Des Moines, IA, have recently purchased transmitters, antennas and studio equipment from RCA.

Plastic Reel Corporation of America (PRCA) has opened a divisional office at 8140 Webb Ave., North Hollywood, CA; 1-213-504-0400. The new facility will provide sales and service of PRCA products, as well as rentals.

Skirpan Lighting Systems, recently acquired by **Dilor Industries,** has established new manufacturing facilities in Kent, WA. In another announcement, the company named **Midlan Technology Corporation,** New York City, as representative of the company in New York, New Jersey and Connecticut.

Pye TVT Ltd. has announced a recent sale of a 1kW Band III TV transmitter to Zambia. The most recent sale follows contracts for two identical transmitters that were installed in that country last year. The new transmitter site is located at Mongu, increasing local coverage and introducing color television to the area.

Neve Electronics' series 51 broadcast consoles, introduced at the November 1981 Tonmeistertangung in Munich, have been placed worldwide. More than 80 systems, standard and custom, now serve audio production facilities in the United States, Japan, Australia, the Middle East, Europe and the United Kingdom.

Marconi Communication Systems has played a large part in the new Channel 4 and S4C TV services in the United Kingdom. Of 15 installations, 12 use dual B7445 15kW transmitters and three include one

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began operating with IRIS II last September as part of its changed news format. WNEV-TV also anticipates the use of the IRIS II during fall election broadcasts. Anglia TV of Norwich, England, has recently purchased Harris' PAL system.

Production house upgrades

Recently installed at Snazelle Film and Tape, a Videomedia Z6000-E editing control system oversees operation of a Grass Valley 1600 1X with serial E-MEM and Sony BVU-800 and 5850 VTRs.

B7445 and one B7442 4/5kW transmitters.

Kahn Communications has introduced a new company called **Kahn Consumer Products.** Its initial product will be the AM stereo/FM stereo tuner, emphasizing quality within the AM section. The design includes a decoder for the Kahn/Hazeltine AM stereo technology.

Hughes Helicopters has received the FAA's certification of the model 500E single-turbine commercial helicopter. During flight tests, the E model has achieved speeds to 175 mph. An optional internal fuel tank allows a range of 400 miles at 500 feet.

Harris Video Systems has announced the sale of IRIS II still-store systems to **ABC** and **ATC** Corporations. The IRIS II system includes Digifont character generation in the Harris Digigraphix system. **Chyron** assisted Harris in the design of the new feature.

Dyma Engineering has established new facilities at 367 Main SW, P.O. Box 1535, Los Lunas, NM 87031; 1-505-865-6700. The new location improves warehousing of equipment available for broadcast, LPTV and CATV industries.

Elector of Santa Clara, CA, has agreed with **Barco Industries** of Belgium to market the complete line of Barco video and communications products in the United States. An East Coast location will be established. Elector is a subsidiary of **Electro & Optical Systems Ltd.,** Toronto.

Convergence Corporation has installed ECS-104 editing systems with list management for **California Communications,** a Hollywood post-production facility, and for **Opryland Productions,** Nashville, TN. The Opryland system also includes the ME-100 mix effects system.

Sony Broadcast has received orders from **CFTO Television,** Toronto, for 10 BVW-3 Betacam VTR systems initially. An option for further units is included. At the same time, **NHK,** the Japanese National Broadcasting Network, has placed orders for 63 BVW-1N single-tube systems and 71 BVW-10 Betacam players.

Joseph Schneider Optische Werke Kreuznach GmbH & Company KG, after a recent reorganization, is fully operational, supplying **Schneider** TV lens systems through **Tele-Cine Corporation** to the US and Canadian markets.

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IDEA #1 . . . VBB 1, the Video Building Block

The VBB-1, our broadcast video line driver . . . a hybrid differential amp with excellent frequency response, differential phase and differential gain . . . is complete in one device.

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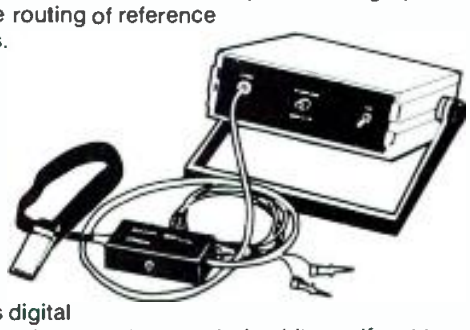

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What You Should Know Before Buying a Character Generator:

The Dubner CBG-I

There are scores of character generators on the market today. With so many manufacturers and models to choose from, it's hard to know what's important. Here's what to look for:

Reputation: Does the product have a proven track record? Are others using it successfully in a situation like yours? After delivery, can you count on the manufacturer for continued software updates?

Ease of Use: The system should be user-friendly. Can you select fonts and colors at the touch of a button, or are special "system modes" required? Are the prompts in plain English? Time spent battling the machine is time lost for production.

Capacity: Do you need hundreds of fonts and thousands of pages available on-line? If so, a high-speed, large-capacity disk is essential. What about colors? How many can be displayed at one time? How many do you have to choose from?

Font Flexibility: How many fonts are available from the manufacturer, and how easy is it to create your own? Can you change the size of an existing font? Create many types of edges? Type on an angle? Are there any limits to the size or number of colors in a character?

Background Capability: A "background" can be more than simple horizontal stripes. A good system will let you create complex images as backgrounds.

Extras: What does the system offer besides the standard rolls and crawls? Dissolves? Wipes? Zooms? Frame by frame animation?

Expansion: Can the system grow with you? Does it offer options that can make it more than a simple character generator? Can it do weather graphics? Election reporting?

When you consider these points, be sure to consider the Dubner CBG-1. The CBG-1 offers all the features you'd expect from a state of the art character generator, and one important extra—it can grow into the Emmy award winning CBG-2, with its animation capability, painting system and 3-D image creation. You get all of this and at a price that will surprise you.

For a free demonstration of the Dubner CBG-1 or CBG-2, call (201) 592-6500 or write:

DUBNER COMPUTER SYSTEMS INC.
158 Linwood Plaza, Fort Lee, New Jersey 07024

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calendar

March-May

The Radio-Television News Directors Association has scheduled the following regional meetings:

- Region 9 with Georgia and Alabama UPI broadcasters, March 24-26, at the Holiday Inn, Gulf Shores, AL;
- Region 11, April 9, at Curry College, Milton, MA;
- Region 1 with SPJ/SDX at the Sheraton Spokane, Spokane, WA;
- Region 14 with Georgia UPI broadcasters at the Stadium Hotel, April 22-23, Atlanta, GA;
- Region 13, May 7, with Virginia AP broadcasters at the Sheraton Fredricksburg Inn, Fredricksburg, VA;
- Region 14 with Florida AP broadcasters at Busch Gardens, May 14, Tampa, FL; and
- Region 12 with Pennsylvania AP broadcasters, May 20-22, at the Pittsburgh Hyatt, Pittsburgh, PA.

For more information, contact: RTNDA, 1735 DeSales St. NW, Washington, DC 20036; 1-202-737-8657.

March-June

The Institute for Graphic Communications, specializing in small-group, intensive 2-day conferences for manufacturers and users, has announced its early 1983 schedule of conferences. Conference titles include: *Optical Videodisc Systems; Electronic Imaging; HDTV Systems; Interactive Integration of Text and Pictures;* and *Direct Broadcast Satellite Systems.*

For more information on dates and exact locations of the conferences, contact: Richard Murray, Director of Conferences, Institute for Graphic Communication, 375 Commonwealth Ave., Boston MA 02115; 1-617-267-9425.

April

George Washington University, Washington, DC, has announced its Continuing Engineering Education courses to be held in Washington, DC, and San Diego, CA. Course subjects include: Antennas and Arrays; Microwave Systems Planning; Advances in Electronic Technology I; Advanced Topics in Digital Signal Processing, Advanced Radar Technology; Advances in Electronics Technology II; and Modern Air-To-Air Radar Systems. For more information, contact Douglas Green at 1-202-676-8512.

April 5-8

For the first time, a Japanese telecommunications show will be exhibiting products of non-Japanese manufacturers when *Communications Tokyo 83* takes place at the Tokyo Ryutsu Center. A US pavilion will house US exhibitors. Clapp & Poliak International, a division of Clapp & Poliak, the international exhibition and conference management firm, has been appointed to organize the pavilion by the Communication Industries Association of Japan, which sponsors the exhibition.

The US pavilion has been endorsed by the US Electronics Industries Association, which hailed the event as "another step in the continuing effort to open the Japanese telecommunications market to non-Japanese equipment."

Products to be exhibited include the following: late technology and new products, including software for telecommunication instruments, systems and related products; major products for sales promotion; switching equipment; telephone application equipment, such as key telephone, telephone supplemental equipment and emergency call units; carrier transmission equipment; radio communication equipment; and telecommunication components.

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For more information, contact Clapp & Poliak International, P.O. Box 70007, Washington, DC 20088; 1-301-657-3090.

April 10-13

The *NAB 61st Annual Convention and Exhibition* will be held at the Convention Center in Las Vegas, NV. The convention is divided into three main areas—Radio: The Name of the Game is the Bottom Line; TV: An Industry in Transition; and Engineering: Keeping Pace with the State-of-the-Art.

The show, which features radio seminars, discussions of TV trends, exhibits and demonstrations, will be kicked off with the State-of-The-Industry Address given by NAB's new president, Edward Fritts. Following the address, the Distinguished Service Award will be presented to an outstanding industry representative. The Oak Ridge Boys will perform Sunday night and Bill Cosby will close the convention on Wednesday, April 13. For more information, contact: NAB Convention Information, 1771 N St. NW, Washington, DC 20036.

April 14-16

The *1983 International Conference on Acoustics, Speech and Signal Processing (ICASSP)* sponsored by the IEEE Acoustics, Speech and Signal Processing Society, is the eighth in a series of international conferences devoted to experimental and theoretical aspects of signal processing, speech and acoustics. The conference will be held at the Sheraton Boston Hotel, Boston, MA. For registration information, contact: Jae S. Lim, Massachusetts Institute of Technology, Elect. Eng. & Computer Science, Room 36-657, 77 Massachusetts Ave., Cambridge, MA 02139; 1-617-253-8143.

April 25-27

Satcom '83, sponsored by the International Association of Satellite Users, will be held at the Hyatt Orlando, Orlando, FL. The Third Annual SATCOM Conference and Exhibition will cover broad satellite industry topics and issues ranging from the newest satellite user applications to future satellite systems designed for the '80s and '90s.

For more information, contact Dr. Kerry Joels, program chairman, at 1-202-357-2828.

May 3-7

NOR-COM '83, a major new international exhibition and conference featuring all aspects of civil and military communications will make its debut in Oslo, Norway. Areas to be covered include radio communications and mobile telephone systems, telephones and telephone equipment, systems for computer, data and text transmission, satellite communications and broadcasting and related activities.

For more information, contact: Karin Mehren at 1-212-421-9210 or John Ogilvie at 1-212-267-5250.

May 29-June 2, 1983

The *13th International TV Symposium* will be held in Montreux, Switzerland. A technical exhibition is also planned. Session topics include the following: wireless TV broadcasting, cable TV broadcasting, digitization of video signals, high definition television and home terminals. For more information, contact the International TV Symposium and Exhibition, P.O. Box 122, CH-1820, Montreux, Switzerland.

What You Should Know Before Buying an Animation System

The Dubner CBG-2

Many companies are offering advanced video graphics and animation systems. But all are not alike. To make sure you're getting exactly what you need, ask yourself these questions:

Reputation: Is the manufacturer recognized as an industry leader? Do they provide adequate training and ongoing support? How do previous buyers feel about the product?

Painting: Electronic "painting" allows an artist to draw images directly on the screen. What kind of "brushes" are available? Can you create your own? Can you cut and paste?

Geometrics: Are there any aids for creating geometric objects? Straight lines? Circles and ellipses? Curves? 3-D objects? What about surfaces and hidden line removal?

Text: Letters and symbols are an important part of graphic design. How easy is it to enter text? Do you have a wide choice of fonts and colors? Can characters be typed and repositioned directly on the screen?

Manipulation: Once an image is in the system, can it be modified? Scaled? Tilted? Repositioned? Recolored? Rotated with perspective? Can you magnify the image and change it at the pixel level?

Animation: What sorts of animation possibilities does the system offer? Color animation? Simple motion? True cel animation? Can you transform one object into another? What kind of aids are available to speed the process?

Storage and Playback: How many frames can you store on-line? Does image quality degrade in successive generations? Can a series of images be played back in real time, or is an external single frame recorder required?

All advanced video graphic systems include some of these features, but only one has them all—the Dubner CBG-2. Dubner's industry leadership has been recognized by the 1982 Emmy award for outstanding engineering development.

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

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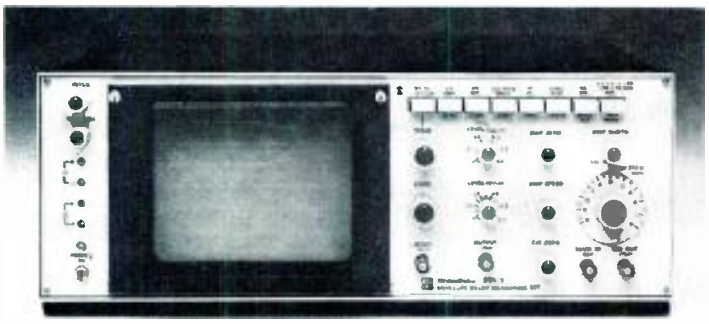

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This compact unit measures the envelope delay in video transmission equipment quickly and accurately. It displays both delay and amplitude response simultaneously on a large, easy-to-read screen. A built-in sweep and CW generator measures delays up to 200kHz–10MHz. An internal sync generator measures systems with clamp controls. Sweep speed control and fixed frequency markers help you take more accurate readings, keeping errors to an absolute minimum.

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- **Available in NTSC; PAL B, M, N; and SECAM systems.**

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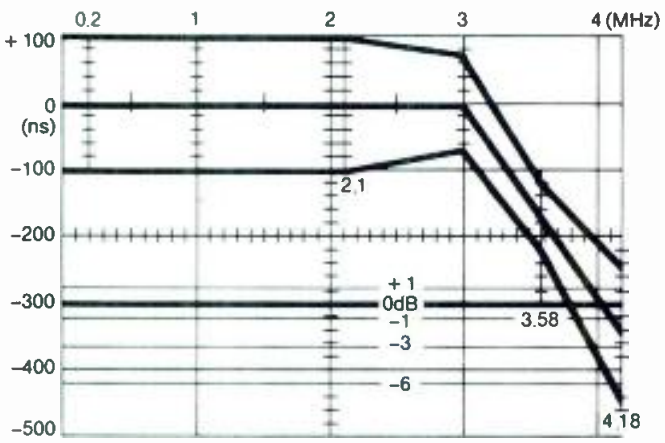

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people

Michael Bock has been named chief of engineering operations at WMAQ-AM in Chicago. He comes to WMAQ from WNBC-AM in New York, where he previously served as a Group 6 engineer.

John E. Cunningham, senior technical director, Cleveland Institute of Electronics, died on Jan. 15. A licensed professional engineer in Ohio, Cunningham was dedicated to the electronics field and the home study method of teaching. He joined CIE in 1968. Almost all of his engineering education was acquired through home study. Cunningham's teaching experience included teaching courses in engineering mathematics at General Electric and Canoga Electronics Corporation. He authored numerous technical books and articles on electronics, especially in the areas of security electronics and broadcasting. He also served as editor for *The Electron* newspaper. He was active in many professional and civic organizations including Recovery; IEEE Cleveland Chapter; and the Cleveland Engineering Society. Cunningham was listed in the 1979 *Who's Who in the Midwest.*

H. Ward Gebhardt has been named director of Marketing and **Gary Schultz** has been named product manager for CMX Systems, a division of Orrox Corporation. Gebhardt was formerly director of International Marketing at Altos Computer Systems. Schultz, who will be responsible for product management of the company's computer-assisted videotape editing system, THE EDGE, was formerly product specialist at CMX.

J. E. "Ed" Risk, vice president for Engineering, Pulitzer Broadcast Stations, whose career has spanned the development of the TV industry itself, retired from the company last December. Risk began his career in radio with the Pulitzer Publishing Company in 1939 as an engineer with KSD Radio. One of his first assignments was handling the "remote" broadcasts of dance bands from area hotels and ballrooms, but in late 1946, he moved over to that then-new medium, television. He brought in the first equipment and was there when St. Louis' first TV station, KSDK (then known as KSD-TV) went on-the-air on Feb. 8, 1947. He became chief engineer for both KSD Radio and KSD-TV in 1948; director of Engineering for both in 1973; and vice president of Engineering in 1979.

W. Bart Bielawski has been named vice president of Siecor Corporation and general manager of Siecor FiberLAN. Bielawski had been part of Siecor Optical Cable's management team since its inception in 1977 when he was named vice president of Sales and Marketing.

John Hoge has been appointed manager of Transducer Research and Development at JBL. As department manager, Hoge directs the transducer engineering staff in investigating, developing and improving component loudspeaker and system designs.

COMSAT has announced the appointment of **Francois Giorgio** as vice president, INTELSAT Engineering and Development, COMSAT World Systems Division.

Hiroaki Minoshima has been named president of Fujinon. Minoshima joined the parent company, in Japan, in 1954, as manager of the Accounting Division, and transferred to Fujinon in 1977, where he has served as ex-

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ecutive vice president until his recent promotion.

Siecor FiberLAN has made the following announcements: **Dr. J. Richard Jones** has been named director of engineering; **Alan B. Mann** has been appointed manager of systems integration; and **Allen W. Dawson, Jr.**, has been named administrator.

Augat Fiberoptics has named **James I. Ravita** to the newly created position of applications engineer. Before joining Augat Fiberoptics, Jim was a design engineer with ITT Electro-Optical Products Division in Roanoke, VA, with previous background from Northrop Page.

Robert D. MacCormack has been elected president and chief executive officer of BTX Corporation. He succeeds **David Krumholtz,** a founder and director, who becomes manager of product development. In another announcement, the company named **Michael L. Sipsey** vice president of Marketing, a new position with the company.

Dilor Industries Ltd. has announced the appointment of **Martin Moore** as its representative for New York, New Jersey and Connecticut.

California Microwave has promoted **David M. Hammond** to area sales manager/East Coast for the Telecommunications Division. Hammond was previously Southeastern regional sales manager. In his new position, he is responsible for all sales activities east of the Mississippi.

Terry Borchers has been named national sales manager for Mycro-Tek's video products. Borchers will be responsible for locating qualified distributors and for developing distributorship agreements. Distributorships will be set up for a variety of markets, including cable, LPTV, broadcast television and industrial television.

Victor Duncan has announced the addition of **Kirk Paulsen** to the position of video rental coordinator in its Chicago office. Paulsen comes to Victor Duncan with several years' experience in consumer/industrial video equipment, editing systems and production. The company has also announced that **John Duty** has joined the staff as sales representative in the Chicago branch office.

Microdyne Corporation has announced the promotion of **David L. Alvarez** to vice president of Marketing for its Satellite Communications Division. Alvarez has been with Microdyne for 11 years and was promoted from his position as director of Marketing.

Jerry Cudlipp has joined the staff of Tele-Measurements as a broadcast sales specialist. Cudlipp's major responsibilities are in the areas of broadcasting and TV production.

Laurence J. Thorpe has been appointed manager, camera products, for Sony Broadcast Products Company. Thorpe will be responsible for the marketing and product planning of all Sony Broadcast camera products in the US market.

Gary Persons has joined Cetec Broadcast Group as radio systems sales manager. Persons will direct field sales of Cetec's System 7000 and 7000CLS program automation system and MAPS computer-based business systems.

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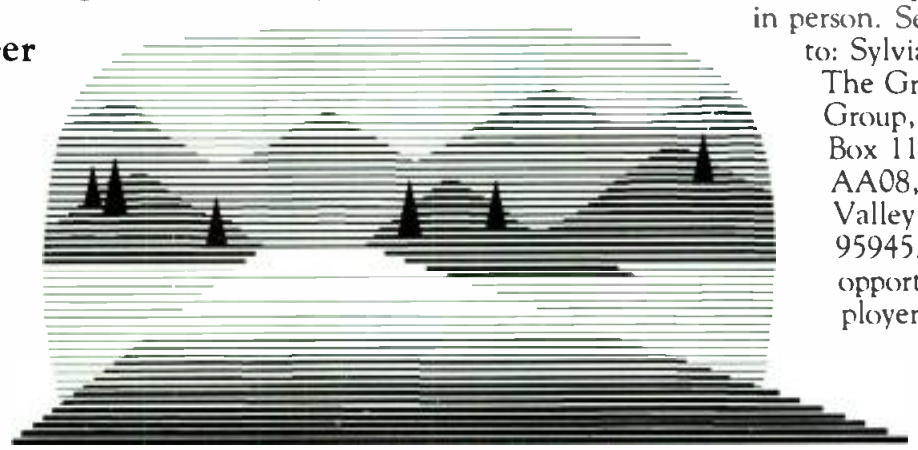

Grass Valley Group

A TEKTRONIX COMPANY

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ENGINEER/TECHNICIAN WITH EXPERIENCE in studio maintenance RCA quad, Ampex 1", Sony, JVC, Panasonic ¾", and TBC's. Salary: DOE. To work in Alaska's largest city. Contact Ron Moore, KTVA-TV, 1007 W. 32nd Ave., Anchorage, AK 99503, (907) 272-3456. An EEO Employer. 3-83-2t

TELEVISION STUDIO MAINTENANCE ENGINEER. Require technical school graduate. Experienced in ENG and ¾ inch editing systems. Send resume to Chief Engineer, WKRC-TV, 1906 Highland Avenue, Cincinnati, Ohio 45219. 3-83-1t

TRANSMITTER SUPERVISOR: Immediate openings. Strong RF background. UHF experience preferred. Ability to work unsuperivsed. Openings at two locations: KTXA-TV 21, Arlington, Texas and KTXH-TV 20, Houston, Texas. Salary commensurate with experience. Send resume to Ed Reid, Director of Engineering, KTXA-TV 21, 1712 E. Randol Mill Rd., Arlington, TX 76011. An Equal Opportunity Employer. 3-83-2t

CHIEF ENGINEER – small market television station in the west seeks experienced engineer interested in exciting opportunity in one of America's most liveable areas. Should be familiar in all phases of television technology. Dept. 586, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 3-83-2t

TELEVISION MAINTENANCE ENGINEERS
CABLE NEWS NETWORK

The leading news system in satellite communications has career opportunities for broadcast maintenance engineers. Openings are now available in Atlanta for engineers experienced in studio and ENG equipment maintenance. CNN, as a part of Turner Broadcasting System, offers an excellent benefit and compensation program. Interested maintenance engineers may call (404) 898-8700 between 9 A.M. and 5 P.M., Monday-Friday, Eastern time, or send resume in complete confidence to:

TURNER BROADCASTING SYSTEM, INC.
1050 Techwood Drive
Atlanta, Georgia 30318
Attn.: Jim Brown
TBSI is an equal opportunity employer. 3-83-1t

WANTED, VIDE TECHNICIAN, Maintenance experience required. ENG experience preferred. Great opportunity for Operations Engineer, doing some maintenance to move into a maintenance oriented position. Live and work in a warm resort community. Contact: John Ross, Chief Engineer, KIII-TV, P.O. Box 6669, Corpus Christi, TX 78411, (512) 854-4733. 3-83-2t

ELECTRICAL ENGINEER
VIDEO SYSTEMS

Outstanding opportunity to become part of a leading contract R&D organization involved in video technology, i.e., image processing, tape recording, editing and storage tubes.

Position requires a BSEE or equivalent, and 3-7 years experience with video displays, discs, and related technologies.

Competitive starting salary with full range benefits offered. Reply with resume and salary specifics to: *J.C. ANDERSON, Dept. VSB.*

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10 West 35th Street
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WTVF NASHVILLE

Audio/Video Maintenance Technician needed to repair various technical equipment. General class FCC license required. Send resume to: Bill Nunley, WTVF, 474 James Robertson Parkway, Nashville, TN. 37219. An Equal Opportunity Employer M/F. 3-82-2t

TOP DOLLAR FOR RIGHT PERSON. We're a major market, state-of-the-art TV production facility with CMX, Chyron IV, Grass Valley, DVE, Quantel, Ikegami cameras, Sony 1", RCA TR600's, and BVU-800's. We need a very experienced engineer strong on maintenance and some operation. We're good, we're growing and we're going to make the right person a very attractive proposal. Call (215) 568-4134, Mr. Schwartz. 2-83-1t

VIDEO DESIGN ENGINEER WANTED

Lenco Electronics is in need of an innovative video design engineer, knowledgeable in the design and development of analog and digital audio and video products.

Experience in state-of-the-art digital technology is a requirement and engineering management experience is preferred. The individual we select must be familiar with television broadcast products with a minimum experience of 5 years in design. **BSEE** or equivalent is required.

For immediate consideration, forward resume to Bruce Blair, Chief Engineer, Lenco Electronics, 300 North Maryland Street, Jackson, Missouri. 63755.

–AN EQUAL OPPORTUNITY EMPLOYER–

Microwave Radio Engineer

For HBO's new Satellite Communications Center

HBO, a wholly owned subsidiary of Time Inc., is building a new Satellite Communications Center in Hauppague, Long Island. The facility will start with four 11-meter uplink dishes and will include on-site origination facilities for HBO and Cinemax as well as other Time Inc. Video Group projects.

To be responsible initially for installing and integrating all microwave transmitters and antennas at the new facility and then to maintain systems at optimum efficiency.

Applicants must be experts in R/F satellite communications involving video voice and data. A BSEE is preferred plus a minimum of 5 years relevant experience with an emphasis on operations and maintenance. A 1st class Radio Telephone License or equivalent is essential.

We offer a good salary and the all inclusive Time Inc. benefits.

Please send your resume including salary history to Scott Tipton, Director of RF Systems, Box CST, HBO Studio Productions, 120A East 23rd Street, New York, NY 10010.

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HELP WANTED (CONT.)

ENGINEERING – CHIEF ENGINEER ASSISTANT: Ground Floor Opportunity In Broadcasting! · Our Telecommunications Div. seeks an Assistant to Chief Engineer to work with the latest radio, TV and satellite systems at our West Windsor, N.J. campus. You'll be involved in working on public radio station WWFM, a county-wide cable TV network, closed circuit TV and academic programs in radio and television. Position requires an FCC 1st or General license, experience in radio and/or TV construction and maintenance and preferably a two or four year college degree. SBE certification a plus. Salary range, $12,618 to $22,535. Actual salary dependent on experience, excellent benefits. Work in an academic environment. Send resume to: MERCER COUNTY COMMUNITY COLLEGE, Personnel Services, Dept. GS, P.O. Box B, Trenton, N.J. 08690. Equal Opportunity/Affirmative Action Employer. 3-83-1t

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VIDEO TECH HIGHLY SKILLED, international experience. Available for short term positions, anywhere. Personable. Skilled in all production areas. Contact Bruce Teed, (413) 586-6592. 3-83-1t

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Broadcast Systems Engineers

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The National Broadcasting Company now has a number of excellent opportunities for qualified Electronic Maintenance Engineers, Draftsmen, and Broadcast Systems Engineers at our West Coast Burbank facility.

The individuals we seek should have experience in broadcast systems technology or a background that reflects training, education and/or practical experience in a related complex electronics field. A BSEE is an added plus.

Successful candidates will become directly involved in providing vital technical support to sports, entertainment and daytime shows. You will work on the latest cameras, recorders and RF equipment on state-of-the-art studio, graphics and video systems; on Grass Valley Switchers, character generators, Quantel digital effects equipment, Convergence and CMX editing systems. A knowledge of digital techniques and microprocessing is desirable.

NBC is committed to the future of broadcasting. If your enthusiasm can match ours, and you know you can contribute to our efforts, we'd like to hear from you. We offer salaries commensurate with experience and a comprehensive benefits package. Please send resume with salary requirements to:

Employment Dept. — BE
3000 W. Alameda Avenue Burbank, California 91523

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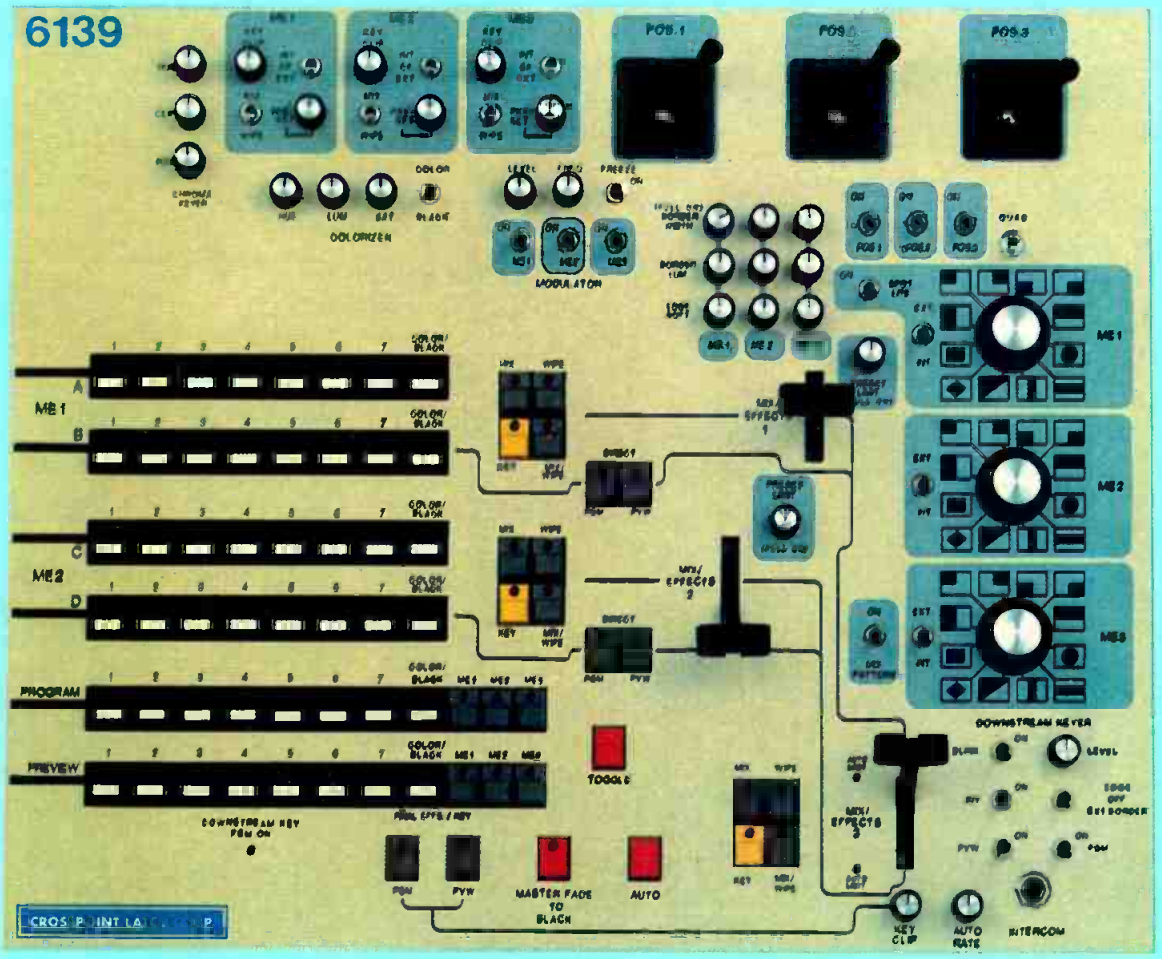
THE 6139
AN IMPECCABLE SWITCHER
FOR THOSE WITH IMPECCABLE TASTE

8, 16, OR 24 INPUTS

The **6139** is an extremely high quality video switcher. Its modern, state of the art design and components, yield a performance that is unexcelled.

Its **BLANKING PROCESSOR**, like a miniature proc. amp. introduces a very clean and stable sync and burst on the outgoing video, completely eliminating jumps and color shifts at the end of a mix or wipe.

8 INPUTS $14,500
24 INPUTS
with rotary wipes, chroma keyer and Auto Drive™ with editor control $49,020



Apart from its extremely high signal quality, absolutely superb performance and rock stable circuitry, the **6139** has many innovative features. It is **FIELD EXPANDABLE** to a **16** input unit. The **6139** has a special test mode which greatly simplifies system timing; its blanking processor then completely eliminates the effects of the external residual timing errors.

The **6139** is a producers dream come true. It can wipe or mix from one effect to another; display portions of five video signals at the same time, with a downstream key superimposed over the five and then fade all six signals to black. Its **ROTARY WIPE** option, pattern modulator, colored borders and multiple keys, provide a wide range of creative effects.

- **THREE MIX-EFFECTS SYSTEMS EACH WITH IT'S OWN KEYER**
- **DOWNSTREAM KEYER WITH EDGER**
- **DOUBLE RE-ENTRY ON EACH M.E.**
- **AUTOMATIC FADER ON M.E. 3**
- **QUAD SPLIT**
- **MIX PATTERNS (PATTERNS DISSOLVE)**
- **FINAL EFFECT PERMITS FIVE VIDEO SIGNALS TO BE DISPLAYED TOGETHER — PLUS D.S.K.**
- **BACK PORCH FEED BACK CLAMPS**

EDITOR INTERFACE with direct control from the editor keyboard via either the **6403** Editor Switcher Interface or the **7200 AUTO DRIVE™** computer controller.

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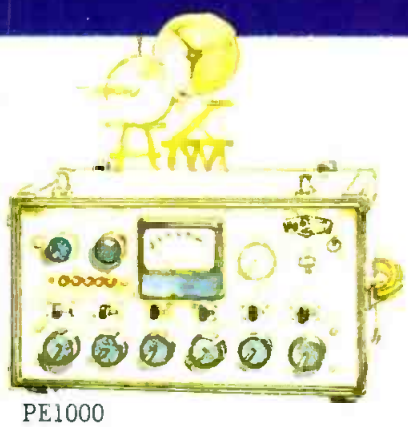
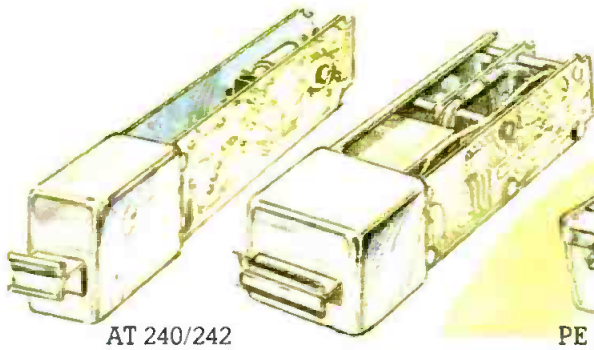
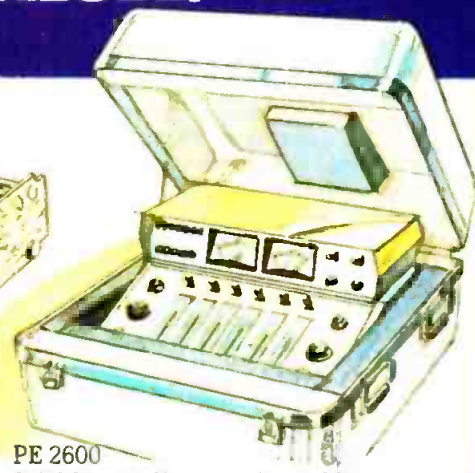
After 34 years in broadcasting, McCurdy has built more than a sound reputation.



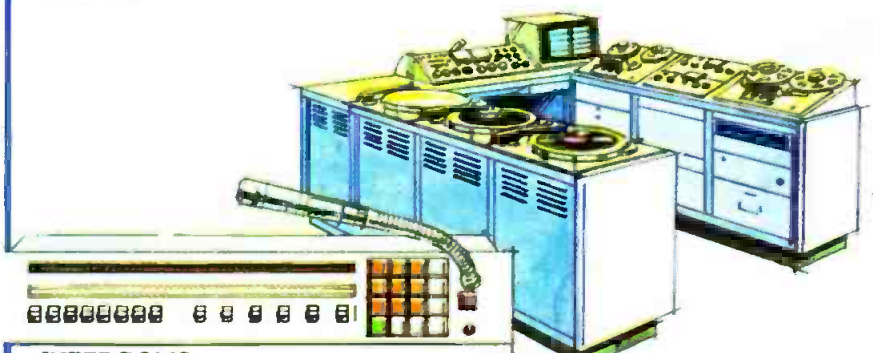
PE1000
First portable console with full studio capability.



AT 240/242
Universal audio amplifiers.

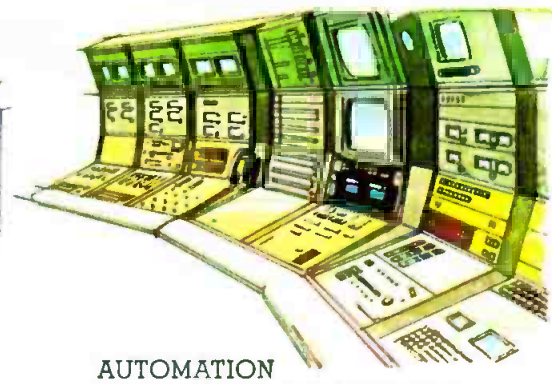


PE 2600
Solid State, self-powered portable mixing console.



INTERCOMS
Microprocessor based programmable intercom systems.

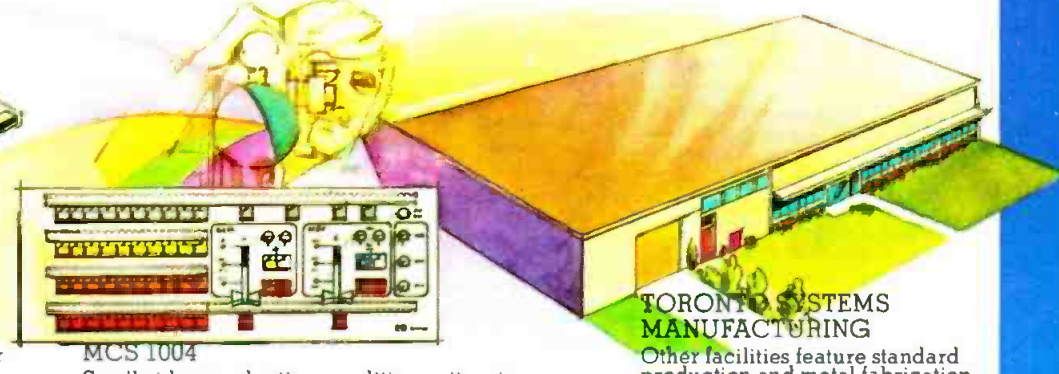
SS 4000
First pre-packaged complete master control system.



AUTOMATION
Computer based, multi-bus network routing systems.

SS 8900
Multi-track production console for recording or television.

MCS 1004
Small video production or editing suite mixers.



TORONTO SYSTEMS MANUFACTURING
Other facilities feature standard production and metal fabrication.

Over the years, McCurdy Radio Industries and AVL Digital have become the leading names in the design and manufacture of quality audio and video control products.

Today, we offer the same quality of design and engineering, the same quality of total manufacturing and the same after sales service that have been our standards since 1948. But now, there's one little difference, we're under one roof... and we call ourselves MRI Systems Ltd.

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Communications in the digital world.

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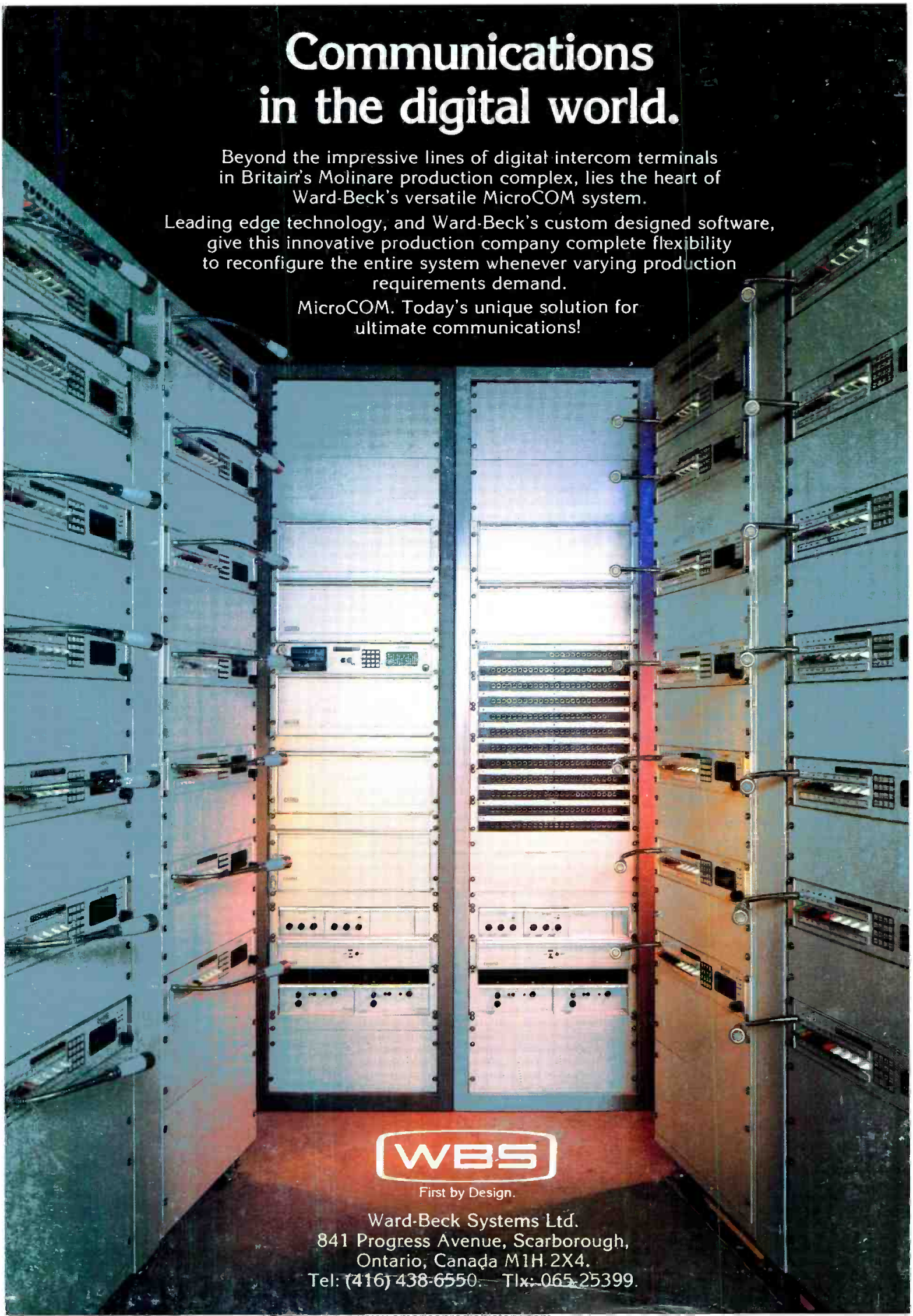
Leading edge technology, and Ward-Beck's custom designed software, give this innovative production company complete flexibility to reconfigure the entire system whenever varying production requirements demand.

MicroCOM. Today's unique solution for ultimate communications!



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