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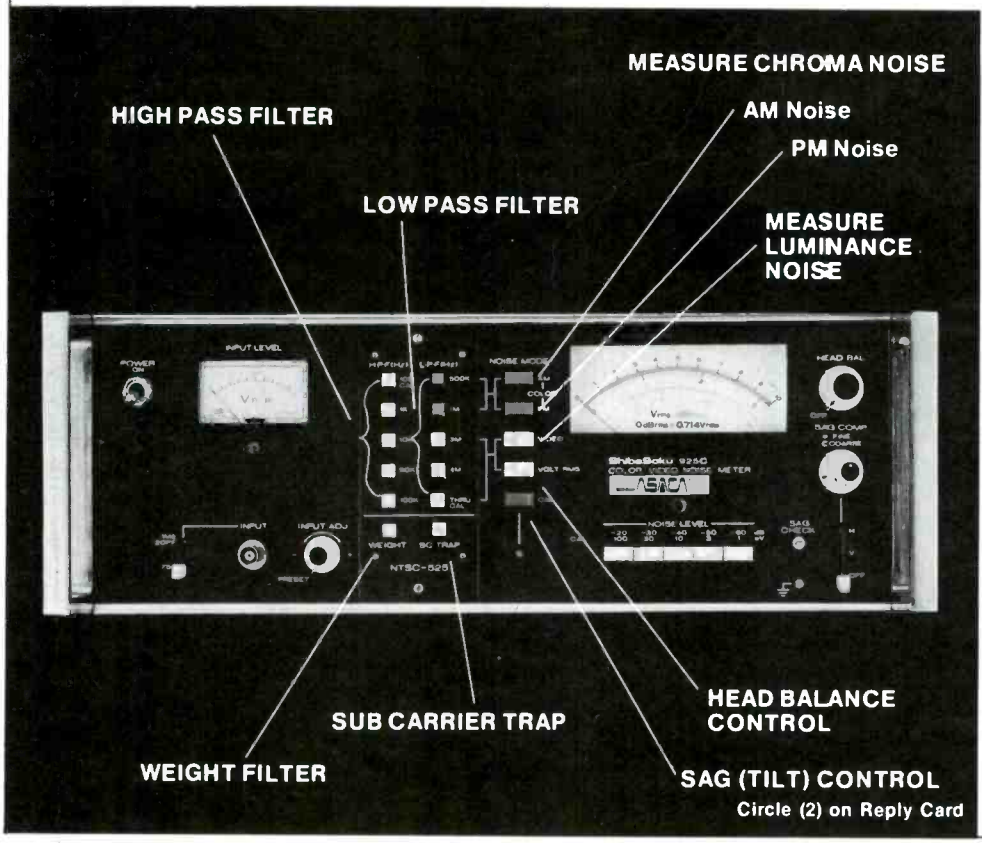

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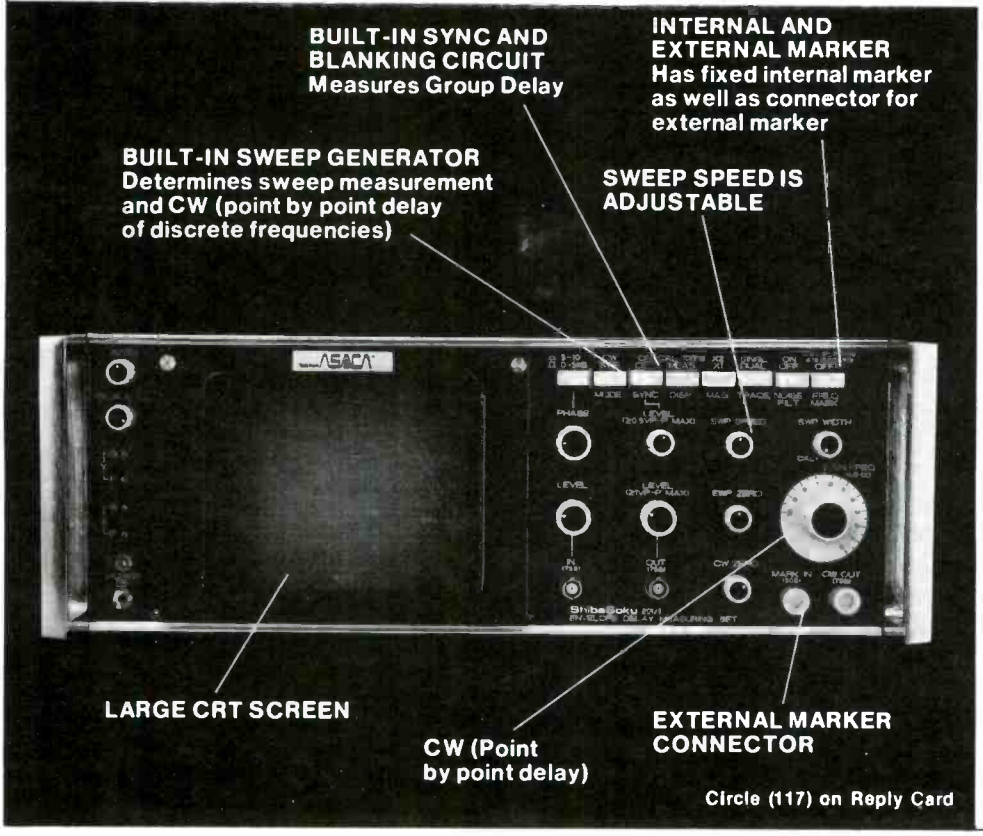

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BROADCAST® engineering

The journal of broadcast technology

June, 1980 □ Volume 22 □ No. 6

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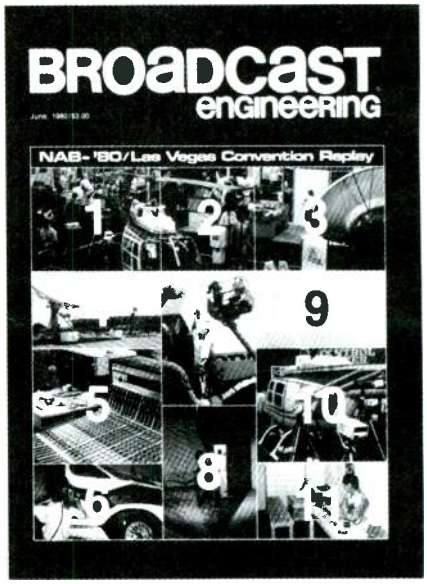


THE COVER captures brief scenes from NAB-'80, the 58th Annual Convention and International Exposition of the National Association of Broadcasters. Held in Las Vegas, April 13-16, 1980, the convention was the biggest and most successful to date.

Some of the many colorful exhibits shown on the cover are:

1, 2, 3: This is an overhead view of one section of the exhibit floor as seen from the Dolby demo room overlooking the radio exhibit hall.

4: Harris' earth station antenna was one of many exhibits that overflowed to the parking lot. The convention center is the dome in the background.

5: McCurdy's audio console was just one of many colorful boards on hand.

6: Toshiba used a flashy sports car to demonstrate its cameras.

7: RCA staged an outdoor production to demonstrate field productions with its color cameras.

8: The **Thomson-CSF** magic exhibit was a show stopper throughout the convention.

9: The **Ampex** AVA art generating system drew big crowds; made significant sales at the convention.

10: Microwave Associates demonstrated its line of ENG microwave links and included a fully-instrumented ENG helicopter.

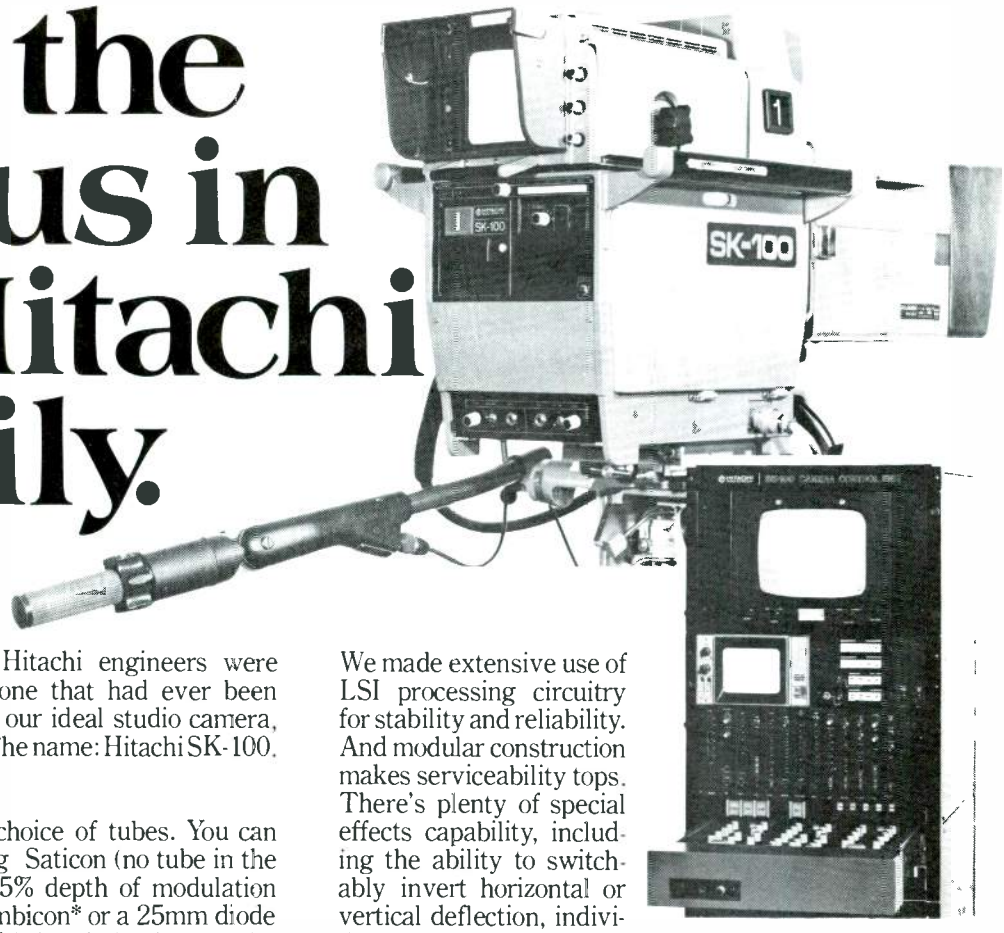
11: Fujinon used a colorful Oriental setting to capture audience interest.

This entire issue is devoted to the NAB'80 convention, with emphasis on sessions and new products.

July Issue

Special emphasis on digital audio and video technology of interest to broadcasters. Some of the scheduled topics include: digital standardization, digital post-production techniques, digital special effects, digital delay lines and digital servicing.

Meet the Genius in the Hitachi Family.



Actually, we didn't set out to build a smart camera. We "just" wanted to make the best camera that had ever been made. But meanwhile, another group of Hitachi engineers were working on a computer like none that had ever been created for a camera. Add it to our ideal studio camera, and the results are astonishing. The name: Hitachi SK-100.

The camera

The SK-100 comes with your choice of tubes. You can have our *new* 1" (25mm) low-lag Saticon (no tube in the world has greater resolution: 65% depth of modulation @ 400 TV lines) or a 30mm Plumbicon* or a 25mm diode gun tube. Choose the Saticon with its pin-lead target design, and you also get the highest S/N ratio of any camera to date: 56 dB!

There's an Automatic Beam Optimizer that gives you a wider dynamic range—four f/stops more light-handling capability. A full linear matrix masking amplifier lets you make fine adjustments of hue and color saturation. Other built-in features include a VIT color bar generator, automatic detail circuit, and high performance G/R contour corrector. The camera can be driven by discrete pulses or genlock.

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The computer

This is a zero-reference computer that gives you a dramatic reduction in set-up time, yet requires no technical skill. Just push a button and green, red, and blue channels are set up so you can be air-ready in moments.

There's complete fault diagnosis displayed on the picture monitor, and even an optional printout. You get six built-in memories for lens distortion correction. Plus a full remote control panel for painting and contrast adjustment.

Just as important, unlike some computer cameras, you can take over full manual control of the SK-100. Or select a single set-up function and bypass the others for fast custom adjustments after initial set-up. The SK-100 computer gives you the best of all possible worlds.

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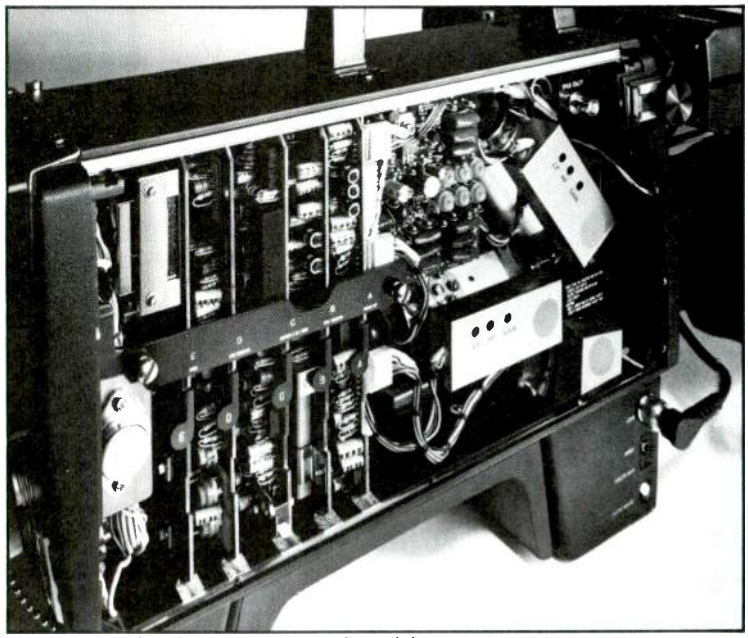

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Editorial, advertising and circulation correspondence should be addressed to P.O. Box 12901, Overland Park, KS 66212 (a suburb of Kansas City, MO); (913) 888-4664.

EDITORIAL
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John Wiliszowski, *Video Editor*
Joan Jackson, *Associate Editor*
Rhonda L. Wickham, *Editorial Assistant*
Mary Thornbrugh, *Editorial Assistant*
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ART
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TECHNICAL CONSULTANTS
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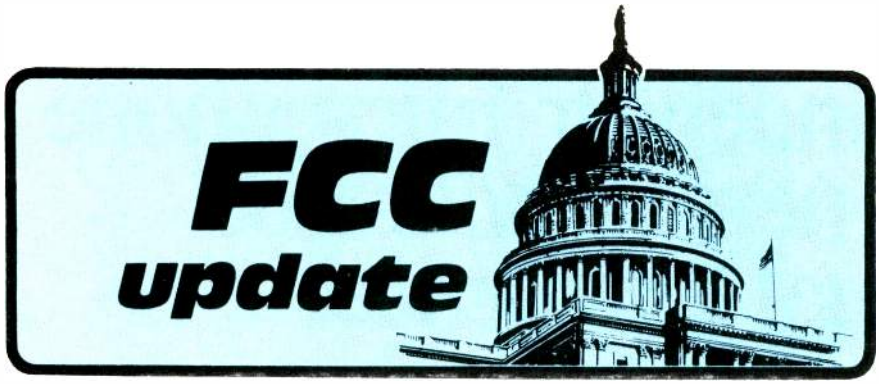

By Howard T. Head, A. D. Ring & Associates

June, 1980

AM Stereo standards near adoption

The Commission has overruled its Office of Plans and Policy (OPP) and has instructed the Broadcast Bureau to prepare an order adopting a final set of technical standards for stereophonic sound for AM radio. OPP had recommended that no final standard be adopted but that the choice of standards be left to the *marketplace*.

The system chosen for standardization is one originally proposed by Magnavox and tested by the National Stereophonic Radio Committee. It is compatible with existing monaural transmissions in that (L+R) is amplitude modulated onto the carrier in the usual fashion, while (L-R) is employed for linear phase modulation of the carrier.

Some critics charge that this system has technical defects, including a *popping* sound when negative peaks exceed 95% and phase reference is lost. Proponents of the losing systems have already asked the Commission for reconsideration, and it looks as though it may be some time before the controversy is resolved and a single system standardized.

Commission studying FM expansion

The Commission is studying various proposals intended to increase the number of channel assignments for FM broadcast stations. A Notice of Proposed Rule Making has been issued, aimed at reducing the present mileage separation requirements for the existing channel structure.

The Commission's new proposal would permit the assignment of Class A stations on all the existing commercial channels (not just the Class A channels), Class B stations in both Zones I and II, and two new classes of station, Class B-1 limited to 20kW at 300 feet and Class C-1 limited to 100kW at 1000 feet. New mileage separations would be established for the new classes of station, and existing mileage separations would be reduced, with the most seriously affected stations being Class B stations, which would find protection reduced from the existing value of approximately 500uV/m to 1000uV/m.

Existing Class B and C stations not meeting the minimum requirements would be reclassified as Class B-1 and Class C-1 stations, with a three-year grace period to apply for improved facilities.

Canadians troubled with tight AM directional antenna

The Commission has authorized a 250W daytime-only AM station in Rochester, NY, to change frequency temporarily because of excessive interference being received from a high-power co-channel station in Toronto, Ontario, only 100 miles from Rochester. Reports inidicate that the Canadian station has been unable to achieve the expected radiation pattern due, at least in part, to reradiation from conducting structures near the Canadian transmitting antenna. The Canadians have indicated their intention of relocating the antenna to a site from which the intended radiation pattern can be achieved. This is likely to be an expensive proposition since the transmitting antenna consists of eight 400-foot towers. In the meantime, the Rochester station has been given temporary authorization to operate on a reserved Canadian clear channel, and just for sweeteners, is being permitted to operate fulltime.

Proposes MDS channel expansion

The Commission is finding that the demand for operation of MDS (Multipoint Distribution Service) stations has already exceeded the supply of available frequencies. This service, originally tucked into an unused frequency niche in the band 2150-2160MHz, has proved to be very popular, primarily for Pay-TV distribution.

The Commission now proposes to make available the entire 2500-2690MHz band, now used primarily by the Instructional Fixed Television Service (ITFS), for MDS use. A channeling plan is proposed that would make a total of 11 channels available for ITFS operation.

At the same time, the Commission has begun an inquiry into the establishment of engineering standards for allocations for MDS stations which are presently administered largely on an *ad hoc* basis.

Clear channel decision close?

The Commission is expected to act soon in the AM clear channel case whose origin goes back to February, 1945. Expected actions include a permanent limitation of 50kW on the power of clear channel stations, the establishment of the 0.5mV/m 50% skywave contour at night as the protected contour, and the compilation of an inventory of assigments that the Commission wishes to make on the various clear channels. This latter list is an outgrowth of the recent Region 2 conferences in Buenos Aires at which time it was agreed that all Region 2 countries would establish a tentative list of future needs for planning purposes.

Short circuits

VHF TV translators may now originate 30-seconds per hour fundraising solicitations, and all TV and FM translators may now originate emergency warnings...The Commission has received two research reports dealing with improving the final amplifier efficiency of UHF TV transmitters and the performance of indoor UHF receiving antennas... The Commission's Office of Science and Technology (OST) is conducting a series of tutorial seminars dealing with such subjects as Digital Techniques, Fiber Optics, Rainfall Attenuation, and SAW Devices...The Commission has declined to reduce the protection of UHF-TV stations required by land mobile stations sharing television Channels 14-20... The Commission continues to study the problem of interference to the aeronautical radio services caused by leakage from cable systems... The Commission has finally acted on a petition filed by a college student in 1971 which had become *lost in the cracks* somewhere in the FCC bureaucracy; how about those old cases that have not been "lost"? □

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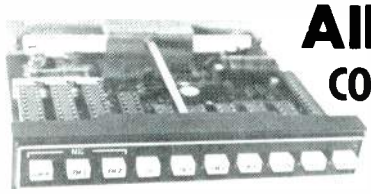

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news briefs

ITA announces statistical sales program

As part of its new program of collecting and disseminating statistics on sales of audio and video products, ITA has announced the start of a statistical program of blank audio tape sales.

Henry Brief, ITA executive director, said this was a follow-up to a previously announced program of collecting sales data on pre-recorded video cassettes. In time, he said, ITA hopes to supplement these two programs with data on U.S. sales of blank video cassettes and statistics on all other products in the audio/video industry for which no reliable statistics currently exist.

When the data collection service in the US is in full operation, Brief said, plans will be mapped to inaugurate counterpart efforts by ITA member companies in other areas of the world. He added that in time he hoped that ITA would become the source for valid statistical information in the audio/video industry.

Pioneers honored

Special Order of the Iron Test Pattern awards were presented during the 1980 NAB convention to Bill Kelly, vice president/chief engineer, WNEW-TV; and Adron Miller, manager, RCA Photophone Systems; for service with single organizations longer than anyone in the association. The award was given to Kelly for being with a single TV station for 33 years. Miller's award was for working with a single TV manufacturer for 33 years.

Also recognized were seven members of the Order who began in television in 1947 or earlier, including John Battison, editor of **Broadcast Engineering** from 1961 to 1964, and founder of the SBE.

The Order, founded by Dynair Electronics, San Diego, serves 900 members who have served at least 15 years. Qualifying candidates can apply to Phyllis Lynch, Herald, c/o Dynair Electronics, 5275 Market St., San Diego, CA 92114.

Pioneers honored at Iron Test Pattern get-together. Left to right: Hal Johnson, Sony (41 years); Bob Thalner, Thalner Electronic Labs., Inc. (40 years); Frank Jordan, KDBC-TV (35 years); Bob Vendland, Dynair Electronics, Inc. (33 years); John Battison, Ohio St. University (35 years); Gene Crow, Cohu, Inc. (38 years); Jim Brooks, KNBC-TV (35 years).

Photographer's escape from Mt. St. Helen's captured on film

Dave Crockett, KOMO-TV, Seattle, staff photographer, was one of the people trapped on Mt. St.

Three more reasons for ADDA's leadership in digital image technology.

The VIP-2 . . . affordable video compression.

ADDA delivers low cost video compression, featuring one-hand joystick operation and pre-programmed picture sizing and positioning. The selectable "zoom" mode features fixed picture center or fixed picture edge.

The VW-2 . . . TBC/Frame Synchronizer for Type C VTR's.

The VW-2 is designed for Type C format VTR's, with time base correction and digital dropout compensation. Other features of the VW-2 include velocity correction, heterodyne time base correction, freeze frame, and freeze field.

Computerized Library Control for ESP Systems.

ADDA's new computer-directed library control system records the description and location of as many as 64,000 stills stored in the ESP System. It provides the off-line capability to preview stills, assemble and edit sequences through the use of subject, time, and program source codes.

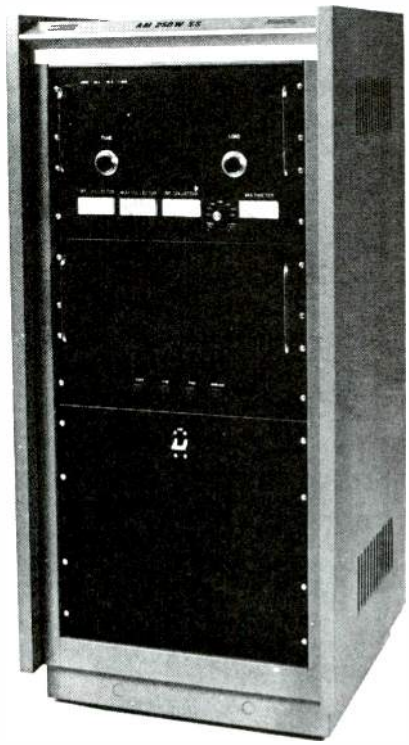
ADDA CORPORATION

1671 Dell Avenue, Campbell, California 95008 (408) 379-1500

Circle (10) on Reply Card

WILKINSON ELECTRONICS

AM-250SS SOLID STATE 250 WATT AM TRANSMITTER



FEATURES

- **Not Susceptible To Reacting Loads**
- **Low Operating Cost - Extreme Efficiency**
- **Drawer Construction - Extreme Accessibility**
- **Expandable - Combine two for 500 Watts**
- **Available at 125 Watts or Less**
- **Power Flexible - 115 or 220 volts AC**
- **125% Modulation Cabability**
- **Exceeds U.S. FCC Specifications**

The Wilkinson Electronics AM-250SS is an all solid state 250 watt Am transmitter housed in an attractive 24 inch cabinet, 52 inches in height. All components are mounted in two drawers for maximum accessibility and ease of maintenance. Space is available in the cabinet fora second transmitter making it possible to combine two 250 watt units to obtain 500 watts. It is also available at any power below 250 watts at a reduced price.

WILKINSON ELECTRONICS, INC.

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TRAINER, PA. 19013 • TELEPHONE (215)497-5100
TWX 510-669-3188 CABLES:WILEC WILEC CHR

Circle (11) on Reply Card

Helen's when the volcano erupted last month. Crockett kept his sound on film camera running and narrated his feelings as he escaped on foot. After eleven hours, he was spotted and rescued by a Coast Guard Helicopter that was searching for survivors.

KOMO-TV executive news director Jim Herriott looked at Crockett's film, and listened to his narration and put together and aired a special half-hour news program on Crockett's dramatic experience. Following the program, KOMO-TV's switchboard logged more than 200 calls praising the show. An additional 300 callers requested a repeat of the news special.

KOMO Radio and the Rainier Brewing Company combined efforts with the Seattle community to collect food, clothing and bedding for the victims of the Mt. St. Helen's disaster.

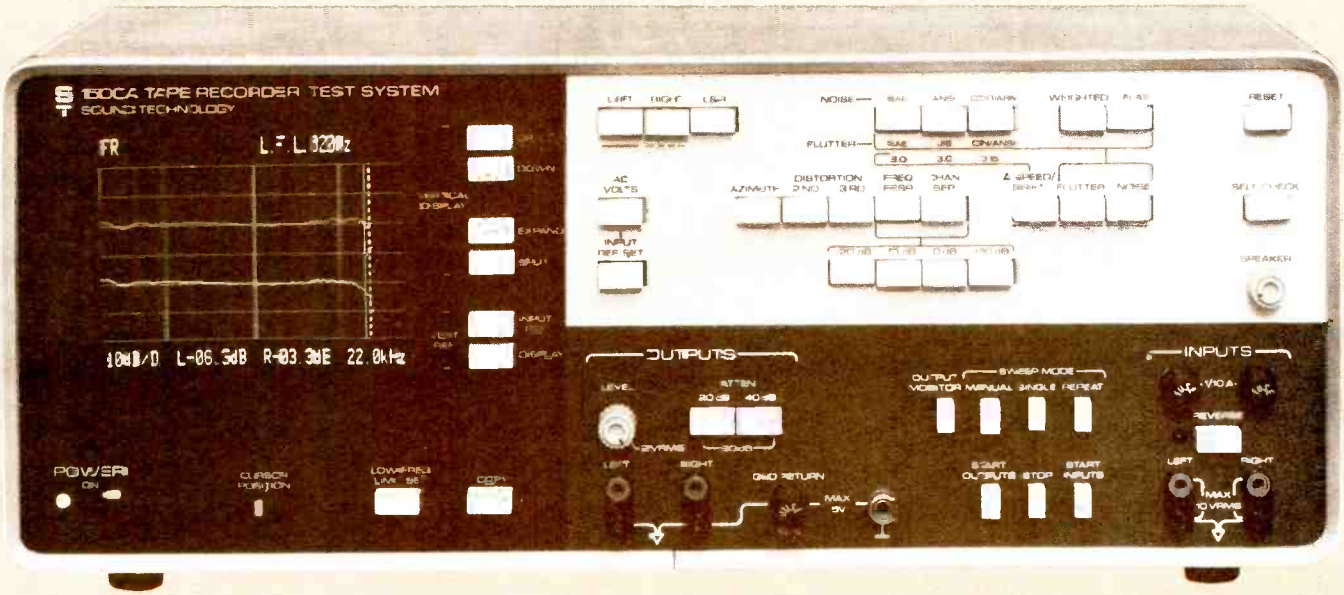
Sitcom seeks realism

On the set of "WKRP in Cincinnati" (MTM Enterprises, shown on CBS), producers want a realistic radio station environment. Small details, including

copies of **Broadcast Engineering** and other magazines normally found in stations, are an important part of the set. (*Photo courtesy of MTM Enterprises, T. Womack.*)

We're cooking now

Still cooking after 21 years, **Broadcast Engineering** celebrated its largest issue ever with its March NAB Show issue. Shown celebrating after the show (left to right) are Jack Hancock, Intertec Publishing's executive-vice president; Bill Rhodes, BE editorial director; George Laughead, BE publisher (holding record March issue); Emmett Langan, agribusiness magazines publisher and creator of BE's name in 1959 (holding first copy of BE); George Seferovich, Intertec president; and Cameron Bishop, BE marketing director.



How to check your tape recorder in ten minutes

Graph-type display with digital readout

If you haven't actually measured the performance of your audio tape recorder lately, there's a better than 50-50 chance it's much poorer than you think. That's what considerable experience shows.

Checking ATR's is now simplicity itself. All you do is connect your recorder to the new Sound Tech computerized Tape Recorder Test System.

Just by pushing panel buttons you can measure:

- Frequency response
- Harmonic distortion
- Wow and flutter
- Noise
- Speed accuracy and drift
- Channel separation
- Head azimuth accuracy (position a head in 10 seconds)

Information-packed display

The display system in the New Model 1500A gives you all the information you want. Frequency response, distortion, noise, flutter, head azimuth, and channel separation are displayed as graphs with the scale values shown in numbers.

Then you have a positionable cursor (vertical dashed trace in photos). At whatever frequency, level, etc., you place it, the measured value will be shown on the screen in numbers.

Just by pushing buttons you can fully test your recorder almost in seconds.

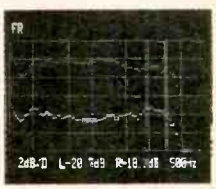
Call now

Users love the 1500A for its ease and speed.

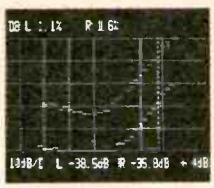
You will, too. You can clean up your audio a whole lot easier than you ever imagined.

So call Sonny Funke or Dennis Noecker at Sound Tech now for our sales literature.

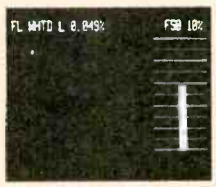
This new computerized test system is popular and you should get informed about it.



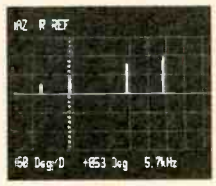
Two channel frequency response



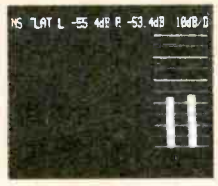
Third harmonic distortion vs. level



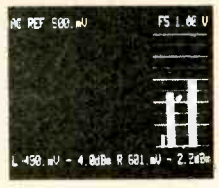
Flutter: 0.049% shown



Head azimuth accuracy



Noise: two channels; −53.4 dB shown

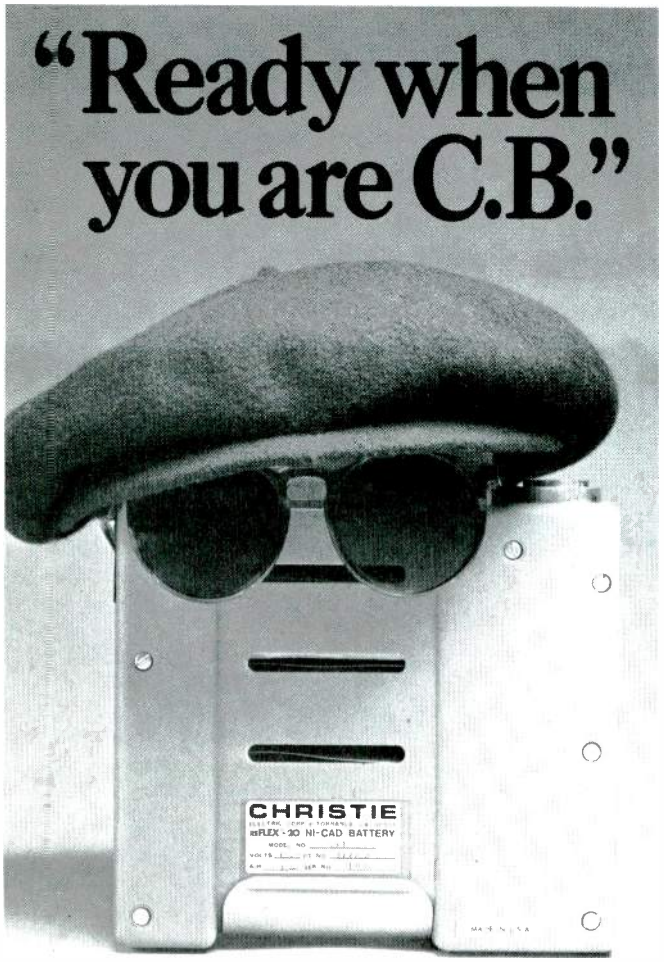


Voltage (yes, it's a voltmeter, too)

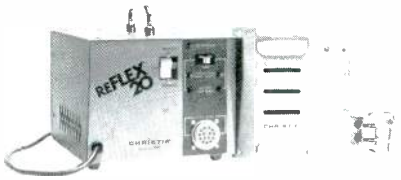
SOUND TECHNOLOGY

1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540
In Toronto: The Pringle Group

Circle (12) on Reply Card



Christie - The "*Burping*" Charger/Battery System That Does It In 20 Minutes or Less.



Whether you're shooting a full-length documentary or news gathering for the evening wrap-up, you need a battery/charger system that's ready when you are. Christie has the only ni-cad battery pack that's completely rechargeable in 12-20 minutes. The REFLEX® 20 Charges and sempiternal battery packs provide 90-97% efficiency, while extending battery life up to 10 times longer than other ni-cads and 50 times that of ordinary batteries. That's state-of-the-art technology backed by Christie's 51-year reputation for excellence.

When time is money, keep your cameras rolling with the REFLEX 20 from Christie.

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1929—1980 51 YEARS THE SOURCE

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people in the news

Robert Estony has been named director of corporate communications, Barnes Engineering. He was previously with Thomson-CSF Broadcast.

Herman Schloss is vice president, distributor sales and marketing, Ikegami Electronics. He comes from Professional Video, JVC.

Jack Russell comes to marketing services manager, Hitachi Denshi America, from JVC.

Deborah Harter has been appointed western regional sales manager for Convergence Corporation. Prior to her appointment, Harter was with Scriptech.

Fred J. Haines has joined Harris Corporation as video engineering manager. He will be responsible for the development of new TV cameras and other video products.

Bill Turner has been appointed operations manager of Angenieux Service Corporation of California in Venice, CA. He will be responsible for the service of all television and motion picture lenses, the sale of spare parts and accessories for these lenses, and the rental of television lenses in the western US and Mexico.

Hal Jones has been appointed national sales manager at ADDA. Jones has been serving as National OEM sales manager of Memorex video and professional tape products division since 1976.

Gordon H. Allison, Jr. has been appointed administrator, broadcast audio products, for RCA Broadcast Systems. Allison is responsible for the product management of RCA's line of audio equipment for radio and television broadcasters, including audio consoles, tape recorders, microphones and other audio systems. The promotion of **Jack E. Banister** to vice president, broadcast systems, Europe, Africa and the Middle East was announced by RCA International Ltd. Banister succeeds **Patrick J. Murrin** who has retired from RCA after 29 years of service.

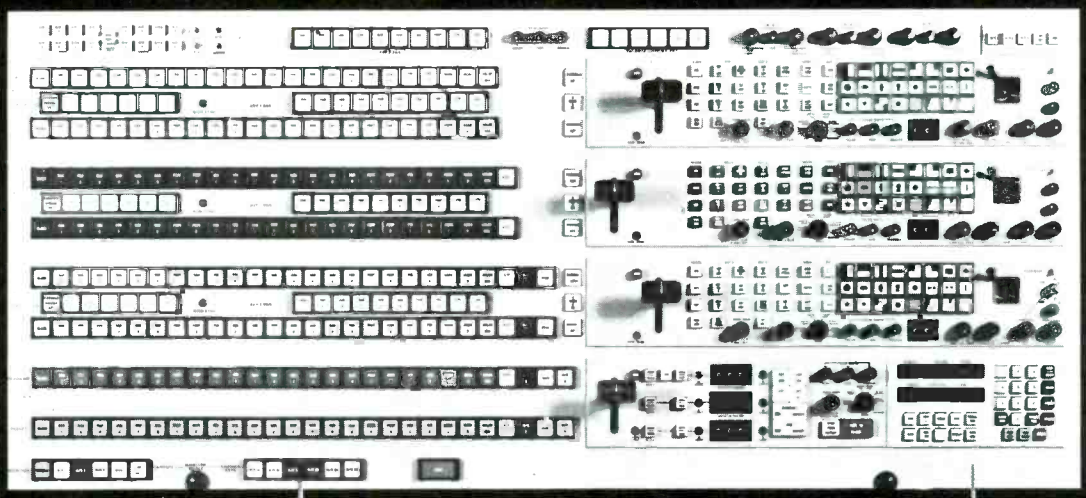
Ann Balzerit has been appointed technical services coordinator for Micro Consultants. Balzerit is responsible for getting customers in touch with a field service engineer to solve their equipment's technical problems.

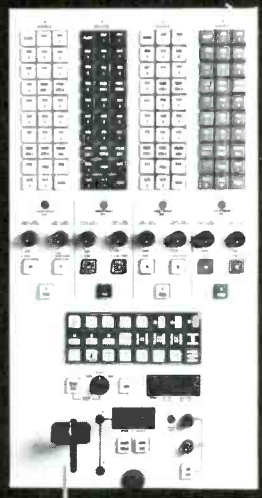
BE award winner

Joe Concert, Broadcast Engineering's East Coast marketing manager, was presented with BE's 1979 Achievement Award during NAB in April. He received this recognition because of outstanding territory sales improvement during 1979.

Vital today for big-time real-time production

The latest in production switching, the last word in production switcher automation systems and the best in movie-style special effects





THE NEW MULTI-LAYERED M/E
VIX-114 SERIES
VIDEO SWITCHERS

- 12 to 24 Inputs and 4 to 17 bus systems
- Chroma key and 2 title keys on each Mix/Effect
- Mix or Wipe behind chroma key
- Auto Transition Control programmable in frames
- Interface for Editor and Computer control
- RGB or Encoded Shadow Chroma Key
- Varikey for Soft, Hard, or See-thru keys
- Digital controlled

THE ALL NEW
PSAS-2
Production Switching Automation Systems

- Controls the VIX-114 Series Switching Systems and SqueeZoom with smart microprocessor systems
- Autolearn and Endpoint Plotting
- Unlimited floppy disk storage
- Analog signal control
- Re-store capability for altering analog and digital paramenters
- Display of event description

THE INCREDIBLE
SQUEEZOOM®
Optical Effects Synchronizer

- Up to 123 effects available
- Frame Freezer
- Video Compressor
- Electronic Zoom
- Avoid FCC violations with blanking correction
- Up to 4 channels on one screen

Many more advanced features fully described in our brochures. Contact office nearest you.

NTSC or PAL

Get it all together or one at a time!

We're ready to make a Vital contribution to your operation today.

ERIC KING Southeast-804/384-7001
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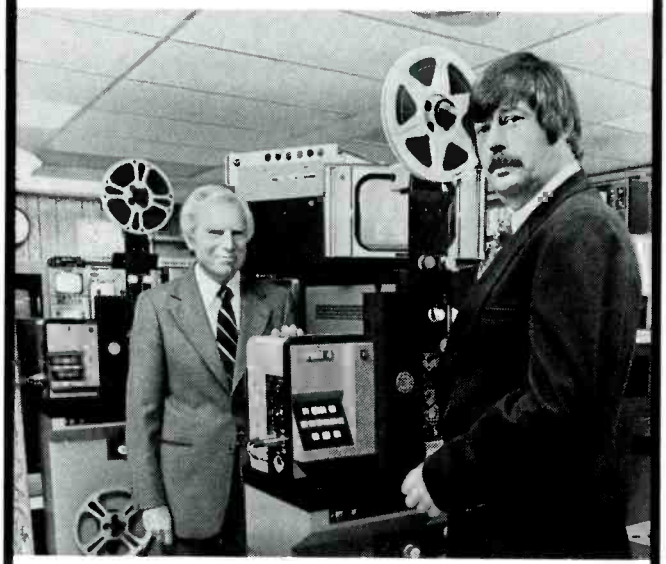
1980-the year Vital doubled its sales-personnel-plant facilities.

Tell me, Ken Reid,
how do you use **ATHENA®**
Telecine Projectors?

(asked Bob Lawrence of L-W International)



KEN REID (right) is Chief Engineer at KSBY-TV, Ch. 6, San Luis Obispo, California. KSBY-TV is owned by John Blair & Co. KSBY serves over 155,000 homes in San Luis Obispo and Santa Barbara Counties.

Ken says:

ON AIR USE

"We are able to cue the first frame, and start projectors instantly. During cut-away breaks we can cue to first frame of next segment and still frame. The Projector is ready to instantly start at termination of cut-away break and if operator does not stop projector in time at start of cut-away break, reverse is used to re-cue the film to the proper frame."

NEWS

"Operator still frames first frame of news story, assuring director that proper film story is ready. If film runs out too early during a news story, operator still frames picture at end of film, and holds till end of story. Projectors are sometimes used in still frame only as a "key source." Sometimes as a picture behind graphics as in sports scores and such. Projectors on second film chain are often used as "B" roll projectors for visual inserts while "A" roll has talking head shot with sound."

PRODUCTION

"In transfers from film to tape, instant start and still frame, cue-up and reverses make these projectors ideal editing tools. Many precise edits can be made during transfer process without physically cutting the film. Slow-motion forward and reverse and instant still frame allow many novel effects in commercials. Magnetic sound reproduction is excellent."

"It might be noted that we have found the 5000's excellent for running programs and the 4000's somewhat more convenient for production use."

For information on how the ***Athena telecine projectors*** *can save you time and money, please contact an L-W authorized representative or;*

L-W INTERNATIONAL,
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Woodland Hills, CA 91367, USA.
Telephone (213) 348-8614
TWX 910/495-1714 LW INTL LSA

Circle (15) on Reply Card

NRBA

National Radio Broadcasters' Association

1705 De Sales Street, NW
Washington, DC 20036

ARB contract negotiating committee supported

Sis Kaplan, NRBA president, called an NRBA Executive Committee conference call meeting on June 2 to get approval for maximum support of the All-Radio Industry Negotiating Committee being formed to negotiate Arbitron's new radio contract.

Kaplan planned to ask for financial committment and the establishment of a special NRBA committee to coordinate activities.

"This is an issue of great importance to a large number of radio broadcasters and NRBA expects to be in the forefront of the battle," Kaplan said.

Full-time authorization urged for daytimers

The National Radio Broadcasters Association has filed a Petition for Rulemaking with the FCC urging the Commission to amend its rules to permit daytime-only licensees to operate on a full-time basis, as long as it would not create objectionable interference or prohibited overlap with other stations.

The NRBA petition called the restrictions, such as the "two-station to a community" rule, "unjustifiable" and "discriminatory." This discriminatory effect will become more pronounced should the FM channel allocation proposals, which would create hundreds of new FM stations, be adopted.

Eliminating the artificial barriers to full-time service, contained in Section 73.37 (e) of the Commission's rules, "would permit freer interplay of marketplace forces to the ultimate benefit of the public interest," said NRBA.

NRBA asks FCC to establish government-industry committee

In a letter from Abe Voron, executive vice president, to Chairman Ferris, NRBA has "respectfully, but urgently, requested" the FCC to establish a joint government-industry committee to establish a plan for orderly change in the American radio system *before* the proposals now pending before the Commission are adopted in "dangerous haste."

Several proposals currently being considered by the FCC would dramatically affect radio and the American public and the implictions of these changes touch many basic aspects of American life and the well-being of the radio industry.

Voron's letter to Ferris states, in part, "the far-reaching implications of the proposals being considered by the Commission need to be carefully considered *before* they are adopted in dangerous haste. We believe a joint government-industry radio advisory committee will aid the Commission and protect the interests of the American public and of the radio broadcaster."

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AMPEX
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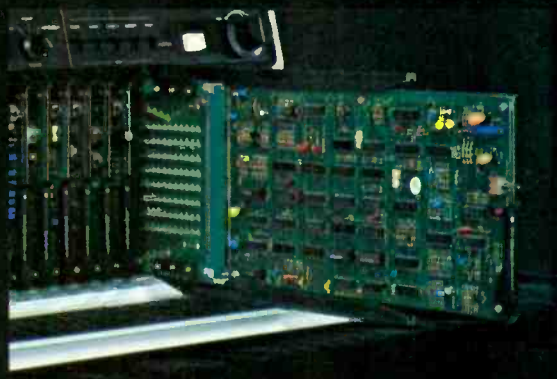
AMPEX VPR-28

AMPEX ON PRODUCTION

The VPR-2B Edge. Intelligent Design.

INDIVIDUAL REPLACEABLE HEADS



EASY FRONTAL ACCESS

SMOOTH AS SILK SLOW MOTION

We designed the successor to our popular VPR-2, our new VPR-2B, with one idea in mind. Build a superior videotape recorder that provides performance, quality, and ultimate day-to-day operational advantages above all other VTRs.

Expect Ampex to Lead the Way.
We have since 1956. When we design a 1" machine, we know exactly what to look for. And, with our edge on experience, we know exactly what to avoid.

Consider the intelligent design given our individual replaceable heads. Head replacement, when necessary, takes a few minutes, not a few hours. This Ampex advantage means minimum downtime. And, because you replace only the defective head, this intelligent design means money savings as well!

This smart approach carries through to the compact size and light weight of the VPR-2B. In the studio and on location, the payoff to you is substantial.

The VPR-2B is practical, too. When we designed the packaging system of our newest VTR, we allowed easy frontal access and service to electrical and mechanical controls, reels, scanner, sub-assemblies, and PC boards. This common sense approach was designed for all configurations—rack mount, console, and full monitor bridge.

Another Example of Design Excellence.
Our AST™ automatic tracking system option gives you unequaled slow motion results in forward and reverse. Once again, Ampex design experience makes the difference. With our exclusive AST in use, you're assured of a quality playback under all operating conditions.

Take Ampex all the way. Add our TBC-2B time base corrector, plus Ampex professional tape, and you'll have the best professional production tools available.

Call your Ampex representative today. Tell him you're ready for the Ampex edge!

Get the Ampex Edge.

AMPEX

Ampex Corporation, Audio-Video Systems Division
401 Broadway, Redwood City, CA 94063
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WILKINSON ELECTRONICS

FM-250SS SOLID STATE 250 WATT FM TRANSMITTER

FEATURES - Pure Perfect Sound

- **Proven High Quality Exciter - More than 300 In Service**
- **Small - Light Weight - Requires Little Space**
- **Drawer Construction for Simple Maintenance**
- **Self-Testing Power Supplies**
- **All Solid State Including Timing Controls**
- **Safe - Reliable - Efficient**
- **Exceeds U.S. FCC Specifications**

The Wilkinson Electronics FM-250SS all solid state FM broadcast transmitter is housed in a steel cabinet finished in a hard durable enamel finish. Only four square feet of floor space required and it is light enough for table mounting. All operating controls are on the front panel and access to the interior of the Power Amplifier is through the PA cubicle. A sliding drawer directly beneath the PA houses the power supplies and control ladder circuits. Overload indicators as well as overload reset controls are on the front panel of this slide-out drawer. All components of these circuits are completely accessible when the drawer is opened.

WILKINSON ELECTRONICS, INC.

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new literature

Electronic instruments catalog

Viz—The full line of VIZ electronic instruments, including over 70 of the company's products, is illustrated and described in a new 44-page catalog. Complete information is given, including: major features of interest to users, detailed description, and complete technical specifications—performance ranges and limits, power required, weight and physical dimensions. The VIZ line of electronic instruments includes signal generators (including the new color bar Signalyst).

Circle (950) on Reply Card

Catalog

Phelps Dodge Communications—A 24-page catalog describes the standard lengths in which rigid line is available, along with information on end fitting configurations, components, hardware and installation accessories. Also included is information on rigid line installation, typical VSWR curves, attentuation and power rating charts and data on custom rigid line assemblies.

Circle (951) on Reply Card

Technical magazine

Rohde & Schwarz—"News from Rohde & Schwarz" (No. 87) contains an article on the new ESH 2 test receiver for precision wanted-signal and interference measurements over a frequency range from 10kHz to 30MHz, which, with the required antennas forms the HFH2 field strength meter.

Circle (952) on Reply Card

Nonmetallic tower guys

Philadelphia Resins—Ten major advantages of PHILLYSTRAN dielectric tower guys, for use with broadcast antennas and for users of radio, TV or CATV reception towers and antennas, are featured in a new brochure. These nonmetallic, non-corroding tower guys combine high strength with light weight and inherent flexibility for ease of installation.

Circle (953) on Reply Card

Furniture literature

Bretford Manufacturing—This literature package highlights all of the company's TV/VTR cabinets and stands, mobile equipment tables, material storage cabinets, mobile utility trucks and audio visual carts and stands.

Circle (954) on Reply Card

Broadcast transmission line systems

Andrew—The bulletin provides detailed information on transmission lines, connectors, and accessories for use in broadcast transmitting antenna systems. Included are specifications for HELIAX air- and foam-dielectric coaxial cable, and rigid coaxial transmission line systems. Design data includes graphs and information on attenuation; VSWR effect on transmission loss; transmission line efficiency; also average, peak and increased power ratings.

Circle (955) on Reply Card

STATE OF THE ART

AMPEX 196 SERIES BROADCAST 1" HELICAL TAPE

This is the tape Ampex *had* to design to demonstrate the fantastic capabilities of our VPR Series 1" helical videotape recorders that is revolutionizing professional video recording.

With Series 196, color brilliance is preserved and signal-to-noise-ratio is unaffected even after multiple playback passes, lengthy still framing and heavy post-production editing. This tape is the ultimate match for the VPR-Series video recorders—a brilliant combination that is unsurpassed in today's video recording industry. Available in SMPTE Type "C" or "B" formats. 34 min/66 min/94 min.

Contact Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, CA 94063, 415/367-2011.

AMPEX

Circle (19) on Reply Card

Tom Bolger, chairman, NAB Board of Directors, and president of WMTV, Madison, WI, welcomed attendees to the opening of the 58th NAB Annual Convention and International Exposition and introduced Senator Howard Cannon (D-NV, and Chairman of the Senate Commerce Committee) and Vincent Wasilewski, NAB president.

Mac Davis, well-known entertainer, enlivened the opening ceremonies with his warmth, humor and song...and the audience loved it. However, the coup of NAB went undetected. Because of a microphone problem, Burns Auditronics loaned Davis the Beyer M400 microphone being exhibited; he liked it and used it for his NAB show.

NAB-'80/Las Vegas: A Spectacular Conference

By Bill Rhodes, editorial director, and Joan Jackson, associate editor

- **Las Vegas Convention Center**
- **April 13-16, 1980**
- **6570 Broadcasters**
- **6875 Exhibitors and guests**
- **6000 Exhibition personnel**
- **410 Exhibitors (paid)**
- **198,985 square feet paid exhibit space (under roof)**
- **Extensive parking-lot exhibit space used**

Nearly 20,000 broadcasters, exhibitors and guests descended on Las Vegas and the Las Vegas Convention Center April 13-16 for the 58th Annual Convention of the National Association of Broadcasters. The convention featured the world's largest display of broadcast equipment.

Highlights of the show were many and varied. Politicians, entertainers and journalists held convention-goers spellbound as one after another they treated audiences to their respective specialties.

The show opened on Sunday, April 13, with an invocation by Rabbi Marc Tanenbaum, a welcome from Thomas E. Bolger, chairman of the NAB board of directors, and remarks from Senator Howard Cannon (D-NV).

Following was a keynote address from NAB president Vincent Wasilewski in which he emphasized that American broadcasters have made

In his keynote address at the convention, NAB president Vincent T. Wasilewski answered those critics who call broadcasters "obstructionists" in the path of technological progress. "Nothing could be further from the truth," he said. "American broadcasters are pioneers and innovators. As our system of communications expands, we will be right there on its leading edge."

Wasilewski pointed out that the NAB International Exposition of Broadcast Equipment, covering some 200,000 square feet, testified to broadcasters' technological vision. "Over the years, our annual convention's exhibit hall has served as the industry's global crystal ball," he said.

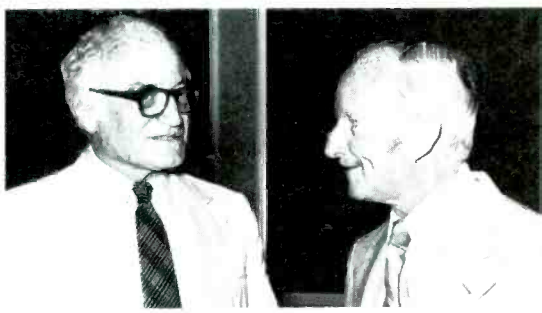
Wasilewski also refuted critics who accuse broadcasters of fearing competition and stifling their competitors. "New competition has been a way of life for us since the 1930s," and he cited such examples as AM stereo, with NAB being the major force behind its adoption, and expansion of the AM band. Wasilewski repeated his request that the FCC appoint a joint government-industry advisory committee to prepare in-depth studies of additional ways to provide full-time service. He added that "NAB does not oppose reducing channel spacing from 10kHz to 9. We never have. But without further comprehensive technical and economic studies, no responsible action can be taken."

Broadcasters welcome fair and open marketplace competition, Wasilewski said, but he noted that cable television enjoys an artificial, governmentally-imposed advantage. "The competition is hardly fair when cable pays about 1% of its revenues for all the broadcast programs it can get its hands on, while broadcasters pay from 35 to 40% for theirs."

In closing, Wasilewski said that "American broadcasters have had the vision to look toward the future, and we have employed every technological advancement possible to make that future brighter. We have competed fully and fairly. We will continue to do so."

Senator Cannon: Welcome, broadcasters, to Las Vegas.

David Brinkley: Pay attention to feedback from listeners.



Senator Goldwater: US needs to coordinate policy and technology in Region 2 activities.

the American system of communications the most sophisticated in the world. He cited such examples as audio and videotape recorders, minicams, microwave links, ENG equipment and captioning for the hearing impaired as proof of the innovations by broadcasters.

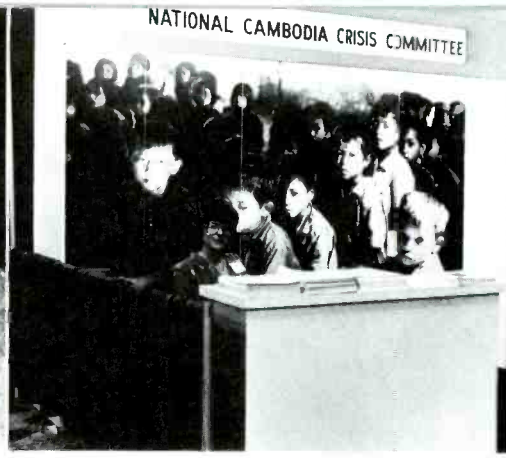
The joint session continued with the presentation of the Distinguished Service Award to Donald A. Thurston, Berkshire Broadcasting Company. His stirring and touching remarks received enthusiastic audience approval as he urged broadcasters to accept the responsibility of their power, the common good and their freedom.

Composer and singer Mac Davis wrapped up the opening ceremonies with an almost hour long performance.

David Brinkley

One of the many celebrities to address the convention was David Brinkley, who addressed television executives at the April 14 television luncheon. Brinkley urged broadcasters to pay attention to the feedback they get from their listeners, stating that he has always benefited from the first-hand knowledge of such respondents.

Brinkley emphasized that the country seems to be tending toward a new conservative era. He stated that Americans are now aware that in European welfare states everyone pays high taxes, but everyone reaps



It was intimated that Rosalyn Carter may have planned to speak at the convention opening but that she could not do so because of the Cambodian Crisis. Rabbi Marc Tanenbaum delivered the invocation and spoke out, from personal experience, against the inhuman treatment of the Cambodians. His plea was to broadcasters everywhere to exercise their power in publicly denouncing the atrocities against the Cambodians.

At the convention, the National Cambodian Crisis Committee maintained a booth to inform the public and broadcasters about the struggles in the Far East.

the benefits. In this country, all benefits go to low income brackets.

Barry Goldwater

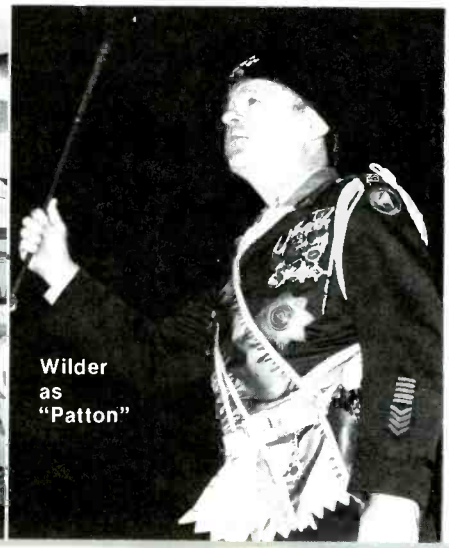
In remarks at the engineering luncheon, Senator Barry Goldwater told broadcasters that while politics is his bread and butter, tinkering with electronics equipment is one of the great loves of his life. Senator Goldwater's interest in radio and television is well known in the engineering industry. He has consistently opposed the legislation that supports the use of a spectrum fee.

The senator stated that the US had difficulty persuading other nations to support their position's at the World Administrative Radio Conference because of their inability to coordinate policy and technology. He asked the Congressional Office of Technology Assessment to assist the Congress in its search for ways to devise a responsive, ongoing mechanism to ensure preparedness for the telecommunications conferences scheduled during the next 10 years.

Luncheons were packed at NAB, and speakers were well received.

General Patton

An appearance by General George Patton (portrayed by Simon Wilder) was made at the opening radio multi-media presentation. He came prepared with campaign strategy for his troops at radio's opening session. This was followed by an audio/visual presentation of what radio and TV programming might be like in 2076, a production made by TM Companies of Dallas.



Wilder as "Patton"

Ham radio reception

The Ham Radio operators reception has almost become a tradition at NAB. Sponsored by NAB, it salutes all amateur radio operators and provides a focal point for them to gather and visit while at NAB. Chris Payne, assistant to the NAB vice president, expressed pleasure at the exceptional turnout at this year's reception. Ranked among the roster of ham operators are such figures as Senator Barry Goldwater and legal newsletter publisher Larry Perry. About 450 people attended the NAB-'80 reception, and door prizes made for a lot of excitement.

Closing ceremonies

Congressman Lionel Van Deerlin (D-CA) addressed the attendees of the morning joint session on the final day of the conference. Van Deerlin advised listeners that if he were an FCC commissioner he

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would be forced to veto deregulation. His comments were "I would vote no, not because I am an advocate of federal regulation and agency paperwork...not because I believe that broadcasters should be punished, like rambunctious school children, for their opposition to more radio outlets. I would vote no because I would have no other choice under the existing law." He went on to say that he would vote no until convinced that marketplace competition could replace regulation as the principal means of serving the public interest.

Charles D. Ferris

The final speech of the convention was delivered by Charles D. Ferris, chairman of the FCC. Ferris offered his views on regulation and the importance of it. He also urged broadcasters to provide, without regulation, the range of programs necessary to meet the diverse backgrounds of American society. Ferris commented that although cable and satellite technology are causing uncertainty in the broadcasting world, the FCC cannot stand in the way of their progress and the competition they provide.

The Ham Radio Operators' Reception, sponsored by NAB, was well attended. Above left photo shows John Leonard, Moseley Associates, receiving a door prize from NAB's Janice Shipe. On the right, Chris Payne and Janice Shipe team up to draw and deliver door prizes to lucky 'hams'.

NAB Coverage

Immediately following are two short reports from joint radio and television sessions at NAB and a section on special awards, honors and citations.

The balance of this issue is devoted almost entirely to other sessions at NAB and to the exhibits. For a detailed organization, see the contents page.

Van Deerlin

Monroe

Ball

Rowan

McAfee

Heller

Joint Session on Deregulation and on the Future

Words from Washington

Speaker: The Honorable Lionel Van Deerlin, D-CA, and chairman, House Subcommittee on Communications

Congressman Lionel Van Deerlin, (D-CA), chairman of the House Subcommittee on Communications, said that without increased competition in the marketplace, the Federal Communications Commission should not deregulate the radio industry.

"Less regulation, more competition," he said. "You can't have one without the other.

Van Deerlin told the broadcasters gathered for the closing assembly of the 58th annual convention of the National Association of Broadcasters that "deregulation is a two-way street. Less regulation and more competition go hand in hand—a marriage not made in heaven, but in the courts."

Broadcast regulation, he said, is a "direct consequence of scarcity. As long as a scarcity of broadcast outlets exists, so shall broadcast regulation."

Van Deerlin believes that added competition can be achieved through the reduction in AM channel spacing from 10kHz to 9, ensuring, he said, "hundreds more radio outlets for the US."

Although deregulation has become the *buzz word* in Washington, DC, and at the FCC, Van Deerlin pointed out that the broadcasting industry has not received any of its benefits. The FCC's recent decision to approve AM Stereo, he said, "represents sound public policy, but it was hardly an example of deregulation."

Van Deerlin reviewed the recent commission actions that have had a negative effect on broadcasting, including the inquiry into children's television, the Carter-Mondale decision, the FCC's new EEO regulations, and the RKO/General Tire decision. These items, he noted, have demonstrated a "remarkable consistency in policy decisions" at

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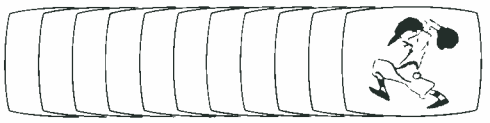

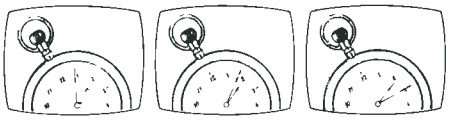

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the FCC. The Commission's proposal to deregulate radio, while simultaneously increasing the number of radio outlets, follows this trend.

"This two-pronged attempt was not merely well-timed, but essential. To do otherwise," Van Deerlin noted, "would be an abdication of the Commission's public interest responsibilities."

The Congressman also described his recent fact finding trip to Pakistan, where he was disturbed to learn that the *Voice of America* is not heard in the northwest corner of the country. The inhabitants of that section, which includes not only 25 million Pakistanis, but a half-million Afghan refugees, receive the messages of Radio Moscow, Radio Peking, and All India.

"Our silence," he said, "in this critical part of the world is maddening...This is a war of words we cannot afford to lose. America's voice should be heard in this potential cauldron for World War III."

America's Future

Presiding: Edward O. Fritts, vice chairman, NAB Radio Board, and owner, Fritts Broadcasting, Indianola, MS

Outstanding national and international figures told radio and television broadcasters that while America is facing many serious problems, they feel confident that the situation will improve during the 80s if the American people keep informed and optimistic.

Broadcasters attending the NAB convention heard opinions on America's standard of living, defense, energy, and productivity during the *America's Future* session. Bill Monroe, moderator of NBC Television's *Meet The Press*, led the discussion. Participants were: George Ball, former Undersecretary of State and influential voice in America's foreign policy for over two decades; Jerry McAffee, chairman of the board of Gulf Oil; Carl Rowan, journalist and former Ambassador to Finland and former director of the US Information Agency, and Walter Heller, former chairman of the President's Council of Economic Advisers.

Monroe opened the discussion by asking each panelist to comment on whether the US is facing a crisis "bigger than we are." Ball said that while we are economically stronger than ever, other nations are catching up. On defense, we have weakened, he said, just as importantly, the quality of our diplomacy is not as effective as it could be.

Heller, addressing the question from the economic position, said there is "no quick fix" for inflation but predicted an improvement due to lower oil prices and mortgage money by the end of the year. To alleviate the long range inflation problem, Heller insisted that the country must follow a tight budget with "meaningful wage and price restraints." He noted that in order to de-escalate wage rates some ingenuity must be used to provide incentives such as a "3% reduction in the payroll tax."

McAffee said he feels the country has made a start toward solving its energy problems, but that the oil industry needs more capital to do its job, less of a "regulatory quagmire," and greater access to land—for exploration—under government control.

The panelists agreed that productivity goes to the heart of many of America's economic problems. Ball said he fears the country is losing its world competitive position. Heller acknowledged the problem but sees the productivity level going up.

Asked about leadership qualities, Heller said we need someone who can design a specific program which includes fiscal restraint and long range goals to "mobilize Americans to invest in the future." McAffee said there is a great need for consistency in leadership. Rowan said the vital ingredient is an ability to "inspire" the people to follow a program.

On foreign policy, Ball said the hope of freeing the hostages in Iran through "political means" is receding, but explained the great risks involved in naval blockades. He criticized the lack of "quiet diplomacy" to mobilize the other Western countries to recognize the threat to their own embassy in Iran. Rowan said he thinks the situation eventually will require military action but wishes our leaders were able to deal with the crisis in "something other than an election year." He said the enormous emotion surrounding the situation could be clouding sound resolutions to the problem. □

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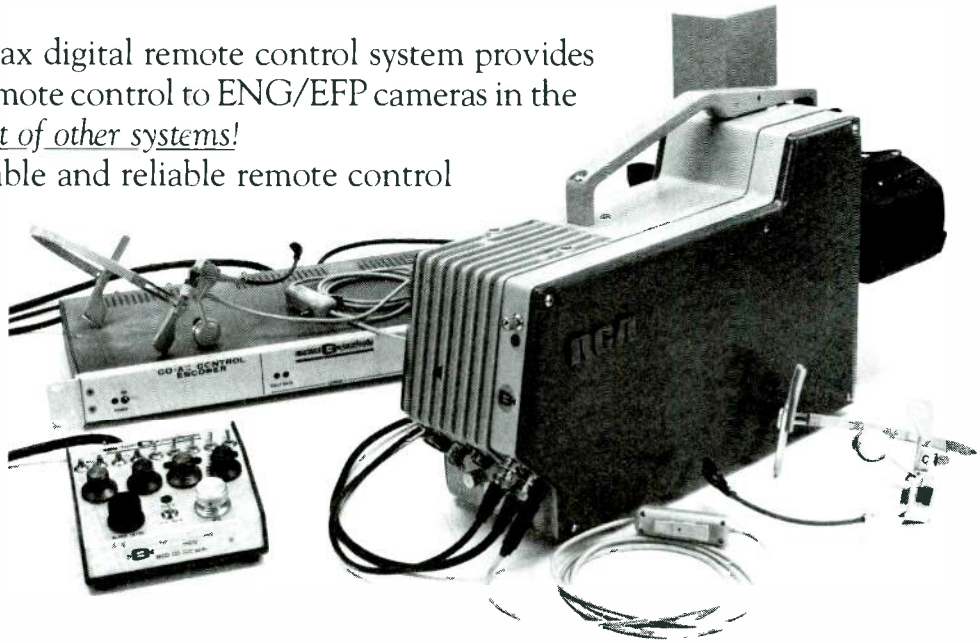

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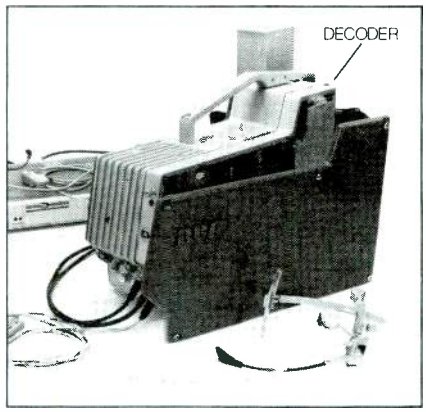
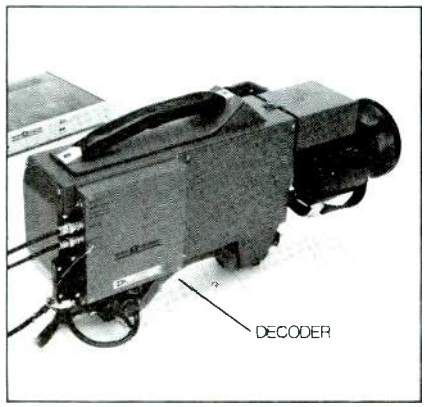


RCA TK-76B shown with decoder neatly "sandwiched" between camera body and door.



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Awards, honors and citations

The Las Vegas Convention provided an excellent platform for broadcasters to honor colleagues, associates and entertainers.

Donald A. Thurston, during his acceptance speech for the National Association of Broadcasters' Distinguished Service Award, called programming the *common denominator* of the broadcasting industry's problems. Thurston also told over 6000 broadcasters attending the annual convention that programming is tomorrow's opportunity.

Thurston, president, Berkshire Broadcasting Co., North Adams, MA, warned broadcasters that "it will not be enough...tomorrow...to define success in purely quantitative terms. Myopic allegiance to the bottom line will not be enough." The DSA winner challenged broadcasters to accept the responsibility of their influence over society instead of allowing government to "base legislation and regulation" on the "abuses of a tiny minority."

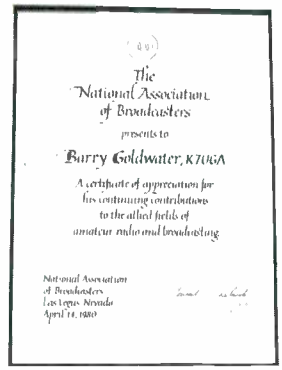
Thurston also discussed minority ownership of broadcasting stations, radio deregulation, and the Buenos Aires AM allocations conference.

He explained that the NAB Minority Broadcasting Investment Fund allows broadcasters to make a tax deductible contribution to minority ownership through a structure designed, unlike some government programs to "ensure success...through proper financing and technical, program and management assistance...." He called the fund a "private enterprise response to this need rather than a total governmental response." Thurston asked broadcasters to consider contributing "four tenths of one percent of one year's gross, that's forty cents from each hundred dollars that you take in this year," which is "a pretty small investment to ensure a private enterprise experience for the minority communities of America."

On the Federal Communications Commission's proposal to deregulate radio, Thurston said that misinformation is being spread by some religious and other groups. He pointed out that the FCC proposal will not eliminate jobs through automation, has no impact on public service announcements or religious programming, does not lift EEO requirements or the mandate to operate in the public interest. Thurston urged broadcasters "who are active in their churches at home" to demand "some reform in their central offices of communication."

Broadcasters are sometimes accused of being afraid of competition because the NAB has not endorsed a switch to 9kHz, but Thurston said NAB simply wants more study of the effect of such a major change on the millions of radios and transmitters now in use. He described the US delegation in Buenos Aires as "at odds within itself. They held separate meetings of the government representatives, excluding those from the private sector, a delegation that was really primed for the political battle, but inadequately prepared for the technical...." Thurston also said that many countries in the Western Hemisphere, like the NAB, want "facts, not political fancy" before changing to 9kHz. He urged all broadcasters to give careful attention to the issue over the next few months.

Thurston warned the delegates to forget the adage that politics and business don't mix because the government will fill any vacuum created by broadcasters who abdicate their responsibility.



Left photo: Tom Bolger (l.) presents the NAB Distinguished Service Award to Don Thurston, president, Berkshire Broadcasting. **Right photo:** James Parker (l.) was presented the Engineering Award Citation..."for his spirit of dedication and devotion to broadcast engineering." Parker, a retired staff consultant, telecommunications engineering and development department, CBS Television Network, is shown with award winners Don Thurston (center) and Senator Goldwater (right).

George Bartlett presented an award of appreciation to Senator Barry Goldwater "for his continuing contributions to the allied field of amateur radio and broadcasting." Bartlett himself was the recipient of a citation of special recognition for over 20 years of service to the NAB.

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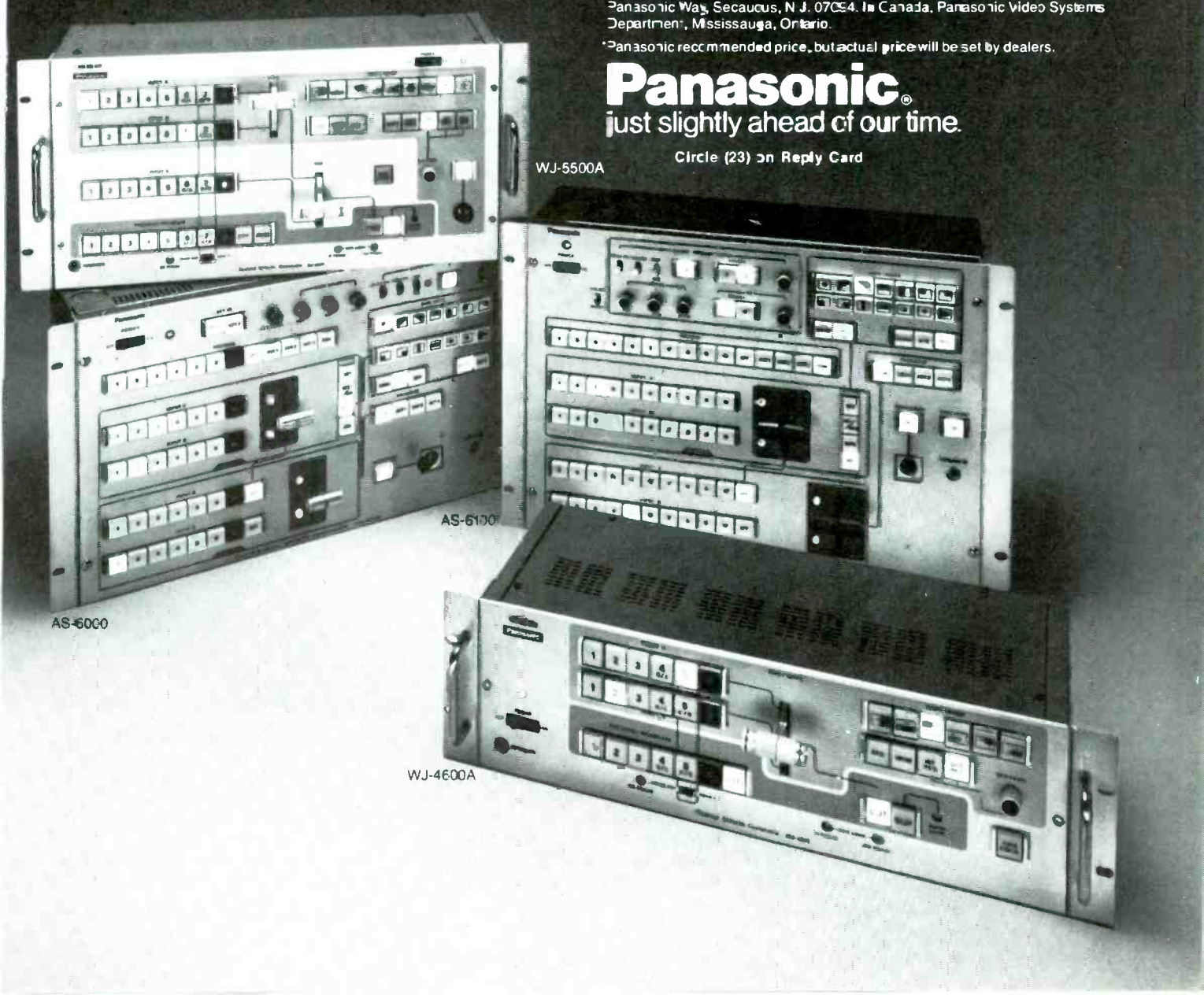

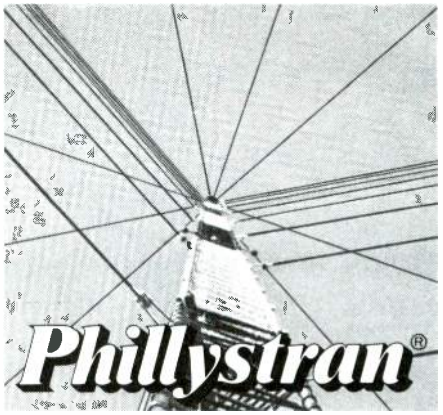

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Erlick receives award

Everett H. Erlick, senior vice president and general counsel, American Broadcasting Companies, said that the broadcasting industry was viewed with mixed feelings in many government circles, and called on broadcasters to aim for "solid and comfortable relationships with Congress."

Erlick received the National Association of Broadcasters' Grover C. Cobb memorial award during the closing general assembly of the 58th annual convention. The award, created in 1975 by the Television and Radio Political Education Committee, which is affiliated with NAB, is given annually to a broadcaster or public servant who demonstrates unusual dedication to improving broadcasting's relationship with the federal government.

The ABC executive said one of the reasons for the *fractured image* is "the failure of the world's best communicators to the public to communicate successfully with their own representatives in Congress. If we were shoulder to shoulder as an industry more often and if we worked at achieving common objectives more consistently, we could avoid at least some of the pitfalls. Certainly, Congressional problems that are rooted in a lack of understanding or a lack of information would be eased."

He said broadcasters are not getting across to Congress the fact that they do not deplete airwaves the way drillers deplete oil deposits. "Rather," he said, "we add to the spectrum technology, talent and financial resources—without which it is just so much empty space." He also said they are not getting across that over-the-air broadcasters "are compelled to compete in a counterfeit marketplace against cable and pay-cable entrepreneurs who benefit from a skewed Copyright Act, or that they should not be required to pay another royalty to help record companies meet their talent payroll."

A bronze plaque was given to Erlick along with a $1000 cash award that will be presented to a college student enrolled at any American college or university who is studying broadcasting, political science or broadcast journalism. Presentation of the Cobb Award was made by William F. Turner, president, KCAU-TV, Sioux City, IA, and chairman of TARPAC and the political education committee.

Bing Crosby and George Burns were inducted into the Radio Hall of Fame during the National Association of Broadcasters' 58th annual convention.

The Radio Hall of Fame was created in 1976 to recognize and honor those individuals who have made a significant and lasting contribution to the radio industry. The inductees were announced during a luncheon for radio broadcasters by the Radio Board vice chairman Edward Fritts, Fritts Broadcasting, Indianola, MS.

Frits called Crosby "a household word in the golden age of radio," and Burns "a giant in radio." ☐

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The automatic mic mixer that thinks before it speaks.

JBL's new 7510 advanced digital/analog mic mixer actually thinks before it speaks—by activating or deactivating up to 24 input channels. Automatically. Now, you don't need an operator to constantly adjust controls. The 7510 does it all. Quickly, precisely and without error.

Versatile modular design makes the 7510 an all-around performer. In churches, meetings, courtrooms and council chambers. Delivered with a single, 4-channel input module, the system is expandable to 24 channels. And each panel features controls for level, threshold, release time and mode selection.

The 7510 offers a variety of other advantages over conventional mic mixers. Automatic mic on/off and output level correction permit hefty power gain without the "howling" of feedback. Turn-on features a zero crossing detector. So there are no pops or clicks!

Advanced level sensing circuits trigger extremely fast attack—30-60 nanoseconds. This quick rise makes it ideal for gated mixing. The 7510 offers separate outputs for every input. So the user can program to match each need. When in the priority mode, all inputs in automatic are muted by selected lead mics.

At the same time, a unique digital attenuator decreases the system's output gains by 3 dB each time the number of live mics doubles. The feedback stability margins remain constant regardless of the number of mics operating. And the system's threshold circuits can distinguish between program signals on one mic and ambient noise on all mics to within 1 dB.

Other features include 48-volt phantom power supply. Master VU meter. And the system fits easily in three EIA rack spaces.

The 7510's low distortion, low noise, flat response and wide input dynamic range make it perfect for all sound reinforcement applications. It's also ideal for noise gating in recording studios and for broadcast and live music reinforcement applications.

JBL's 7510 delivers what it promises.

James B. Lansing Sound, Inc., 8500 Balboa Blvd., Northridge, CA 91329

Frequency Response	
Input Module	20 Hz-20 kHz ±0.2 dB
Output Module	20 Hz-20 kHz ±0.03 dB
Overall System	20 Hz-20 kHz ±0.3 dB
Maximum Gain	
Overall System	83 dB
Output Characteristics	
Maximum Output	+21 dBm
Load Impedance	600 ohms or higher loads
Total Harmonic Distortion	
Mic In to Direct Out	0.01% at +21 dBm
Mic In to Main Out	0.1% at +21 dBm
Automatic Mic Functions	
Input Rise Time	30-60 nS
Input Release Time	100 mS to 5 S, adjustable

JBL First with the pros.

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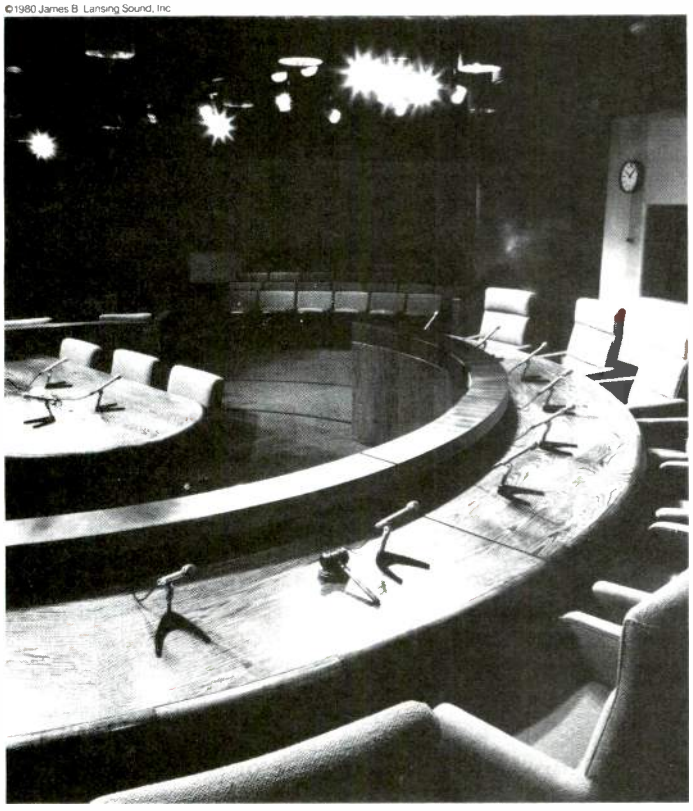

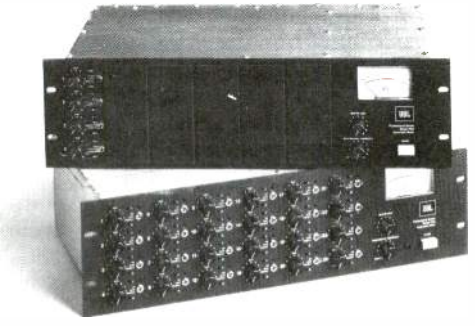

Circle (24) on Reply Card

NAB Action

At NEC's suite, Bill Rhodes (left), **BE** editorial director, and Ray Schneider (center), CBS Television, discuss the convention with Tsutomu Kimura, NEC.

William Connolly, CBS, told the press at the Sony luncheon that digital video standarization is crucial to full realization of the advantages of this new, advancing technology.

Both on the floor and away from the convention (in hospitality suites and press receptions) several manufacturers made announcements introducing new products worthy of note. Although some of their introductory products were still in prototype stages, and not ready for the hands-on scrunity, they did provide an inkling of what is on the designers' boards and might be released in the near future.

Cezar International

Saturday night of the show, Cezar International introduced a new system for encoding color information on videotape. The system, designated "Chromax," achieves full color recording on heterodyne VTRs by shifting the coded 3.58MHz color signal to a frequency around 1.5MHz and operating the VTR in the black-and-white mode. According to company executives, the system permits the VTR to record and playback the luminance and chrominance signals in their monochrome or direct modes taking advantage of their total FM recording capability.

Initial marketing efforts for Chromax will focus on the ENG/EFP markets plus licensing the use of Chromax to other manufacturers.

MCI/Quantel

A prototype of Quantel's picture rotation was shown to invited audiences in its suite at the Hilton Hotel during the show.

Picture rotation is a new digital video effect and will be available as an option to the Quantel DPE5000 digital production effects system. The new effect turns the video image in a complete circle, with a variable rate of rotation.

The new product was made available during the development cycle so that broadcasters could provide input on the unit that could be incorporated into the final design.

NEC

At the NEC hospitality suite a short, warm reception was held to welcome editors and clients to the NAB convention. NEC took this opportunity to introduce Ed DiGiulio, president, Cinema Products, and to announce the new MNC-81A ENG/EFP camera by NEC which Cinema Products will market.

THe over-all thrust of the NEC presentation was to convey NEC's total capability to broadcasters.

RCA

The RCA breakfast-press conference was an impressive affair. A *guided tour*, in slide format, walked everyone through the RCA inside/outside booths to show a host of new products to be seen and tested. Also in slide format, all new products were described to alert the press and RCA distributors to what was new on the horizon.

RCA introduced a variety of new products this year, as presented in the *Other New Products at NAB* section. The press was treated to an extensive and colorful presentation on the new RCA 1" helical VTR that was described by Lee Hedlund in a paper given Tuesday morning.

Sony

The Sony press luncheon featured addresses by Sony executives on the marketing directions envisioned for the organization. An added treat was a videotape presentation on Sony America and its progressive attitude toward equipment service.

A special treat turned out to be a major address on digital technology by William Connolly, CBS Television Network. Connolly, who is active in the SMPTE standardization work, is well informed on the necessity and impact of digital standardization.

"Every step in the television process," noted Connolly, "—staging, imaging, recording, editing, distribution, broadcast, and display—has a supporting technological structure which is sensitive to technological innovation.

"Two recent examples of the impact of technological innovation on television systems design are the 1-inch helical videotape recorder and ENG equipment. These are two of many possible examples of recent advances that have affected the superstructure of the television system. However, at this moment in time, there looms innovation which will have a profound influence on the foundation.

"The name of this technology is digital television. The future potential of digital techniques is an improvement in the technical quality of the television service. At CBS we feel that the goal should be an overall performance—from the camera to the output of the transmitter—equal to that theoretically achievable from the NTSC standard for the radiated signal. Although this is a theoretically impossible goal, with proper application of digital technology this quality aim can be approximated to a degree not practical before."

Videomedia

A press conference was held at the Videomedia booth to announce and celebrate the purchase of the firm's Z6 editing system by the National Republican Congressional Committee (NRCC) for installation at convention site in Detroit.

The system is to used to edit campaign commercials for congressional candidates in this election year. According to NRCC Chairman Congressman Guy Vander Jagt, the decision to buy the dedicated system was due to the tight schedules in Washington production houses. It was thus considered effective in both time and money for NRCC to acquire its own professional editing system. In off years the system will be used by congressmen to communicate to their constituents. □

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Control the complete audio spectrum

Your video and our ADM 2400 console: a perfect pair

One of the features you'll quickly appreciate about your ADM® audio console is that it performs in perfect harmony with your video equipment.

ADM's 2400 Series consoles are modular, multi-input broadcast production units designed to handle the most sophisticated and demanding audio requirements. They are 24 input, 4 submaster, 2 output, fully modular consoles. The 2400 housing comes completely wired, permitting ease of expansion if the full complement of modules is not initially required.

Our proven design and manufacturing capabilities, and the use of highest quality components, assure you of unquestioned professional integrity and maximum reliability — backed by an exclusive 5-year warranty, the most comprehensive in the industry.

Make sure you control the entire audio spectrum. Contact ADM Technology, Inc. — *The Audio Company* — 16005 Sturgeon, Roseville, Michigan 48066. Phone (313) 778-8400. TLX 23-1114.

Equipment Highlights at NAB '80/Las Vegas

An introduction to spectacular exhibits

- 410 exhibitors
- Over 200,000 square feet of exhibit floor space plus parking lot exhibits for vans, earth station antennas and special set-ups.

As NAB-'80 approached, there was general concern about the economy and international conflicts affecting this year's attendance. Actually, NAB-'80 was bigger and more spectacular than ever.

The color shot above shows the floor activity from the Dolby demo room overlooking the radio exhibit hall. Exhibit action was brisk throughout the show, and most exhibitors were pleased with the numbers of visitors to their booths and the high level of buying interest.

Several exhibitors observed that booth attendance seemed a little low this year but that quality of visitors was noticably higher. This was interpreted as indicating that broadcasters may have been bringing only their decision-makers to the show in an effort to economize.

Record attendance coupled with exceptional interest in new products resulted in a record-making NAB. Many exhibitors were delighted with record sales...and if not actual sales, at least record sales leads.

Everyone knows that sales figures are subject to suspicion. However, the overall enthusiasm for the sales activity at NAB was encouraging. A major video exhibitor, for example, claimed to have sold all equipment he brought to the show. A small manufacturer sold two years output at his present production level and went home from NAB to reconsider his production plans.

And the story goes on. Only a few exhibitors expressed concern at low sales action at NAB-'80. In view of the generally good sales interest at NAB, these firms must reconsider their booth attraction and, perhaps, their product line.

Exhibit Coverage

Exhibitors at NAB-'80 displayed both their well-established product line and new equipment—either new prototypes or new production models of equipment introduced last year.

The NAB coverage that follows is organized into special chapters, and these can be seen most clearly on the contents page. Equipment coverage, this chapter, is divided into three segments: videotape editors, both established and new; radio consoles, both established and new; and other products and exhibitor highlights.

Thus, except for radio consoles and video tape editors, the equipment coverage herein is chiefly devoted to what was new at NAB-'80. If you missed something, you can use the reader service card to obtain any exhibitor's new product data.

On the other hand, if you'd like to get data on some established products, use the **BE** March pre-NAB show issue (until July 1).

Some of the new products unveiled at NAB, and some of the exhibitor's display schemes, warrant special coverage beyond the brief summaries given here. Some of these products will be considered in future test reports and technical articles. If you'd especially like to see an expanded coverage of something new that intrigued you, write the editor, **Broadcast Engineering**, for consideration.

FUJINON invented the ultra high resolution lens. Only FUJINON could make it better.

New. Now with a built-in 2X extender.

It reads 1300 tv lines to deliver 40% higher resolution. As a result, first generation tapes never looked better. A test pattern projector is built in. Microprocessor equipped cameras have never been easier or faster to set up.

Now, for greater versatility — with the same unmatched performance standards — FUJINON introduces the 14X E.-F. lenses with built-in 2X extenders.

Consider the advantages and the possibilities:

- Two high performance, high resolution zoom ranges.
- Ultra high resolution performance in the studio and in the field.
- Better than 90% MTF in green, red *and* blue.
- Compact, built-in 3-lamp diascope for precise color temperature matching.
- Greater color convergence — taking lens moves *with* the zoom.
- Constant maximum aperture in all zoom and focus ranges.

For ⅔-¼" format: P14x16.5 E.-F.R. F/2.1 (16.5mm~231mm; 33mm~462mm)

For 1" format: P14x22.5 E.-F.R. F/1.6 (12.5mm~175mm; 25mm~350mm)

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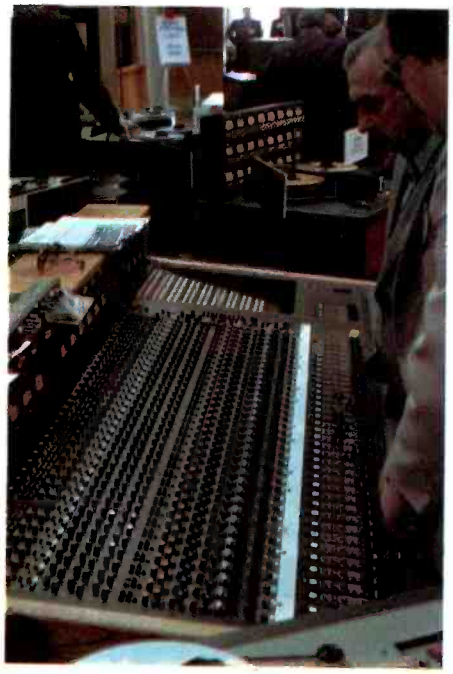

MCI

Radio Consoles at NAB '80/Las Vegas

By Edward A. Schober,
Radiotechniques, Haddon Heights, NJ

McCurdy

This year's NAB show held treats for radio broadcasters in audio consoles. From the five-figure top line models, to the five mixer under $1500 boards, broadcasters saw a wide choice.

Top line manufacturers are paying new attention to the air console in addition to recording and production. Offerings from McCurdy, Ward-Beck, Pacific Recorders and Engineering, Auditronics and others are now available with the simplicity of operation needed in the fast-paced air studio, instead of the flexibility needed in production. This is not to say that these boards are simple underneath—CMOS logic provides some very sophisticated source control and monitoring, automating and foolproofing the starting and stopping of sources. Needless to say, these boards have the pristine audio quality and sleek ruggedness of their recording studio brothers.

Some novel consoles and new sources were at Las Vegas this year. Howe Audio Productions showed their model 700 console, an amazingly simple and clean 12-channel console with many creative features not obvious at first glance, like proportional monitor dip on the control room mic channel, and dc optical control without the photocell delay of previous design.

Logitek Electronic Systems' flashy custom audio series is an air console family based upon a group of plug-in modules that may be customized for the station, and updated at a later time for changing needs.

Arrakis Systems' 1000 series console breaks new ground in its price class by putting the works in a 19-inch rack, and making the console look like something out of Star Wars. All control and switching is dc, with touch switching and LED peak level meters.

RCA is back in the radio console business with their BC-300 series consoles. These well thought out rotary consoles are available in a variety of versions with clocks, timers etc. as options. Based on a proven layout, these consoles provide a rugged, straightforward approach for the station with varied programming.

Many firms had new offerings as well as their popular established products.

QRK Electronic Products' (*) Omega audio console seems to be paying off for this pioneer in dc logic control in a modestly priced console. This console has full status

*A subsidiary of Filmways/Broadcast Electronics.

Firms Displaying Radio Consoles At NAB—'80	Circle # For Data
ADM Technology	900
Ampro/Scully	901
Arrakis Systems	902
Auditronics	903
Autogram	904
Broadcast Electronics	905
Cetec Broadcast Group	906
Harris	907
Howe Audio Productions	908
Logitek Electronic Systems	909
LPB	910
McCurdy Radio Industries	911
McMartin Industries	912
Micro-Trak	913
Pacific Recorders & Eng.	914
ProTech Audio	915
QRK Electronic Products*	916
RCA	917
Ramko Research	918
Rockwell-Collins	919
Tri Tec Systems†	920
Tangent Systems	921
Tweed Audio†	922
Ward-Beck Systems	923

*A subsidiary of Filmways/Broadcast Electronics
†See chapter on Other Products at NAB for product descriptions.

Facts from Fluke on low-cost DMM's

Direct readings in decibels: Keeping track of your gains and losses.

If you'd rather forget about the last time you got wrapped up in an audio jungle, you'll want to respond to this ad.

Meet our new 4½-digit Model 8050A Multimeter — the first low-cost DMM with self-calculating dB features that let you keep your mind on your mission instead of on conversions and formulas.

While most analog meters read dBm referenced only to 600 ohms, the Fluke 8050A delivers direct readouts in decibels over a 108 dB range referenced to any one of 16 impedances (8 to 1200 ohms) with 0.01 dB resolution.

Push one button, and the microprocessor in the 8050A scrolls through its reference impedances. Simply stop at the one that matches your system and get back to work. No more math; just action. And with the 8050A's relative reference feature you can measure gains or losses in dB throughout your system faster than you thought possible.

When you're dealing with voltage, current or resistance, an offset function provides a means of comparing stored inputs with all subsequent inputs, automatically displaying the difference. A real timesaver.

And there's more. True RMS measurements to 50 kHz; 0.03% basic dc accuracy; conductance (measures leakage and high resistance); extensive overload protection and safety features; a full line of accessories; and a low price of $349 U.S.

For all the facts on how to maximize your gains with the 8050A, call toll free **800-426-0361**; use the coupon below;or contact your Fluke stocking distributor, sales office or representative.

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Top specs, small space, good price!

The 2000 Series is an all new Cetec family of high-performance, compact, and attractively priced mono and stereo audio consoles.

These five- and eight-mixer consoles are ready to go—plug in the inputs and the speakers, and you're in business. Monitor amplifier and muting relays are built in. The electronics are modular—easy to reach and easy to service.

The 2000 Series is high performance and reliability, packaged to save space and dollars. The five-mixer (10 inputs) is perfect for a newsroom, small studio, or for remote broadcast. The eight-mixer (16 inputs) can be a production-room workhorse that doubles as an on-air board.

Prices start at $1325 for the five-mixer mono console, and range to $2750 for the eight-mixer stereo unit.

All the engineering and performance data are available now in a full-color brochure. Write or phone today for your copy.

New Cetec Model 2003 8-mixer audio console

Cetec Broadcast Group

Cetec Corporation
1110 Mark Avenue, Carpinteria, Ca 93013
(805) 684-7686 Telex: 658-461

Circle (28) on Reply Card

display using alphanumeric LED indicators, automatic source and timer starting, full transformer balanced audition and mono mix channels, and serious attention to RFI proofing.

Cetec Broadcast Group showed its new 2000 Series consoles. They look surprisingly like their old A-20 series, but look again—entirely new works, switches and performance.

LPB introduced the Citation series consoles. These rugged, well-built consoles provide just about everything needed in a conventional style console—from reed relay switching with large telephone type switches, to full facility stereo audition, and LED peak flashers in conventional VU meters.

Ampro/Scully introduced its Microtouch consoles. These sleek looking 5- and 8-channel boards have touch controlled input selection with positive LED readout of selection. Full transformer output audition and transformer balanced inputs on all channels make the Microtouch easy to apply without ground loops.

Broadcast Electronics introduced its new 10-mixer version of its console line. This console adds to the firm's trim line and is in keeping with the trend toward more input channels so that each source can always appear on the same channel, thus avoiding confusion in which source is switched in at any time. In case 10 inputs aren't enough, each input can be selected to two sources. Full audition, and mono mixdown option, along with step attenuators flesh out this full facility console.

Protech Audio introduced a 12 channel stereo model in its 30000 series consoles. These vertical slider consoles use an interesting rotary slide attenuator that should be quite trouble free. Also improved are the specifications on the Integra 3 audio models used in the console.

Ramko Research showed its DC-12 console. The DC-12 has all audio circuitry in a 19 inch rack unit, with DC control from the console head. The DC-12 has 12 channels and may be expanded up to 8 additional channels. Program and audition amplifiers are identical. The DC-38 rotary fader 10-channel console uses the same dc-technology, but is all in one compact cabinet. Other advanced features of the DC-12 are Ramko's LED peak level meter, and active balanced inputs and outputs.

Micro-Trak introduced its Sport III portable console. Although this is not a studio console, it is appropriate to mention here as new and novel. The Sport III is designed for remote broadcasting over the

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MODEL J & D 712

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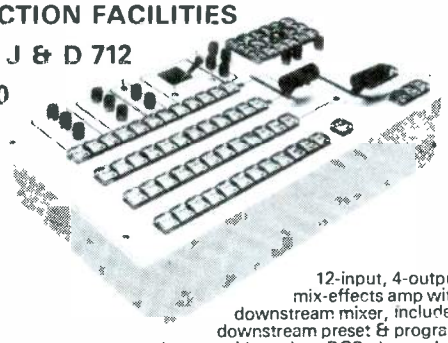

12-input, 4-output mix-effects amp with downstream mixer, includes downstream preset & program busses with cut bar, RGB chroma key

Standard Features

- 12 inputs including Black-burst and Color Background
- Built-in Black Burst Generator
- Built-in Colorizer
- Built-in RGB Chroma keyer
- Four Switching busses
- Downstream Preset and Program Busses with cut bar
- Rack-mounted electronics
- Adjustable Soft Wipe
- Adjustable Border edges
- Color Matte
- Vertical Interval switching thru-out
- Illuminated Momentary Contact push buttons
- Internal, external, Chroma-key, and matte inputs to keyer
- Built-in pattern modulator with frequency and amplitude controls
- Full Tally
- Pattern symmetry control
- Illuminated Momentary contact push buttons for effects selection
- Normal/Reverse/Normal-reverse wipe transitions
- Pattern limit controls for presetting size of patterns or varying vertical and horizontal aspect ratio
- Loop-through inputs
- Input amplifiers with clamping
- Synchronous/Non-synchronous inhibit
- Modular construction with front access plug-in modules

Options:

Downstream Keyer

FOR MODERATE SIZE FACILITIES

MODEL B1-154

$12,990.00

15-input, 4-bus mix/eff/key amp with downstream mix/key amp Many optional features including DSK & quad-split, etc.

FOR SOPHISTICATED FACILITIES

MODEL B1-156

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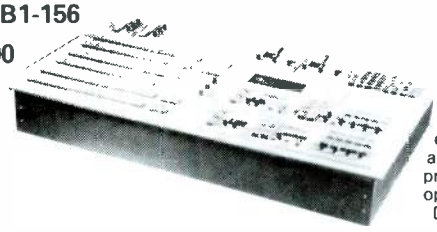

15-input, 6-bus with two full mix/eff/key systems and dir. pgm and pre busses: many options available, DSK, quad. etc.

MODELS 154 & 156

STANDARD FEATURES

1. **Switcher Models 154 and 156** are of the same basic design and utilize the same electronic sub assemblies. These switchers have the same standard basic features, differing only in the number of busses and in the number of mix/effects units. The basic standard features include 32-pattern mix/effects, color black and color matte background generator, and a mix/key unit in the case of the Model 154.

2. **Input Amplifiers**
   - loop through high impedance input • gain equalization for 1000' cable • 22° sub carrier phase control • clamped inputs (10% to 90% APL) • sync addition on non composite signals if desired.

3. **Tallies**
   - isolated dry contact relay closure on all inputs (2 amps at 50 v.)

4. **Mix-Effects Units (Includes Keying Function)**
   - **One** (1) used in Model B1-154
   - **Two** (2) used in Model B1-156.

   Fades (or Supers), Wipes, Keys may be produced.
   Positioner Joystick for each M/E positions patterns.
   - **Pattern Modulation** may be accomplished by an internal waveform generator. Modulating sources may be either (1) sine wave, (2) square wave, (3) saw tooth, or (4) an external customer generated source.
   - **Mix Key** and **Wipe Key** available.
   - **Soft Wipe** and **Soft Key** available with adjustable variations.
   - **Push to Preview** obtained by depressing knob on clip potentiometers (provides for M/E monitor output).
   - **Wipe Mode**—3 interlocked buttons select "NOR", "REV" or "N/R".
   - **Hard Wipe, Soft Wipe** or **Border** can be selected with degree of softness made by "Edge" control adjustment.
   - **Border** may be **Colorized by adjustment of "Hue" and "Luminance" control.**
   - **Symmetry of Pattern** may be adjusted by "SYM" knob.
   - **Preset Wipe Limits** are set by potentiometers. "H" and "V" vertical preset limits activated by Pattern Limit button.
   - **Spotlight** alternate action push button produces a 6 db. level difference between "A" and "B" input channels in the "Wipe" mode. (Operates on all patterns.)
   - **Pattern Assignment** is made by depressing "**ASSIGN**" button. Pattern select feature may be "locked" to pattern matrix by depressing the "**ASSIGN**" button a second time on the same pattern. Patterns assigned appear on LED display on M/E control panel.
   - **Non-Synchronous Inputs.** An "NS" indicator is provided. Tearing is prevented by not allowing a non-synchronous signal to be switched except at extreme position of fader handle where a "cut" transition occurs.
   - **Key Input Sources** may be either (1) "A" bus video for self keying, (2) preview Key bus, (3) chroma key, or (4) an external key source.
   - **Key Invert** selector provided to accommodate either positive or negative video as a keying source.
   - **Key Fill** may be either "A" video for self keying or a colorized matte.
   - **Mix/Key** provided a lieu of second Mix/Effects system for Model B1-154 switching system. Provides for all mix and keying functions of mix/effects system (as previously described) except for the pattern effects.

OPTIONAL FEATURES

May be added at any time (required control panel wiring already installed)

Chroma Keyer (C.K.) **$950.00**
• **Hue**—selects hue of keying color • **Gain**—adjusts the amplitude • **Clip**—adjusts the clip level for keying • **Camera (4 x 1) input switcher**—selects RGB output of any one of 4 cameras to feed C.K.

Down Stream Keyer (DSK) **$1,975.00**
• Keys in titles, inserts, or fades to black with or without insert • Color matte background • Key sources: (1) Mix/Effect, (2) Chroma Key, (3) External • Push to Preview (Monitor)

DSK Border **$1,950.00**
• **Border**—black edge around insert • **Shadow**—black edge on right side and bottom of insert

Quad Split **$1,900.00**
Provides four (4) variable size quadrants from eight possible sources with variable width border.

Aux Busses—(Model 156 only) **$2,100.00**
Two remote outputs are available—remote control panel and amps required.

2nd **Mix/Effects Unit** in lieu of **Mix/Key** amp in 154 ..... **$2,650.00***
Mix/Key amp fed by preview and program busses in 156 ..... **$3,500.00***

*Except those indicated with an asterisk.

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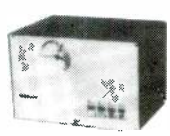

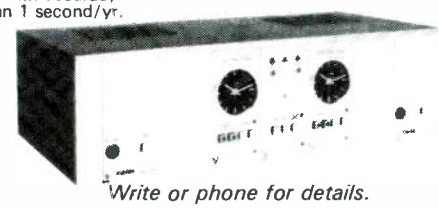

Write or phone for details.

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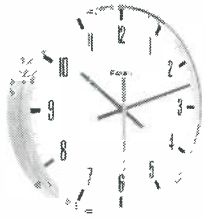

Surface Mtg. Semi-flush

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Prices and Specifications Subject to Change Without Notice.

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Now you're telling us...

...why TV broadcasters continue to specify 2/3-inch Plumbicon* tubes in their ENG/EFP cameras.

Two years ago when competitive 2/3-inch camera tubes made their appearance, we said "...in the final analysis only you, the broadcaster, will be able to judge the *system* performance of these other 2/3-inch tubes by comparing their in-camera performance with that of Plumbicon-equipped cameras."

Today, after the broadcaster has had the opportunity to make this comparison of the in-camera performance of the Plumbicon versus the Saticon (Registered trademark NHK/Japanese Broadcasting Corporation), TV professionals across the nation have made the Plumbicon the leader. To date we've delivered more than 8000 2/3-inch Plumbicon tubes in the U.S.A. and the pace is still picking up.

Here's what we've been hearing from broadcasters about the crucial factors that affect the "in-system performance" of ENG and EFP cameras...Sensitivity, Resolution and Burn-In:

*Reg. T.M. of N.V. Philips of the Netherlands

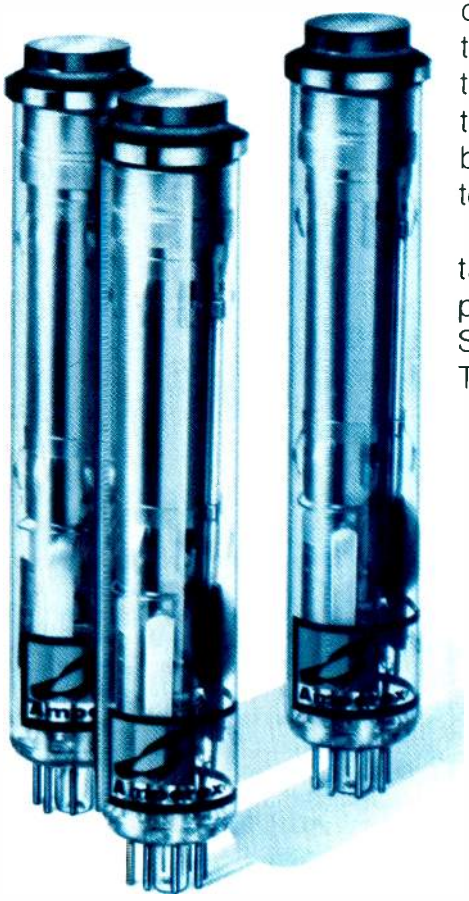
SENSITIVITY: The ability to shoot and air pictures under the most severe and often uncontrollable lighting conditions is of first importance. When it comes to "get the footage now or forget it", the choice of a Plumbicon-equipped camera over a Saticon gives you that ***extra measure*** of sensitivity that allows you to get the job done.

RESOLUTION: If your business is demonstrating a camera on a still scene or a test pattern, then static resolution is important. If however, your business is making good video under all conditions, especially those difficult ENG and EFP action shots, then you're telling us that it's total resolution that counts. While the Saticon tube's static resolution has been compromised in order to improve its lag and burn-in weakness, we've listened to what you had to say and have actually increased the Plumbicon's static resolution performance while maintaining its superior dynamic resolution characteristics.

BURN-IN: In the fast-moving, uncontrolled environment of ENG and location shooting, you ***are*** going to face extreme and unexpected highlights. Under these conditions, you ***cannot*** afford to run the risk of increased production costs while you repair "burned" tubes or, even worse, having no choice but to air live shots not up to your broadcast standards. You ***can*** rely on the superior highlight-handling capabilities of the Plumbicon.

Plumbicon tubes exhibit very little perceptible burn-in, especially in highlights. The Saticon, on the other hand, has a noticeable characteristic of "hanging-up" on bright highlights and tends to exhibit picture-sticking after a camera has been focussed on a scene for any length of time.

After making the comparison, broadcasters like yourself have made their choice a Plumbicon-equipped camera with which they can be assured of getting quality video with that extra measure of protection in burn-in, and of performance in total resolution and sensitivity which only the Plumbicon can provide.



We reaffirm our long-standing commitment to staying abreast of the needs of the broadcast industry...and to continue to supply the finest camera tubes that can be made. Amperex is dedicated to product excellence.

For more information, contact: Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

Amperex®

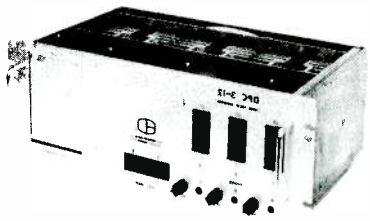
TOMORROW'S THINKING IN TODAY'S PRODUCTS

A NORTH AMERICAN PHILIPS COMPANY

Circle (30) on Reply Card

...in lighting control systems

Try A New Idea
D.P.C.



EDI's new DPC system (Dimmer Per Circuit) is a concept which offers the best of two worlds, plug-in design for flexibility and service, as well as space saving, high density packaging.

The DPC series is not just another dimmer, but a different philosophy in control systems. As the name implies, the DPC systems were designed for applications where a dimmer for each load circuit is desirable. With this new compact design, 50% more dimmers can be provided in a single 22"W x 87"H rack (up to 96-2.4Kw, 48-6Kw, or 24-12Kw). Each DPC plug-in has as standard a front mounted test jack, power indicators, front access to curve adjustments, and many other features.

The DPC systems use the same high quality electronics that have been engineered into EDI's complete line of dimmers. These systems are very cost effective considering the money saved in eliminating expensive load distribution items such as slider or cord and plug patch panels.

High Quality, High Flexibility, but not High Cost. For more information write us or call (503) 645-5533.

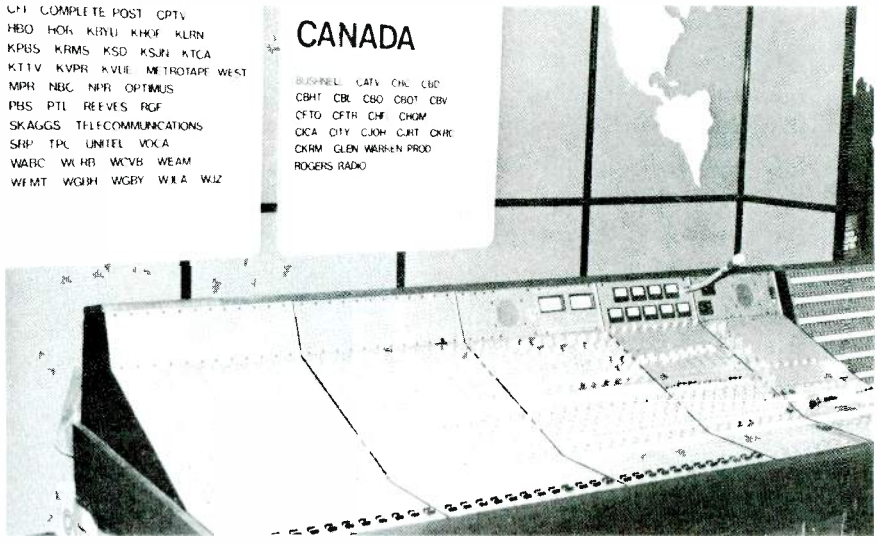
DPC

Electronics Diversified, Inc.
Lighting Control Specialists
1675 N.W. 216th
Hillsboro, Oregon 97123
(503) 645-5533

Representatives Wanted

Circle (31) on Reply Card

Modular Audio Products



Rupert Neve

Radio Consoles

switched telephone system. It comes complete with a keypad for dialing, battery backup, talkback, and three headphone outputs. A lot of attention was put into the design so that it provides exactly what is needed for sports remotes, without unneeded frills (you have to carry it there and back).

Production consoles were in their glory. ADM Technology featured its 2400 series, and 1600 series consoles for multitrack recording. Auditronics was enthusiastic about its Grandson and Grandson II consoles designed to bridge the gap between radio production and sophisticated recording consoles. McCurdy's SS8500 and SS8650 consoles are designed for radio production, with radio organization and the flexibility of recording style modular boards.

Tangent's BC-1 series is high technology applied. The BC-1 is a modular series recording console that has all the right specs. Jensen transformers, Penney and Giles faders, high slow rate, etc.

The Ward Beck R1200/R2000 series of consoles may be configured for radio production, with stereo program 1 and program 2 radio organization; or, by selecting appropriate modules, it may be configured as an air console with sophisticated source control and presets.

In top-of-the-line air consoles, ADM showed its ST 160 modular console, Auditronics' 110B on-the-air mixer derived from the Grandson series is specially configured for the simplified controls of the air

Hard to Find?

According to some of our over 200 customers & friends who have searched far and wide for that "Certain Sound," the answer has been . . . **YES!**

So we thought we should let you know how to find us and our AM & FM audio processors. They're not just more pretty "Black Boxes" . . . they've been designed for you the broadcaster . . .

Designed for **Incredible** Sound Control, **Maximum** Flexibility & Reliability, **Precise** Useability, **Excellent** Serviceability, **Affordable** cost, and more.

AM System 4A
$2800

FM System 4
$5500

AM System 4A

AM System 1A
$1450

FM System 1
$2800

So if you have been trying to find that "Certain Sound" for your Radio Station . . . , Find us and you may just have found YOUR sound!

CRL Systems AM & FM
Audio Processing of the 80's

Contact

CRL CIRCUIT RESEARCH LABS, INC.

3204 S. Fair Lane • Tempe, Arizona 85282
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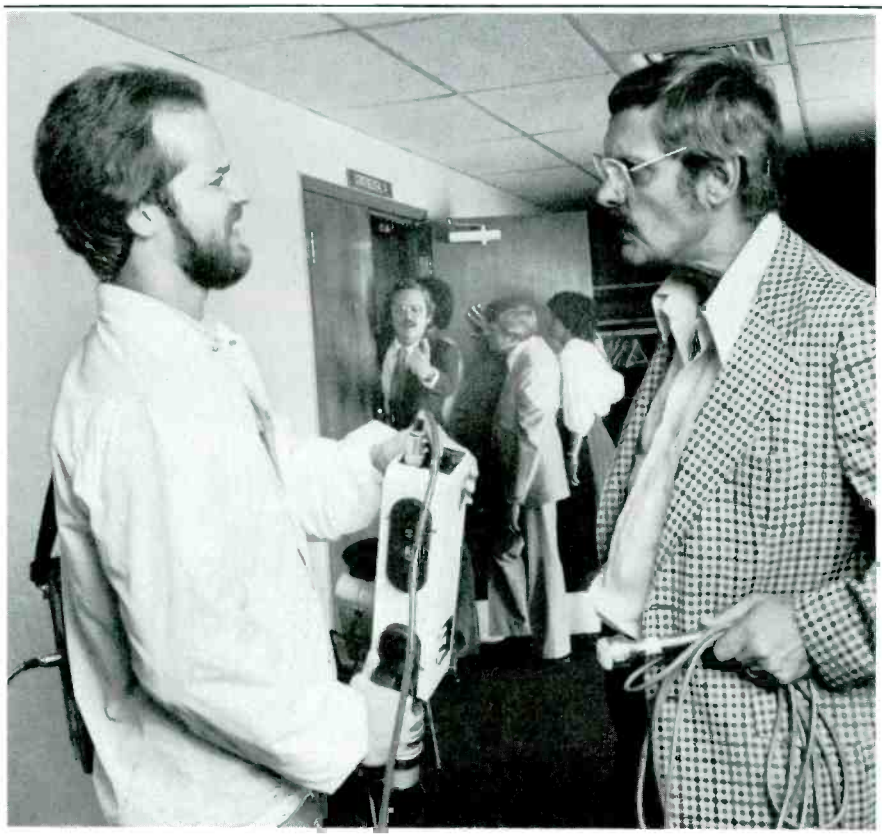
Circle (32) on Reply Card

Tangent

Broadcast Audio

Broadcast Audio



The Senator just announced he's running again.

Too bad your camera isn't.

If you've lost a story because of weak, unreliable batteries, take a look at Alexander Ni-Cad replacement batteries. Alexander was a pioneer in the development of nickel-cadmium batteries for ENG and EFP. And we're working closely with station engineers and videographers to develop new power products for even greater reliability.

Alexander. Batteries are our only business.

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Alexander Manufacturing Co.
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Mason City, Iowa 50401
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Circle (33) on Reply Card

studio. McCurdy's new SS8800 is likewise configured for on-air use, and built in the enviable McCurdy tradition.

Pacific Recorders and Engineering's BMX series consoles are designed expressly for on-air use, and have been tailored well to that purpose. The clean functional layout, and full shopping list of options prove that the BMX has been designed by people who know the problems in the field.

Tangent showed its BC-163, possibly the highest technology "gorilla proof" console on the market, which provides the recording console type controls, but behind the panel.

Harris showed its Gatesway 80 and Stereo 80, based upon the venerable Gatesway of the '50s, but with current mechanical design and solid-state works. These consoles, and others having a common heritage with the Gatesway, still do most of the work in American radio. The Ampro/Scully ac series, The Autogram AC series, the LPB Signature II, and the Rockwell-Collins Mark 8 all draw from, and live up to, the tradition for solid performance and reliability set over 25 years ago in the Gatesway.

Rockwell-Collins' Audio Rock 10 shares modules with the Mark 8 and provides the larger facility with the extra inputs and flexibility that 10 channels offer. These consoles come across as very clean and well made.

McMartin's B1000 series consoles are available in rotary as well as vertical fader design in a stylish functional cabinet.

Cetec's Centurion series, and Broadcast Audio Associates' System 8 and 16 follow much of Pacific Recorder's BMX series philosophy in

YOU SHOULDN'T HAVE TO WAIT SIX MONTHS TO GO ONE INCH.

After spending six months researching the purchase of a 1" VTR, you shouldn't have to wait another six to get it.

Introducing the 3M TT-7000 "C" 1" VTR. The technology of today that's available today.

The TT-7000 is sold and serviced by 3M. One of the largest suppliers to the broadcast industry. And it's built by one of the most respected manufacturers of video equipment: Nippon Electric Company.

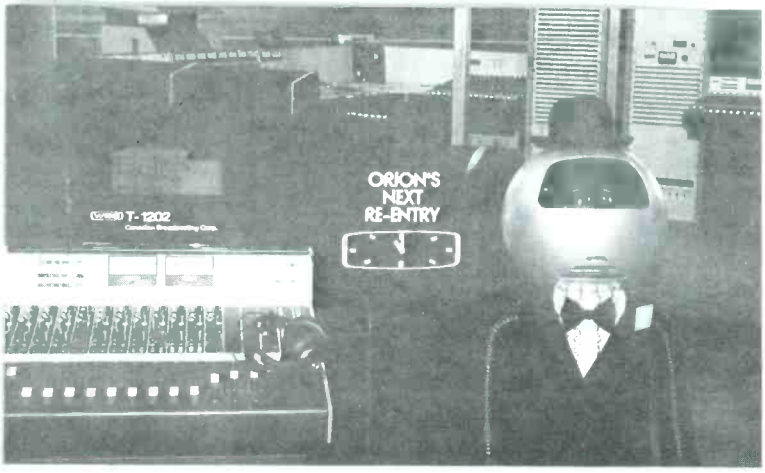
Which means you get all the standard features found in other 1" VTRs. Plus a few important extras. Like full audio/video confidence heads, built-in FM calibrate oscillator/marker and a sync channel.

For complete details and technical specs on the TT-7000, call (612) 733-7914. Or write: 3M/Mincom Division—Video Products, 3M Center/223-5E, St. Paul, MN. 55101.

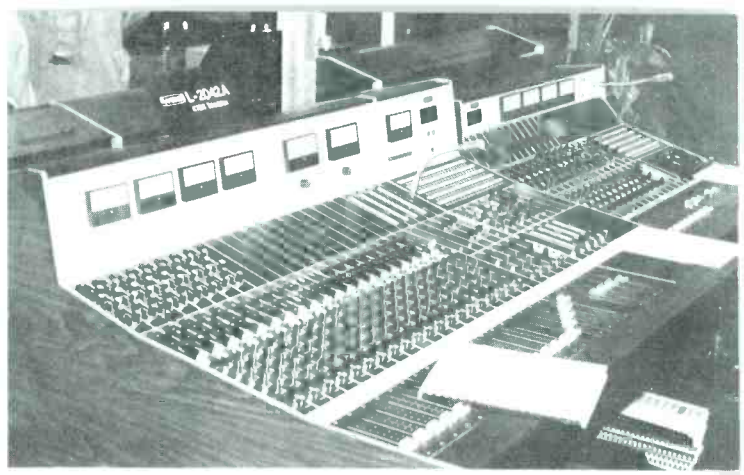
If you don't take too much time making your decision, you can get the TT-7000 in practically no time at all.

Circle (34) on Reply Card

3M



Ward-Beck



Ward-Beck L-2042A

a less expensive range. The modularity and flexibility of these consoles make them easy to use.

Last, and least only in size, is Micro-Trak's little 6618 audio console. This economical console provides a single stereo line output, with a mono mixdown. This appears to be a nicely made remote board, or console, for news.

Anyone needing to buy a new console had a hard but pleasant job sorting through the consoles at the show. After narrowing to a price range, and console type, there is still a wide selection available in every area. Console technology continues ahead, and there are new things every year, so the *best buy* may improve each year.

Other Audio Boards

A number of audio boards exhibited at NAB-'80 have not been discussed here but will be included in the final section of this chapter. These boards are those large and small systems that are more closely identified with production—either studio or in the field—and those designed as rack mounting components.

Some of these boards were shown in the booths of Avab, Hallikainen & Friends, Harrison, Modular Audio Products, Rupert Neve, and Panasonic—in addition to the companies listed in the accompanying table. Appropriate products from these firms will be listed later under *Other Products at NAB*. □

Circle (35) on Reply Card

Blue chip ENG on a budget

If you thought that an Ikegami ENG camera's been beyond your budget till now, take heart. The HL-78A approaches the high performance standards of the HL-79A. But the price is encouragingly lower.

The HL-78A is the quintessential ENG camera—20 pounds complete with lens, battery and ready for action. It is beautifully balanced, human engineered, with BK-7 glass beamsplitter optics, and state-of-the-art electronics. +18 and +9 dB gain settings enable you to invade domains of darkness that daunt lesser cameras.

And with studio options like 4½-inch electronic viewfinder, remote paint box, program microphone and intercom, it does double duty. What's more, it meets EIA Std. RS-170A including SC-H phase criteria, with adjustable H&V blanking pulse widths to meet FCC limits. Put the HL-78A on your ENG team. See your Ikegami dealer/distributor or contact Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance. CA 90501 (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, TX 77060 (713) 445-0100; Southeast: 552 South Lee St., Americus, GA 31709 (912) 924-0061.

Ikegami HL-78A

Circle (36) on Reply Card

Videomedia

Convergence

Edit Controllers at NAB '80/Las Vegas

EMS Res-Q

By John Wiliszowski, video editor

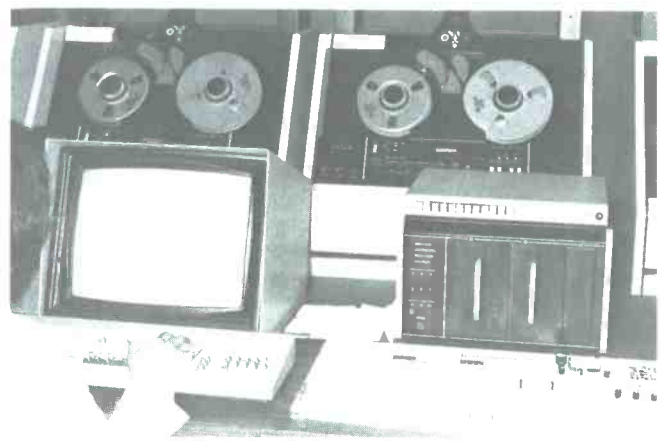
NAB/Las Vegas '80 was the arena where manufacturers demonstrated their ability to provide videotape edit controllers that would satisfy every editing need. The trend for many manufacturers was to complete their product lines. Many companies formerly associated with large, computer-assisted editing systems introduced small editing systems suitable for ENG or off-line editing. Others that traditionally catered to the users of small editing units unveiled larger, more sophisticated systems. The result was that this year's show had on display edit controllers ranging from those that would withstand the rigors of a broadcast newsroom to elaborate units for multi-source editing and auto-assembling.

Broadcast Engineering has included this NAB roundup of edit controllers to provide the reader with in-depth information and specifications of models displayed at the show. For convenience, the NAB edit controller wrapup is divided into two sections. Part one includes two tables detailing specifications. Table 1 consists of VTR controllers which are generally considered ENG systems. Table 2 consists of large systems in which some features are universal and not listed. These include the use of SMPTE code, computer control and control three or more VTRs.

Part two is a wrapup highlighting the special features offered on specific units. The listing of each model in part two carries a reader service number. For additional information on any edit controller, circle the number that accompanies it on the reader service card in this issue.

Continued...

Datatron Vangard



Datatron

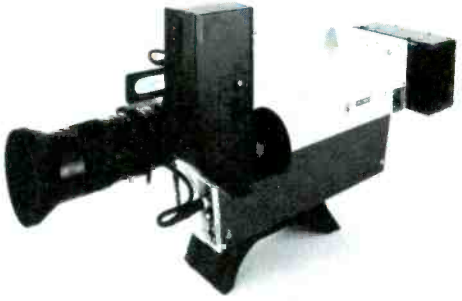
Sets new ITV standards

The ITC-350 is more camera than you ever imagined you'd command in the $13,000 range. It sets new standards for industrial, educational, and scientific television. Its prism-optics offer twice the sensitivity of a dichroic system (about 1½ additional f-stops). High resolution (500 lines) and an extremely quiet picture (53 dB S/N ratio) tell you a lot about its quality.

For top-grade color in the studio, there's an optional CCU. A color filter wheel, H&V enhancement, stable black balance, shading circuits and its roster of automatic features make it perform more like a network-quality camera than an ITV camera.

And because it weighs only 13 pounds (with viewfinder), has up to +12 dB extra video gain setting, and draws only 17 watts, it's a great ENG camera.

For a demonstration call your Ikegami distributor or contact Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; (201) 368-9171. West Coast: 19164 Van Ness Ave., Torrance, CA 90501; (213) 328-2814. Southwest: 330 North Belt East, Houston, TX 77060; (713) 445-0100. Southeast: 552 So. Lee St., Americus, GA 31709; (912) 924-8309.



Ikegami ITC-350

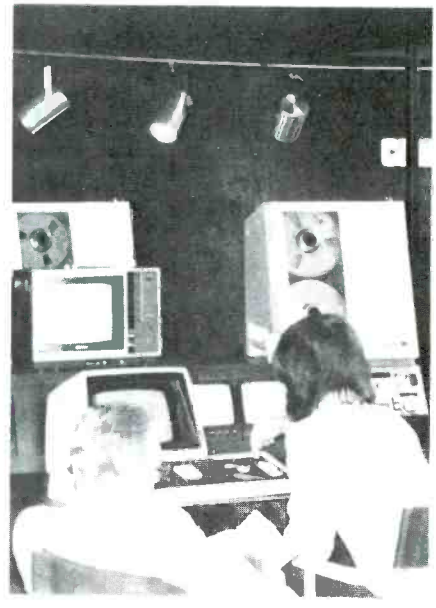
Circle (37) on Reply Card

Table 1. Features of edit controllers at NAB-'80/Las Vegas

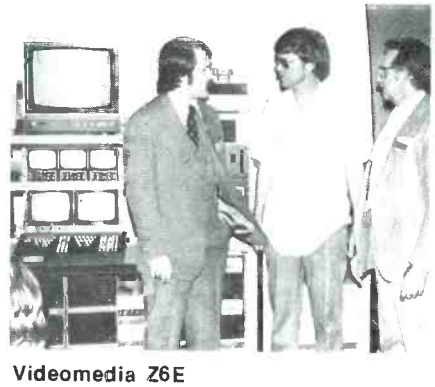
System \ Features	Type VTR	Changeable software	Tape indexing methods	Max. number of VTRs	Tactile control
Ampex RES-1	1",2"	no	SMPTE	4	key
Cezar International EA-3X	½",¾"	no	†	2	lever
***CMX/Orrox** The Edge	½",¾",1"	no	SMPTE	3	lever
***Convergence** ESC-90	½",¾"	no	††	2	joystick
Datatron TEMPO-76	¾",1",2"	no	††	3	slider (Varascan)
***Dynascience** SPECTRA-80	½",¾",1",2"	no	real time	2	knob
***EMS** RES-Q II	¾"	yes	pulse count	16	lever
Fernseh** EES-9	SMPTE Type B1"	no	tape timer/ SMPTE	2	key
Jatex VSEC-42T	½",¾",1"	no	Scene-Dex time code	3	key
***JVC** RM-82U	¾"	no	pulse count	2	knob
***JVC** RM-88U	¾"	no	pulse count	3	knob
NEC America BC-101	NEC VC-1010 only	no	pulse count	2	key
***Panasonic** AU-A70	¾"	no	SMPTE	2	knob
***Panasonic** NV-A960	¾"	no	pulse count	2	key
RCA Broadcast Systems SE-1	TR-600A only	no	pulse count	2	key
***RCA Broadcast Systems** SSE	TR-800 only	no	††	2	key
Sony BVE-500	¾"	no	††	2	knob
Sony RM-430	¾"	no	pulse count	2	key
Video Aids of Colorado Quad-AR-1	2"	no	pulse count	2	key
Video Aids of Colorado EDIT-AID II	2"	no	pulse count	2	key
***Videomedia** Mini-Z Series	¾"	.....	†	3	lever

*New at NAB-'80/Las Vegas.
**The Video Corporation of Bell & Howell and Robert Bosch.
†Microloc/SMPTE (optional).
††Pulse count/SMPTE.

CMX



United Media Commander II



Videomedia Z6E

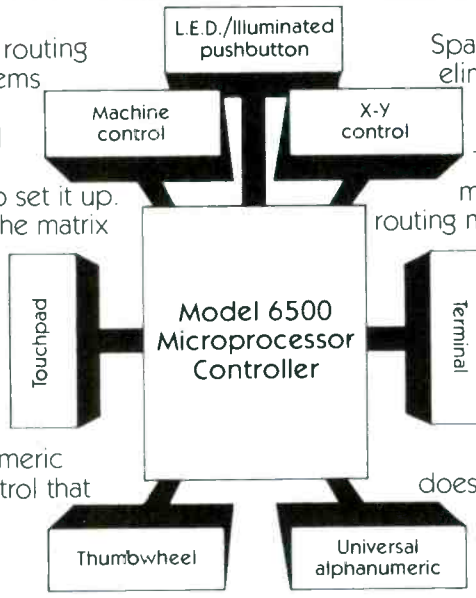
ON THE OTHER HAND, OUR ROUTING SWITCHERS HANDLE GROWTH VERY NICELY.

With a microprocessor-based 3M routing switcher, you can eliminate the problems of hard wiring once and for all. And specify just about any type of control you want.

It all depends on how you'd like to set it up. Our design engineers can then tailor the matrix for you. From your smallest requirement on up to any desired size. And they'll help you select the control that's best suited to your needs, too.

The choice is yours. Touchpad, thumbwheel, illuminated or L.E.D. pushbutton, machine, X-Y, or alphanumeric universal control. Even a terminal control that allows you "supervisory" control throughout the system, or computer control through our RS-232 port.

What's more, 3M routing switchers are easily expandable. Start with a matrix that matches your present requirements. Then as your studio grows, your routing switcher does, too. With the simple addition of extra frames and switch cards.



Space-guzzling, multi-conductor cables are eliminated. And so are unnecessary output panels. Because with our system, outputs can be reallocated as required.

The heart of the system, the Model 6500 microprocessor, as well as controlling the routing matrix, can be integrated with a machine control system to offer absolute production control of film chains, VTR's and other production machines.

Or it can be used as a stand-alone machine control system which offers the same coaxial wiring and expandability of the routing switcher panel.

Finally, a routing switcher whose growth doesn't depend on the size of your building.

For more information about 3M routing switchers, or a custom design consultation for your studio, call collect, (612) 736-1032. Or write on your letterhead to: Video Products/3M, Bldg. 223-5E/3M Center, St. Paul, MN 55144.

THE ROUTING SWITCHERS THAT GROW AS YOUR NEEDS GROW.

Circle (39) on Reply Card

3M

Table 2. Features of edit controllers at NAB-80'/Las Vegas

System \ Features	¾-inch VTR	1-inch VTR	2-inch Quad	Audio recorder	Switcher	Active list	Auto assembly	Type CPU	Tactile control
Ampex HPE-1	yes	yes	no	no	yes	no	no	6800	yes
CMX/Orrox 340X	yes	yes	yes	yes	yes	yes	yes two modes	distributed PDP-11 PACE	yes
Convergence ECS-100 series	yes	yes	no	yes	yes	ECS-103C only	ECS-103C only	6800	yes
Datatron 2000	yes	yes	yes	yes	yes	yes	yes	distributed NOVA Z-80	yes
***Datatron** VANGARD	yes	yes	yes	yes	yes	yes	yes	distributed NOVA Z-80	yes
Datatron TEMPO-7620 to 7650	yes	yes	yes	yes	yes	no	yes	PACE	yes
***Dynascience** SPECTRA-80P	yes	yes	yes	no	optional	optional	no	NA	yes
Fernseht MACH ONE	yes	yes	yes	yes	yes	yes	yes two modes	LSI-11	yes
Harris Video Systems HVS-EPIC	yes	yes	yes	yes	yes	yes	yes	NOVA	yes
RCA Broadcast Systems AE-600	no	no	yes	no	no	no	no	8080	no
***RCA Broadcast Systems** AE-800	no	TR-800 only	no	no	no	no	no	8085	yes
Sony BVE 5000	yes	yes	no	no	yes	no	no	8080	yes
United Media COMMANDER I	yes	yes	yes	yes	no	yes	yes	NA	yes
***United Media** COMMANDER II	yes	yes	yes	yes	yes	yes	yes	NA	yes
Videomedia Z6 series	ues	yes	no	yes	yes	yes	no	NA	yes

*New at NAB-'80/Las Vegas
†The Video Corporation of Bell & Howell and Robert Bosch

the New Workhorse

Quietly, you have made the OTARI tape machine a standard for reliability and performance in literally hundreds of stations and thousands of production studios—worldwide! The legendary 5050 series were the first compact professional recorders accepted by the industry and remain, dollars for dB's, the best tape recorders made. Whether moving ¼" or ½" tape, these SMPTE adaptable machines are complete with every necessary production feature.

Our ARS Series Reproducers have been accepted by the most prestigious automation manufacturers in the business. These people must have a reliable product before they put their name on it. Our MX-7800 1" transport production machine remains the most functional eight track on the market.

The OTARI pre-eminence in engineering is more than fifteen years old and encompasses tape formats from full track to twenty-four track and tape speeds from 3¾ to 240 ips. To the broadcaster, OTARI has earned its envied reputation for reliability with technological leadership and 100% pre-shipment check-out.

Behind our product is a further commitment: factory support with a large domestic parts inventory, thorough documentation and communicative personnel. A qualified and dedicated dealer network is the final link in OTARI's comprehensive approach to the broadcaster.

You have made OTARI—*The New Workhorse*. We have made them the most comprehensive line of tape machines in the world.

Call or write today for your nearest dealership. They will be happy to put you on top with an OTARI.

OTARI®

Otari Corporation
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San Carlos, CA 94070
(415) 592-8311

In Canada:
BSR (Canada, Ltd.)
P.O. 7003 Sta. B
Rexdale, Ontario M9V 4B3

Circle (41) on Reply Card

Models 5050B & Mark II-4 shown in optional cabinets available from the Rus Lang Corporation, Bridgeport, Conn. (203) 384-1266

Roundup, Part 2

Ampex

EC-2/RES-1—The EC-2 is the heart of the EC-2/RES-1 system. The EC-2 allows stand-up editing control of up to eight AVR-2s equipped with the unit. The RES-1 is the sit-down remote control using the EC-2 electronics. The total edit interface system is capable of controlling up to eight VTRs, four as individual machines and four as slave recorders.

Circle (200) on Reply Card

HPE-1 Series C—This microprocessor-based, table-top system is for on- or off-line videotape editing with up to four Ampex VPR series recorders. System design flexibility allows the user to specify any of a variety of configurations.

Circle (201) on Reply Card

Cezar International

EA-3X—The EA-3X is a microprocessor-based editing system based on the "microloc" coding system developed by Cezar International. The unit features cruise capability, pre-roll cue, numeric trim of in- and out-edit points, programmable pre-roll and post-roll times and the capability of selecting in or out points on the fly.

Circle (202) on Reply Card

CMX Systems

340X—This distributive processing, microprocessor-based system is capable of controlling up to eight individual devices including multiple record VTRs, production switchers and multi-track audiotape recorders. Using the intelligent interface it is possible to use quad VTRs, ATRs, helical machines, slo-mo discs and a/v mixers in order to create the composite program master tape or work print. Three additions were introduced for the CMX-340X at this year's NAB. They include jam sync, edit decision list notes and frame bump. Jam sync eliminates the need for time code prerecording of the videotape master, edit decision list notes permit the editor to make electronic decision notations with each event and using the new bump feature, the editor can adjust the sync of two sources a frame at a time to bring the source tapes to the desired phase.

Circle (299) on Reply Card

The Edge—The Edge is designed to work with ½-inch, ¾-inch and 1-inch VTRs. The basic system will handle two VTRs. Options include built-in digital dissolver, third machine control and audio/video monitor package as well as an edit decision list output (fully CMX-compatible) in floppy disk, paper tape and/or hard copy format, which can easily be added as requirements dictate.

Circle (204) on Reply Card

Convergence Corporation

ECS-100 series—This series is microprocessor-based and includes three units using the ECS-101 mainframe as the basis. Model 101 includes superstick panel with cruise control, auto tag, replay, automatic return to edit, transport controls, adjustable pre-roll, automatic audio monitoring with built-in speaker amplifier, remote mode controls and accessory controls. Model 102 offers the same features in addition to capabilities that include insert edit controls, timer set controls and edit trim controls.

Circle (205) on Reply Card

ECS-103 series—The ECS-103A is a multi-source, cuts-only cassette editing system. The ECS-103B is a multi-source editing system with switcher effects and A/B rolls. The ECS-103C is a multi-source, auto-conforming videotape editing system.

Circle (206) on Reply Card

ECS-90—This unit is a microprocessor-based editing system that is plug-in compatible to most ¾-inch and ½-inch videocassettes. Accessories include 2-channel time code reader. Options include LL-90 Liplock, audio pitch corrector and BL-90 black generator and fade control.

Circle (207) on Reply Card

Datatron

2000—This unit is a distributed processing, computerized, SMPTE code system designed to control up to eight VTRs and one production switcher in either an off-line or on-line environment. The unit incorporates operating features such as user bit capability, look-ahead continuous record VTR roll, multi-event preview and edit, scene storage of up to eight scenes per VTR, and interactive color CRT operator control station and floppy disc edit list storage.

Circle (208) on Reply Card

Vanguard—This unit is a microprocessor-based system using control track and/or SMPTE time code editing modes. The standard system controls five VTRs and a production switcher and is equipped with 300 events of edit list memory. Auto assembly from up to four play VTRs and three external sources, A/B/C/D sync'd roll editing, variable operator reaction time compensation, variable preroll and postroll times, and text editing are also standard. Floppy disc edit list storage, a 999-event edit list memory and dual Varascan tactile shuttle controls are among the available options. The operator control station is comprised of a color-coded, dedicated function keyboard and a pedestal-mounted CRT display. The CRT has an auxiliary video output which allows the editing display to be remoted to any standard video monitor.

Circle (209) on Reply Card

Tempo 76—The 76 series consists of four edit controllers, the 7620, 7630, 7640 and 7650. The units are microprocessor-based expandable systems using control track and/or SMPTE time code editing modes. By adding features to the basic Tempo 76 editor, various editing systems can be assembled. The most elementary configuration is a 2-machine editing system. This can be expanded into a 3-machine system with auto assembly, a 50-event memory and split edits; a 3-machine system with auto assembly, 300 events, split edits, and text editing; or a 3-machine system with all the above plus remote control of a special effects switcher.

Circle (210) on Reply Card

Dynasciences

Spectra-80—The Spectra-80 is a microprocessor-based editing system that will interface with any combination of VTRs, modified or unmodified. The system permits random access to any point on either VTR and simultaneous searching of source and edit VTRs at a speed inherent to the VTR. Options for the Spectra-80 include SMPTE reader, split edit and soft take (fade to black and back). The Spectra-80 automatically cues edit VTR at the end of the last insert to allow the operator any number of edits.

Circle (211) on Reply Card

Spectra-80P—This unit is a multi-source, microprocessor-based editing system offering the features of the Spectra-80 in addition to full video display, multiple event memory and SMPTE time code reader as standard features.

Circle (212) on Reply Card

EMS

RES-Q II—The RES-Q II is a microprocessor-based unit requiring no modification of VTRs. Features include insert length timing and unlimited time duration for inserts. Modular design permits options including multi-VTR roll and record capabilities, variable search speeds from still-frame to three times normal play, intelligible speech from .6X to 3X play speed and programmable A and B rolls.

Circle (213) on Reply Card

Fernseh

Mach One—The system is microprocessor-based and designed for off-line, on-line and text editing as well as assemble functions. Decision list entries, or events, define the in- and

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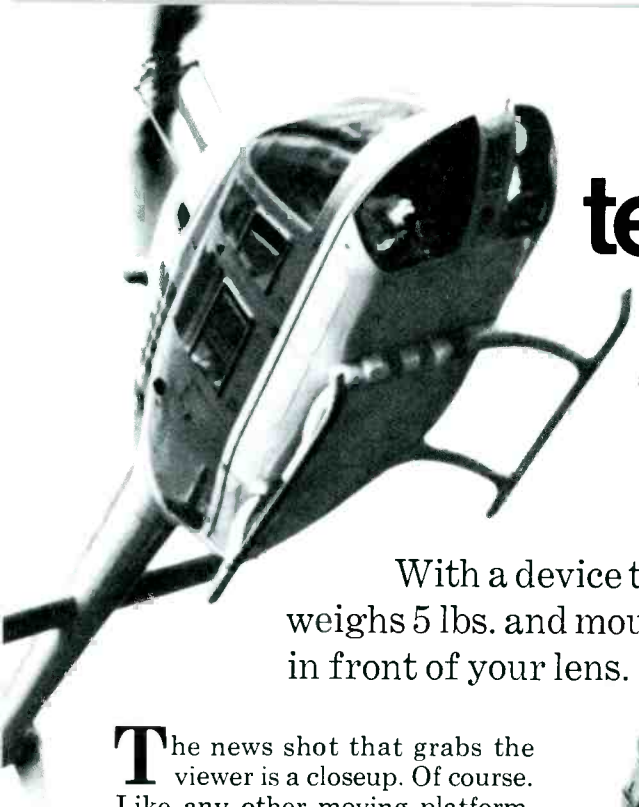

How to get steady telephoto shots of the news action from 300 feet up:

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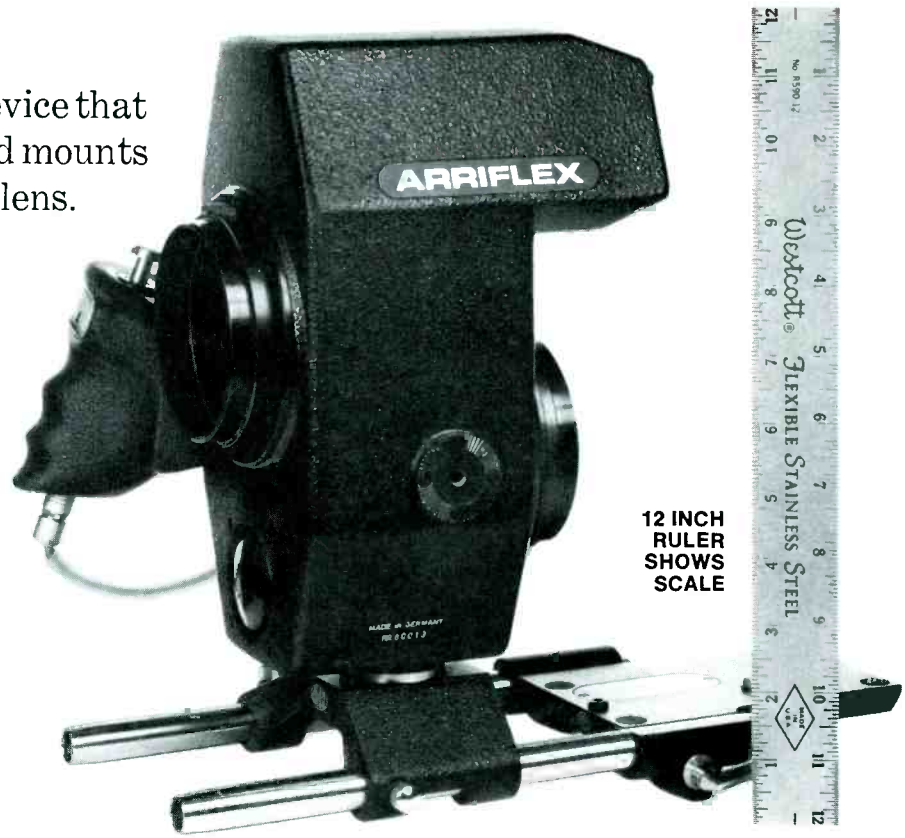

12 INCH RULER SHOWS SCALE

The news shot that grabs the viewer is a closeup. Of course. Like any other moving platform, though, the helicopter isn't steady enough for the camera to zoom in tight. Needless to say: at the long end of the lens, vibration is magnified.

You pay good money for that helicopter. You should get high-quality images.

The police, the F.A.A. and the pilot all quite rightly want you to keep a safe distance from the action on the ground. *But you need close shots.* You're paying for the helicopter to make your news operation look good. Shaky pictures don't help.

Get 3 times closer.

Without stabilization, you can't go longer than about the 50mm focal length on your ENG camera. With the Image Stabilizer, depending on air turbulence, you can get smooth shots at 150mm or longer.

No special training needed. It's just another (astounding) accessory.

The Image Stabilizer comes with its own Support Plate and bracket. You mount your camera on the Plate and position the Stabilizer in front of your lens. Switch on the Stabilizer. Switch on the camera. Shoot. Any competent cameraman can use it. It works with any camera and with any prime lens longer than about 35mm. (With zoom lenses, the widest focal length varies slightly.)

The new Arriflex Image Stabilizer

an important ENG/EFP accessory.

At focal lengths wider than 35mm, the Stabilizer vignettes. A small price to pay for getting *three times* closer. And if you need a panoramic shot, that's easy: Pull the helicopter back.

How it works:

The entering light rays are reflected off a front-surface mirror mounted on two gimbals powered by a battery-driven gyroscope. The mirror is effectively floating in space, as though on two trapezes – one oriented N-S, the other E-W. The image from this mirror is reflected onto another (fixed) mirror and thence into the camera's lens.

Aerospace technology.

A gyro's directional stability makes it resist off-axis movement – such as panning the camera. If you insist, it tumbles in that direction. British Aerospace, the designers, have turned this tendency to advantage. A precession brake causes the gyro to *lean with* the panning motion, steadily. This is military aerospace technology, ingeniously adapted.

The British Aerospace Steadyscope uses the same stabilization method. Above: surveillance from a NATO army helicopter.

British Aerospace is a company very much involved with high-precision technology. Military missile systems, orbital satellites...

One of their products is the Steadyscope. It uses the same gyro-stabilization as our Image Stabilizer, whose moving parts are also made by British Aerospace.

How well does it work?

In the November 16, 1978 issue of the British magazine NEW SCIENTIST, there's an article by Guy Parker on stabilized binoculars. Referring to the Steadyscope, Mr. Parker writes:

Anchored in space

"On pressing the uncage button there is an immediate transformation which is both psychological and optical. The impact is of course greater if one is being shaken in a helicopter, but even on land the image appears in an almost uncanny way to anchor itself in space, even if the instrument is deliberately jiggled about."

Detail resolution

"An optical phenomenon now becomes apparent," writes Mr. Parker. "After the initial pleasure at the disappearance of jitter, the eye seems to demand needle-sharp resolution, now that the visibility of detail is determined mainly by the quality of the optical design. *There is no future for a stabilizer which does not give the highest resolution under all conditions of use.*"

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IMAGE STABILIZER SPECS:

Length (Image Stabilizer alone): 6 5/8 ins. Width: 4 11/16 ins. Height: 9 1/4 ins. Weight (Image Stabilizer alone): 5 lbs. Weight (on Support Plate with 9 1/2 inch rods and with cable-release handle): 7 lbs. 4 oz. Maximum panning speed: approx. 4 degrees/second. Maximum accelerative force: 6g. Equalizes vibration frequencies 1 Hz and higher. Camera lens focal lengths usable with ENG/EFP format: 35mm and longer.

Rear view of Image Stabilizer shows Support Plate with threaded camera mount. Custom brackets are available for various cameras. Stabilizer can be removed from camera in less than two minutes.

No light loss, no image degradation.

There are no lenses or prisms in the Stabilizer. Light rays pass through optical flats front and rear, and reflect off two front-surface mirrors. If you meter the light at the exit port, it measures the same as the light entering.

Doesn't perform miracles. *Does* work in a car, though, or any other moving base.

The Stabilizer is for making shaky shots smoother, *not* for simulating a rock-steady tripod. Its low mass is vital in the unwieldy g forces inside a helicopter. But that's useful in a car, too, or on horseback . . . You can get out of the car and continue shooting with a body-brace. And the Stabilizer is quiet enough to shoot sync sound out of doors.

Elegant proof of low mass space-hardware sophistication: a gyroscope powered by one flashlight battery.

To improve a gyroscope's effectiveness, you can increase either its mass or its RPM. For military purposes, British Aerospace had to make it small, light and efficient.

High speed with low mass requires exact dynamic balance, of course. Eccentricity and bearing friction would impair accuracy and soak up power. One measure of the phenomenal precision of this device: The gyroscope – with its double gimbal and mirror – will run about four hours on a 1.5 volt D cell!

Low mass saves money.

A low mass device is likely to be compact. With this one, you can rent a 5 place helicopter at $300 an hour, and get steady shots *from inside.* No need to hang out of the open door. And no need, either, for a 7 place helicopter at $400 an hour, or more. The Image Stabilizer, incidentally, rents for about a tenth of that.

5 PLACE BELL JET RANGER

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out-points in SMPTE frame code values. The combined audio and video events may be audio-follows-video, or the audio may be split at the in- and/or out-point by ±999 frames with respect to the video in- and out-points. Transition types are limited only by the attendant switcher/effects generator. Recording may be accomplished one event at a time, automatic/sequentially or in checkerboard fashion.

Circle (214) on Reply Card

EES-9—The EES-9 is equipped on all BCN-50s and is designed for simple machine editing. The unit will control two BCN-50s, one record and one play. In- and out-edit points are selected during playback of the record VTR.

Circle (215) on Reply Card

Harris Video Systems

Epic—The HVS Epic is a software-based, central processing system that provides on-line or off-line editing with multiple VTRs from quad and 1-inch to ¾-inch videocassette units. The basic three VTR system can be expanded to eight VTRs or more by the addition of plug-in interface cards and can be interfaced to almost any computer-compatible video switcher. Standard functions include look ahead, jam code editing, color framing, user bit identification and adjustable cue time. A major feature of the HVS Epic is multitasking. This feature enables the editor to perform several functions simultaneously. With multitasking, the editor can edit on one VTR, write time control on another and print an edit list on the optional printer.

Circle (216) on Reply Card

Jatex

VSEC-42T—The 42T is microprocessor-based and capable of working with any combination of capstan servo VTRs without modification of the VTR. The 42T uses Scene-Dex time coding (time coding method developed by Jatex) for addressing edit decision points. The 42T will reverse and fast forward at 2X normal speed and is capable of search speeds from 1/20 to 1/5 normal speed, depending upon the VTRs used.

Circle (217) on Reply Card

VSED-42TD—The 42TD is designed around the main frame of the 42T and is compatible with it. It offers the increased capability of remote controlling both the source and record machines.

Circle (218) on Reply Card

US JVC

RM-82U—This unit offers frame-accurate videotape editing and FM-to-FM dubbing capability. The RM-82U has simplified editing control sequence, and full-function counters for both the player and the recorder in the editing system. These counters indicate tape travel in hours, minutes, seconds and frames on a 7-digit fluorescent display. The RM-82U has split insert editing capability. Either of two audio channels or the video channel may be replaced in the editing process, independent of any other signal.

Circle (219) on Reply Card

RM-88U—The RM-88U can control any combination of three VCR units, feeding a master recorder. It has the features of the RM-82U plus a number of editing functions that are more automatic. These include independent entry for edit-in and edit-out points for both the player and the recorder in the system. The RM-88U also has edit point correction so that a user may shift and correct edit points with frame-by-frame accuracy. The indicators on the RM-88U may be used to display edit lap time.

Circle (220) on Reply Card

NEC America

BC-101—This unit is designed as the edit controller for use only with the NEC VC-1010 VTR. The edit controller

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To find out more about the AA 501 Distortion Analyzer and SG 505 Oscillator, contact your local Tektronix Field Office or write Tektronix, Inc.

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offers full remote control capability for all functions of the VC-1010. Four tape speeds, 2X, 1X, 1/5X and 1/10X are available in forward and reverse. Edit shift capability for bi-directional edit point correction is also a feature of the BC-101.

Circle (221) on Reply Card

Panasonic

NV-A960—This is an automatic editing controller for insert and assemble edits. Both entry and exit points are found through the controller's search function that can memorize specific tape points along the entire length of the tape. The unit displays control pulses on LED laptime/address time indicators in hours/minutes/seconds/frames.

Circle (222) on Reply Card

AU-A70—The AU-A70 is a programmable editing controller with built-in SMPTE time code generator that allows automatic editing of as many as 20 programs. Entry and exit editing points are found via the controller's search function or a programmable 10-key keyboard. Lockable sequential speed knobs operate in forward and reverse at 1/20X, 1/5X, 1X, 2X, 5X speeds or single-field advance.

Circle (223) on Reply Card

RCA Broadcast Systems

AE-600—The AE-600 is capable of controlling one record and up to any combination of eight playback TR-600 quad or TH-200 1-inch VTRs. The system uses SMPTE/EBU time code in either drop frame or non-drop frame modes. Editing capability includes complete lockup, color framing and synchronization of all TR-600As and TH-200s in the system within four seconds, split audio only, audio/video edits and as many as three independent edits on the same tape pass.

Circle (224) on Reply Card

SE-1—This unit is a built-in editing device for the TR-600A VTR. The SE-1 counts control track pulses to provide both in and out edit point selection.

Circle (225) on Reply Card

AE-800—This unit is designed to be used with RCA's TR-800 1-inch VTR only. The unit offers all of the same features as the AE-600 plus it offers six preview modes, built-in printer output, the ability to edit all of the channels of the 1-inch machine, field edit capability and selectable post roll up to 10 seconds.

Circle (226) on Reply Card

SSE—The SSE is a built-in editing device for the TR-800 VTR. The SSE will work with control track or SMPTE/EBU time code. Features include 9-point search to cue, out-transfer mode, store-direct mode and unlimited edit point shift. Other features include automatic re-cue, variable pre-roll time and programmable relay closure.

Circle (227) on Reply Card

Sony Corporation of America

BVE-5000—This unit is a computerized system using a combination of standard SMPTE time code and Vertical Interval Time Code (VITC) information. Time code reading switches automatically between SMPTE and VITC to allow frame identification in slow motion or still frame. The system is designed to accommodate six VTRs, four playback units and two record units.

Circle (228) on Reply Card

BVE-500A—This unit is a control-track controller designed for use with Sony Broadcast's BVU-200A series of recorders. The unit features Sony's Bidirex search control, self-returning search dials that replace pushbutton speed selectors and permit forward and reverse search at tape speeds of 2X, 1X, 1/5X and 1/20 normal speed; a decision prompting system; automatic return to out edit point; ex-

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The 1200 Series (Model 1208 shown) features 12-20 inputs and from 1 to 3 Mix/Effects Units. Our two channel M/E **includes** the key edger you'd usually pay extra for and lets you do a wipe or key behind an edged title key — in one M/E.

In addition to standard mix, wipe, and key functions, every 1200 Series switcher includes a downstream keyer with border edging.

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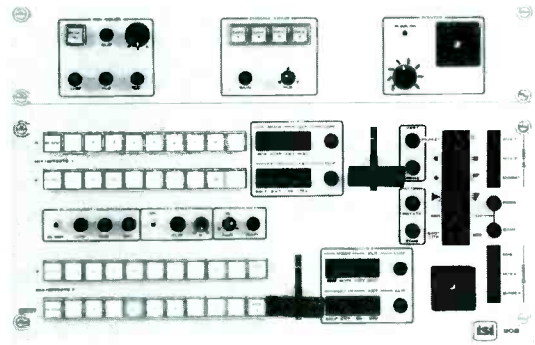

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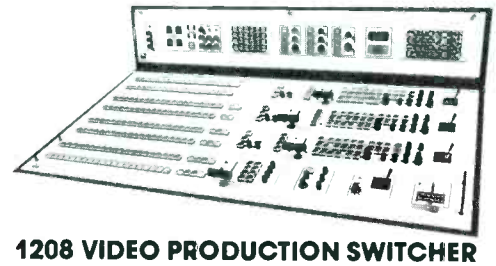

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The 931 is just right for smaller stations and cable operations with 10 AFV inputs, auto mixing, audio breakaway with over/under, and downstream keyer with border edging. The 821 has similar features with 20 AFV inputs and a built-in pre-roll system.

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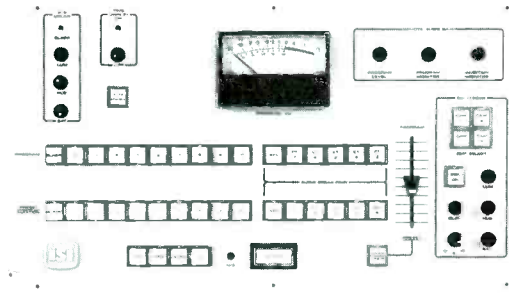
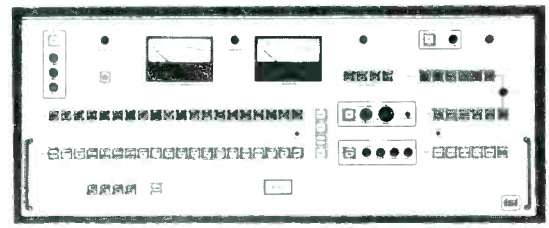


931 MASTER CONTROL SWITCHER



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Circle (47) on Reply Card

tended time counter capable of ±79 min/59 sec/29 frames; and the ability to edit video, audio/channel 1 and audio/channel 2 separately or simultaneously.

Circle (229) on Reply Card

RM-430—This unit is a control-track system designed to control one record and one playback unit.

Circle (230) on Reply Card

United Media

Commander II—The Commander II is capable of multiple formating from two to eight VTRs. It controls any combination of playback and record VTR for multiple format master; plus a switcher can be used. Full implementation of SMPTE/EBU time code with user bits is provided via built-in time code reader and generator with auto sync capabilities. An automatic switcher allows double re-entry with three independent M/E amplifiers. The Commander II also features automatic assembly.

Circle (231) on Reply Card

Commander I—The Commander I SMPTE/EBU time code and user bit computer assisted electronic editor is designed for controlling any combination of 2-inch, 1-inch or ¾-inch VTRs. The standard Commander I console incorporates keyboard display, memory for 25 edit decisions, two time code readers and interface for two VTRs. Built-in interface for industry-compatible teletypewriter to produce formated paper tape is also provided.

Circle (232) on Reply Card

Video Aids of Colorado

QUAD-AR-1—This unit is designed to program edit-in and edit-out functions on any VTR that has editing ability and a cue audio track. Pulses from the unit are recorded on the cue audio track of the videotape. The electronic pulses are retrieved during playback and through the unit the edit-in and edit-out functions are performed.

Circle (233) on Reply Card

EDIT-AID II—This unit is similar to the model QUAD-AR-1 with the addition of automatic preview and cross-pulse generator. A built-in cross-pulse generator permits the operator to view wrong field edits on the monitor.

Circle (234) on Reply Card

Videomedia

Z6 series—This series consists of the Z6B, Z6C, Z6D, X6E and Z6M. All Z systems are upgradeable to any higher model. The units are microprocessor-based and use a micro-loc controlling function or optional SMPTE time code. Installation of any Z system requires no mechanical modification to the VTR. Each Z system is capable of A/B/C rolls and is equipped with printer output. Z system editors include a "dump" feature which digitally encodes the edit decision list on the first five seconds of the videotape. Options include text editing.

Circle (235) on Reply Card

Mini-Z—This unit is a microprocessor-based, single-event editing system. No mechanical modifications are required to interface with the VTRs. Features of the Mini-Z include auto-tag, full keypad for numeric entry, bi-directional shuttle arm control and cruise control.

Circle (236) on Reply Card

Mini-E—The Mini-E offers the same features as the Mini-Z. It is equipped with a special effects generator/switcher and is capable of A/B rolls.

Circle (237) on Reply Card

Mini-M—This unit is identical to the Mini-E but without the special effects/switcher.

Circle (238) on Reply Card ☐

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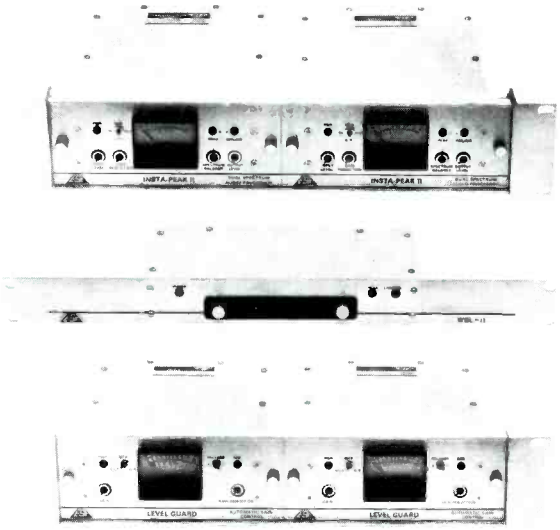

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- ☐ Optical control by modulation flasher
- ☐ Meets FCC ATS rules

Good audio processing does not have to be expensive and complicated. ESP products are value engineered, have operational simplicity and are maintenance free. Prices start at $495 for the WBL-1, the *original* wide band composite limiter. The "Level Guard" $545, the "Insta-Peak II" $575. Add second unit for stereo applications.

ELCOM
SPECIALTY PRODUCTS, INC.

2810 REDDING AVE., #E
SACRAMENTO, CA 95820
(916) 453-0859 • CABLE "ELCOM"

Circle (48) on Reply Card

To improve your video recording...Maxell.

No matter what kind of video cassette system you're using, the results will be clearly superior when you choose Maxell. And the choice is yours, in VHS, Beta and U-Matic formats.

You can depend on Maxell videocassettes to give an outstanding performance, no matter how often they're called upon. That's because of Maxell's exclusive *Epitaxial*™ oxide tape formula, which reproduces image, sound and color with exceptional clarity and accuracy. And it happens every time, because the cassette shells that house our choice tapes are made with such precision and quality, they'll stand up to repeated playback.

So depend on Maxell for performance. All ways.

Maxell Corporation of America
60 Oxford Drive
Moonachie, NJ 07074

maxell
PROFESSIONAL INDUSTRIAL PRODUCTS

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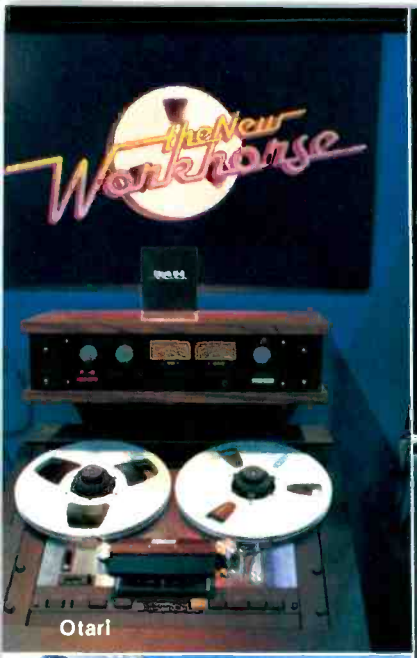
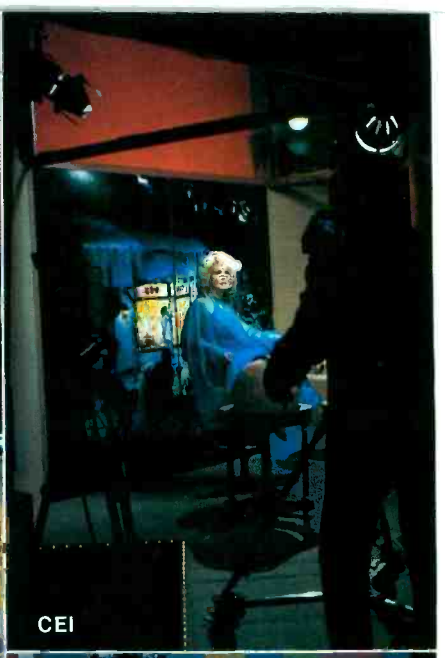




Other new products for Broadcasters at NAB '80

By BE staff

As normally expected, exhibitors unveiled a great many new products for broadcasters at NAB in Las Vegas this year. Some of these products have been covered in the previous sections, but the bulk of them are described briefly below. Details on these products may be obtained by using the reader service card and the appropriate numbers below each firm's new products.

Exhibitors also displayed some or all of their standard products. Data on these products may be obtained by using the service card in the March pre-NAB issue of BE (until July 1). Also included here are product listings for firms exhibiting at NAB that did not get listed in the March issue because of late registration.

If you missed some products at NAB, or if you didn't make it to this year's great show, use both the June and March issues to shop for new equipment. And, plan to attend next year's show to see prototypes displayed this year emerge into production models.

ADM Technology

The ST series of stereo broadcast consoles is engineered to provide features most desired by engineers and announcers. The consoles are available in 10, 16 and 20 input configurations with up to three stereo and one monaural outputs.

Circle (301) on Reply Card

AEG-Telefunken, Bayly Engineering Division

Bayly exhibited five new products at the convention. The BRT 500 radio/telephone interface provides an interface between a private telephone network and a radio base station. Intermas is a universal electromechanical packaging system for electronics that includes 19-inch rack-mount PCB housings, desktop housings, weatherproof portable equipment cases, connectors, etc. The model FM 25V is a solid-state 2-way mobile radio system featuring 1 and 25W RF output, 134-174MHz, 12 channels, mobile or base application. The model FM 15H 2-way portable radio system has 1 and 5W output, 134-174MHz, six channels, is fully solid-state and has a rechargeable NiCad battery. The AC-11 automatic battery charger is designed for use with VHF/UHF radio/telephone, which contains nine nickel-cadmium cells.

Circle (302) on Reply Card

A.F Associates

DUBCOM Computer System features tape labeling, tape stock inventory, scheduling for post-production and syndication.

Circle (303) on Reply Card

Accurate Sound

The AS 2400 high-speed tape duplicating system features constant holdback tension and torque boost takeup. Options include constant takeup and slow start, automatic cure, and tone insertion.

Circle (304) on Reply Card

Acrodyne

The TT-3480 U 5kW tetrode UHF

Announcing new AM/FM Stereo Consoles from ADM

THEY DO EVERYTHING BUT THE HELICOPTER REPORT

ADM® is proud to announce the ST Series, newest addition to our line of quality professional broadcast consoles. Compact as they are, they're big on capability and flexibility. They feature the same performance excellence, operational simplicity and reliability you'll find in any product from ADM.

The new ST consoles offer a series of modular frames that we will equip to your particular needs. A variety of input, output and signal processing modules are also available to satisfy your present requirements as well as future expansion. Each ST frame offers up to three separate stereo and one monaural output. All modules are front panel plug-ins. Electrical specifications set a new level of excellence for the industry.

So confident is ADM of the excellence of the ST Series, that they're backed with an exclusive 5-year warranty.

To find out more about how the new ST Series can make Audio Broadcasting easier for you, write or telephone us today. ADM Technology, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone 313/778-8400. TLX 23-1114.

ADM®

The Audio Company

THE NETWORKS' CHOICE. (AND EVERYONE ELSE'S.)

At Camera Mart, we've been a leading equipment supplier to broadcasters and producers for years. We're no strangers to the 'instant' needs, unexpected calls, tough standards and difficult operating conditions that are often S.O.P. in this rough-and-tumble business. But you probably know that...at least, when it comes to film.

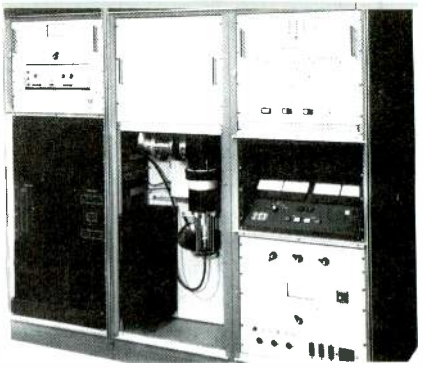
What you may *not* know is, for the past few years, we've been quietly doing the same in *video!* Testing and selecting the leading equipment for performance and reliability. And offering a wide selection of production and post-production components and packages—on rental, lease and purchase plans with our customary flexibility.

But don't take our word for it: talk to our customers. You'll see why so many people the industry depends on, depend on us.

Camera Mart
THE CAMERA MART, INC.
456 West 55th Street, New Yorк 10019
(212) 757-6977/Telex 1-2078
Sales • Service • Rental

NAB

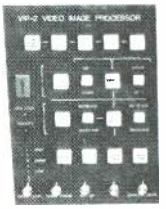
Circle (50) on Reply Card



transmitter has a single tube, is IF diplexed, has a broadband solid-state plug-in driver, high efficiency wideband tetrode output, forced air-cooled thermal protection, IF modulation and parallel operation to 10kW. The T-2400 series 1kW UHF translator features 5.6 KVA maximum total consumption, single tube, gain stabilized solid-state modular driver, plug-in wideband RF circuits and almost no translator-induced distortion. The T-2300 100W UHF translator has no tubes, is totally solid-state and has wideband front panel plug-in RF modules, unmeasurable video distortion, maintenance-free operation and is lightning/transient protected.

Circle (305) on Reply Card

ADDA



The VIP-2 with time base correction and frame synchronization will compress live or still video in real time along the horizontal and/or vertical axis with infinite area compression.

Also, the VW-2, time base corrector and frame synchronizer, is designed to operate with type C VTRs and includes digital dropout compensation.

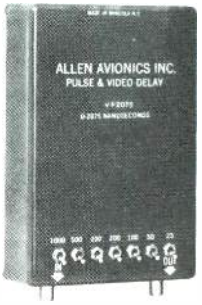
Circle (306) on Reply Card

Agfa-Gevaert

PEM428 studio mastering tape, 1mil/2", high output, low noise print for SMPTE lock up.

Circle (307) on Reply Card

Allen Avionics



PHILIPS®

World Class TELEVISION

The full lineup of innovative cameras and broadcast equipment hailed by broadcasters, production companies and industry at the recent 1980 NAB Show.

LDK-14
The years-ahead 2/3-inch field and studio camera family. Now with triax capability.

VIDEO 80
Modular camera and expandable production system in Broadcast and Institutional use around the world.

LDK-25B
Newest version of the World Class, state-of-the-art LDK 25/5/15 camera family. With innovations used by ABC in exciting coverage of the Winter Olympics.

Plus... a wide array of innovative World-Class products like:
Transmitters and Exciters
Fastest growing UHF/VHF transmitter line in North America.
Video Tape Recorders
1" type C, system and stand-alone.
New, Time Code Generator
SMPTE, PAL, SECAM rates, and film...24 frames per second!
Tape Synchronizer
Television audio post production.
Digital Noise Reducer
Fully automatic.
New, Synch and Timing System
Built around ultra-stable Philips SPG sync generator.
Test and Measuring Equipment
Modulators, demodulators, VITS analyzer & generator, and new waveform monitor and vectorscope.
New, Teletex
Text display system component.

Contact your Philips representative today, indicating product interest, or call Philips Broadcast Equipment Corp., 91 McKee Dr., Mahwah, N.J. 07430. (201) 529-3800.

PHILIPS® *Innovative Leader in World Television*

Circle (51) on Reply Card

Introducing the Ramko a new cart machine, but

Finally you can get your hands on a cart system with reel-to-reel performance.

A cart system that eliminates phase shift error once and for all. That sets new standards for low wow-and-flutter. That provides signal-to-noise, distortion and frequency response that are better than anything else in the industry.

Finally, the PhaseMaster.

PhaseMaster: the cart machine, redefined.

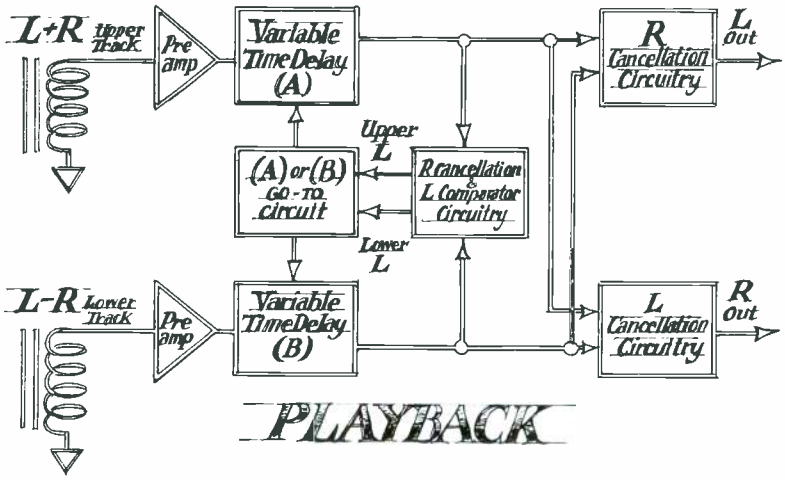
The new Ramko PhaseMaster has all the features you want, and some that never existed before.

It's built to take the pounding you're going to give it, hit after hit, commercial after commercial, day after day.

The deck is a 5/8″ casting for stability, with a stainless steel cover plate for wear resistance. The crystal-controlled dc servo motor ensures greater speed accuracy and lower heat

PhaseMaster™ not just a whole new concept.

generation (15 ips, 7½ ips, 3¾ ips motor speeds field-selectable). The machined head stack is rock-stable, and we've included internal illumination for your periodic head inspections and cleaning. There are no micro-switches to break or jam —and never any start-up wow—because the motor is started by an optical sensor as you begin to insert the cart. And the cart hold-down presses on the edges for greater stability and exacting alignment, pressing with roller contact for velvet smooth insertion and withdrawal.



And no more stereo phase shift error

Phase shift doesn't much matter in mono, so when you're recording stereo, the PhaseMaster encodes a mono L + R signal on the upper track, L − R on the lower track. On playback, the left channel signals from both tracks are compared, and any phase shift difference is corrected automatically by a continuously tracking electronic time delay.

Simple.

And it works—no more holes in your sound, and no more side-to-side spectrum shift.

The ultimate cart system, mono and stereo

The Ramko PhaseMaster System, in mono and stereo, is available as a playback unit or a record/playback deck.

It also comes as a complete reproduction center which duplicates—as well as plays and records—your mono and stereo carts and cassettes. This consists of four modules: an electronic control center; two A and B cart decks; and a cassette deck.

To record, you switch-select any of three inputs to record on any or all of the decks. When you play back, the control center determines whether your tape is mono or stereo, coded or uncoded, and automatically reproduces the correct outputs.

To dupe, you simply load tape (cart or cassette) and one or two blanks, then hit Record/Play and the control center puts the signal where it's supposed to be.

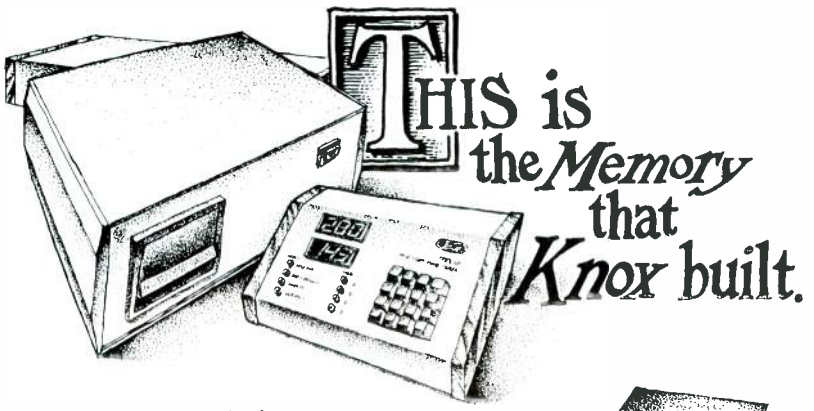
Call collect for the full-featured brochure

Get the brochure. It covers the PhaseMaster System's convenience and ease of operation; the left, right and phase meters; the 4-digit timer; the three cue tones; the integral testing facilities; and everything that you were hoping would be in it.

Write Ramko Research, 11355 Folsom Blvd., Rancho Cordova, CA 95670. Or if you can't wait for the mail, contact your nearest rep or call (916) 635-3600 collect and arrange for a 2 week free trial.

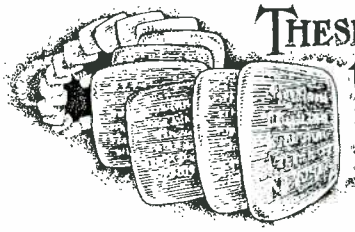
RAMKO

©Ramko Research 1980



THIS is the *Memory* that *Knox* built.

THIS is the *Disc* that plays in the memory that *Knox* built.

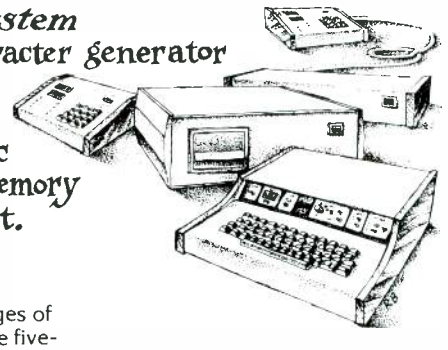


THESE are the *Pages* that store on the disc that plays in the memory that *Knox* built.

THIS is the *Program* that cues the pages that store on the disc that plays in the memory that *Knox* built.

THIS is the *Character Generator* that typed the program that cues the pages that store on the disc that plays in the memory that *Knox* built.

THIS is the *System* that goes with the character generator that typed the program that cues the pages that store on the disc that plays in the memory that *Knox* built.



Create and store up to 400 pages of character generator type on a single five-inch floppy disc.

Using the same keyboard, program the playback and store it — the program — on the same disc with your typed copy.

Call or write today for a demo to see what the Knox memory system can do for your screen.

Knox VIDEO PRODUCTS

A DIVISION OF COMPUTER OPERATIONS, INC.

5001-A Forbes Boulevard, Lanham, MD 20801
301/459-2106 Telex 89-8327

Circle (53) on Reply Card

The model VP2075 features a longer delay with a flat loss of 3dB for any delay setting. The unit is useful in applications where delay changes are necessary and amplitude variations cannot be tolerated.

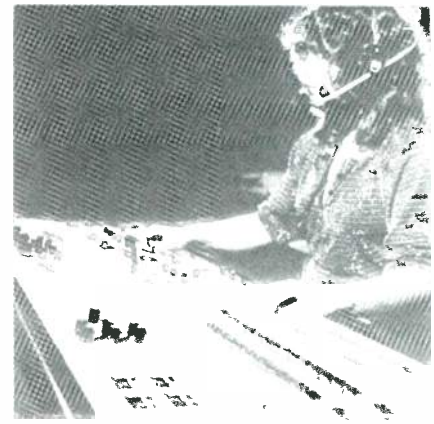
Circle (308) on Reply Card

Allsop

The Allsop 3 cassette deck cleaner cleans the head, capstan and pinch roller. It uses two replaceable virgin wool felts that are non-abrasive and will not damage the deck head. The cassette recorder cleaner pushes into the machine like any other videocassette. Cleaning action starts when play button is pushed.

Circle (309) on Reply Card

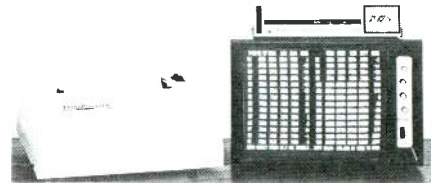
American Data



The model 870 is a linear downstream keyer designed for producing title keys in the final output of a switching system or with any other video signal. It includes a remote control panel that may be configured as either a rack-mount or a drop-in unit. The 3100 series mixers were developed to accommodate user demands. It uses four channels: time shared-mix, wipe, key; prime-through channel, mix, wipe; color mattes and borders; and chroma key fill video. The 3200 series microprocessor control system is designed for cost-effective control of audio/video distribution matrices, machine control assignment switchers and program event automation.

Circle (310) on Reply Card

American Quotation Systems



ProData is a business communication system designed to confidentially transmit data. ProData eliminates complex equipment and extra per-

Take a cute little dish on a trip to the country.

Transportable satellite uplink service is a reality....and available now! Western Tele-Communications, Inc. (WTCI), a Denver based common carrier, is offering transportable uplink service and has been providing this service to the national television networks for news and sports coverage since August of 1978.

Uplink Capability

Two, high power amplifiers feeding the 4.5 meter dish can provide, simultaneously, two network quality television signals for delivery to a 10 meter receive station.

The transmitters can also be operated in a hot standby protection mode to provide one, protected uplink. Each uplink is equipped with two audio subcarrier modulators which can also be operated simultaneously, if required.

The station receivers can be operated simultaneously with the uplink to provide two full duplex television channels, if required.

Transportability

The station is constructed on a 40 foot trailer pulled by a diesel tractor and can be moved over 750 miles per day.

The unit is designed so that it can travel across country without wide load permits.

The station can be moved to very remote areas, practically anywhere in the United States in just a few days.

A diesel powered generator provides AC power to the station for operation in areas where no commercial power is available.

Service Availability

NOW! Call us at 303-771-8200. We are booking orders and providing uplink service at this time.

The station is authorized for each use by the FCC on a per occasion basis. The FCC requests ten days notice on applications. Special news or other events can be processed sooner, if it is in the public interest.

Frequency coordination also must be accomplished on a per occasion basis and frequently requires blockage to solve potential terrestrial interference problems. We have successfully accomplished the necessary frequency coordination for the use of our transportable uplink on all projects, up to this point.

Rates and Charges

The uplink service is ideally suited to save the customer money on situations involving transmission from remote locations, where existing facilities are not currently available and construction would be required. The customer can also reduce his costs on intercity transmission of television signals by utilizing satellite services.

Send for a brochure or call

WESTERN TELE-COMMUNICATIONS, INC

P.O. Box 22595 Wellshire Station□ Denver, CO 80222□ (303) 771-8200

Circle (54) on Reply Card

D.C. Servo Drive Runs Smooth Steady Cool

Of course, it's Telex/Magnecord

Telex Magnecord broadcast cart machines run cool and steady. So cool no ventilation is required, so steady not even voltage or frequency fluctuations will alter their speed. Thanks to our dc servo flutter-filter drive. Completely immune to RFI and EMI, it meets or exceeds all NAB standards and is suited for local or remote/automated operation.

Standard features at no extra cost.

- An edit pushbutton to add stop cues in playback and omit stop cues in record
- LED indicators show end of tape, status and secondary/tertiary cue tones
- Front panel headphone jack
- VU meters for each channel

Convenient, Flexible

MC-Series is field convertible from mono to stereo, or play to record. Optional remote controls simply plug in.

Four broadcast cart machines to choose from in the Telex/Magnecord MC-Series - all made in U.S.A. and affordable. Write for detailed information.

Quality products for the audio professional

9600 ALDRICH AVE. SO., MINNEAPOLIS, MN 55420 U.S.A.
Telephone: 612-884-4051, telex: 29-7053
EUROPE: 22, rue de la Légion-d'Honneur, 93200 St. Denis, France, Téléphone: 820-98-46, telex: 63-0013
CANADA: Telak Electronics, Ltd., 100 Midwest Road, Scarborough, Ontario M1P3BI, Telephone: 416-752-8575

Circle (55) on Reply Card

sonnel, according to the manufacture.

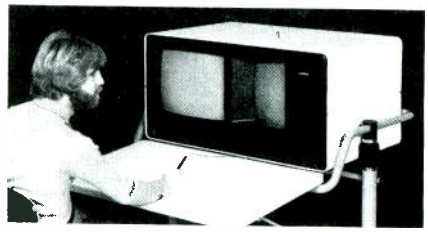
Circle (311) on Reply Card

Amperex

The 30mm Diode Gun Plumbicon TV camera tube 78XQ features high modulation depth and sensitivity. It has low geometric distortion, low input capacitance and low lag.

Circle (312) on Reply Card

Ampex



The Ampex Video Art (AVA) system gives the television graphic artist a conventional work environment in which to create and store work. Working with just an electronic stylus and pallet, the artist has at his command a broad selection of colors, hues, saturations, line weights, shapes and color intensities to create original art or modify existing picture, charts or diagrams. The TCR-650 edit time code reader is for indexing video and audiotapes from any source. It displays it as real or elapsed hours, minutes, seconds and frames. It is a microprocessor-based system. The Ampex BCC-20 portable color camera system is expandable to satisfy a broad range of teleproduction uses. According to the general manager, it is the first studio quality, self-contained portable color camera.

Circle (313) on Reply Card

Ampro/Scully

Series 8300—This 3-deck audiotape cartridge reproducer features removable decks, a servo motor without bearings adjustments and a new head bridge assembly. Modular construction allows field conversion from mono to stereo.

Circle (700) on Reply Card

Amtron

The DVA-1 digital video analyzer accepts up to three synchronous or non-synchronous video signals for

Studer 169 and 269. The mixers with the master touch.

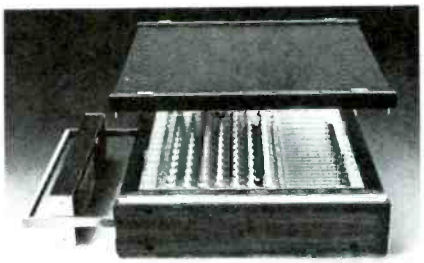
On the air, on the road or in the studio, success depends on two good mixers: the man with the ear and the console he works with.

You supply the ear, but let Studer supply the consoles, the 169/269 mixers.

Portable enough for remote pick-ups, their flexibility and quality has made them the natural choice for everything from City Hall coverage to direct-to-disc mastering. Put them in a suitcase, console, or (169 only) 19" rack, either can run from the power line, internal NiCads or even a car battery.

The Studer 169/269 give you separate low and high-frequency equalizers with a ±16dB range, plus a presence equalizer (±11dB) whose center frequency is continuously tunable from 150 to 7,000Hz. Plus independently-metered variable recovery-rate limiters, complete reverb-send, foldback, and pan pots, and solo, muting, and slating facilities. There's a built-in electret condenser talkback mike and a pre-fade monitor amp. 6-step switches adjust input sensitivity from −61 to +16dBu, and the floating XLR connectors provide phantom powering, as well. Separate line-level inputs are included and the long-throw (4") conductive-plastic faders have additional switching contacts. Built in low-end and external filters are switch-selectable, and you have your choice of PPM or ASA-standard VU meters.

But whether you pick the 10-in/2-out 169 or the 16/2 Model 269—or any of the variety of 2- and 4-out configurations their plug-in modular construction lets you choose—you know that when you buy a Studer console you're buying the reliability, low noise and sonic clarity that are the Studer hallmarks.



There's a complete line of Studer mixers, from the ultra-portable 069 to the still-more flexible 369, all built to the unique Studer standard of excellence: a Studer mixer never gets in the way of your ear.

STUDER REVOX

Studer Revox America, Inc.
1425 Elm Hill Pike
Nashville, TN 37210, (615) 254-5651
Offices: LA (213) 780-4234;
New York (212) 255-4462

Circle (56) on Reply Card

Here's $3,990.50 worth of great news... from the originators of low cost, high performance microprocessor video editing systems.

Introducing the:

The EA-3x is not designed to be the least expensive editing system on the market. What it represents, however, is an extremely potent editing system that simply does it all. It works handily with all popular ½" and ¾" VTRs. No modifications necessary.

One example of the advanced microprocessor technology developed by Cezar International, LTD., is Micro-loc.* Micro-loc* totally eliminates the need for SMPTE time code...actually it is an improvement. It doesn't require a $2,000 SMPTE reader. It doesn't tie-up an audio channel. Micro-loc* format already is hard at work in over 150 editing systems.

Compare EA-3x Features

- ☐ Variable shuttle arm control of tape speeds
- ☐ Edits may be rehearsed, performed and reviewed
- ☐ Interchangeable VTR formats
- ☐ Independent control of audio and video channels
- ☐ High speed search to any specific frame on the tape (That's the potency of Micro-loc*)
- ☐ Selects in or out points on-the-fly
- ☐ No CRT required. Display is totally self contained
- ☐ Programmable pre- and post-rolls
- ☐ Full VTR remote control
- ☐ Auto tag with recall
- ☐ Control track (With or without Micro-loc*) plus optional SMPTE

- ■ Cruise capability
- ■ Pre-roll cue
- ■ Numeric trim of ins and outs
- ■ Optional fade "up from/down to" black
- ■ Optional "Perfect Pitch"...eliminates the Donald Duck effect

And a little built-in personalized feature we especially appreciate:

- ■ Numeric brightness control (DIM) of all lamps and displays.

Afterthought: Actually, when you consider all the features of the EA-3x.. at $3,990.50, it may indeed be the least expensive editing system around. How about a demo? Contact us or the best distributor in your area. Chances are he's one of ours.

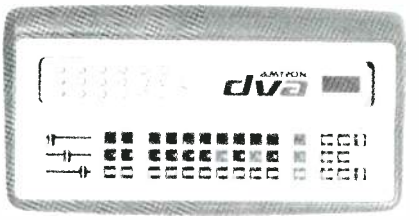
"The Originators"

*Micro-loc. Patent Pending, Cezar International LTD.

Cezar
International, LTD.

491 Macara Avenue, Sunnyvale, CA 94086 Tel: (408) 733-1436

Circle (57) on Reply Card



simultaneous display on a precision color video monitor in three distinct colors. The unit consists of a single electronics unit, a remote control panel that may be portable, rack- or desktop mounted, and a 13-inch or 19-inch high-resolution color video monitor.

Circle (314) on Reply Card

Andrew

The Andrew UHF-TV transmitting antenna is completely enclosed in radome for environmental protection. The traveling-wave, slotted array computerized design eliminates internal or external cable harnesses and power dividers.

Circle (315) on Reply Card

Angenieux

A 4mm super-wide angle adapter for the 15x2/3-inch lens system is for use in conjunction with the retrozoom attachment for the 15x9.5 zoom lens without ever having to remove the lens from the camera.

Circle (316) on Reply Card

Anixter Mark

The 5.0 meter satellite TVRO Antenna system is a dual polarized TVRO antenna operating in the 3.7-4.2GHz band. It features a parabolic reflector, feed and mount structure design that allows for easy 2-man installation.

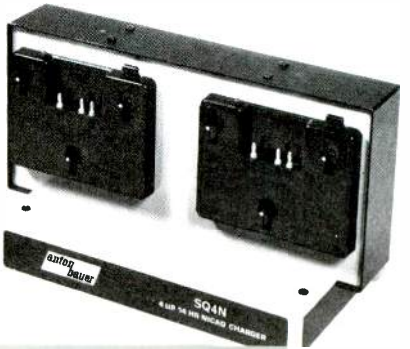
Circle (317) on Reply Card

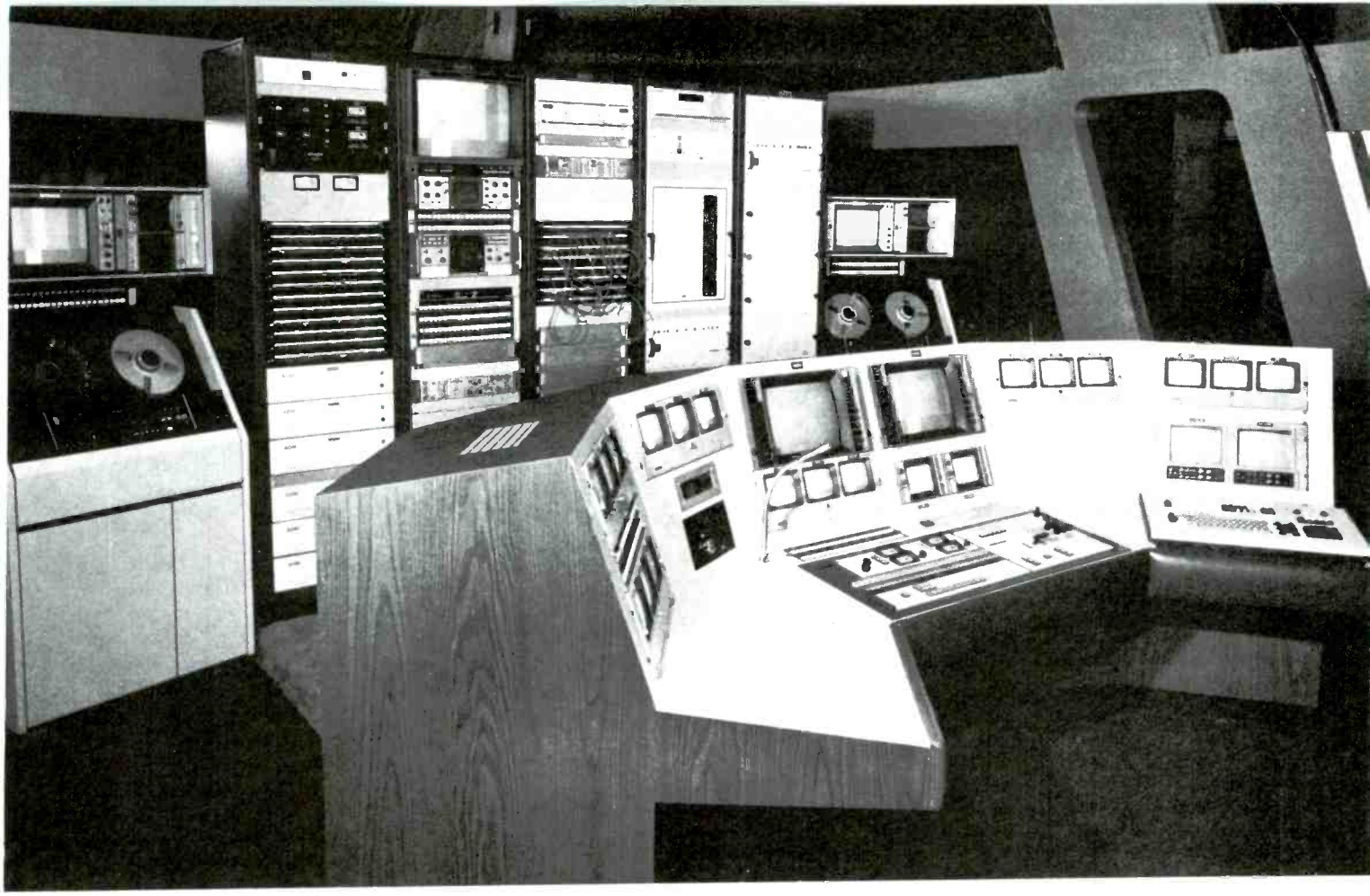
Antiope Videotex Systems

A new captioning technique employing the SMPTE time and address code provides dual language captions for hearing impaired or ethnic minority viewers. Still in the developmental stage, the system can already accommodate up to 1800 captions covering 30-45 minutes of program time. It is expected to provide limitless captioning capability for TV programs of any duration.

Circle (318) on Reply Card

Anton/Bauer





ONE 'TURN-KEY' STATE-OF-THE-ART PAY TV NETWORK FACILITY TO GO... VIA NAB TO PRISM

Every "inch" of PRISM's new facility is the best and most up to date available. We know, because we built it!

When PRISM, a regional Pay TV Network serving Pennsylvania and New Jersey, decided to upgrade their operation to full 1" broadcast quality, they selected AFA to do the job.

PRISM's new programming and production facility will produce local programs including all "Spectrum" live sports and the finest in films.

PRISM ordered "one complete facility to go" and AFA took it from there. AFA designed and engineered the system and specified and purchased all the OEM equipment.

We also designed and custom built consoles, cabinets and racks, then installed, prewired and tested the entire system in our own plant.

Then...in an unprecedented display of confidence, we disassembled the entire system and shipped it to Las Vegas, where it was reassembled and operated in AFA's booth at the NAB Convention. After NAB, we disassembled it, repacked it and shipped it to "Philly" where it is permanently installed at PRISM's facilities.

The system includes: six- 1" Type C VTR's, master control switcher, two-Chyron IV's, 40 x 20 audio/video routing switcher, production switcher, 16-channel audio console, complete monitoring, small production switcher, audio mixer and 4 video cassette recorders.

Here's a "turn-key system that turned on *more than once* and turned on PRISM's management as well.

We'd like to build a turn-key system for you. If you would like to know more about AFA, why not contact us today.

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201-767-7000

2465 E. Bayshore, Suite 301
Palo Alto, CA 94303
415-856-1060

AFA

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FOR BROADCAST AUDIO MEASUREMENTS, if you compare features . . .

	Hewlett Packard 339A	Sound Technology 1710A	Potomac Instruments AT-51
AUDIO GENERATOR	**Combined With Analyzer**	**Combined With Analyzer**	**Separate Unit**
Intermodulation test signal	No	Option	Yes
Wow & Flutter test signal	No	No	Yes
Simultaneous L&R Outputs	No	No	Yes
600 ohms and 150 ohms Source	No	Yes	Yes
Stereo Matrix Switch (L,R, L+R, L-R)	No	No	Yes
Switch to remove signal and terminate line for S+N/N	No	Yes	Yes
10 dB, 1.0 dB, 0.1 dB Step Attenuators	No	Yes	Yes
AUDIO ANALYZER	**Combined with Generator**	**Combined with Generator**	**Separate Unit**
Harmonic Distortion Mode	Yes	Yes	Yes
Automatic Nulling	Yes	Yes	Yes
Automatic Set Level	Yes*	Option*	Yes
Intermodulation Distortion Mode	No	Option	Yes
AC Voltmeter Mode	Yes	Yes	Yes
Stereo Phase Meter Mode	No	No	Yes
L/R Amplitude Ratio Mode	No	No	Yes
Wow & Flutter Meter Mode	No	No	Yes

*Limited to 10 dB capture range.

AT-51
AUDIO TEST
SYSTEM

. . . there is only one logical choice!

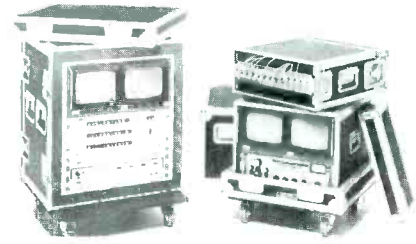
POTOMAC INSTRUMENTS
932 PHILADELPHIA AVE.
SILVER SPRING, MD 20910
(301) 589-2662

Circle (59) on Reply Card

The SQ-4N compact charger is capable of charging one to four snap-on NiCad batteries simultaneously. Also, the Silver/NiCad Discharger can determine a battery's capacity and pinpoint weak cells automatically.

Circle (319) on Reply Card

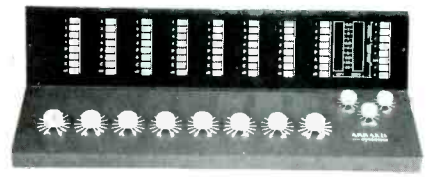
Anvil Cases



The Shock-Mount case design is a shock-isolation travelcase. Two layers of plywood sidewalls are separated by a 2-inch cushion of high-density polyfoam, for protection of delicate rack-mounted components.

Circle (320) on Reply Card

Arrakis



The 1000 series consoles features 19-inch rack-mounted electronics, touch switching, transformerless electronics, 60W RMS monitor amp, LED peak level meters and EQ availability.

Circle (321) on Reply Card

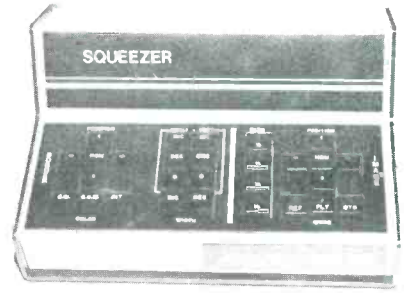
Arriflex

The Image Stabilizer consists of an optical system governed by a precise, battery-powered gyroscope, and makes steady shots possible anywhere cameras are subjected to unusual shocks or vibrations.

HMI lights ranging from the 200W ac/dc hand-held version to the 4kW lights, include stands, tripods, telescope hanging mounts and the distribution required for the operation of several lights from a single power source.

Circle (322) on Reply Card

Arvin/Echo



- Over 20,000 ITC cartridge machines purchased since 1969.
- Since 1975, ITC has outsold all other cart machines combined.
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- Three of five stations planning to buy cartridge machines will buy ITC.
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Broadcasters' No. 1 Choice:

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Circle (60) on Reply Card

Transmitters Love Our Modulimiter.

The Competition Will Hate Your New Sound.

The BL-40 Modulimiter is a unique automatic AM broadcast limiter, which will maximize modern transmitter performance. Whatever your format—hard rock to classical, Modulimiter will increase transmitter efficiency and extend coverage.

The BL-40's patented electro-optical attenuator provides smooth, unobtrusive, true RMS limiting. An ultra fast F.E.T. peak limiting section assures absolute protection from unwanted over modulation without peak clipping. Attack time is essentially instantaneous.

Three separate meters indicate RMS LIMITING, PEAK LIMITING AND OUTPUT LEVEL, simultaneously. All critical adjustments are behind a front security panel. A "phase optimizer" maintains most favorable signal polarity permitting up to 125% positive modulation without negative undershoot. " Its the limit " in todays broadcast limiters. UREI quality of course

Available from your UREI dealer.

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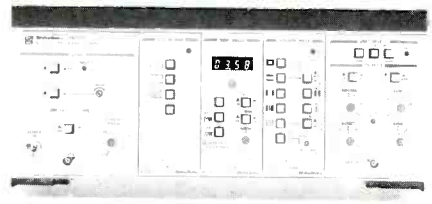
Exclusive export agent: Gotham Export Corporation, New York

Circle (61) on Reply Card

The Image Maker is a compact software-based unit that delivers random access to 500 images on-line with the exclusive Discassette. It can also do several motion loops from one to 16 seconds. The Squeezer is a production tool that can reduce images to four discrete sizes with complete positioning capabilities. The unit can also insert one image into itself or key it over another image. The low-cost TBC used in conjunction with the Discassette meets broadcast requirements in one affordable unit.

Circle (323) on Reply Card

Asaca



The model TG-7 TV test signal generator is a main frame that accommodates plug-in modules, and by using it together with these modules, it generates TV test signals that are used for the adjustment, testing and measurement of video equipment. The main frame contains a standard sync signal generator and it is also provided with a function that allows genlock with a VBS (composite color video signal) signal supplied from an external source.

Circle (324) on Reply Card

Atlas Tower

A choice of tubular, solid rod or angle iron in welded section or knockdown-type towers are available. Hot dip galvanizing after fabrication offers the maximum protection. Designs equal or exceed EIA specifications and meet OSHA requirements.

Circle (325) on Reply Card

Audico

The model 751 VTL videotape cassette loader operates simply and requires no skilled maintenance. An extra charge option is a loader/unloader model that strips out old tape at the same time that it loads in new to conserve the costly plastic housings. It has an average capacity of 125,000 0-60 audiocassettes a year on a single shift.

Circle (326) on Reply Card

Audi-Cord

The LAP (Live Assist Programmer) is a 16-step programmable memory control head with eight switching sources located in the separate rack panel unit. These

Get Control of the 80's with..... SUCOSCAN™

the "smart" remote control system that thinks and acts for itself.

SUCOSCAN stands for supervisory control and scan. It's the newest and most sophisticated in TFT's arsenal of systems that use computer intelligence to boost efficiency and cut costs. Expandable to 64 sites and 96 channels per site, SUCOSCAN can put over 6,000 channels under your control.

The need for a smart system.

Today, it's becoming increasingly critical to maintain the broadcast signal within the competitive environment. Typical remote control systems do not monitor every channel or warn you of impending problems. All this changes when you have a microprocessor-controlled system like SUCOSCAN. Here is just some of what you get.

—*Comprehensive information at your fingertips.* This means full display of time, site, channel, data, units and self-test status lights. This makes for ease of operation, even without a CRT or teletype.

—*Self-calibration.* SUCOSCAN's advanced software program eliminates the need to recalibrate periodically. It also prevents drift.

—*Fast Scan.* Quick alarm identification is never more than four seconds away.

—*Multiple simultaneous logging.* SUCOSCAN can operate two teletypes and one CRT at the studio and one teletype per remote site—all simultaneously!

—*Computational ability.* Automatic calculation of power, efficiency, and power-to-linear conversion eliminates the need for extra hardware and allows for more reliable facilities operation.

Failing channel identification. SUCOSCAN is programmed to quickly identify failing channels to permit almost immediate analysis. In the event of a power failure a battery back-up preserves the program for several hours.

ATS operation provides power and modulation control automatically. SUCOSCAN's studio and remote computers can be made to interact with each other without ever involving an operator.

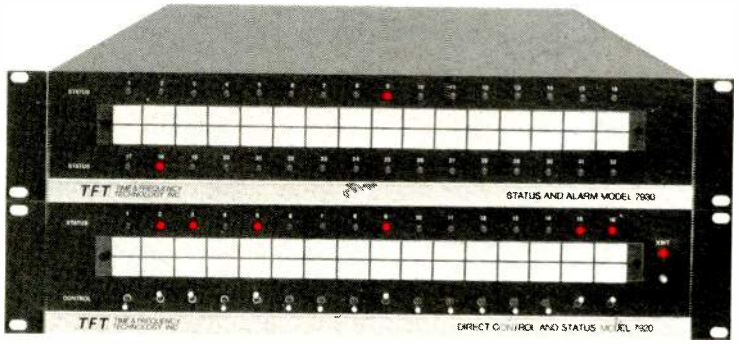
Lower operating costs.

You'll reduce downtime with SUCOSCAN because it's easier to spot trends and take corrective action before the signal is lost. An alarm can be pinpointed in seconds.

Furthermore, as FCC requirements change, SUCOSCAN's computer operation will allow unskilled personnel to take over monitoring duties, freeing studio personnel for more productive work.

Don't get caught with yesterday's technology. Smart systems are the wave of the future. You owe it to yourself to look at the most advanced system available today—SUCOSCAN.

Call or write for full information.



TFT TIME & FREQUENCY TECHNOLOGY INC.
3090 OAKMEAD VILLAGE DR., SANTA CLARA, CA. 95051
(408) 727-7272 TWX 910-338-0584

Circle (62) on Reply Card

units are designed to provide remote control of short automatic operating sequences with tape cartridge machines or other sources that are capable of *end of message* signals.

Circle (327) on Reply Card

Audio & Design Recording

The FM stereo Ex-Press limiter is a compressor, limiter expander with digital logic switching, level clipper, dynamic pre-emphasis and 1 ¾-inch rack mounting. The M600L broadcast limiter is suitable for AM or FM use, has two independent outputs per channel for reliable operation, single card modular construction and low noise, low distortion.

Circle (328) on Reply Card

Audio Kinetics

The XT24 intelocator features two separate counters, master and intelocate, both operating in minutes and seconds, four pre or immediate load memories, inches per second speedometer for vari-speed reference and full standard tape transport remotes with LED indication. The unit interfaces with 3M M79, Studer A80 and Ampex MM 1200.

Circle (329) on Reply Card

Case History #437

Electro-Voice DO56 Shock-Mounted Omnidirectional Microphone

Electronic News Gathering is one of the toughest environments a microphone will ever encounter. Every mike we've seen has compromised the demand for low handling noise, fine audio quality and virtual indestructibility.

Credit the NBC Electronic Journalism Department/Operations and Engineering in New York for putting the Electro-Voice DO56 shock-mounted omni in the field. Although originally designed as an on-camera entertainment and MC's microphone, NBC found the DO56 to be the microphone that provides an audio signal commensurate with video in real-life crisis situations. In these situations audio often takes a back seat to video, resulting in a final product that doesn't accurately reflect the broadcaster's professional standards. NBC discovered that the DO56 takes the pushes, the shoves, the rubs and finger taps in stride. And when handling *really* gets rough, the DO56's unique internal shock mount virtually eliminates the bell-like clang transmitted by other shock-mounted mikes.

Congratulations to the NBC Electronic Journalism Department in New York. You found the solution – the DO56.

For an in-depth description of this and other case histories, get on the Electro-Voice "Mike Facts" mailing list. Write on your letterhead to Mike Facts, c/o Electro-Voice, 600 Cecil Street, Buchanan, MI 49107.

Electro-Voice a gulton company

Circle (63) on Reply Card

Audio Plus Video

Services include standards conversion using a Marconi DICE unit to assist non-broadcast television users to exchange programs around the world.

Circle (330) on Reply Card

Auditronics

The model 720 is a 36 in, 16 out TV audio production console. It features nine VCA sub-groups, is externally controllable, has four solo busses, four effects channels, and all modules have three-band parametric type EQ with Tranzamp-LZ transformerless mic preamps and VCA sub-group capability.

Circle (331) on Reply Card

Audio Technologies

The DA1008/DA2016 distribution amplifiers feature single or dual one in to eight individual outputs, transformer or balanced differential +22dBm outputs, scan metering, 3-color LED meter display and headphone outpu. The PA-1000 monitor amplifier has 10W per channel, switchable mono bridged output and full electronic output protection. The P1000 turntable preamp features ±25dB, 30-20,000Hz, +22dBm transformer or balanced differential outputs, 80dB S/N, subsonic filter -30dB at 7Hz high boost and cut filters. A dual line amplifier features ±25dB 30-20,000Hz, +22dBm transformer or balanced differential output, 3k balanced bridging input and 26dB gain. The M1000 dual microphone amplifier features XLR inputs, 72dB gain, -124 equivalent input noise, +22dBm transformer or balanced differential outputs, transformer inputs.

Circle (332) on Reply Card

Automated Broadcast Controls

The Audio mate audio processor has adjustable gain input, clipping and audio indicators, switchable in/out compressor and equalizer, VU or G/R meter indication and battery operation for remotes. The 1050 wideband modulation controller is designed to provide FM stereo overshoot protection. The unit interfaces with any stereo generator/exciter combination. The RS-512 random select controller features a program up to 512 random select steps plus 15 formats of 32 steps each. All programming information is entered by keyboard. The 1600S sequential controller features provisions for external off-air monitoring,

Panasonic adds a new division:

The Professional Audio Division

Professional audio isn't new to us. In fact, we're old hands at it. Take Technics direct-drive turntables. As a recent survey shows, 73 of the top 100 radio stations that use turntables use Technics direct drive. And when it comes to classical music stations, Technics is even more popular.

Now the Panasonic Professional Audio Division introduces two lines of components for the recording and broadcast industry: Ramsa, a new name in professional mixers, amplifiers, microphones and sound reinforcement equipment. And Technics R&B Series, a specialized line of products from a name you already know.

Technics R&B Series The big news is our new professional turntable console, the rugged and totally mobile SL-9560. It consists of two highly sophisticated acoustically isolated sections. The deck section includes a quartz-locked direct-drive turntable, a static-balanced heavy-duty gimbal-suspended tonearm with dynamic damping and a "companion" moving coil cartridge. The control section consists of a phono-equalizer amplifier with a high pass filter, tone controls and a monitor amplifier with speaker.

There's also the EPA-500 tonearm system consisting of the EPA-501H, a titanium nitride tubular arm unit with dynamic damping for today's high-compliance cartridges. The EPA-B500 tonearm base with four-point gimbal suspension. And the SH-50P1 stylus pressure gauge, fully electronic and accurate to 1/10 of a gram. Also available are four other titanium nitride arm units with dynamic damping to match the mass and compliance of any cartridge.

RAMSA For remote broadcasts there's the Ramsa WR-130, an 8x2 portable mixer. It includes −70 dB attenuation for each input, high and low equalizers and a pre/post sub mixer. Plus pan pot, peak-overload indicators, and balanced mike inputs. While inputs 1-4 will accept turntables. There are also two auxiliary inputs. Outputs include high and low equalizers, a headphone output, echo send and receive, and record send.

To complement the WR-130 mixer, use the Ramsa WP-9210 power amplifier. When you do, you'll get a clean 200 watts RMS per channel into 8 ohms from 20 Hz to 20 kHz with no more than 0.05% THD. You'll also get electronically balanced XLR inputs with continuous level adjustments, phone-jack inputs, as well as overload and short circuit protection.

To meet high performance standards there are three Ramsa hand-calibrated microphones. The WM-8000 and WM-8050 are designed for vocal use and include floating microphone capsules and triple wind screens to suppress shock and pop noise. For instrument miking there's the back electret condenser WM-8150 for improved high frequency and transient characteristics. It operates on batteries (not included) or connects to a phantom power source.

For your nearest Panasonic P.A.D. representative and more information, call toll-free 800-447-4700. In Illinois, 800-322-4400.

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Panasonic.
PROFESSIONAL AUDIO DIVISION

EOM advance hold for manual jock-assist operation and remote control inputs for stop, start and special event.

Circle (333) on Reply Card

Automated Music

The company distributes program service and audio products, including country music service, TEAC tape recorders, Sennheiser headphones and microphones and others.

Circle (334) on Reply Card

Automation Electronics

The Star System is self-contained, employing a technology that is dedicated for the next decade. The entire system is modular for repair and growth purposes. It utilizes the GE Terminet 200 matrix printer. This 200 character per second printer provides dependable high speed printing.

Circle (335) on Reply Card

Avab

FM 800—The FM 800, designed for film and TV remote production features pre-fade listening; line/mic switch for each input; monitor and level control; reference oscillator; stereo pan pots mixer to boom ban talkback; ac/dc powering; remote tape start; director script monitor outputs; and slate microphone.

Circle (336) on Reply Card

BEI

The Data Prompter is an automatic character generator that paces an announcer through commercials, documentaries or announcements. It will perform text editing, assembly and perform material-handling tasks as well as automatically control the speed of presentation.

The CG-800 is a message system designed to be used as a character generator, local weather and NOAA system and news service. Standard features include automatic centering, crawl line with elastic length, random display of pages and adjustable page-by-page display time.

Circle (337) on Reply Card

BTX

The series 50 SMPTE time code systems provides clean, stable SMPTE code reference to external video sync, internal crystal reference, or automatically synchronizes

to any source of external standard code.

Circle (338) on Reply Card

Beaveronics

The J&D model 705 ENG video switcher is a 35-pound portable unit. It has a built-in sync generator with genlock capability and compos-

We've been quietly refurbishing quad heads for over three years.

Now there's a new team at Videomagnetics that's even more dedicated to quality, service and value. And we still offer the lowest prices in the industry.

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ANOTHER NEW ROUTING SWITCHER CONTROLLER FROM UTAH SCIENTIFIC

CSP-100-E

Switching by source name, true matrix statusing, coax party line control, audio/video breakaway — all this from Utah Scientific in a 1¾" routing switcher control panel.

Utah Scientific's new CSP-100 panel in its **encoded** form permits your operator to address and status sources by their familiar name — VTR 7, CAM 3, etc. The panel connects to the matrix via a single coax party line while LEDs in the **Group** and **Units** button rows provide true audio and video statusing from refresh memory data. Separate audio and video buttons are provided for breakaway switching.

The CSP-100 joins a long line of routing switcher controls from Utah Scientific that all feature single coax control connection, true statusing, and breakaway switching, and that are human-engineered to minimize operator error.

SINGLE COAX CONNECTION — SELECTS AND STATUSES BY NAME — 1¾"

TRY THAT ON YOUR GRASCOMFERNSAMDYNATEK SWITCHER!

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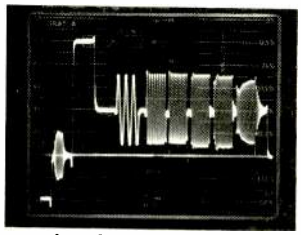
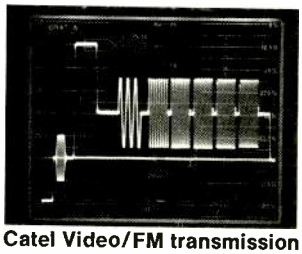
HI-FI TV on coax



Conventional AM/VSB transmission



Catel Video/FM transmission

With the Catel Video/FM coaxial transmission system (VFMS) in your CATV or CCTV system, instead of conventional vestigial sideband AM you can get longer runs without amplifiers, and improved overall transmission quality for TV, high speed data, PCM, FDM, facsimile and other broadband signals.

VFMS gives you an economical, quality alternative to microwave or direct video transmission, and several specific advantages over AM. Like a signal-to-noise improvement of approximately 10 dB. Plus excellent video frequency response and greatly improved differential phase, differential gain and chroma delay performance.

VFMS video and audio modulators and demodulators can be matched to almost any requirement in the 19 MHz to 290 MHz range. They're already paying off for a large number of users worldwide, from Pay TV and security surveillance to satellite terrestrial links.

These, and other uses, are described in recent issues of our applications newsletter, the *Catelegram*. For your complimentary copies, and full details on how VFMS can help you send better broadband signals on your cable system, call or write.

CATEL

DIVISION OF
UNITED SCIENTIFIC CORPORATION

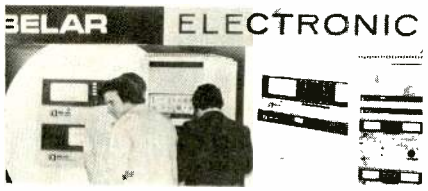
1400-D STIERLIN ROAD P.O. BOX 1389
MOUNTAIN VIEW, CA 94042
415/969-9400

Circle (67) on Reply Card

ite sync and blanking outputs. It is designed for on site or remote location program production or origination.

Circle (339) on Reply Card

Belar Electronics Laboratory



The FMM-2 FM modulation monitor features an ultralinear digital discriminator to ensure low intermodulation distortion for best stereo and quadraphonic performance. The FMS-2 features two independent peak modulation meters for simultaneous monitoring of left and right channels. Two independent autoranging voltmeters with LED displays for range, simplified automatic measurement of channel separation, crosstalk, sub-carrier suppression and noise are also featured.

Circle (340) on Reply Card

Bell Helicopter

The Jet Ranger III reduces costly travel time and increases productivity for employees who have less idle time.

Circle (341) on Reply Card

Berkey Colortran

The Colortrac Lighting System includes color-coded display, faders, dual-purpose submasters, channel override and library storage.

Circle (342) on Reply Card

Bird Electronics

Series 8860 Termaline RF load resistors are for use with low power transmitters. Designed with a highly efficient thermal structure, they will terminate 1500W CW or FM transmissions, or can act as a load for 1000W AM transmitters under full modulation in high ambient temperature or otherwise hostile environments. All units are equipped with an overload thermoswitch. Models in this series are available with 1 5/8-inch or 3 1/8-inch flanged or unflanged input or with any of Bird's two dozen Quick Change QC cable connectors.

Circle (343) on Reply Card

Blonder-Tongue

An addressable STV decoder is part of the BTVision STV system for over-the-air transmission of pay programs. It is a fully integrated system with a variety of programming options, designed for centralized control of individual subscriber decoders. The system provides a broadcast quality picture, total system security and reliable operation.

Circle (344) on Reply Card

Boston Insulated Wire and Cable

Duraguide fiber optic cables are designed for use in industrial control, instrument and data processing applications. They are designed to be installed and to operate in the environmental conditions of industrial service.

Circle (345) on Reply Card

Broadcast Electronics

The TG-2 dual tone generator is used in the production of reel-to-reel tapes for use with broadcast program control systems. The FM-30 transmitter incorporates a folded half-wave cavity power amplifier design, digitally programmed FX-30 ultra-linear exciter and microprocessor-based control system. The FX-30 FM exciter has extremely low distortion and loud and clear programming. It provides minimum intermodulation of baseband frequency components, resulting in superior stereo and SCA performance. The FM-3.5 transmitter is completely contained in a single low profile cabinet with easy access to all components.

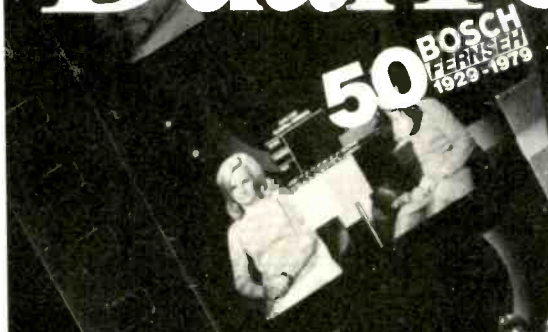
Circle (346) on Reply Card

Broadcast Video Systems

Provides services and represents manufacturers from all over the world. Specializes in audio and video specification and selection.

Circle (347) on Reply Card

CCD and Digital. Dual Format. FDL



The new generation telecine employing CCD line sensors and a digital frame store. For 16 mm and 35 mm positive and negative film. Film deck with variable speed transport using continuous capstan drive. Microcomputer controlled deck and electronics. Slow motion, jogging, stills and variable search mode with correct picture format. Automatic color correction. High fidelity color reproduction and superior signal to noise ratio. No pick-up or scanning tubes. Minimal ageing CCD line sensors and digital technology – low operating and service costs. The safe telecine system with a future. In all color standards.
From Bosch.

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Robert Bosch Ltd., P.O.B. 166, Watford, Great Britain - Robert Bosch Pty. Ltd., 69 Edward Street, Pyrmont, NSW 2009, Australia - Robert Bosch Pte. Ltd., P.O.B. 4, Thomson Rd., Singapore 20.

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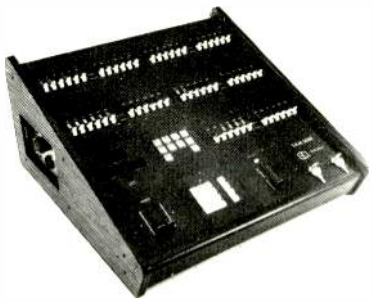
...in lighting control systems

T.A.M....
The Adaptable Memory



The Adaptable Memory (TAM) offers an economical way to convert existing manual consoles to memory systems, providing benefits of both manual and memory units. The manual console may be used separately or with the TAM to make instant adjustments on the stage, providing even greater flexibility.

The standard TAM provides up to 250 stored cues, and is compatible with up to 96 channels of multiscene presets. A dipless split crossfader is standard, permitting lead-lag fades or pile-ons. Powerfail battery backup insures against loss of memory for up to 14 days.

With the optional diskette, more than 10 cues per second may be "read into" or "written from" TAM's resident memory, giving up to approximately 2000 additional cues per diskette. If you're thinking memory in lighting controls, compare adaptability, compare TAM from EDI. For more information, write us or call (503) 645-5533.

MEMORY SERIES

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Lighting Control Specialists
1675 N.W. 216th
Hillsboro, Oregon 97123
(503) 645-5533

Representatives Wanted

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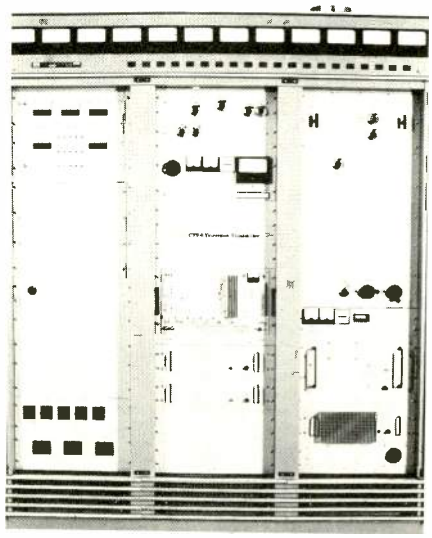
Burns Audiotronics

The model MCE-5 is a clip-on-type electret-condenser microphone that is suitable for a wide range of on-camera applications.

Also, the M-111 lavalier microphone includes a unique filter that provides a flat frequency response when the unit is suspended over the chest.

Circle (348) on Reply Card

CCA Electronics



The CTV-6L color television transmitter is designed for remote control unattended operation. It has open construction for total accessibility. RF circuit modular solid-state design extends the life of the transmitter and simplifies routine maintenance. The ST-25 broadcast transmitter features single tube, high efficiency tetrode PA amplifier, solid-state dyadic IPA stage and a solid-state logic control system.

Circle (349) on Reply Card

CMC

XPL heads are plug-compatible with all Ampex VR 1200, 2000 and RCA Hi-Band VTRs. Available in 10,6 and 5 mils track width, they offer the advantages of improved interchangeability, increased tape life, reduction of chroma noise and chroma saturation banding and increased head life.

Circle (350) on Reply Card

Cablewave Systems

The 4½ O.D. air dielectric, flexible transmission line for FM and TV is a low loss high power cable.

Circle (351) on Reply Card

California Microwave

The multi-purpose small aperture terminal makes a new spectrum of innovative services practical for broadcast, wire service and data users. Broadcast features are: all

program demodulators stereo phase and gain matched better than 10dB head room, +18dBm, peak program output, STL quality performance and carrier and AFC alarms.

Circle (352) on Reply Card

Cambridge Products

The CPFI UG88 is a solderless, crimpless 40-second connector. Paladin wire stripper is a 1-step wire stripper. The CPL 259 is a low cost quick termination crimp.

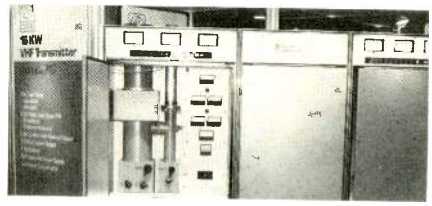
Circle (353) on Reply Card

The Camera Mart

Ultimatte operates on a linear principle, reproducing all foreground information seen by the camera (unless purposely inhibited). It features no loss of fine detail, good blue control and reproduction and holds all transparencies.

Circle (354) on Reply Card

Canadian General Electric



The type TTC-16000 FH 16kW high-channel television transmitter has only two tubes, one aural and one visual. Driver is 1000W of solid-state and requires no tuning. The TTC-6000 FL is a 6kW low channel television transmitter that has just one visual and one aural tube. Driver is 350W of solid-state. 30kW low band and 30kW high band models are also available.

Circle (355) on Reply Card

Candex Pacific

The type 1724 VIMACS (Vertical internal machine control systems) feature remote control of any machine, television vertical internal line used for transmitting data, interfaces with telephone lines, microwave links, satellites and transmitters and avoids the need to install inter area cables for control purposes.

Circle (356) on Reply Card

Canon

The J20x8.5 for 2/3 Plumbicon format camera features 56-degree-wide angle, 2-foot MOD built-in range extenders. The J25x11 is

suitable for field work with a 42-degree wide angle, 1.5 MOD.

Circle (357) on Reply Card

Capitol Magnetic Products

The Audiopak AA-3 broadcast cartridge meets or exceeds the requirements of the NAB cartridge standard. It provides lower long-term wow and flutter than other cartridges and provides consistent and reliable performance from cartridge to cartridge.

Circle (358) on Reply Card

CeCo

An established franchised super distributor of electronic tubes for the broadcast industry, they carry such brands as RCA, Eimac, Amperex, GE, Sylvania and others.

Circle (359) on Reply Card

Central Dynamics

New products include the MC990 master control switcher; CD480-4 production switcher and computer-assisted production accessory for the CD480 switcher family.

Circle (360) on Reply Card

Centro

Services include specification development, space planning, environmental control design, custom enclosure and console design and construction.

Circle (361) on Reply Card

Cetec Broadcast

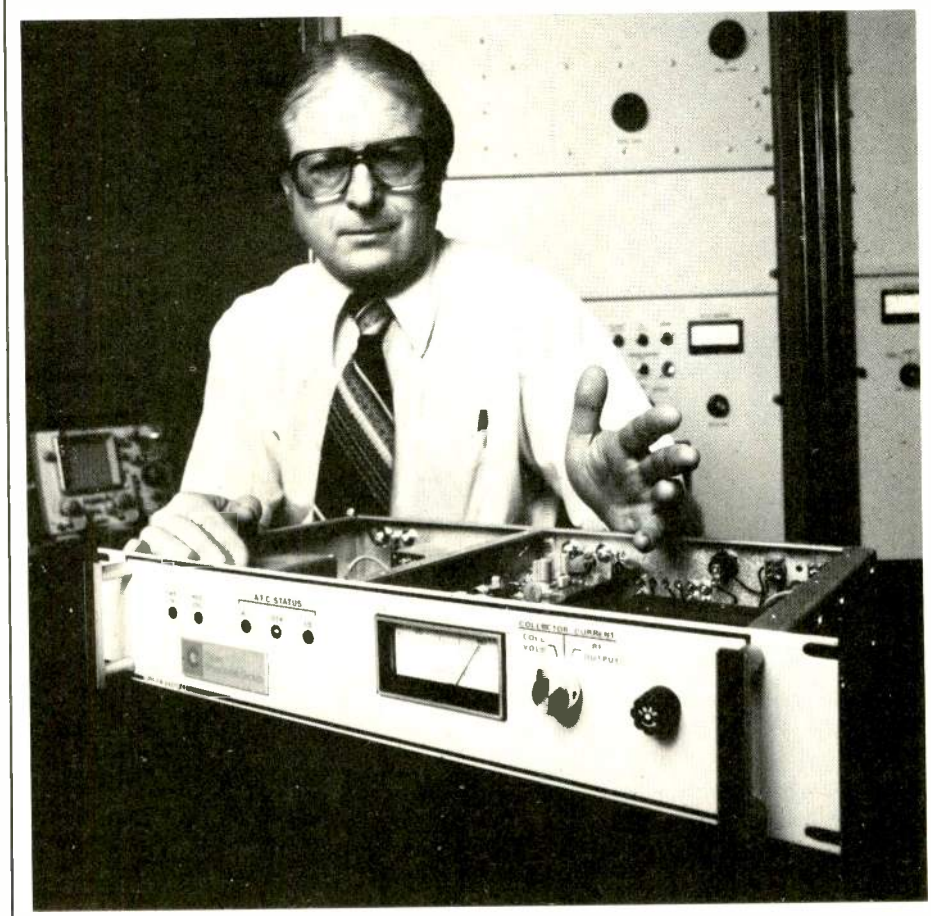
The 690PLL FM exciter drives any FM broadcast transmitter optimizes performance of audio processing systems, features solid-state, IC-controlled power supplies and top-of-the-line specifications for any broadcast mode. The model 80-250FM transmitter is solid-state and features two RF power amplifiers capable of 150W each. The amplifiers are combined for a nominal power output of 250W with a power output range of 100 to 300W. The 200 series of audio consoles are made up of four basic configurations: the 5-mixer (10 inputs), stereophonic or monophonic; and the 8-mixer (16 inputs), stereo or mono. All four represent significant im-

690PLL: Clean, clear FM sound.

This is the all-new, extra-stable FM exciter from Cetec. Phase-locked loop technology for pure, powerful sound; IC-controlled power supplies for solid reliability.

Model 690PLL can bring the FM sound of tomorrow to any FM transmitter—even yesterday's transmitter. Top-of-the line specs throughout. Very, very low noise and distortion. Perfect compatibility with all audio sources—monaural, composite stereo generators, SCA generators. 690PLL brings out the best in any audio processing system.

Full engineering and performance data are available right now, and so is this great new FM broadcast component. Write or telephone Andy McClure today at (805) 684-7686.



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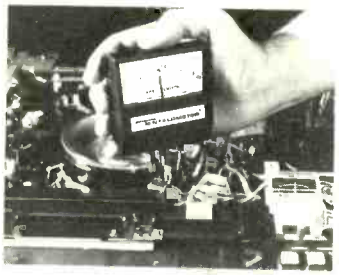
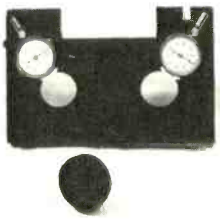


The T2-H15-UM TENTELOMETER® Tape Tension Gage shown checking the critical hold-back tension on a Sony 2850. Price $225 complete.

The **T.U.S.H.** Gage is simply inserted into your U-Matic - the indicators are visible through the cassette window. No need to remove the cassette top chamber to read the indicators.

The **T.U.S.H.** Gage measures the critical tape reel spindle heights. It is a must to prevent tape damage due to binding. Technical as well as non-technical persons can determine if the machine needs adjustment.

The **T.U.S.H.** Gage comes complete with master gage, instructions, and carrying case. Price $495 complete.



Write or call for more information; or order direct.

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On any location, this portable, lightweight, focusable, weatherproof H.M.I. Light will recreate daylight with instant strike or restrike and without flicker. The five-pound hand-held lamphead also may be used with a stand for studio work. It is equivalent to a 2000 Watt quartz light with a daylight filter. Adaptable to AC current, the BELDEN/LEE Light can be taken anywhere. This unit is powered by a 48 volt battery or alternately by only four 12 volt automobile batteries in series. This allows 3 to 10 hours of continuous shooting time.

UNIT INCLUDES: lamphead, clear lens, inverter, 48 volt battery, gel frame, lamp, barn door, pistol grip and dual battery charger.

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provements in performance specifications and built-in features.

Circle (362) on Reply Card

Cetec Vega

The model 80V hand-held mic transmitter is equipped with an Electro-Voice EV-671 mic capsule, and the model 81 utilizes a Shure SM-58 capsule to provide the clearest sound from conventional hardwire mics.

Circle (363) on Reply Card

Christie Electric

Reflex-20 selection guide for videotape recorders, film cameras, and lighting systems. Reflex-20 selection guide for video cameras.

Circle (364) on Reply Card

Chyron

The RGU-1 portable graphics and titling system features 27ns resolution, multi-font library compatible with Chyron IV standard font library, four font loading positions, multiple roll and crawl speeds, automatic centering and Vididisc magnetic storage system.

The U-1A cassette cleaner and evaluator is self-contained and features selectable erase, selectable operating modes, automatic high-speed operation, optical evaluation, adjustable sensitivity and feed-back to operator.

The Chyron IV graphics and titling system features character and graphics resolution, 25 style font library, italics, font storage, Palette display of 64 colors, background, proportional spacing and 15 edging effects.

Circle (365) on Reply Card

Cine 60

A NiCad dememorizer for ENG TV cameras and VTRs serves to recondition and balance cells in battery supplies that have been subjected to repeated, shallow discharges.

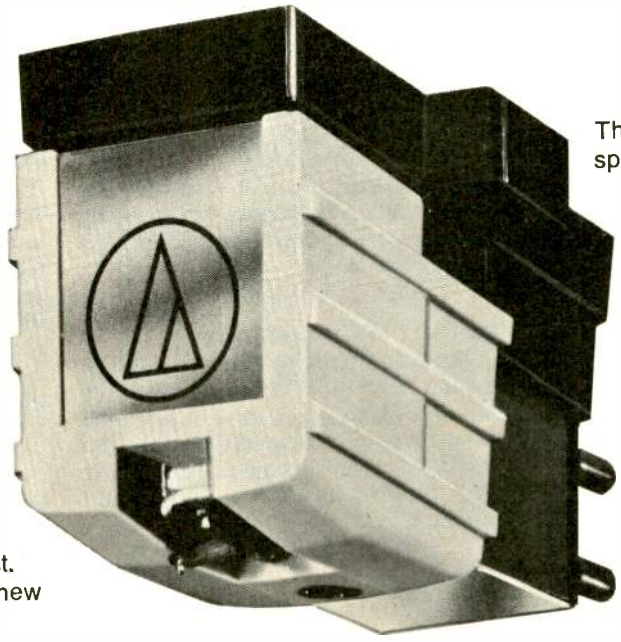
A series of high-performance rechargeable NiCad Battery Packs designed to snap-mount on the rear of portable ENG TV cameras are available ranging from ±7.2V to 14.4V at 4Ah capacities.

Circle (366) on Reply Card

Cinema Products

The model MNC-81A new generation ENG/EFP camera is designed for high fidelity color reproduction, superior handling and reliability

Audio-Technica rewrites the book on professional phono cartridges.



Introducing The Professionals

The new Audio-Technica ATP Series Dual Magnet™ Stereo Phono Cartridges

What do you really need from a professional phono cartridge? Impeccable quality. Reliability. Uniformity. And reasonable cost. The goals we've met with the new ATP Series cartridges.

The new ATP Series are flat, smooth, low distortion performers that will do your station, studio, disco, library, or commercial installation proud. They are also very tough... the next best thing to "bullet proof". Because we know that "needle drop" isn't just a way to pay for music or SFX. It's a fact of life!

Both ATP cartridges and styli are *uniformly* excellent. When you at last need to replace a stylus, you always get "like new" performance again, and again, and again.

Don't confuse the ATP Series with other "professional" cartridges that are merely modified home units. ATP units don't have to be treated with kid gloves. And yet we haven't sacrificed tracking ability to make them rugged.

The all-new ATP cartridges were specially developed for the working environment. Three models provide a choice of either spherical or elliptical styli. Each cartridge is hand-tuned for optimum performance, with stereo channels matched within 1.5 dB to eliminate balance problems.

All ATP cartridges feature tapered cantilever tubes that combine high strength with minimum moving mass. There's no problem with back cueing, and the brightly colored cantilever tip is readily visible so that you can spot an LP cut quickly and accurately.

ATP cartridges are priced from $45.00 suggested professional net. Write for complete specifications. Try the ATP Professionals on your own turntables. We know you'll be pleased with what you hear. From the thoughtful pros at Audio-Technica.

Upgrade your entire record-playing system with new ATP tone arms. Rugged and precise, like ATP cartridges. Professional in every respect. Model ATP-12T or ATP-16T just $150.00 suggested professional net.

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with a wide range of sophisticated optional remote control capabilities.
For information: Cinema Products, 2037 Granville Ave., Los Angeles, CA 90025.

Cohu

The model 1550B telecine system is a professional quality broadcast color film camera featuring the model 8500 color encoder with image enhancer, automatic balance and an optional color comp variable masking system.

Circle (368) on Reply Card

Colorado Video

Slow scan television systems in the areas of teleconferencing, business communications, telemedicine, and UPI newstime are available.

Circle (369) on Reply Card

Comark Communications

The CIT-U-10, CTT-U-30, CTT-U-55 and CTT-U-110 television transmitters have solid-state IF modulated exciters, are energy efficient and require less floor space than other manufacturers.

Circle (370) on Reply Card

Commerce Airborne

The CA-214 airborne audio and control system is an advanced communications management tool designed to simplify the complexities of any airborne ENG system. With one dedicated headset and his own CA-214, each crewmember instantly controls all communications and monitoring modes.

Circle (371) on Reply Card

Compact Video Systems

The Compact 42 is a 42-foot trailer that functions as a fully self-contained earth station with the capability of transmitting on the standard uplink frequency of 6 GHz and receive on the 4 GHz and band.

Circle (372) on Reply Card

Compucon

Specialists in engineering and planning services primarily directed toward the selection of sites, frequencies and equipment to optimize communications systems performance.

Circle (373) on Reply Card

Computer Concepts

Broadcast turnkey computer system with financial and traffic software; word processor to assist in ad composition and document preparation.

Circle (374) on Reply Card

Computerized Automation for Telesystems

The CAT contains a computer that analyzes the parameters at critical test points of the system. For a multiple transmitter and/or multiple frequency installation, true RF power can be measured and analyzed.

Circle (375) on Reply Card

Comrex

The studio/telephone conferencer integrator is designed to aid in the rapid growth of telephone talk shows. When the system is not in operation the telephone system will operate in its normal fashion. When a call comes in, the producer picks up the handset, depresses the button and answers the caller. A seize switch is pushed when it is decided the call should go on the air.

Circle (376) on Reply Card

Comsearch

Provides satellite earth station siting, interference analysis and frequency coordination. Also provides STL/TSL frequency assignments.

Circle (377) on Reply Card

Conrac

Model 6100 occupies 15 ¾-inches of vertical rack space and can be fully serviced from the front by pulling out the rack slide-mounted chassis. It has 38 active convergence controls providing independent control of all display areas. The model 5300 has a 19-inch color monitor as does the 6100. It features a shadowmask, Colormatch CRT. The 5700 is a 13V Colormatch monitor with a high-resolution shadow-mask CRT. The chassis is designed for VTR instrumentation monitor bridges or it can be enclosed in a cabinet for portable or mobile applications.

Circle (378) on Reply Card

Continental Electronics

The 317C-2 features ±0.5dB amplitude variation from 10 to 10,000Hz and less than 5° phase variation from 10Hz to midband and essentially phase linear to 30kHz. It is designed to be compatible with any AM stereo transmission system, and is built to receive a stereo exciter.

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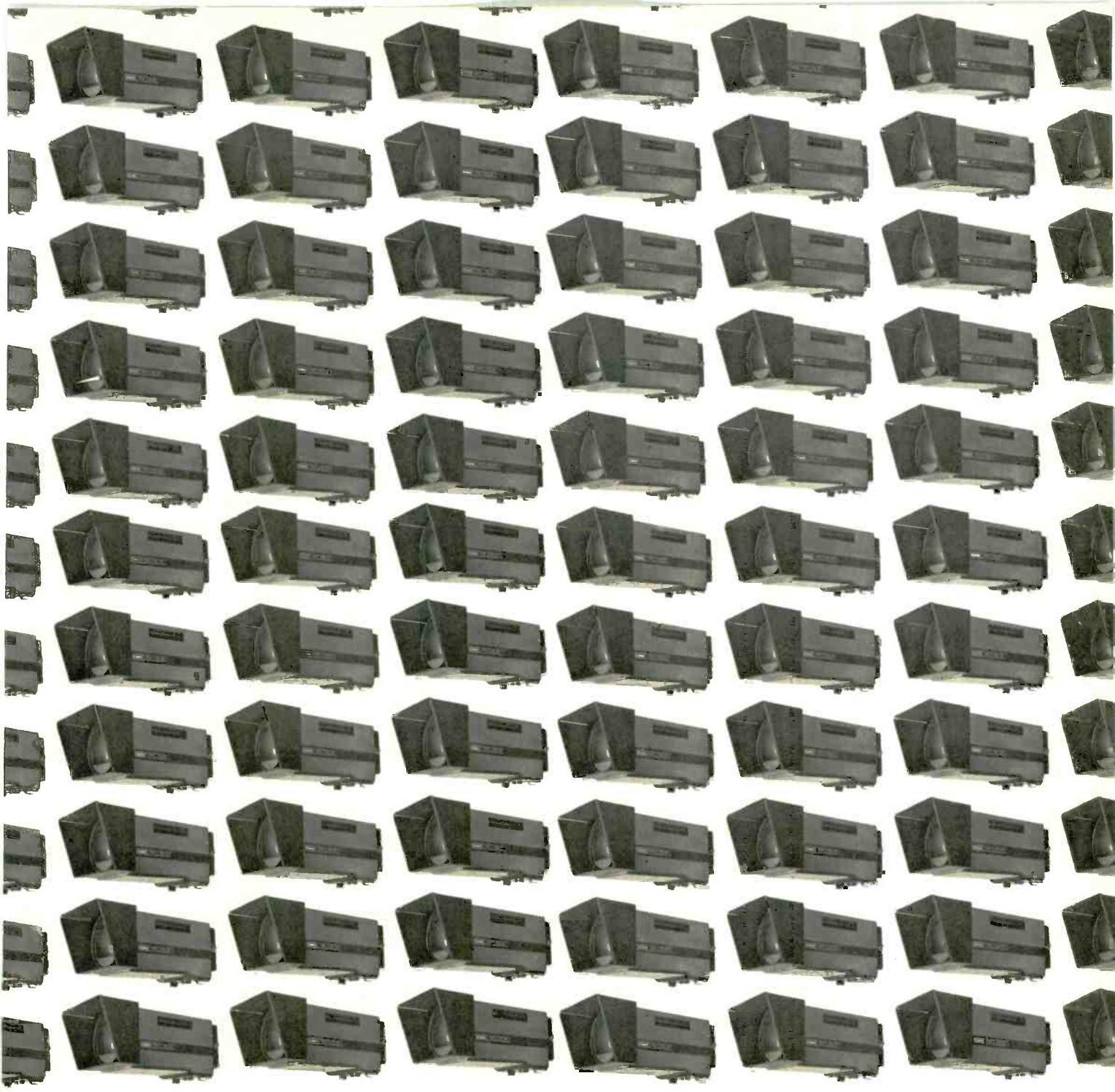
Control Video

The model ICIOOI is compatible with all remotable VTRs. The SMPTE reader model ICIIOO displays user bits, freezes display and compares tape color frame to house



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Schneider SLA 14100 (14w/10ah) belt with RCA TK-76 and 100 w sun-gun. Running time: 45 min., camera and light; 2½ to 3 hours, camera only. Model SLA 12100 (12w/10ah) available for 12 volt systems.

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color frame. The model ICIOIO has keyboard entry, writes color frame, includes separate real-time clock and has an optional keyer.

Circle (380) on Reply Card

Cool Light

The Cool Light system is designed to reflect more lumination with 90% less heat. A scientific coating permits reflection of only the visible spectrum. The system allows the invisible spectrum to pass through the coating and be absorbed by the Pyrex coating.

Circle (381) on Reply Card

Crosspoint Latch

The model 6118 has a unique auto lock feature for camera inputs. The model 6124 is a four bus 12 input production switcher with a 30-inch panel and illuminated pushbuttons.

Circle (382) on Reply Card

DBX

The 165 uses "over easy" compression so it cannot be heard while working. It was designed for professional applications, with a balanced, high impedance differential input stage and unbalanced output terminating in a Jones barrier strip.

Circle (383) on Reply Card

Datametrics

The model SP 700 character generator is low cost and converts BCD time code and user bit data to video characters. The model SP-760 incorporates LED display and video character generator. The model SP-766 can preset both user and time data with a jam sync option.

Circle (384) on Reply Card

Datatek

The D-2000 series of video and audio routing switcher has expanded capacities for larger systems. The unit can be offered for systems as large as 250x250 and for multiple levels of operation. Maximum redundancy is built into the system with each input, and each output has individual modules, with each output having an independent microprocessor-control system.

Circle (385) on Reply Card

Delta Electronics

The RCS-1 modular microprocessor remote control system has up to 72 inputs, not including 3-16 channel alarms and antenna monitor interface. The APC-1 FM automatic power controller automatically adjusts power for FM transmitter, and maintains 100% power level despite voltage variations.

Circle (386) on Reply Card

Telegram western union

TO : VIDEO TAPE EDITORS

SUBJECT: Z 600 INTELLIGENT INTERFACE

Z6E/POST PRODUCTION AND Z 6M EDITING SYSTEMS TO BE DELIVERED WITH INTELLIGENT INTERFACES. THE INTELLIGENT INTERFACE WILL BE DESIGNATED THE "Z 600" AND WILL BE AVAILABLE WITH SEVERAL OPTIONS. OPTIONS INCLIDE Z 601 SMPTE TIME CODE READER (DIRECT READING OF SMPTE TIME CODE), Z 602 LOCAL CONTROL PANEL (WITH SHUTTLE ARM AND CRUISE), Z 603 SERIAL DATA TRANSMISSION SYSTEM (EXTENDED REMOTE OPERATING DISTANCES).

THE Z 600 IS A MICROPROCESSOR BASED DEVICE. THE PROGRAM ALLOWS THE Z 600 FULL TWO-WAY COMMUNICATIONS WITH THE Z6 EDITING SYSTEM AND COMPLETELY REMOVES THE CONCERN OF WHAT TYPE MACHINES ARE BEING USED. ANY CAPSTAN SERVOED TAPE MACHINE CAPABLE OF REMOTE CONTROL CAN BE SERVICED BY THE Z 600. MACHINES (VTR/ATR) CAN BE MIXED OR INTERCHANGED.

THE Z 6 EDITING SYSTEMS WITH THE Z 600 INTELLIGENT INTERFACE DEFINITELY MAKES IT THE MOST POWERFUL EDITING SYSTEM IN THE WORLD

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DeWolfe Music Library

Music library that provides a large source of contemporary production music for audio visual and broadcast needs.

Circle (387) on Reply Card

Dictaphone

The 4000 series 24-hour program logger dual capstan drive, high speed digital time recorder for fast search and legal court admissable documentation.

Circle (388) on Reply Card

Dielectric

The model 1000-A RF wattmeter features a square meter with mirrored background and expanded lower scale. The unit measures RF power in 50Ω coaxial cables and transmission lines. It accepts plug-in elements that range from 0.1W to 5000W full-scale, and from 2MHz to 1000MHz.

Circle (389) on Reply Card

Di-Tech

The Pace 1000 weekly event controller features seven particular function modes: Help, realtime event monitor, edit, hold, manual operation, set and define. It employs solid-state memory. The video terminal and keyboard are designed for simple English communication with the computer.

Circle (390) on Reply Card

Dolby

The model 360 is a basic single-channel noise-reduction processor that can be used for either recording or playback. The model 361 is a single processor unit with built-in changeover facilities and is designed to serve one recorder track during both recording and playback.

Circle (391) on Reply Card

Victor Duncan

Suppliers of rental and purchase equipment that includes NEC, Fernseh, JVC, Comprehensive Video and Videotek.

Circle (392) on Reply Card

Dynacom

The Digicode over-the-air encoder/decoder system is made up of an encoder installed at the transmitter site and a decoder at all viewing locations. A ticket module is used to activate the decoder.

Circle (393) on Reply Card

Dynair

The series 5300 modular distribution system allows minimal passband ripple, extremely low differential phase and gain, and excellent transient response achieved through the use of dc servo stabilized hybrid video operational amplifiers.

Circle (394) on Reply Card

EEV

The Paglight 100 portable power kit is a lightweight 12V 100W lamp designed for TV and professional film applications.

PAG's molded leather battery belts are produced to give portable power for portable equipment with minimal effect on the mobility of the user.

The Speedcharge 4000 provides power for the PAG system for charging the NiCad batteries. It will charge in 40 minutes (4Ah capacity) and 70 minutes (7Ah capacity).

Circle (395) on Reply Card

EG&G Electro-Optics

The SS-123 single enclosure obstruction light features single stainless steel enclosure, solid-state printed circuit plug-in modules, low power consumption, narrow vertical beam and self activating monitoring system.

Circle (396) on Reply Card

EMCEE

The TU-1000DU high efficiency 1kW UHF translator features 5000W power consumption, digital control ladder and optional remote control and interrogation. The TTU-50 50W UHF transmitter is 100% solid-state. The TTV-5000 UHF 5kW TV transmitter is a high efficiency, internally diplexed designed digital control with optional remote control and interrogation. The TTS-20 MDS transmitter and TSA-100 100W MDS amplifiers feature 20W or 100W MDS operation. High linearity is capable of handling most scrampling systems.

Circle (397) on Reply Card

ENG Corporation

The Tritower's telescopic mast consists of three pneumatically powered, 7-stage cylinders joined together to form a triangular cross-section. Tubes are produced from 6063-T832 aluminum that is drawn over a mandrel to produce a smooth bore. The pistons are machined from aluminum bar stock and are fitted with seals made from Buna N rubber.

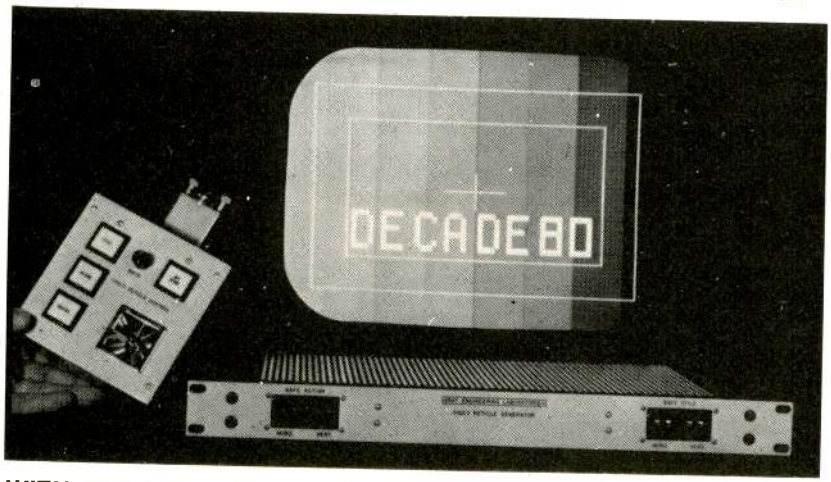
Circle (398) on Reply Card

ESE

The ES280 is a 10 digit audio time code generator/reader capable of laying down a serial BCD time code on audiotape in the generator mode, and recovering and displaying it in digital form in the reader mode. The frequencies used to produce the code have been selected to be compatible with cartridge machines as well as other tape recording and playback equipment.

Circle (399) on Reply Card

Camera Titling Made Easy



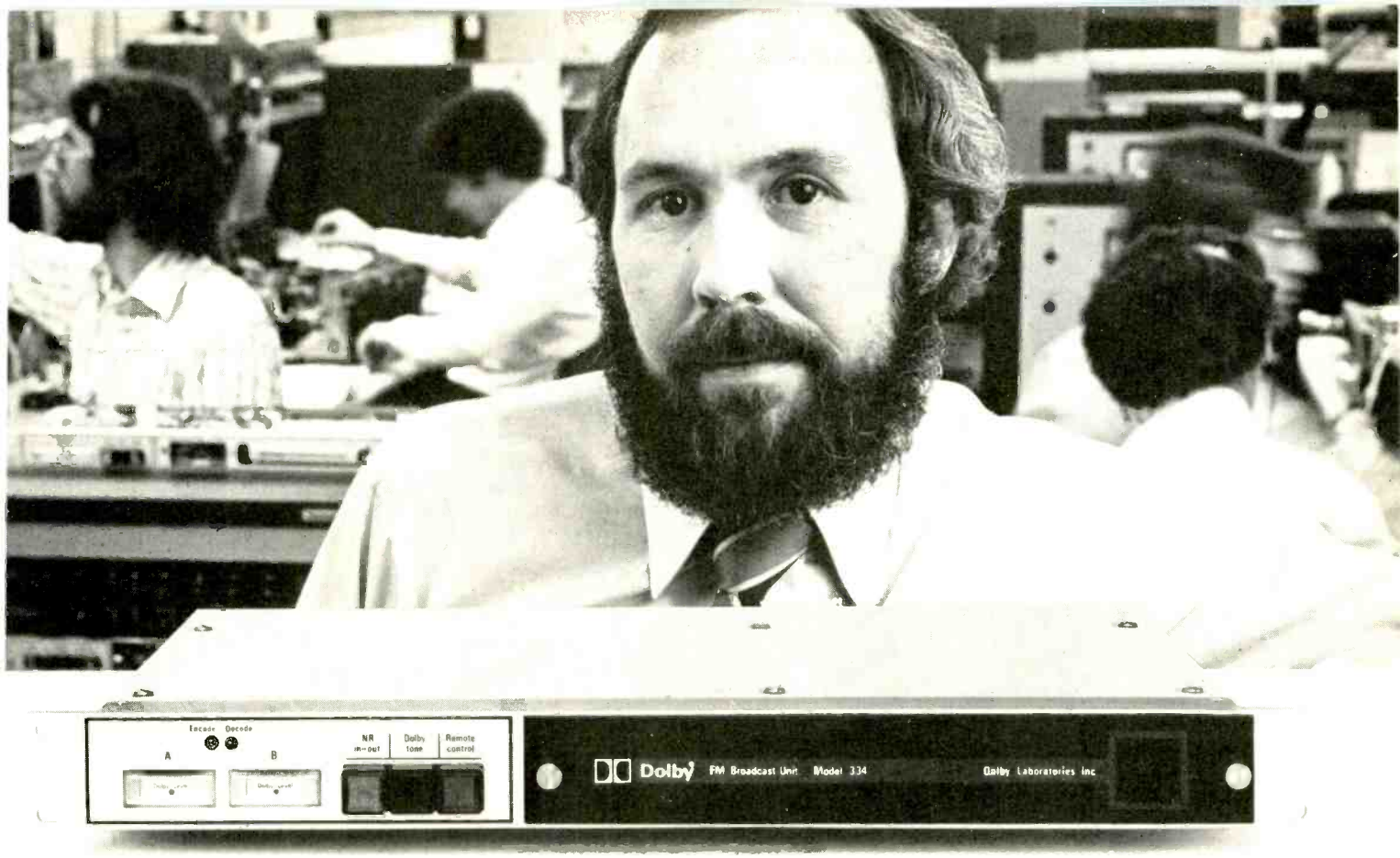
WITH THE NEW VIDEO RETICLE GENERATOR VR-116

—Independent control of Safe Title and Safe Action reticles
—Unrestricted selection of limits both horizontally and vertically
—Remote control switching of Safe Title, Safe Action and cross-hairs
—Continuous brightness control from 0 to 100% luminance value
—Joy-stick control of Safe Action reticle from dead-center to edge of blanking area

GRAY ENGINEERING LABORATORIES
INCORPORATED

504 W. Chapman Ave.—Orange, Ca. 92668—714-997-4151

Circle (79) on Reply Card



There's More To Dolby® FM Than Another "Black Box"

When you decide to broadcast Dolby FM, you get more than the proven technology of the Dolby Model 334 Broadcast Unit. You also get the personal assistance of Tim Prouty, Dolby FM Development Manager. The engineering, service, and marketing support of Dolby Laboratories. And the opportunity to take advantage of probably the best known single name in consumer, professional, and cinema audio.

Dolby FM provides the increased high frequency headroom that makes it possible to reduce limiting without sacrificing level. That can mean a higher quality signal for your sound-conscious listeners and clients. And a higher quality signal can lead to a unique marketplace position audibly above the competition, which can help increase your local sales.

If the prospect of a higher quality signal makes sense to you, call us at (415) 392-0300 to arrange for an on-air trial at no cost. That way you can see and hear for yourself what Dolby FM is really *all* about.

DOLBY LABORATORIES, 731 Sansome Street, San Francisco CA 94111. Telephone (415) 392-0300, Telex 34409 • 346 Clapham Road, London SW9. Telephone 01-720 1111, Telex 919109. Dolby and the double D symbol are trademarks of Dolby Laboratories. S80/2315

DOLBY FM™

Circle (80) on Reply Card

Circle (81) on Reply Card

Circle (82) on Reply Card

EDCO

The dimmable HMI spotlight for location lighting and news studio operation operates on one-fourth of the power required by conventional lighting while producing only one-eighth of the heat.

Circle (400) on Reply Card

Editall

The S-3X splicing block for ¼-inch tape and the S-3.5X for ½-inch tape feature X-cuts for quiet splicing with no disturbance of the stereo image. The Editab dispenser dispenses Editabs from rolls, to make using them a one-handed operation.

Circle (401) on Reply Card

Edutron

The ccd-2h series is a broadcast-quality time base corrector that will work with non-segmented capstan servo and non-capstan servo, heterodyne VTRs.

Circle (402) on Reply Card

Eigen

The Slide/Slo-Mo Combination unit features 600 electronic slide capacity with random access to any of the images through 64 memory position. It is designed for use in news segments, commercials and in other needs for multiple shots.

Circle (403) on Reply Card

Elcom

The WBL composite limiter eliminates all filter and preemphasis overshoot, increases FM modulation up to 40%, is compatible with existing exciters and stereo generators and has long term stability.

Circle (404) on Reply Card

Electro & Optical Systems

The TPC-MKI Time Code Calculator has additional memory stop watch and film footage to time conversions. The TCS-MKI includes two high-speed readers and LED display, 24-hour offset and fine phase adjust.

Circle (405) on Reply Card

Electrohome

The EDP-56 monochrome projection monitor is specifically designed for large screen, high resolution video displays of alphanumeric and graphic information from computer-generated signals.

Circle (406) on Reply Card

Electro Impulse

The DPTC-25KFM has average power, 25,000W continuous, DC-110MHz frequency and is useable to 200MHz.

Circle (407) on Reply Card

Electro-Voice
The Sentry 100 monitor speaker system has high efficiency with extended low-frequency response, high power capacity across the entire frequency range, uniform frequency response and dispersion, in a compact package. It uses a Super-Dome tweeter capable of handling 25W of input power while reproducing the program material with response out of 18kHz and uniform dispersion (120° at 5kHz).

Circle (408) on Reply Card

Enterprise Electronics
Enterprise radar data remoting systems comprise a transmitter as well as a data receiver and are designed for use on a dedicated closed C1 telephone line or by an optional telephone dial-up voice grade telephone line.

Circle (409) on Reply Card

Eventide Clockworks
The AI B232 real time audio spectrum analyzer initializes internal variable, prints axes and frequencies on screen, displays bargraph of data determined during the analysis and performs statistically independent, real time analysis for each call. It is used in conjunction with the Apple computer.

Circle (410) on Reply Card

Eumig
The FL-1000 cassette deck is computer interfaceable; up to 16 decks can be interfaced at once, allowing broadcast automation on cassette in random access.

Circle (411) on Reply Card

Excalibur
The Excalibur custom case is a rugged, top quality shipping container. It is designed to specifications, engineered to protect equipment and constructed for long-term use.

Circle (412) on Reply Card

Farinon Video
The FV2.5CR ENG microwave radio receiver for ENG applications has 16 channels synthesized, instantaneous phase lock, and covers the range from 2450 to 2690MHz. The FV7CR ENG microwave radio receiver for ENG applications has 30 channels synthesized, instantaneous phase lock and covers the range from 6875 to 7125.

Circle (413) on Reply Card

Faroudja Labs
The Image System automatic image controller consists of a preprocessor called Record 1 and post processor called Playback 1. Record 1 boosts small details that will be predictably degraded or lost in all color under VTR formats. Playback 1 reduces noise and ringing, eliminates chroma/luminance delay and sharpens details automatically.

Circle (414) on Reply Card

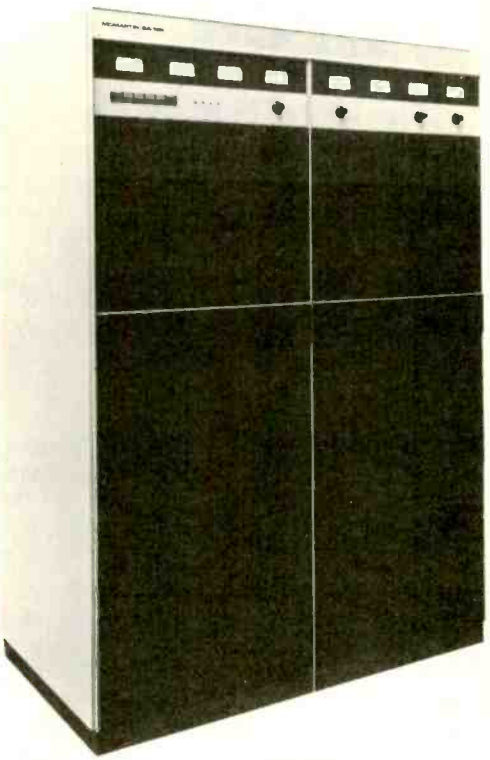
Imero Fiorentino
Production, design and lighting consultants.

Circle (415) on Reply Card

Film Video Equipment Service Company
Film/Video Equipment Service Company offers Cinema Products for sale or rent. The Kangaroo Video Pack features straps and pockets, to hold spare battery, cassette, audio cables and lavalier mics; Velcro loops to secure earphones and mics; and two white-balance panels designed for one or two-man operation.

Circle (416) on Reply Card

Flash Technology
The high-intensity twilight night-



BA-10K

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YOU DEPEND ON MCMARTIN

McMartin **AM and FM Transmitters** are the choice of broadcasters who need equipment they can rely on.

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Circle (83) on Reply Card

time aviation obstruction beacon for L-856 obstruction lighting has omnidirectional white flashing light, extended flash duration at night, minimal electric power drain, integral solid-state flash and photoelectric control simplified installation, reduced maintenance, long life flashtube and ac power input.

Circle (417) on Reply Card

For-A

The VTG-22 portable video timer features low power consumption, extremely compact design, crystal controlled accuracy, and battery back-up in power failure.

Circle (418) on Reply Card

Frezzolini Electronics

The model FL-250 portable Frezzi-Lite features lightweight head for hand-held or camera-mount operations.

Circle (419) on Reply Card

Fuji Magnetic Tape

H621 videotape brings the 1-inch format advantages that ensure professional results. A new binder ensures good wear-resistance characteristics, the backside of the polyester tape has been specially treated to impart good static-resistant properties and the ideal surface frictional resistance.

Circle (420) on Reply Card

Fujinon Optical

The 3.5 x 6.5 wide-angle zoom lens provides servo and manually controlled zoom over a range of 6.5 to 23 mm. The 14 x 9.5 ERMPI is an EFP zoom lens with a built-in diascope and 2X extender. The low-cost, lightweight 12 x 9 ENG zoom lens is a compact servo unit with adjustable back focus.

Circle (421) on Reply Card

Gardiner Communications

The 5.6 meter antenna features a whole new antenna design. It is made of petalized fiberglass. The design includes a tension collar to provide additional fine tuning or peaking capability. It offers 55% more surface than a 4.5 meter antenna; 25% more than a 5 meter.

Circle (422) on Reply Card

Garner Industries

The model 1100 bulk tape degausser is designed especially for 1-inch high-coercivity videotapes, and can be used on high-density videocassettes and audiotapes. It will erase up to 13 reels per minute up to 10½-inches diameter.

Circle (423) on Reply Card

Glentronix

The PCS-200 presentation controller is a complete systems approach, incorporating video and audio switching, microprocessor control and memory, CRT readout and two-wire machine control. It is simple to use, has 200 event expandable memory, manual, semi-automatic or fully automatic operations, fully adjustable prerolls in 200μs increments and automatic time checking.

Circle (424) on Reply Card

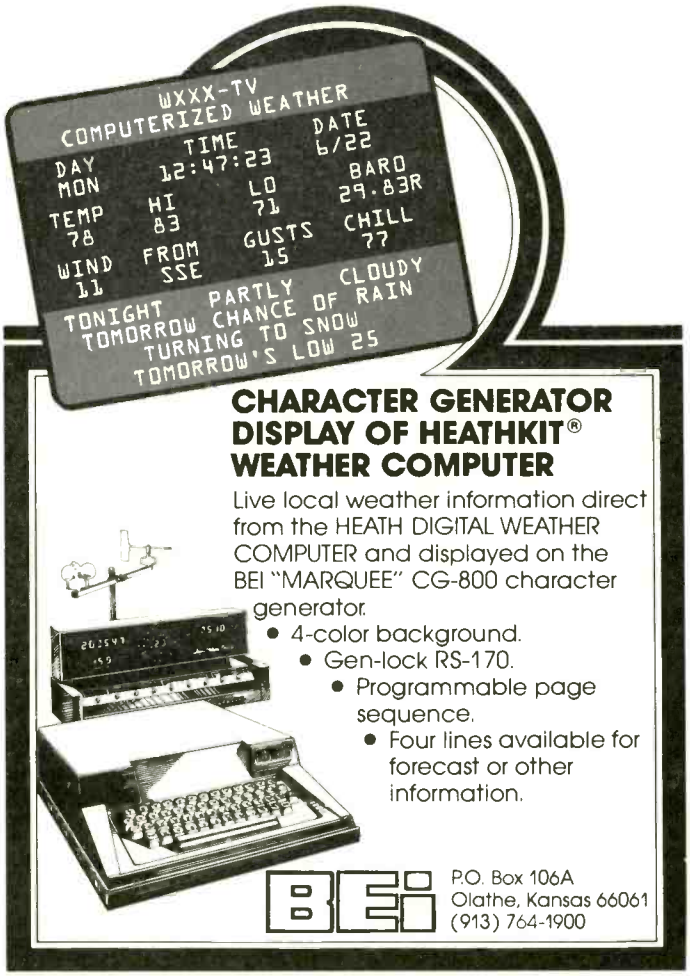
Graphic Express

Company researches, designs, constructs, installs, and lights news environments. They also furnish graphic images to add a contemporary look to news sets.

Circle (425) on Reply Card

Grass Valley Group

The Model 1600-4S is a special-purpose, audio and video switching system designed for master control applications. The switcher operation



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Live local weather information direct from the HEATH DIGITAL WEATHER COMPUTER and displayed on the BEI "MARQUEE" CG-800 character generator.

- 4-color background.
- Gen-lock RS-170.
- Programmable page sequence.
- Four lines available for forecast or other information.

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Circle (84) on Reply Card

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Broadcast Engineering's 13th annual directory issue published in September 1980. The industry's oldest, most comprehensive product directory.

Buyers' Guide offers more for manufacturers and suppliers who advertise...

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*Makes your ad work longer
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Submit your listing and reserve your ad space today in BE Buyers' Guide. Ad closing date is August 5. Call your local rep or the home office at 913-888-4664 or write to:

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Overland Park, KS 66212

Buyers' Guide. The one with FREE Red Listings for advertisers.

is optimized for efficiency whether operated manually or by the M200 modular automation system.

The 300 series production switcher has been developed to complement the 1600 series and to accommodate Digital Video Effects (DVE) and fully integrated E-MEM effects memory control.

Circle (426) on Reply Card

Great American Market

The SPE-2 special effects generator features rate of flash variable, random flash up to 1800W load, is all solid-state, has self-contained battery operated control, 500-hour battery life with alkaline cells and no RFI interference.

Circle (427) on Reply Card

Gregg Laboratories

The series 2530 tri-band audio processing amplifier is designed for use in AM/FM/TV broadcast transmission and recording applications. It provides level control and an increase in apparent loudness while preserving phycoacoustic accuracy.

Circle (428) on Reply Card

David Green Broadcast Consultants

Distributors of audio and video equipment and consultants to the industry.

Circle (429) on Reply Card

Groton Computer

Billing and logging systems for stations.

Circle (430) on Reply Card

HM Electronics

HME's studio quality hand-held microphone system is available with UHF lo-band frequencies and consists of a hand-held transmitter and receiver.

The system 24E Professional UHF Wireless Microphone system is designed for applications requiring high-quality sound reproduction and reliability.

Circle (431) on Reply Card

Hallikainen & Friends

The Process Control Computer for broadcasting is a series of microcomputers that provide the broadcast station with flexibility in the control, monitoring and logging of transmitter facilities.

The TVA series of audio systems provides high-quality audio, rack-mount construction, audio-follow-video, noiseless audio switching and mic and line mixing.

Circle (432) on Reply Card

Harris

Harris model 6503 8.8 meter antenna features 50dB gain, 16-panel aluminum parabolic reflector, shaped subreflector and linearity polarized motorized Cassegrain feed horn. The antenna is programmable for quick satellite switchover and meets FCC specifications.

Circle (433) on Reply Card

Harrison Systems

The Alive console features transformerless microphone preamplifiers, automated VCA faders with groupers, 8 VCA matric sub groups, 3-band parametric EQ with high-pass and direct communications interface.

Circle (434) on Reply Card

Harrison and Harrison

Optical engineers specializing in filters for all types of environments.

Circle (435) on Reply Card

Karl Heitz

Gitzo Video Combi tripods come with firmly attached video/cine heads, in six different models, to match any video or cine camera up to 50 pounds or more. Hand assembled of stressproof light metals, the extra solid tubular legs are firmly positioned against the rigid center part, for optimal stability without torque, to prevent vibration.

Circle (436) on Reply Card

Hitachi

SK-100 computer controlled studio camera, with auto set for 100 controls/functions, complete fault diagnosis, and simultaneous set-up of 24 cameras in under 2 minutes.

HR-200 type "C" studio recorder with slow motion, variable motion control.

The Zero Reference Digital Computer for the SK-100 studio camera uses 1-inch low-lag Saticon tubes and has a 56dB S/N ratio and resolution in excess of 600 lines.

Night Hawk—An ENG low light camera that is equipped with Image Intensified Saticon tubes. The Night Hawk will produce pictures with illumination of only one footcandle.

FP-40SS—This prism camera delivers a signal-to-noise ratio of 52dB with more than 550 lines of horizontal resolution. Features include auto white balance, horizontal and vertical 2-line enhancer and optical remote operating panel.

SK-91—This camera weighs 9½ pounds and operates on 20 W of power. The SK-91 is available with Saticon, Plumbicon or Diode Gun Plumbicon tubes. Built-in digital white balance with memory, ABO, high gain switch (+9, +18) and adjustable horizontal and vertical blanking.

Circle (437) on Reply Card

Howe Audio

The 7000 stereo console features a new main fader circuitry design that virtually eliminates fader repair. The volume is controlled indirectly, through optically-coupled integrated circuitry.

Circle (438) on Reply Card

Hughes Electronic Devices

The model ADA-200 is a modular, high-performance amplifier. Each module contains tandum output stages containing LF 256H operational amps and MPS-U05/MPS-U55 output transistors in tracking loops that provide very low THD and high output drive capacity.

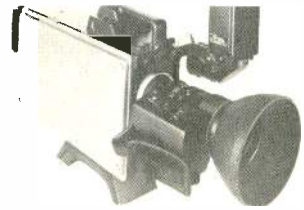
Circle (439) on Reply Card

IGM

The Go Cart II multiple cartridge playback unit features the fastest access times in the industry. The Go Cart 24 multiple cartridge playback unit for 24 cartridges cuts access time drastically from that of older circular playbacks. It features a drive design different from other playbacks but used in precision machines such as motion picture cameras.

Circle (440) on Reply Card

Ikegami



The MA-79 consists of a snap-lock camera head adapter, the base station itself and TV-39 cable. It provides remote control of all of the automatic and monitoring features inherent in the HL-79A camera.

The TA-79A consists of a clip-on camera head adapter, a hip pack, the base station unit and associated triax cable. The triax remote base station permits the HL-79A to be used at distances as great as 2500 meters from the base.

EC-35—termed by Ikegami as an electronic cinematography camera is designed to challenge the traditional 35mm film camera. The EC-35 delivers a signal-to-noise to 56 dB, employs ⅔-inch diode gun Plumbicon tubes and will produce 100% depth of modulation at 400 TV lines (corrected).

HL-78A—has a prism-optics, 3-Plumbicon front end, consumes only 17 W of power and delivers 52 dB signal-to-noise. It features auto-iris, automatic white balance and is equipped with a three-day memory after shutdown. The camera also offers +6 and +12 video gain setting.

HL-790A—The camera is comprised of the HL-79A ENG camera and its remote base station mounted in a studio size housing with a 6-inch viewfinder. All video test and bar signals are available on the rear panel of the HL-790A housing. Two intercom circuits are provided—one for engineering and one for production.

Circle (441) on Reply Card

Industrial Sciences Incorporated

The 200 series of production switchers offer one to three PKE (PolyKey Effects) amplifiers with a downstream transition unit. Twenty inputs including blackburst/colorizer are standard.

902-S—This system features the field proven 902 video production switcher with a full complement of production accessories. Included is an RGB or NTSC encoded chroma keyer with four input selector; a downstream keyer with outline, drop shadow, or border edging and colorizer; an 8-position joystick controlled pointer; a gen-lock sync generator and NTSC color bar generator.

Circle (442) on Reply Card

Information Processing Systems

The model WP-3312 weather satellite recorder is an automatic device tied in via telephone lines to the National Environmental Satellite Service. It continuously stores the last 48 hours of weather photographs on a magnetic disc. Recording does not require an operator.

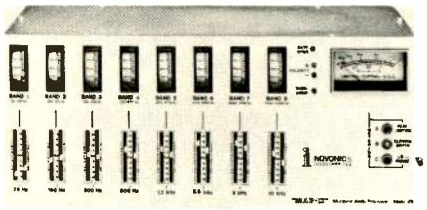
Circle (443) on Reply Card

Innovative Television Equipment

The ITE T-20/D-20 tripod and dolly system is constructed of aluminum and weighs less than eight pounds. Its cast aluminum head can support cameras weighing up to 25 pounds. The dolly has a camera load capacity of 35 pounds, a diameter of 37 inches and is nine inches high.

Circle (444) on Reply Card

Inovonics



The MAP II multiband audio processor has a ± 1dB, 50Hz-15kHz frequency response. The MAP II peak controller represents the most radical departure from previous processor peak reduction systems.

Circle (445) on Reply Card

International Microwave

The ICM-1013XFM microwave relay features all solid-state design with optional outdoor 1W add-on unit, optional separate outdoor assemblies for path performance improvement and ease of installation, dual conversion receiver to minimize image responses and failsafe transmitter power amplifier design.

Circle (446) on Reply Card

International Tapetronics Corp.

The IT1K files 1024 cartridges, plays cartridges back-to-back, self-loads incoming cartridges, provides four simultaneous audio programs, offers reel-to-reel sound quality and is cost effective.

Circle (447) on Reply Card

International Video

The IVC 1-11 high band 1-inch helical videotape recoder employs a new scanner and headwheel with a second video head. Two independently editable audio tracks are provided together with a separate SMPTE/EBU time code track.

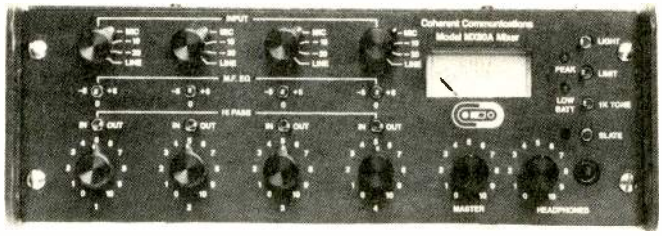
Circle (448) on Reply Card

Kaman Sciences

FILMS (Film Library Management System) features five separate elements in its system: film contract maintenance, amortization, accounts

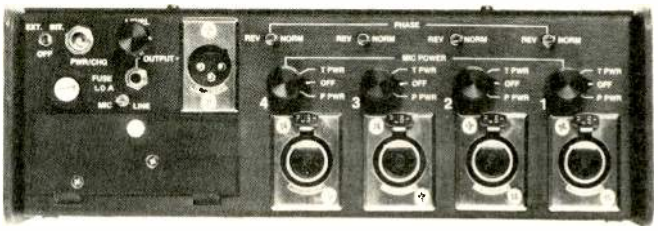
New Coherent MX80 Mixer:

More functions in less space—
best electronics, cleanest sound.



The MX80 uses Jensen transformers, the best in the world. It has a mid-range equalizer, built in slate mic, internal batteries.

Plus a VU meter light, 4 position mic/line select switches, phase reverse switches, internal mic powering, high-pass filters that *work*.



With all these features and more, the new MX80 weighs only 5 lbs. 3 oz., is 3½" high, 9¼" wide and is 7¾" deep. Send for our brochure.

COHERENT COMMUNICATIONS

13733 GLENOAKS BLVD., SYLMAR, CALIF. 91342. (213) 362-2566

Circle (85) on Reply Card

payable, programming and forecasting. Other new products are BCS carts, BCS News, and BCS demos.

Circle (449) on Reply Card

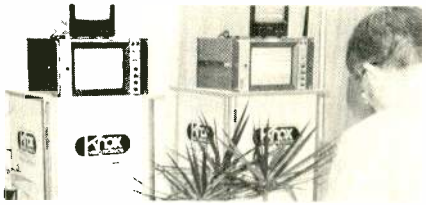
Kliegl Brothers

The Performer II is a compact memory lighting control console designed for theaters, TV studios and touring concerts.

The Kobold 200K variable focus unit is compact, portable daylight source that is designed for location shooting when battery-operated units are impractical.

Circle (450) on Reply Card

Knox Video Products



Models KCB1 and KCB3 color boxes make color backgrounds, colorize character generators, colorize logos or other keys and mix color keys with color backgrounds.

Circle (451) on Reply Card

LPB

The AM-50/250 series transmitters are modular in construction to provide four nominal power classifications—50 watt, 100 watt, 150 watt and 250 watt carrier output. the separate exciter provides continuously variable RF drive to the RF power amplifier to allow adjustment of the TPO from approximately 50% of the nominal rating to 110% of nominal for precise adjustment of radiated power.

Circle (452) on Reply Card

LTM

Lighting equipment manufacturers.

Circle (453) on Reply Card

L-W International

The Athena 6000 offers the capabilities of interfacing with electronic editing equipment through a 5-wire multiplexed control line to a multiprogrammed microprocessor or computer.

Circle (454) on Reply Card

Laird Telemedia

The model 1060 video countdown features audio cue tone, adjustable display size, composite sync/video compatible, local and remote control, no moving parts, is fully adjustable and has keyed-in video.

Circle (455) on Reply Card

James B. Lansing Sound

The 7510 automatic mixer is a state-of-the-art unit that comes standard as a four-input module and is expandable to 24-input capacity.

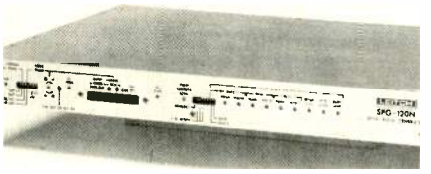
Circle (456) on Reply Card

Lee-Ray Industries

The model 100 LRI TV wall mount bracket is made of heavy gauge steel and tested to hold 300 pounds. It will accommodate up to and including 25-inch monitors.

Circle (457) on Reply Card

Leitch Video



The SPG-120N sync pulse generator features independently phased and timed color black outputs.

Circle (458) on Reply Card

Lemo

New products included triaxial connectors for cameras, audio triax system and stereo connector system. The stereo connector system is designed for use on stereo audio systems that use two twisted and independently shielded pairs.

Circle (459) on Reply Card

Lenco Electronics Division

The PMG-312 master sync generator is a professional master color sync generator designed to meet specifications for performance and stability.

The PMM-399 is a professional 4-inch diagonal engineering monochrome video monitor that features 20 MHz bandwidth, pulse cross standard, sweep protection, underscan standard and differential video input.

Circle (460) on Reply Card

Lexicon

The ATC 1200 audio time compressor compresses program material without changing pitch.

Digital reverberator—The model 224 provides programs of reverberating sound to accompany music. Model 93 Prime Time is a digital processor for doubling, flanging and resonant comb filtering.

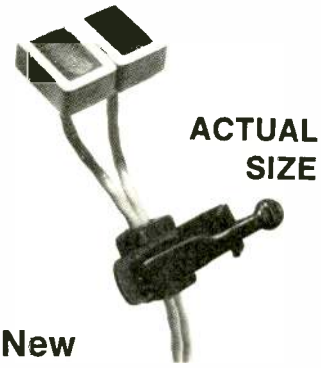
Circle (461) on Reply Card

Lightning Elimination Associates

The guy charge dissipation choke makes the guy wire appear electrically as a solid conductor to the charging mechanism and an open circuit to the broadcast frequencies.

Circle (462) on Reply Card

Two intelligently designed products from Coherent Communications



ACTUAL SIZE

New MINI-MIC 2

double lavalier.

Two separable, hand-picked, music-quality electret mics in one unit for breakdown protection. Capsules are suspended in rubber for isolation from clothing rustle and knocks. Wiring is clamped *and* epoxied *and* molded to the head! Send for our free, detailed brochure.

New PS3 mic Power Supply.

A practical in-line mic power supply in a die-cast box with switch guard. Runs on two inexpensive, readily available 9 volt batteries. Battery test jacks; switches for phase/polarity, 20dB pad, high-pass filter. 4¾ x 2½ x 1½ ins., 13 oz. Send for our free, detailed brochure.

COHERENT COMMUNICATIONS

13733 GLENOAKS BLVD., SYLMAR, CALIFORNIA 91342. (213) 362-2566.

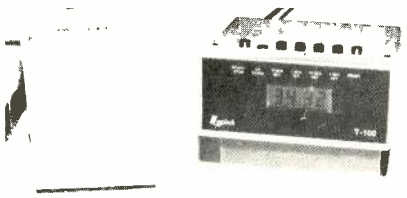
Circle (86) on Reply Card

Listec

The Vinten ENG tripod is lightweight and rugged, and features from an 18-inch to 29.5-inch spread. The camera and Vinten heads can be mounted above or under base plate for greater flexibility. The L.F. cam pan and tilt head Mk 7 features wide-track cams for greater stability, light rigid construction for loads up to 200 pounds and cam balance with lubricated friction drag control for smooth operation.

Circle (463) on Reply Card

Logitek



The T-100 programmable up/down timer offers LED or LCD digital displays, automatic rollover and restart at 100 minutes. The 50/50 and MONO-50 audio power amplifiers feature a power-sensing protection circuit that limits the maximum output power to a safe level even under improper load conditions.

Circle (464) on Reply Card

Lowel-Light Manufacturing

The Lowel Lightflector is a portable, location lighting reflector. It fits the case lids of most Lowel location kits and provides fast key, fill or backlight illumination without using an additional lighting fixture.

The Lowel Roll-up Carrier is a canvas, over-the-shoulder carrying case for stands, extensions, umbrellas and similarly shaped items. The unit makes light work of transporting to location shooting.

Circle (465) on Reply Card

MCI

JH-24 tape machine/reproducer and Model JH-110B series of tape recorder/reproducers featuring transformerless electronics.

Circle (466) on Reply Card

Magnasync/Moviola

The Moviola M-77AH, six-plate 16mm console editor offers a large picture head with a hollow flickerless prism projection and servo-tach system. Frame speed is crystal-controlled and provides a primary speed rate of 24 frames per second regardless of external input frequency.

Circle (467) on Reply Card

Marconi

The B4624 videotape recorder monitoring unit features monitoring and TBC controls on one panel, waveform monitoring selection, picture monitoring selection and waveform-on-picture superimposition.

Circle (468) on Reply Card

Marketron

The Avail system accesses two main data files. The primary and the rationale. The primary stores the audience data for the spot television inventory of programs and time periods for a given market. The rationales are tests of selling points, prepared by the television representative or station.

Circle (469) on Reply Card

Marti Electronics

The RMC 15/30 digital remote control features fully digital command and telemetry, single pushbutton channel select, 15 or 30 full-function channels, two status return channels and relay control compatible with Potomac Antenna monitors.

Circle (470) on Reply Card

Matrix Systems

Matrix System Three is designed to manage traffic, accounting and billing functions using the latest programming techniques. A trained computer operator is not required.

Circle (471) on Reply Card

Howe 7000 Stereo Console

In the technological explosion of the 70's, audio consoles became more versatile, better performing, and more complex. And, unfortunately, less reliable.

Repair costs and downtime of electronics are major budgeting considerations for the radio and TV businessman. The actual cost of a console can be five times its purchase price or more over a ten year life.

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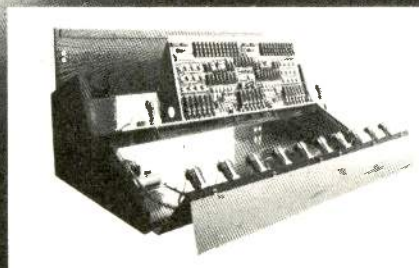

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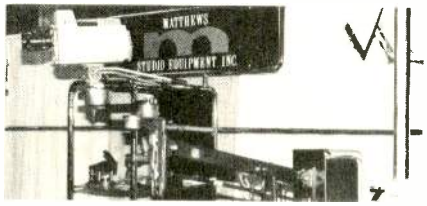
Circle (38) on Reply Card

Matthews Studio Equipment



The Crank-O-Vater is a heavy-duty, lightweight stand designed for HMI, incandescent, Quartz and Arc lights. Both of the unit's risers extend simultaneously. All bearing surfaces are self-lubricated and there is ample storage area on stand pedestal for ballast or grid.

Circle (472) on Reply Card

Maxell

New at the show were the KCA-20-30-60; Beta L250 and L500 and VHS 30-60-90 and 120.

Circle (473) on Reply Card

McCurdy

The SS 8800 modular stereo audio console is a fully modular system providing facilities for the mixing, monitoring and control of audio program material in broadcast or other professional applications. It provides all the basic features of larger consoles in a compact, desk mounting package.

Circle (474) on Reply Card

McMartin

The BFM-8000 FM exciter employs a C-MOS phase-locked direct FM modulator. The unit requires no crystal oven, has remote control provision, includes an internal power supply and features full metering including forward power, reflected power and modulation percentage indications.

Circle (475) on Reply Card

MICMIX Audio Products

The Master-Room XL-305 is an acoustic chamber synthesizer that produces the sound of a live acoustic chamber in a rack-mount package. The unit offers 2-channel stereo capability and is easily switched to stereo imaging of a monaural signal or full mono operation.

Circle (476) on Reply Card

Micro Consultants/Quantel

Quantel DLS 6000 digital library system is capable of resizing, repositioning and combining images allowing production of new images, such as montages, from the library. The DPE 5000/PLUS produces digital zooms, squeezes, flips, flops and other effects performed on five pictures at the same time. The DFS 1750 synchronizer weighs 15 pounds and can be hand-carried in a special attache case.

Circle (477) on Reply Card

Micro Controls

The studio/transmitter link has 10W of RF output power, 2W monitor amplifier in receiver, direct reading forward and reflected power and sub channel injection set on TX front panel.

Circle (478) on Reply Card

Microdyne

The Satro-7M satellite TVRO antenna features 4GHz and 12GHz operation, polarization, azimuth and elevation adjustments, is easy to install and meets FCC side lobe

Now you can completely automate your video tape erasing jobs with Garner's new Video'Raser unit. It's a simple one-step, in-and-out operation. Tapes pass on a continuous belt over high flux coils, giving you tape erasure depth exceeding professional standards. Built rugged and compact, it easily handles video cassettes. You'll also like the Video'Raser's competitive price.

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Circle (88) on Reply Card

regulations. The model 1100-TVR (X24) satellite earth station receiver features 24-channels, frequency synthesizes, no crystals required, local, remote or computer tuning and automatic antenna polarization selection.

Circle (479) on Reply Card

Microprobe

The 100B programmer features reset and float, indicating what the programmer will do when the song being played is finished, timing circuit indicator light, 25Hz cue tone indicator light, source switches, skip toggles and source numbers.

Circle (480) on Reply Card

Microtime

The 1700 time base corrector is designed for broadcast, CATV or industrial TV requirements. It ensures stable performance with a phased color output and will operate in either the heterodyne or 3.58MHz subcarrier feedback mode. The 2520 TBC frame synchronizer features full bandwidth direct synchronizer processing, infinite window time base correction and studio quality picture transparency. The 2525 video signal synchronizer features programmable multi-source synchronizer with synchronous program switching and remote control. The 2080 time base corrector features fully CCIR compatible output with color under input and built-in sync generator.

Circle (481) on Reply Card

Micro-Trak

Sport III sports remote console features electronic rotary dial system. The Ditty Desk is an aduio production-remote system with consoles, turntables, etc. The USA-1 direct-drive turntable features broadcast design, low noise and fast starts.

Circle (482) on Reply Card

Microwave Associates Communications

The Quad-Horn central receive antenna, model QH-360 features 2GHz broadcast band, solid-state polarization/sector switching, low wind loading and low noise preamplifier. Also featured were portable products for 2, 2.5, 7 and 13GHz microwave bands and satellite transmit and receive earth stations.

Circle (483) on Reply Card

Modular Audio Products

The model 4020 is a four channel amplifier. It is capable of delivering up to +20dBm into 75 ohm loads on four independent channels and can be used as a line amplifier. Each channel has a self contained gain control. The models 7821 and 7822 are audio distribution amplifiers. They both feature MAP audio op-amps in a completely transformerless bridging input, differential amplifier configuration. The model 7921 provides eight balanced outputs from one input, the model 7822 provides 16 balanced outputs from two separate inputs. The model 4017 noise generator is capable of providing pink or white noise and can be used for amplifier bandwidth testing, equalizer testing and speaker and room analysis.

Circle (484) on Reply Card

Mole-Richardson

The 1800W Molequartz Teenie-Weenie mole kit consists of a 4-way

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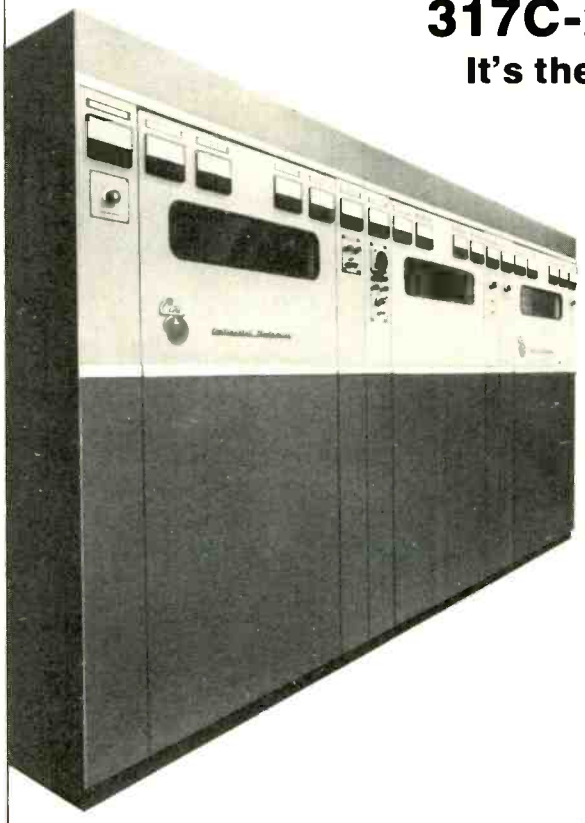

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Let us show you how the 317C-2 50 KW AM transmitter gives you quality sound and superior performance. For information, write or call Continental Electronics Mfg. Co.; Box 270879 Dallas, Texas 75227. (214) 381-7161.

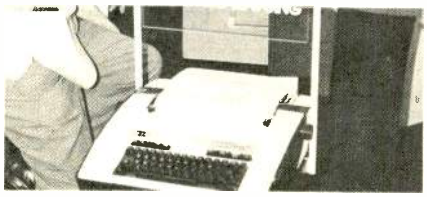
Continental Electronics

Circle (40) on Reply Card

light shield, single moledure scrim-stainless steel screen, 15-foot expansion cable Molepac Litewate stand and carrying case.

Circle (485) on Reply Card

Moseley Associates



The model TCS-2A telecontrol system features fully independent command, status reporting and telemetry capability. The PCL-505A/C aural studio-transmitter link receiver was designed to cope with the problems of a densely populated RF spectrum. RF power amplifiers provide additional power amplification for the company's other systems.

Circle (486) on Reply Card

Motorola

The Syntor FM 2-way radio features frequency synthesizer, broad transmit bandwidth, stability, temperature range, is weatherproof, has solid-state private line squelch, mode select private-line/digital private-line switch and adjustable power output.

Circle (487) on Reply Card

Musicworks

Pop Adult Lifestyle (PAL) is a pop adult format that is programmed with a flexible music mix to blend music of the past 15 years with top hits of today.

Circle (488) on Reply Card

Nady Systems

The VHF wireless system offers quiet operation and wide dynamic range, improved VHF radio transmission characteristics, longer range transmitter design, elimination of null spots and versatility.

Circle (489) on Reply Card

NEC America

Portable helicopter TV relay system, Model TVL-400, has range up to 25 miles at 7GHz and 10 miles at 13GHz.

Digital Mix Effects (DME) system offers full frame sync and features Digital Programmable Control (DPC). System provides: horizontal and vertical flip; a new mosiac effect; repeatable recall; incremental posterization, memory reveal, chromakey tracking; split; field/frame freeze, and much more.

Video processing amplifier, Model TAP-170, is designed to eliminate or compensate transmission line distortion.

NTC-10 Digital TBC delivers 10-bit, 4 times color subcarrier performance and permits locked, broadcastable pictures in slow/fast motion form -¼X reverse to 2X forward.

UHF transmitter PCU-700 uses advanced IC technology and avalanche rectifiers to decrease number and complexity of circuitry, improve reliability.

Compact TAKS-1000 series production switcher employs LSI circuitry for major functions to assure high reliability.

4GHz Direct Satellite Receiver is compact and low-cost, features 4.5m cassegrain antenna and FM demodulator for 5-channel reception.

TI-1000 monochrome TV camera incorporates CCD image sensor for solid-state pickup, S/N is 46dB; power consumption is 4W at 12Vdc.

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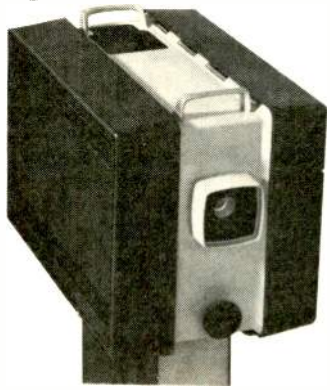

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GENERAL ELECTRIC

Circle (42) on Reply Card

Neve

5432—This console provides for 8-channel, 2-group facilities. The unit features mono facility, auxiliary outputs one and two, left and right monitoring, talkback and test tone generator.

5462—This is a 16-input version of the 5432. Features and options are identical.

5316—This console is a TV sound production console featuring 36 into 8 submasters, into 4 mains. The console includes auxiliary 1-4 with level controls & pre- or post-fade switch, group (submasters) 1-8 with odd-even pan control, solo left and right and pre-fade mono on fader over-press to solo left.

Circle (491) on Reply Card

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Circle (492) on Reply Card

Nidus

The Nidus automated broadcast system is designed to provide service for small to medium-sized radio and TV stations. It handles detailed spot and program orders, rotation

schedules, sales analysis, billing and reports on accounts payable and receivable.

Circle (493) on Reply Card

Nortronics

The QM-250 professional bulk tape eraser completely demagnetizes commonly used professional tapes, accepts cassette, ¼-inch open reel, ½-inch open reel, 1-inch open reel, broadcast/8-track cartridge, ½-inch VHS/Beta cartridges.

Circle (494) on Reply Card

Nova

The Nova block is a universal sapphire tape cleaning device. It is designed to reduce operation costs, oxide build-up, head clogging and dropouts and increase tape life, head life and quality.

Circle (495) on Reply Card

Nurad

The Copter Pod incorporates four circularly polarized directional transmit antennas, a multi-channel transmitter, power amplifier and a multi-channel receiver with downward-looking receive antenna for ground-air-ground relay use. Supertrack facilitates airborne microwave operations by adding to the Superquad II Central ENG/EJ receive antenna provisions. The 70 OR1 Mini-SQ is a compact, circularly polarized antenna for use with 7GHz ENG/EJ systems in transmitting signals from the mobile pickup location back to a central receive antenna. The 70PA5 is a 5W 7GHz power amplifier.

Circle (496) on Reply Card

Nytone

Models TSC-1, TSC-2 and TSC-3 feature broadcast quality color slide reproduction, 80 slide capacity, self-contained, stand alone operation, video AGC, 450 lines horizontal resolution, fade between slide and random access capability.

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Oak Communications

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O'Connor Engineering

The model 102B hydro-ped levels and locks hydraulically on any terrain up to 40° and is four times as rigid as a conventional tripod in torsion and bending, according to the manufacturer.

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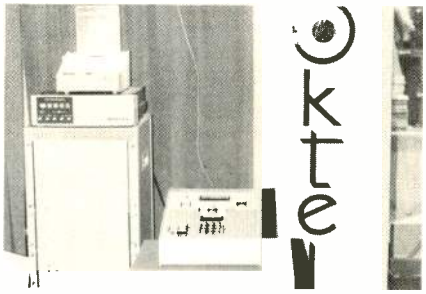


Oktel

The BDR-300 slide file broadcast disc recorder features 122 frame slide storage capacity. It has a digital frame counter, frame playback, preset/reset address control and two buffer channels for program continuity (optional).

Circle (501) on Reply Card

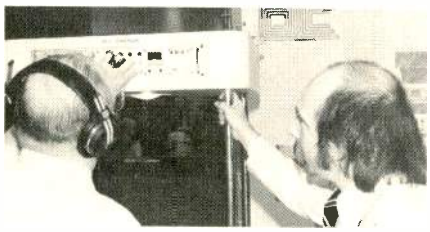
Olesen

Television studio package for 15x20 foot studios are ready-to-install, complete with everything needed to outfit a studio. Packages are also available for 20x30 and 30x40 foot studios.

Circle (502) on Reply Card

Optek

The model 8000 bulk tape degausser adjusts for changes in tape sizes ensuring complete erasure of recorded video and audiotapes in all formats.



Circle (503) on Reply Card

Orange County Electronics

The VS-3/FM stereo processor features a plug-in programming card that contains all the operating parameter adjustments and settings. Programmers and engineers may determine appropriate optimum settings for given formats and distribute hard-wired cards to stations, ensuring consistant performance.

Circle (504) on Reply Card

Orban Associates

The Optimod-FM model 8100A is an audio processing system. It consists of a wideband/multiband compressor that can be ultra-transparent or dense and punchy, a new peak limiter that provides absolute overmodulation control and a newly designed stereo generator.

Circle (505) on Reply Card

Otari

The model MTR-90 is a full capability 24-track recorder, including remote CB-104 session controller. It features 10 memory capacity with full shuttle capability, autorewind, zero search, transport controls and stopwatch. It converts 16/24 version to 24-track and includes eight channels of electronics and 24-track head assembly.

Circle (506) on Reply Card

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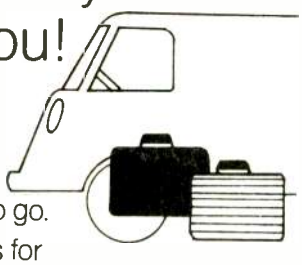

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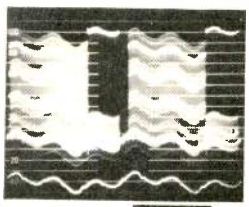

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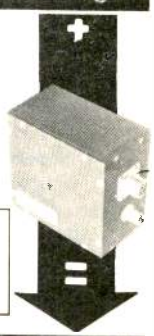

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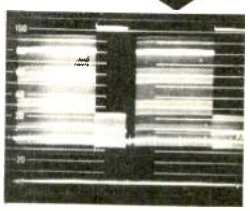

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Circle (92) on Reply Card

Pacific Recorders & Engineering

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Circle (507) on Reply Card

Panasonic

Microphones—The WM-8000 is a unidirectional dynamic microphone. It is equipped with a floating microphone capsule to eliminate shock and noise and triple wind screens to eliminate pops. Nominal impedance is 250 Ω balanced and frequency response is 50-16,000Hz. The WM-8050 hand-calibrated unidirectional dynamic microphone offers floating microphone capsule. Major specifications are: Impedance: 250 Ω. Sensitivity: -77dBm ± 3dB. Frequency response: 50-16,000Hz. The WM-8150 is a slim-styled hand-calibrated, unidirectional back electret condenser microphone designed for miking instruments. Major specifications are: Nominal impedance: 250 balanced. Sensitivity: -74dBm ±3dB. Frequency response: 20-20,000Hz. Technics R&B Model SL-1015 is a turntable system made up of a quartz synthesizer direct-drive turntable, anti-resonant and acoustically deadened turntable base and new tonearm system design. The R&B Series Model SL-9560 is a stereo (or mono) phono disc reproducer featuring a quartz-phase-locked direct drive motor, a tonearm with dynamic damping and anti-skating and control facilities.

Circle (508) on Reply Card

Pep

The Modulery electronic ballast for HMI lighting is fully solid-state, has no flicker, is portable, insensitive to mains variations and mains frequency, allows hot-restriking, allows brightness control and increases lamp-life.

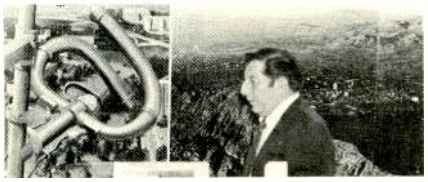
Circle (509) on Reply Card

Perrott Engineering Labs

The Perrott Equalizer is fully automatic, portable and lightweight. It extends operating time of batteries and extends life expectancy of cells.

Circle (510) on Reply Card

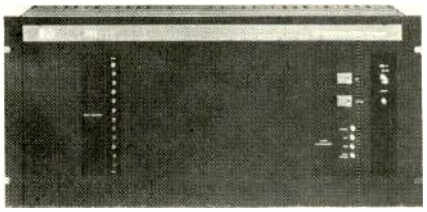
Phelps Dodge Communications



A series of Super Power circularly polarized FM broadcast antennas use a minimum number of bays. All antennas are precisely cut and matched at the factory. A fine tuner is supplied for final matching of the antenna after installation.

Circle (511) on Reply Card

Philips



Triax Repeater—This unit, designed for use with the Philips LDK-5 and LDK-5B triax cameras, is a compact amplifying unit that eliminates picture degradation in triax cable lengths of up to 18,000 feet.

Digital Automatic Noise Reducer—The LDM 3001 digital automatic noise reducer is completely automatic and will process signals with noise reduction at the optimum level without operator supervision.

Video Production Van—The Video 80 self-contained production van makes maximum usage of the compact design common to Video 80 equipment. It includes two cameras, a triple CRCU, video production switcher, audio mixer and monitoring equipment.

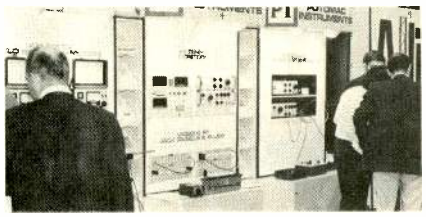
Circle (512) on Reply Card

Pinzone Communications Products

The RCD-100 reflex/command diagnostic system for the RCA TCR-100 monitors logic of TRL, MRL nests and has a display that contains 216 LEDs. It is used as a preventive maintenance tool, an alignment tool, a diagnostic system and a maintenance tool.

Circle (513) on Reply Card

Potomac Instruments



The DX-51 is a low distortion AM detector for AM proof of performance measurements. The IX-51 balanced to unbalanced audio transformer features low distortion, excellent frequency response, switch selected line termination. The DAP-II directional antenna processor is a microprocessor-controlled parameter scanner with auto log option. The SMR-II synthesized monitor receiver (AM) is a crystal controlled high fidelity, AM-receiver with switch selectable bandwidth. Desk and rack mount are available. The ATC-51 transport case is a fiberglass, reinforced shipping case for AT-51 audio test equipment.

Circle (514) on Reply Card

Power-Optics

The Grafikon TV light meter is a lightweight meter for checking white levels on color or monochrome monitors and receivers. It has two ranges calibrated 0 to 10 fL, operated by the Low and High pushbuttons respectively.

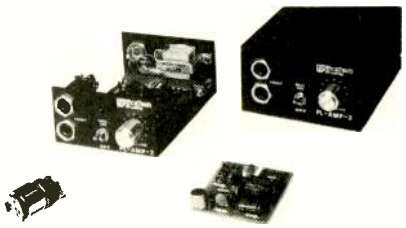
Circle (515) on Reply Card

Procart

The Procart broadcast cartridge exceeds NAB type AA cartridge standards and has a unique bridging design for optimum tape guidance system.

Circle (516) on Reply Card

Protech Audio



The DA1521 audio distribution amplifier features 14 outputs at +20dBm/channel, is self-contained and 1 ¾-inch rack-mounted with power supply. The PL-AMP-2 headset intercom works with low cost telephone type headsets and operates at 9-24Vdc. The RS1000 "rotary-slider" attenuators have conductive plastic elements, sealed against dust, dirt and liquid spills.

Circle (517) on Reply Card

QEI

ATS exciters; stereo generators; FM and SCA monitors.

Circle (518) on Reply Card

QSI

TV demodulator—The DEMOD 40 is a broadcast TV demodulator that uses the latest state-of-the-art technology to convert VHF and UHF TV signals into video and audio.

Countdown Generator—The VT-10 Video Leader Countdown Generator provides video and audio tape cueing information at the head end of each program segment.

Circle (519) on Reply Card

Q-TV Telesync

Micro monitor prompter system.

Circle (520) on Reply Card

RCA Electro Optics & Devices

Improved Saticon tubes; power tubes for TV and FM.

Circle (702) on Reply Card

RCA Broadcast System

The TR-800 1-inch VTR features fully servoed tape handling, 2-hour

reel capability, fast locking, fast acceleration/deceleration. The Supertrack for the TR-800 recorder features 1/5 to 2x play, broadcastable pictures, frame-by-frame jogging and frame accurate control.

The TBC-8000 TBC for the TR-800 is fully digital, has six point surround DOC and digital chroma converter. The MRVC for the TR-800 is for slow motion and instant replay control.

The AE-800 editing system features time code editing full "C" format and is implemented for special effect editing.

The TK-29 is a new series of photoconductive telecine cameras. The units will be mechanically interchangeable with the RCA TK-27 and TK-28. The camera will be available with a choice of 25mm vidicon and saticon tubes, or 30mm lead-oxide tubes with integral bias light.

BC4391/18mm, BC4396/25mm and BC4397/30mm saticon camera tubes feature design characteristics that bring the target contact out through a pin in the faceplate, resulting in low output capacitance and low noise. They also feature a new lag photoconductor that operates at 65 volts.

The TCL-12A is a lower gain Tetra Coil circularly-polarized TV broadcast antenna for VHF/channels 7-13. The antenna produces a power gain of approximately five in each polarization.

The TTG-50H is a 50-kilowatt VHF transmitter for highband (channels 7-13) TV stations using circularly-polarized signals and for other broadcast applications requiring high power.

The BTA-5SS is a five-kilowatt solid state AM transmitter. The tubeless high powered transmitter is scheduled to reach first customers early in 1981.

The TK-780 stuido/field production camera features Triax, remote black balance and joystick control.

Circle (521) on Reply Card

RF Technology

The QA-4 four quadrant automatic, steerable ENG on-camera antenna is a 3-inch cube, weighs less than 15 ounces and has 6dB gain. The PA-215 2GHz power amplifier features lightweight, low current draw (3 amps at 28Vdc) helicopter/aircraft operation. The 7GHz microwave systems WTR-7 features state-of-the-art performance, requires only 5¼-inch rack space and is self diagnostic. The WTR-13 13GHz microwave system has 20 channels optional, 16 poles of filtering and ac/dc operation.

Circle (522) on Reply Card

RKO Tape

Line of custom label, standard label and unlabeled blank audiocassettes.

Circle (523) on Reply Card

RTS Systems

The TW intercom system is a high performance, closed circuit intercommunications system designed for use in entertainment and industrial operations. The system can be custom arranged from a variety of user

Are You Into Tape to Tape?

SIGMA Video Processing Amplifier with SIGMA Genlock Sync Generator is your solution to tape production.

- Inserts NEW sync and burst. Does not merely stretch and clip.
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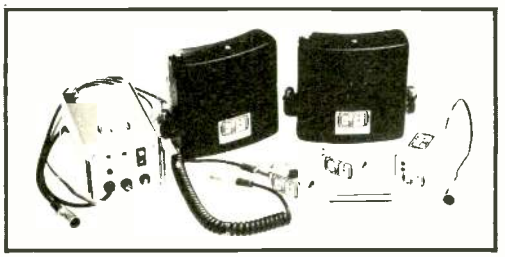
Circle (93) on Reply Card

MOVE INTO THE 80'S WITH A SYSTEM THAT IS ALREADY THERE . . .

The New G&M Nicad Energy System!



HERE'S WHAT IT DOES:

∓ The basic unit powers any 12-volt film or video camera.

∓ Need more light, running time or higher voltage for high speed cameras? Double 'em up with G & M supplied cable; connect two units in parallel for more power or in series for 24-volt cameras such as the new Arri III.

∓ The high density Sanyo ni cads used will deliver 4, 7, 8 or 14 amp/hrs.!

∓ Charges it three ways: with its own 16-hour built-in charger, with our optional ½-hour solid state fast charger, or with our external trickle charger.

∓ The G & M battery will run your Arri 16SR, 16BL, 35BL, Eclair NPR, ACL, Hitachi FP3030, FP1020, SK90, JVC 4400U, Sharp XC530, XC320U, Ikegami HL77, HL79, RCA TK 76, Toshiba PK39, Panasonic, Sony and Philips video cameras.

∓ Comes with handy built-in belt loop and heavy duty belt with velcro closing for easy portability. Or wear it over your shoulder with a snap-on leather shoulder strap.

∓ All our products are unconditionally guaranteed: battery housing, 5 years; cells, one year.

You can't buy a longer lasting or a better energy system. Call or write today!

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Circle (94) on Reply Card

stations, wall mount stations, console mount stations and a special plug-in card for TV camera use.

Circle (524) on Reply Card

Ramko

The PhaseMaster series is a complete system for recording, playing and duplicating cartridges and cassettes. Standard features of the tape cartridge include automatic real-time phase shift error correction, automatic switching of record/playback, encoding/decoding and simple duplication, cart-to-cart cart-to-cassette and cassette-to-cart. Features of the cassette include front panel switch-selectable inputs and illuminated pushbuttons and 25 Hz tone generator for possible future automation use.

Circle (525) on Reply Card

R-Columbia Products

FM wireless intercom headphones that feature 2-way intercommunication without wires.

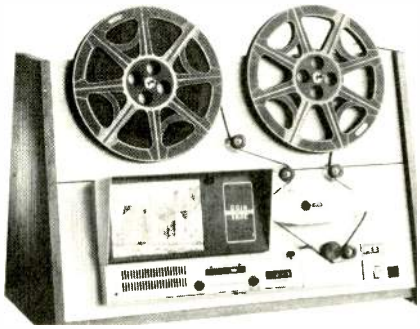
Circle (526) on Reply Card

Recortec

The RTI is a recorder TBC interface to complement the portable HBU-4400. The unit allows the portable HBU-4400 to play back direct highband color signals through a time base corrector.

Circle (527) on Reply Card

Research Technology



The Cinescan 16mm film previewer provides a 48-square-inch screen, bright halogen lamp and 16 sided crown glass prism. The VIM-530 videocassette inspection machine provides video libraries/distributors with an effective way to check their videotapes for defects and damage.

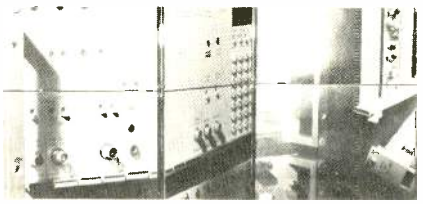
Circle (701) on Reply Card

Rockwell International

The 828C-1 Power Rock One is a 1kW AM transmitter. It offers overall efficiency exceeding 43% at 95% modulation and harmonic distortion is less than 2.0% from 20 to 10,000Hz.

Circle (528) on Reply Card

Rohde and Schwarz



Digital video and color noise meter UPSFZ features full field and VIT measurement, and spot selection. The SPFZ digital video test generator and test line inserter has 32 test signals digital processed, including VTR and color noise signals. The TV Precision monitoring demodulator EKF2/D offers high level precision demodulation, channel 2-74. Barco CTVM 3 series precision color monitors; Barco CD 3NTSC5 super comb filter decoder system that eliminates all interference normally found in decoders.

Circle (529) on Reply Card

Ross Video

The RVS-514 video production switcher features 12 or 20 inputs, multi-level effects unit, quad split, analog key borders, editor interface and digital effects.

Circle (530) on Reply Card

Russco

The MA 220 Monitor Amplifier is a dual-channel utility hi-fi amplifier with separate gain controls as well as separate tone controls.

Circle (531) on Reply Card

SWR Inc

Coax inner conductors can upgrade a system at one half the cost of new transmission line. K-Line coax flange cannot pinch teflon or O ring. It is self-aligning without the aid of alignment pins. Three-part coax switch is one half the cost of a motorized switch with built-in interlock.

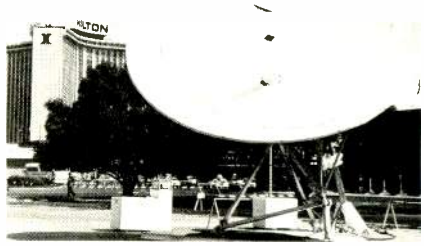
Circle (532) on Reply Card

Saki Magnetics

Manufacturers of laminated, hardtipped and hot pressed glass bonded ferrite magnetic heads.

Circle (533) on Reply Card

Scientific Atlanta



The model 8572 earth station features easy access to several satellites now carrying TV programs. The antenna can be pointed by simple manual adjustments that can be made by non-technical station personnel. A 3-meter antenna is also available.

Circle (534) on Reply Card

Sescom

The model ENG-1 field mixer is designed for use in remote broadcasting and sound reinforcement systems. The unit has three channels: two low impedance transformed-balanced microphone inputs and one 15k Ω bridging transformer-balanced output. The model MB-1 field mult-box is designed for broadcasting and sound reinforcement during press conferences.

Circle (535) on Reply Card

Sharepoint Systems

The Upstart is a compact, tabletop broadcast cartridge recording machine controller/timer used in a production room. It easily connects to the station's turntable and recording cart machine. It features a large, high-intensity timer display providing elapsed time indication of various program segments of the recorded cartridge.

Circle (536) on Reply Card

Sharp

The XC-700 features three bias lighted saticon tubes, prism optics, auto white balance with memory, H and V enhancement, dynamic beam optimization circuit, filter wheel and adjustable blanking. Specifications on the camera include 52 dB signal-to-noise and 500 lines horizontal resolution (center).

Circle (537) on Reply Card

Shintron

New for the company is the model 375 super switcher.

Circle (538) on Reply Card

Shure Brothers

The SM18 Lo-Profile Dynamic Microphone is a high-quality microphone with a color-coordinated foam enclosure and matching cable.

The Model SC35C Professional Studio Phono Cartridge is designed for use on the heaviest and most rugged tone arms that require a tracking force of four to five grams.

The SM63 Omnidirectional Dynamic Microphone is smaller and lighter than microphones with similar performance features. The unit features a hum-bucking coil that is effective in reducing the strong magnetic fields often found in broadcast situations.

Circle (539) on Reply Card

Sigma Electronics

The genlock sync generator: CSG360, RS-170A, full genlock to helical VTR, full dc restoration, blackburst output. Genlock sync generator with color bars: CSG365 color bar output, front panel test points. Blackburst generator BBG 140: four blackburst outputs, three sync outputs, three blanking outputs three subcarrier outputs. Audio distribution amplifier ADA 105: one in one out, +22dBm each, ± 0.1dB 20Hz-30kHz.

Circle (540) on Reply Card

Sintronic

The SI-A1T 1kW AM broadcast transmitter with 1200W output capability is completely solid-state up to the high level RF amplifier and modulator stages, which employ a single tube type, the 4-500A. The tubes are readily accessible through a hinged front panel, which includes an observation window for in-service visual inspection.

Circle (541) on Reply Card

Skirpan Lighting Control

The Cuelog Models 36, 72 and 108 are memory lighting control systems with full manual for composition or back-up use, separate monitor, 12 submasters, mini floppy and print option.

Circle (542) on Reply Card

Skotel

The model PTC-100 portable time code generator reader provides a source of time code for field production. A reader with Jam sync capability is included to enable several units to be synchronized together in the field. The unit is powered by four size AA cells that will provide for about five days of normal operation. An external source of six to 12Vdc may also be used.

Circle (543) on Reply Card

Soll

Computerized remote/local control systems; auto-logging and RF switching equipment.

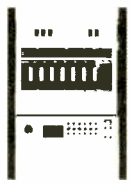
Circle (544) on Reply Card

Sono-Mag

The ESP-1-T automation programmer with full video is capable of fulfilling all system needs of most stations. It is flexible, expandable, simple to learn, and operate. The system is "custom built" to individual station specifications and the configuration of source equipment, based upon format, is designed to interface with the programmer package without individual source cards.

Circle (545) on Reply Card

Sony



Microphones—A line-up of four cardioid dynamic microphones: The F-520 for vocal and instrument reinforcement; the F-420 for public address and recording applications; the F-400A designed for pop and rock vocals; and the F-320A, useful in a wide variety of applications.

CVM-3000 30-inch Monitor—a 30-inch Trinitron with velocity modulation. Features include an all electronic tuner with station memory, a triple function LED indicator and audio power amplifier for external speaker.

Digital Video Multi-Processor—The DVMP processes video signals in a variety of methods. Its features include improved noise reduction, frame synchronization, freeze frame, color correction and improved image enhancement.

Circle (546) on Reply Card

VIDEO ENGINEERS

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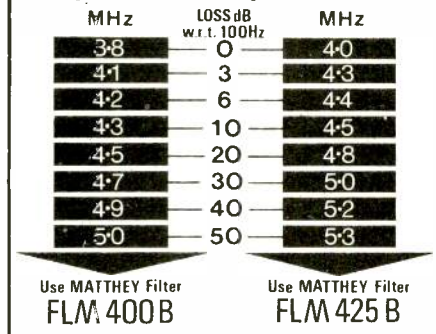

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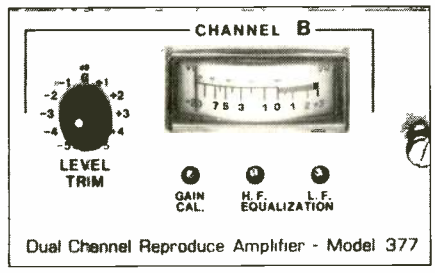
Circle (112) on Reply Card

Bring automated sound to life.



Dual Channel Reproduce Amplifier - Model 377

The Inovonics 377 Dual-Channel Tape Playback Pre-amp adds new life to radio automation system sound. You can expect high stability, low noise, and wide-range response—with new or existing installations.

Model 377 works with a variety of tape heads and transports, and is pin-compatible with older Ampex and Schafer equipment.

Bring automated sound to life. Call or write today for details.
Model 377—$395.

Inovonics Inc.
503-B Vandell Way
Campbell, CA 95008
(408) 374-8300

Circle (95) on Reply Card

Sound Technology

The model 1500A tape recorder test system can allow automatic measurement and display of frequency response, 2nd and 3rd harmonic distortion vs. flutter, wow and flutter spectral components and noise and noise spectrum.

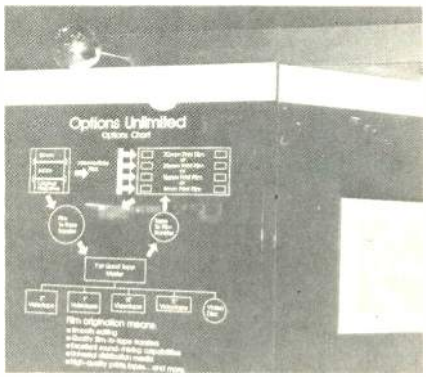
Circle (547) on Reply Card

Sound Workshop

The series 30 recording console is a fully modular control center with a signal flow that is straightforward and logical. Features include three mainframe sizes that accommodate from 8-36 inputs, active balanced microphone preamplifiers, comprehensive control room/studio master module and others.

Circle (548) on Reply Card

Spin Physics



Refurbishing service for Mark X, Mark SV and RCA high band panels, with installation of its proprietary hot-ferrite video heads.

Circle (549) on Reply Card

Stainless

Whoa is a combination snubber and damper system that controls guys independently to control low frequency vibration. It absorbs the dynamic energy of each guy cable and stops the galloping in its early stages.

Circle (550) on Reply Card

Stanton Magnetics

The 310 professional phono preamplifier/equalizer is designed to correctly interface all Stanton and selected magnetic phonograph cartridges for optimum playback of disc records and calibration of audio systems. The Dynaphase 55 combines samarium cobalt drivers with a lightweight padded headband. It features open-audio design allowing music enjoyment with environment isolation.

Circle (551) on Reply Card

Station Business Systems

8800/Votes is a combined effort of 3M Mincom division and Stanton Business Systems division of Control Data Corporation. The unit incorporates an 8800 character generator from 3M and a complete election reporting program from Stanton Business Systems.

Newscom is a computer system designed exclusively for the broadcast newsroom. It is custom designed to be totally broadcast oriented. It handles assignment desk functions, news program production, script writing, editing management reports and much more.

Circle (552) on Reply Card

Storeel

High-density storage systems.

Circle (553) on Reply Card

Strand Century

The MiniPalette memory lighting control system is compact for smaller TV studios. The Flying Spot telecine transfers film to video with T.O.P.S.Y. for color correction. Ianiro HMI Fresnels are high intensity, daylight sources that are lightweight, portable and economical. The Bambino line of Ianiro are lightweight compact 2kW, 5kW and 10kW Fresnels.

Circle (554) on Reply Card

Studer Revox America

A80/RC MKII—A mastering/production recorder, for heavy-duty applications, is available in a wide range of head configurations, including a mono/stereo version.

B67-1PNVU—A neopilottone machine with built-in resolver. The recorder/reproducer is a studio deck for mastering and production but is fully compatible with a Nagra.

Circle (555) on Reply Card

Swintek

The MARK 50A/dBS/ENG Lavalier Transmitter is equipped to accept a variety of audio inputs including electret or dynamic microphone and high impedance instrument inputs.

The Mark Q and Q/dB-S receivers provide portability and battery-powered operation that are especially useful for cueing, bi-lingual remote listening, recording, amplification for hard-of-hearing or any other one-way communication.

Circle (556) on Reply Card

System Associates

Brokers of used television equipment whose services include free listing of equipment wanted to buy or sell in a flyer sent to thousands of television professionals throughout the country, retaining listing for as long as it takes to fill needs.

Circle (557) on Reply Card

System Concepts

Quantafont teleproduction graphic titler is a microcomputer-based teleproduction graphic titler with all display features self-contained for studio, remote and mobile applications. Includes downstream video matte with color lock and genlock.

Circle (558) on Reply Card

Taber

The Taber amp is designed to provide complete flexibility in updating existing electronics for professional recorders. It allows existing Ampex or RCA in VTR recorders to be used for stereo audio with Taber manufactured heads.

Circle (559) on Reply Card

Tape-Athon

Automatic background music systems for broadcasting wire service or CATV transmission.

Circle (560) on Reply Card

Tayburn Electronics

Helicopter/autotracker is a news gathering system. The autotracker delivers broadcast quality pictures, line of sight at ranges in excess of 100 miles. The tracker will lock up with a van or helicopter.

Circle (561) on Reply Card

TEAC

The Airborne Videocassette Tape Recorders were specifically designed and built for airborne and other rugged environments.

Circle (562) on Reply Card

Technics

Professional amplifiers; preamps; equalizers; tuners; turntables; reel-to-reel decs; speakers; and phase-locked, direct-drive stereo cassette deck.

Circle (563) on Reply Card

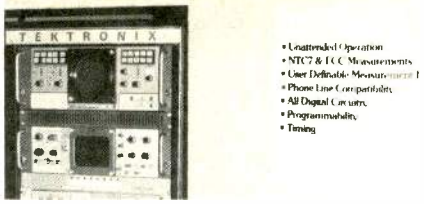
Technology Service

The RRS-35 and RRS-30 are remote color display systems for weather radar. The CRR-80 is a color radar repeater. The ISR-79 is an in-studio remote select unit.

Circle (564) on Reply Card

Tektronix

The 1980 ANSWER is an automatic measurement set offering total video



test capabilities. It is programmed to make both NTC 7 and FCC measurements on all industry standard VITS and full field signals. The 492 spectrum analyzer has a frequency range that can be moved up to 220GHz with commercially available external mixers while lowest characterized frequency of 50kHz is maintained. The 308 Data Analyzer is the first instrument to combine the capabilities of a state and timing logic analyzer, serial data analyzer and signature analyzer into one instrument. The 465B44 portable oscilloscope/DMM is a 100MHz, dual trace delayed sweep scope with a bright 8 cm x 10 cm CRT.

Circle (565) on Reply Card

Telemet

Special emphasis was placed on the RF synthesizer, thermal equalizer and routing switcher, fiber optics with sound and the 3710 broadcast demodulator. Other new products included the 3709 sideband/spectrum analyzer, 3310 video distribution amplifier, 3315 video distribution amplifier with clamp and equalization, 3320 pulse distribution amplifier, 3325 pulse distribution amplifier with variable delay and the 4210 fiber optics transmitter and receiver.

Circle (566) on Reply Card

Television Equipment Associates

The Elcom Magnetek tape cleaner/evaluator for ¾-inch videocassettes features illuminated display of dropouts and damages. BCA intercom system features custom production of up to 16 station systems. BCA Wireless IFB receiver cues on camera talent. TWIP is a newscaster wireless earphone for cueing. BCA IFB system is a 5-channel IFB.

Circle (567) on Reply Card

Television Technology

The XLFM series 1 and 10W FM translators feature distortion-free, spurious-free, overload-proof stereo monitoring. The translators combine state-of-the-art and field proven technology to meet requirements. Options include: special metering, frequencies, multiple inputs.

Circle (568) on Reply Card

Telex

Headset intercom system—The Audiocom closed circuit headset intercom system consists of a switchboard, intercom stations and speaker stations plus a variety of accessories. Adaptable to both small and large installations, the unit can be used for distances up to five miles with minimal system noise and no RFI/EMI.

Circle (569) on Reply Card

Tentel

Spindle height gauge—The U-Matic Spindle Height Gauge for measuring the critical spindle height on U-matic Video recorders prevents tape edge damage caused by the improper height of the spindles that support the tape reels within the cassette.

Circle (570) on Reply Card

TerraCom

The TCM-6 microwave radio is designed for use in STL, ENG, TV pickup and similar applications. It is frequency agile across all common frequency bands from 1.7GHz to 15.3GHz, and is available in tripod, rack and remote RF unit configurations.

The TCM-5 microwave radio is a compact, lightweight unit designed for airborne and mobile applications. It operates at any frequency from 1.7 to 15.3GHz, resettable with built-in test facilities.

The THP-2T20 digital program channel multiplexer combines four high fidelity 15kHz program channels to produce a 1.544Mb/s data stream for transmission over microwave radio or cable. Signal-to-noise ratio is better than 75dB. Rackmount and portable configurations and various interface options are available.

Circle (571) on Reply Card

Thalner

The Model 20 Video super screen splitter inserts a rectangular section of one video picture into another. The model 40 video quad splitter is four cameras on one monitor. The model VM-516 has adjustable size and position, is color or monochrome compatible, has multiple line messages and programmed character flash. The TD-414 video time and date generator features convenient front panel, fingertip controls for position and intensity and internal calendar logic that adjusts for correct days and months.

Circle (572) on Reply Card

Thermodyne

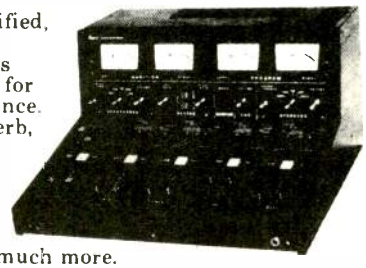
Cases for shipping, demo and rental.

Circle (573) on Reply Card

Thompson-CSF

Microcam MC-601—This camera

If you standardize on Logitek. . . you don't have to standardize!



You can choose from the largest, most diversified, most flexible line of consoles in the industry: more types, more options, more configurations than you can get *anywhere* else, all designed for unsurpassed quality, reliability and performance. Choose up to 24 inputs plus optional EQ, reverb, monitor amps, digital clocks & timers, all at surprisingly low prices!

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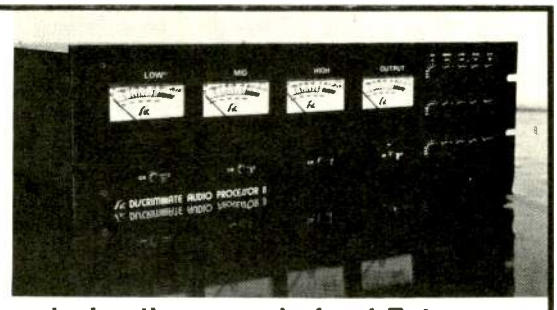

More stations are using our device than ever before! Extreme flexibility and clean sounding! Definitely a proven performer.

Applied Technology Corporation—27106 46th S. Kent, WA 98031 (206) 854-4486

Circle (151) on Reply Card

features F/1.4 prism optics with built-in infrared filter, quartz filter and bias lighting. Other features include digital automatic white and black balance and two-line image enhancement.

Thomson-CSF Broadcast

1525 color studio camera, the main event of the show presentation.

Circle (574) on Reply Card

Thomson-CSF Electron Tubes

Super Noticon, 16mm high, sensitive camera tube; 100W TWT for direct satellite broadcast.

Circle (575) on Reply Card

Thorn Lighting

CID is a compact source lamp for television and studio lighting. The arc tube, which has a silica body, uses a single pinch to position the electrodes 14mm apart. It is filled with a combination of mercury with tin and indium halides, chosen to produce a spectrum closely resembling that of daylight at 5500K.

Circle (576) on Reply Card

3M

The D-4500 random access character generator memory unit allows pre-programming of up to 100 program steps. It is for use with 3M's D-2000, D-3000 and D-3016 character generators.

The Machine Control System is available for use with the 3M model 6500 microprocessor controller. It offers remote manual, semi-automatic and automatic control for videotape recorders, slide/film islands, audio machines or any other devices requiring contact closure for operation.

Circle (577) on Reply Card

3M Magnetic Audio/Video Products Division

The Color Plus ¾-inch videocassettes feature a magnetic coating and backing combination that reduces friction and tape path guide problems in misaligned recorders.

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360 Systems

The Programmable Parametric equalizer stores and recalls 28 sets of EQ curves and level settings from its own internal memory. It gives instant access to the special sounds to be organized into sequences for mixdown.

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Tiffen Manufacturing

Star Effect Filters are engraved and can be used to achieve desired effect. They are supplied in direct screw-in, square and rectangular sizes.

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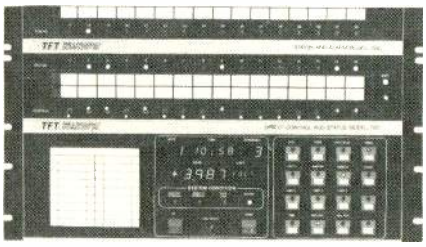
Time and Frequency Technology



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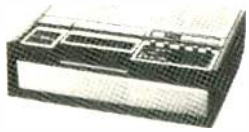

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(2) Sony VO-2850A with Convergence ECS-1/TT-4 ..... $8,995.00
(2) Sony VO-2860 with Convergence ECS-1B/TT-5 ..... $12,500.00
(1) Sony VO-3800 (reconditioned) w/new Sony color camera DXC-1600 ..... $2,995.00
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and telemetry can be effected at either studio or transmitter site as well as display of time, site, channel, data, units and self-test status indicators.

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Toshiba

The PK-40A is an automatic camera where all control operations are performed by a built-in computer and stored in non-volatile memory. Either Triax or multi-conductor cable may be used with appropriate plug-in units at the camera head and CCU.

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Townsend Associates

Tetron UHF transmitter series combining high performance of klystrons for visual power with economical tetrodes for aural amplification.

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Trans-American Video

Laser transmitter/receiver—Low-power lightweight transmitter and receiver for audio and video at network specifications is designed for cableless camera in inaccessible areas.

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Tri Tec Systems

Series 6000 production and on-air consoles are totally modular with a wide range of module and cabinet configuration to suit various requirements. The series 7000 audio crosspoint switchers feature various configurations; range of console or rack mounting control stations including key pad types with digital readout and preselects on application. The series 8000 intercommunication system features various configurations; range of control stations including touch tone interconnect, priority logic, conference, restrictions etc. The model UA500 universal line amplifier features plug-in card; 3 winding output transformer, +30dBm output.

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Tweed Audio

The RP1603 broadcast console is designed for small radio stations. It has been specifically developed to meet the requirements of the broadcaster. The input sensitivity is provided by the first amplifier and rest of the mixers within the console operate at -4dBm level.

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UMC Electronics

Professional Beaucart line of cartridge tape machines and accessories; Monitor II and Beau Pro console.

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UREI

The model 546 dual parametric equalizer features two independent channels in one package. Four sections of parametric equalization in each channel are continuously variable in bandwidth, frequency and boost and cut and bypass switches for both channels and each parametric filter section. The model 1178 dual peak limiter features two independent peak limiters with perfect tracking when used in stereo mode and attack time front panel adjustable from 20-800 us.

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US JVC

The VM-1200 is a magnetic videodisc recording system designed for broadcast, industrial, medical and educational applications. It can record a signal and immediately play it back at normal, variable slower speeds, still-frame or frame-by-frame shifting—all in forward and reverse.

The CP-5500U has a signal-to-noise ratio of more than 48 dB and a horizontal resolution of 330 lines monochrome and 240 lines in color.

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Ultra Audio Pixtec

Audio mixer—The AMA41 is a 12V (internal/external) battery-powered studio grade ruggedized audio mixer with four microphone positions, 1kHz audio tone and standard VU meter.

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Unarco Rohn

Solid leg guyed towers have solid rod legs to give more strength and less bulk, continuous solid steel zig-zag cross bracing and are available in three sizes.

Circle (591) on Reply Card

United Research

Auto Sense tape sensing device prevents tape spillage and tearing. Manufactured for all tape machines

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not having this safety feature.

Circle (592) on Reply Card

Unitel

The Scriptel V microprocessor-controlled compact character generator features compact and stand-alone system, can be adapted to any TV standard, has dynamic transfer (2-speed crawl and roll), and internal 16-page memory.

Circle (593) on Reply Card

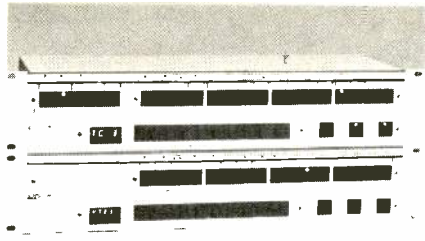
Ursa Major

Space Station SST-282 digital reverberation and multi-tap digital delay system is a versatile, moderate cost reverberation and delay effects for on-air and production.

Circle (594) on Reply Card

Utah Scientific

Eight new party line control panels feature loop-through coax control connection and true cross-point status readout. Also exhibited were large-matrix switchers available in standard configurations to 150x150 audio/video. In conjunction with these large matrices a new power supply system, featuring multiple fused outputs, and automatic



scanner/failure alarm system and full redundancy was also introduced.

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Utility Tower

The company manufactures FM, AM, CATV and microwave towers.

Circle (596) on Reply Card

Thomas J. Valentino

Services include video services, production music library, sound effects library, videostockshots library and audio services.

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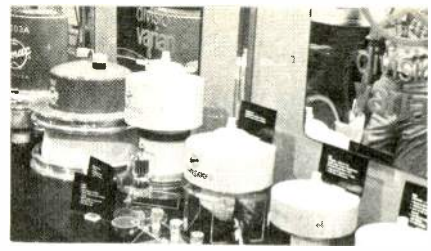
Varian

Varian featured four energy-saving amplifier tubes for UHF-TV transmitters, a series of high-power ceramic metal tetrodes and triodes for a broad range of audio, AM/FM broadcast and television applications, power-amplifier capacity as-



semblies for high performance FM/TV broadcasting, amplifiers for commercial satellite communications and a portable test set for measuring high-power Klystron performance.

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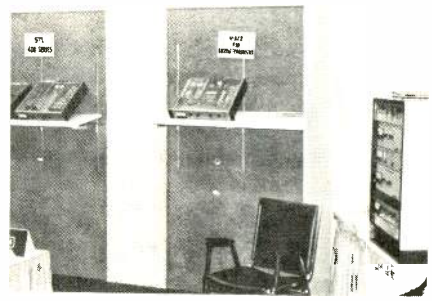
Versa-Count



The model MM-80-P FM modulation monitor has ultra-linear phase-lock-loop circuit to ensure low intermodulation distortion for the best low noise stereo performance. The model LA-150 RF power amplifier combines low cost with high performance, is all solid-state and may be driven to full power with any 10W FM exciter. The 400 series studio transmitter links have been designed to provide high-quality continuous duty RF links between studios and transmitter as well as inter-city connection.

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Video Aids of Colorado

SCH and VIRS meter; video distribution amplifiers; adjustable H&V sync generator.

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Video Data Systems

The T-1024 series, T-1024S PAL microprocessor-based titler has full cursor control, program insert key, 10x14 character matrix and LED display indicating page number.

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Videomagnetics

Offers all head refurbishing services except Mark XX. Tip size variations, user oriented warranties, as well as both RCA and Ampex low to high band conversions are among other services offered.

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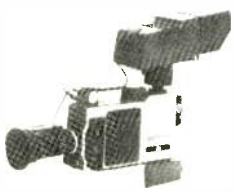

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high s/n and low chroma noise are indicative of quality.

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Videomedia

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Videotek

The TSM-5 waveform monitor features 5-inch CRT displaying video waveform including two field display NTSC or PAL operation, horizontal time base selection, RGB or YRGB inputs, 100% solid-state and available as a portable or rack-mount unit. The VM-5PR and VM 5PT 5-inch professional color monitor in both portable and rack-mount configuration. The VM-17PR professional 17-inch color monitor has individual gun switches, background and drive controls, chroma on-off, pulse cross and underscan options and is rack mounted.

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Viscount

The 1107 special effects amplifier allows any of the standard effects to be generated, through a combination of two or more of the eight standard patterns. Numerous non-standard effects can be performed by combining square and diagonal patters.

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Vital

The VIX-115-5 series ON AIR switching system has been designed to permit a single master control operator to air complex ON AIR programs and station breaks.

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Ward-Beck

The T1202 transportable audio console has 12 inputs, two master outputs, auxiliary output and two monitor outputs. The M605A distribution amplifiers have 4/8 outputs, are self-powered and are actively balanced. The M608A distribution amplifiers feature 8 outputs, are self-powered and have +18/-6dB gain, transformer input and outputs.

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Weathermation

Real-Time weather information system is a computerized system that allows access to data bases of weather information around the world by dialing local telephone numbers in over 200 US cities and 26 foreign countries. MediaWeather audio services offers over 2000 live and taped broadcasts now being provided to over 100 radio stations each week.

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Weather Services International

The Real-Time weather information system contains an extensive set of maps of the world. The maps are designed with simple graphics so that they will work on any type of alphanumeric terminal, both video and printing types. The system supports more than 100 types of terminals, allowing WSI clients to select the one that best suits its needs: video or printing, 300 or 1200 baud.

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Wilkinson Electronics

The FM-30 30,000E 30kW FM transmitter features maximum efficiency and accessibility in a no frills, low-cost package. The FM-250SS is an all solid-state FM transmitter. The DLA-25 is a 40kW AM dummy load with accurate power measurement. The BPF-10 10W monitor amp features low distortion, 20Hz/20kHz 0.5dB response and a single IC.

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Winsted

The versatile production console is of modular construction design that allows for rearrangement to fit working requirements.

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Wolf Coach

Capabilities include vehicle selection, structural modifications, design, engineering, consoles, custom-built racks, and erectable masts.

The quick-release camera saddle enables quick changeover from base plates in any mobile unit.

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World Tower

Total tower systems and services.

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World Video

The CR 1700 17-inch color monitor features keyed back porch clamp, switchable dual inputs, selectable underscan/normal scan, internal/external sync, manual degauss and front panel controls and components.

The PWI/H pulse width indicator accurately measures horizontal and vertical blanking intervals for FCC compliance, may be used with a WFM or picture monitor and requires no modifications to other equipment. □

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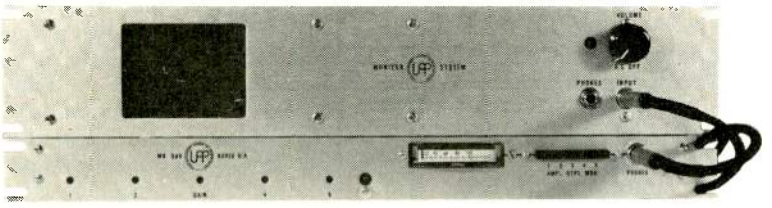
The Rackmount Monitor You've Always Wanted

3 clean audio watts from a -20dbm line • only 2 rack-units (3.5") height • transformer input • headphone disconnects 'speaker • input front & rear • smooth response.



AM3 shown patched to monitor the outputs of the incredible **MR5x5** audio D.A. offering 5 5-output transformer-coupled line amplifiers (5x5) in but 1 rack-unit space.

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Radio Workshop Highlights at NAB '80/Las Vegas

By Bill Rhodes, editorial director; Brad Dick, chief engineer, KANU, and contributing editor; and session moderators.

The schedule of radio workshops at NAB-'80, covering a wide range of topics, is shown in the panel on the right. Highlights of those sessions noted by (*) are presented on the following pages.

RADIO WORKSHOPS AT A GLANCE

MONDAY
Sales—RAB
*Business Automation—Beginners
Political Broadcasting, I
Management, I
Broadcasters in Congress
Research—Small Market (repeat)
Promotions—Large Market
Collections
Political Broadcasting, II
Management, II

TUESDAY
Group Operation
Small Stations/Large Markets
Minorities/Sales
Co-op Dollars
H.R. 6161
Libel Insurance
Sales—Small Market
Co-op Dollars (repeat)
*Business Automation—Advanced
Stretching Dollars
*FCC Panel
*Deregulation
Promotion—Small Market
Sales
Ratings
EEO—Large Markets
*AM Stereo

WEDNESDAY
*AM in the '80s
Promotion—Small Markets (repeat)
EEO—Small Market
Financing Dollars
Stretching Dollars (repeat)
America's Future

*Session summarized in this section.

The FCC's crystal ball

Of the many questions posed to FCC Commissioners Tyrone Brown, Joseph Fogarty, Robert Lee and James Quello, there were four that seemed to be of highest interest to the broadcasters present: AM Stereo, breakup of AM-FM stations, the 9kHz question, and current EEO requirements.

AM Stereo

Of course the question of AM Stereo was on the minds of all AM broadcasters in attendance at the convention. At this session it was made plain (initially) that the commissioners truly felt that a correct decision had been made regarding the selection of a single system, that being Magnavox, as the AM Stereo standard. Commissioners Brown and Jones were the only dissenting votes against the single system decision. Brown stated that he felt that the criteria used in the selection process showed that all of the applicants met the Commissioners' minimal requirements and that the systems were judged on two primary aspects: effective spectrum criteria and quality of received signal. He said that the systems were very similar and what differences existed were very slight, to the point that the average customer would not be able to detect the difference between the various systems. He therefore saw no real reason to make a distinction between the systems. Brown opposed selecting any particular system at this time in order to ensure that AM Stereo could take advantage of future technological developments.

At this point, Leonard Kahn rose with a question that all in attendance had anticipated. Kahn requested that an oral hearing on the subject of AM Stereo be held. He felt that only through such a dialogue would the proponents be able to properly tell their side of the story. Brown replied that no commitment could be made now, but the Commission would give it every consideration. Further, if the Commission felt that the decision-making process would benefit from the oral presentation, then they would order one. Once again the broadcasters expressed their feelings with a round of applause.

Upon questioning from the audience, several of the commissioners stated that if a *significant number* of chief engineers responded with written objections to these decisions (regarding AM Stereo), they might consider *that* sufficient reason to again open the question of AM

"The FCC's Crystal Ball" session was moderated by Vincent T. Wasilewski, president, NAB.

"How minority sales people can succeed in non-ethnic markets" was moderated by Cecil Forester, Jr.

Stereo to discussion. Those remarks also brought a resounding round of applause from the audience. (It should be noted here that Wilson LaFollette, chief of the technical and allocations branch of the FCC, stated earlier that *only new technical evidence* would be reason for a review of the Commission's decision.)

AM/FM stations

The breakup of AM and FM stations was also on the minds of many broadcasters. The FCC Commissioners stated that although the question was currently under study, no decisions had been reached. Even if such a decision were reached, it was stated that the ruling probably would not require the breakup of present operations. The breakup would only have to occur upon the transfer of the broadcast property to another party. It was made plain, however, that "current transfers being processed are conditioned upon the fact that if the FCC does adopt a rule in the future, owners might have to devest."

The 9kHz situation

The 9kHz question remains unanswered as far as the FCC is concerned; however, there will likely be some type of ownership priority set up should 9kHz spacing be adopted. This priority would give preference to both daytimer's and minority ownership. Apparently one of the real reasons to even adopt the 9kHz spacing was to allow for an increase in minority ownership of stations. Brown was quick to point out that very few stations were owned by minorities, and he saw the 9kHz as a chance to help correct that situation.

EEO hardships

The EEO problems faced by many stations were vented as a real concern by the broadcasters in attendance. One statement from the audience expressed concern about the excessive hardships placed upon broadcasters by the EEO guidelines, and this drew a round of applause in agreement.

The commissioners, however, restated that there is a national policy to implement EEO efforts. One member of the audience objected to the requirements and the fact that his license was held up for six months because of the EEO questions raised about his operation. Commissioner Fogarty replied that merely a six-month postponement of renewal was not a serious factor as far as the commission staff was concerned. Commissioner Quello felt that perhaps some consideration should be given when a station could show that earnest effort had been made in the area of EEO guidelines.

It was pointed out that the commission staff is presently under instructions to pull out for closer scrutiny any application for renewal that does not meet the percentage guidelines. If, however, the application shows that an effective EEO effort has been made, then the license is renewed.

Radio deregulation, what's it all about?

This well-attended session might be best described as a lively and sometimes heated debate. The debate centered primarily around the position of Richard Hirsch, secretary of communication, United States Catholic Conference. Opposed to many aspects of deregulation, he found himself defending his position against almost insurmountable odds.

Arnold Lerner, chairman of the NAB's board and panel moderator, stated that he felt that there was a sense that *rocking the boat* would be unwise by those who oppose deregulation. He felt that deregulation was only re-regulation, which would allow the broadcaster to better serve the public. He continued by saying that the opponents of deregulation feel the changes would bring about wholesale commercial gluttony. Speaking in favor of the changes, he felt that the deregulation would allow the broadcaster to better serve its listeners and hoped that the government would have the courage to allow the people to choose for themselves.

A member of the domestic policy staff of the White House, Steve Simmons, outlined that four executive branch offices had filed comments in favor of at least partial deregulation. Those departments included the Justice Department, NTIA, the Office of Consumer Affairs of the White House, and his own office. He was quick to point out that broadcasting is no longer a total of three stations as it was in 1920, but has approximately 8000 stations on the air today. As such, a re-examination of the old rules is necessary.

Of those complaints lodged against the Commission, the main one concerned ascertainment. Three of the departments making presentations to the FCC were in favor of *total* elimination of ascertainment. Furthermore, three of these departments were in favor of eliminating the total number of commercial minutes allowed per hour, and the same number (of departments) were in favor of eliminating many of the present logging requirements. One suggestion made was that the FCC eliminate commercial logging requirements and let the stations keep their own records. The FCC would then simply *audit* several stations per year to see what was happening in the field. Naturally this would tend to keep everyone honest, but at the same time allow for individual station flexibility.

Hirsch quickly pointed out that he felt that some of these changes would not necessarily result in a better serving of the "public interest." He felt that the proposed changes could result in the public

"Heating up business in a cooler economy: "How To" sales development ideas" was moderated by Len Hensel.

Karen Maas moderated a session called "If your advertiser got the spots, how come you didn't get the money?—collections."

Dealing with FCC

Congressman Al Swift (D-WA) and Senator Walter Huddleston (D-KY) were on hand at the convention to tell broadcasters concerned about the lack of responsiveness at the FCC how to best present their interests to their congressional delegates.

Senator Huddleston agreed with broadcasters' concerns saying that the FCC has begun to engage in *social engineering* by trying to correct all the ills of society through regulatory means.

Congressman Swift said that he believed that the three goals of the FCC—for an increased number of stations, for quality service to the public, for the highest level of programming—might well be mutually exclusive and that the FCC must do a *balancing act* between them.

Both representatives told broadcasters that one effective way to get the ear of their Congressmen was through their state broadcasters' associations. Congressman Swift added that broadcasters should talk to their congressmen or senators, tell them what message to take to the communications subcommittee members, who, in turn, would then be able to exert some control over the FCC.

In a question and answer session following the opening remarks, broadcasters wanted to know what changes the Congressman and the senator would make in the 1934 Communications Act. They said they support almost total deregulation: Swift would retain the public trust standard and Huddleston, the Fairness Doctrine and Equal Time provision. "Beyond those two policies, the FCC should just be a traffic cop." Huddleston said, "Marketplace competition assures that broadcasters will continue to serve the public adequately."

Anderson speaks

Investigative reporter Jack Anderson called on broadcasters attending the National Association of Broadcasters' 58th annual convention to inform the public of serious problems in the country today due to the Carter Administration's handling of the economy and foreign affairs.

Anderson said that it was his duty to give broadcasters a personal report of what's happening in the White House. "The time has come for the public to be made aware so they can decide if they want to continue with the present management in November. In this political year, I would suggest politics is no longer the issue. The issue is competence. We can't continue to survive, maintain our standard of living without competence." He emphasized that Jimmy Carter was a good, decent, intelligent man but the country couldn't afford to have "an amateur in the White House."

Anderson said that the country was in worse shape economically than it was during the Depression. He described the current economic policy: "Carter thinks by driving up prices people will stop buying then prices will decline. But what Carter has succeeded in doing is to drive prices to new soaring altitudes. When people stop buying, corporations cut back production, workers are laid off, then plants close. Prices are not coming down, inflation is going up."

Anderson added that if our economy is being mismanaged then our foreign affairs are in even worse shape. Anderson said that the most delicate problem facing the country today is the hostage situation in Iran. Unfortunately, Carter's joint chiefs of staff don't even know what his policy is. "Jimmy Carter's problem is that he has cut himself off from those qualified to advise him; he's been running this country from a glass bubble."

being reduced to a consumer, with the consumer being further reduced to a marketplace. His concern was that commercialism might result in detrimental service to those minorities now being serviced because of the FCC requirements. "We contend that the community goes beyond the marketplace," he stated.

Hirsch felt that the present allowance of 18 minutes of commercial material per hour was sufficient and that it represented a significant amount of time. Furthermore, without FCC guidelines, he was concerned that this amount of commercial time might be exceeded. There was some argument to the point of

Heated debate marked a packed general session radio deregulation panel at the National Association of Broadcasters' 58th annual convention.

Receiving the brunt of questioning was Richard Hirsch, secretary of communication, US Catholic Conference, which opposes radio deregulation.

Speaking for the 4-point proposal was Arnold Lerner, WLLH/WSSH, Lowell, MA, chairman of the NAB's radio board and panel moderator, Richard Shiben, broadcast bureau chief of the FCC and Steve Simmons, domestic policy staff of the White House.

Simmons noted that four executive branch offices filed in radio deregulation—Justice Department, NTIA, the Office of Consumer Affairs of the White House and his office. All favor the proposals at least in some degree, he said.

Shiben, in explaining the FCC's options, said the "programs offered correspond, in my opinion, to the needs and interests of the public... that without these guidelines, radio will continue to serve their communities."

Lerner reiterated NAB's stand that the FCC proposals are in the public interest and the proposals are long overdue.

"You're the manager...you're supposed to know about that," parts I and II were moderated by Orrin McDaniels.

Barry Umansky moderated "The new rules for political broadcasting in the 1980 election year," parts I and II.

whether or not if this indeed happened, that the audience could tune away. He responded that there may well be nowhere else to tune, especially if local information was concerned. Of the many statistics he used in making his presentations, the most striking was that in 1970 47% of religion on radio was done on a sustaining basis, while today, sustaining or free time on radio was down to 8%.

Richard Shiben, broadcast bureau chief of the FCC, pointed out that the public interest standard was not engraved in stone. The FCC is trying to determine what may actually be required in the way of regulations in today's broadcast marketplace, for it is their obligation to periodically review the rules in serving the public. In 1949, for example, radio stations were not permitted to editorialize, and even 20 years ago stations were required to have a certain amount of sustaining time available. Shiben felt that the phrase the opponents were most opposed to was "consumer well-being." Again, he stated that the marketplace would respond to the public interest. In fact, deregulation may encourage diversity and even better serve the needs of the audience. He countered Hirsch's point that the new rules would in fact eliminate programming to the poor, underprivileged and elderly. "It hasn't been shown that service under deregulation would be in any way inferior service to the public," he said.

After the panel had a chance to challenge each other, moderator Lerner opened the debate for questions from the floor. Those questions, usually directed to Hirsch, required that he defend his position. Statements from the floor such as "you folks are living in an ivory tower," "broadcasting is a business," and "broadcasters try for quality and churches don't appreciate quality" were typical of the comments fired at Hirsch.

It was obvious from the audiences' questions, statements, and applause, that they were in favor of deregulation. The broadcasters felt that the industry would uphold high standards and continue to serve the public interest, perhaps even better and in more meaningful ways if deregulation were brought forth. Several broadcasters tried to point out that in many ways the present regulations prevented them from better serving their particular audiences. The position of the audience might be best summarized by the statement, "government should get off the back of the industry." □

Selling the wonderful world of AM in the '80's

By Gary Fisher, ABC Radio

The workshop on "Selling the wonderful world of AM in the '80s" addressed the ever-changing complexity of AM-FM sales dynamics in small, medium and larger markets. Gary Fisher served as moderator, panelists were: Steve Marx, WFTQ, Worcester, MA, and David Parnigoni, WCNX, Middletown, CT.

The over-all message from this session was that selling AM in the '80s will be different, more of a challenge and potentially more rewarding. With nearly 100 in attendance, the message was not only well received but also NAB has already indicated a repeat of this session for next year's meeting.

In addition to moderating the session, Fisher shared his theories, experience, and ploys in selling AM radio's inherent strengths...ways to combat inroads by FM...ways to exploit the strong points of AM radio that cannot be replicated by FM... in short, selling the wonderful world of AM in the '80s.

"I believe that one of the key radio stories of the late '70s," noted Fisher, "was the repositioning, remodeling, and rededicating of AM station in preparing for the '80s... efforts that affected air and off-air operations, both programming and sales. And these developments have manifested themselves in new, imaginative, innovative sales approaches which will emerge as a key story of the '80s for AM radio."

Marx observed that AM radio may be suffering because FM is chic to buy and requires little selling, while AM needs an aggressive sales approach. Toward this end he proposed a 5-point AM sales rescue plan: (1) organize advertisers into two groups for best sales attention, (2) sell benefits, not product, (3) follow a recipe of event, timing, station, copy, and frequency, (4) demand strict accountability, (5) parlay success sales into more sales. "If you adhere to this recipe," said Marx, "your client's radio advertising will start working in 12 to 36 hours."

Parnigoni, in viewing AM sales in the medium and small markets, said that the session could be viewed in three ways: as a question, the '80s?; as a pessimist, sell the station; as an optimist, sell the wonderful world. The station success depends strongly upon the attitude of its staff. "Something to sell is important," said Parnigoni, "but equally important is the salesperson and his/her training. At WCNX, our sales orientation program takes about 13 weeks...and they thoroughly understand their sales tools when they're in the field. And this is followed with a comprehensive compensation plan, quotas, and recognition of performance."

There was considerable audience participation in this session, and the conclusion was that AM is indeed a viable market for the '80s, but aggressive selling is the key to success. □

Workshops on station business automation

By Bob McKune, president and general manager, KTTR/KZNN, Rolla, MO

Station Business Automation. Bob McKune (l., moderator), KTTR/KZNN and panelists (l. to r.): Danny Jenkins, KFDI; Bruce Hoban, ABC; and Paul Woidke, Jefferson Data Systems.

NAB's annual conventions produce some of the most glamorous and innovative technological jumps seen anywhere in the world...and one of the top conversation pieces at NAB-'80 was the business automation system. This year's convention featured two workshops: one for beginners in the computer or automated business system world and one for those more advanced—possibly already into computerized billing, logging and payroll.

The advanced workshop featured three diversified but highly qualified panelists in Bruce Hoban, director of research and station systems for all ABC owned and operated stations; Danny Jenkins, representing users, chief financial officer for Great Empire Broadcasting, with his office at home station KFDI, Wichita, KS; and Paul Woidke, of Jefferson Data Systems, Charlotte, NC.

In general, the advanced workshop panel concerned itself with upgrading current systems and with new technological advances. The chief bit of advice was *know your vendor*: his capabilities in development and in software, his financial status, and his ability to maintain the system he sells both in software and in hardware. Bruce Hoban, who has just completed the specifications and order for a new million-and-a-half dollar computer for ABC, said word processing, especially as it relates to continuity, is one of the major new developments in computers, but there was a difference of opinion as to whether word processing should be part of an in-house system or a separate system entirely. Sales usage, account list maintenance and sales history reporting, with mailing list capability, are among developments to be looked for in new software.

Panelists generally agreed that computers are probably not going to see any dramatic price decreases. While prices may come down on hardware, they are going to increase for software. Other basics—beyond billing, logging, and payroll—include in-house research capabilities, news processing, engineer scheduling and parts inventories, direct links between control rooms and new booths and the master CPU (central processing unit).

There was a need the panelists thought would soon be met for a different software for headquarters locations. Data could be obtained by telecommunications, or other methods, from their stations and processed into the type of report needed at headquarters that would not be the same as that required for the station. Both the advanced and the beginner panels agreed some of the most common misconceptions about computers included "computers make mistakes...preventive maintenance is not necessary...you can switch over from manual to computer systems with no problems at all." Those are, in the panelists opinions, misconceptions, although Woidke said it is possible to convert to an automated business system with a minimum of fuss.

The beginner's panel consisted of Ted Snider, KARN, Little Rock, AR; Bob Wells, Harris Stations, Garden City, KS; and I. Gerome Kenagy, Custom Business Services, Reedsport, OR. Kenagy markets his own software using Wang hardware. Wells uses an IBM 5210, with software developed by a Dodge City, KS, firm, and Snider is using a second generation computer, which, as with the others, is an in-house system.

Panelists and questions from the floor reflected a common concern for someone just getting into systems: "How do you choose a system?" The consensus of the panelists was to decide what is needed and what the station needs, then match those needs up with a vendor, considering availability of maintenance etc. Costs range from just under $20,000 to nearly $100,000 for station in-house systems, with all software, including billing, co-op billing, logging, avails, sales commission reports, aged accounts receivable lists, payroll with its attendant reports, etc. Most floor comments, and most panelist comments, showed a preference for in-house systems as opposed to those *on-line*. An estimate on cost of paper and maintenance ranged from about $100 to $200 monthly on each item, although there are systems at lower costs. There were also cautions about trying to get customized programs without proper documentation, and an urging to include staff people now involved in business systems during computer planning.

But the first and foremost question to any station considering an automated business appeared to be "Do you need one?" And, "Is your station ready for one?" If a station has trouble with paperwork now, is it because of the present system? Is there a personnel shortage for the job required?

It was also the consensus of the panelists that more and more stations are going to be switching to computers, and that the criteria will not revolve around dollars. (A computer doesn't care about the price of the announcement; it's the number of transactions per day or week that counts.) If a station is busy, chances are good that a computer might help business.

One fact was paramount, however, and that is that computers are playing larger roles in US broadcasting, and that interest has never been higher. Not only is equipment and software becoming more sophisticated, but so are broadcasters. And broadcasters can figure out more uses, more quickly, than programmers can produce.

The computer age is only now arriving; and with nearly three-fourths of the licensed stations in the country in markets of 25,000 and less, the greatest market potential for computers is the small market broadcaster. The reflection of that potential, and its interest in automated business systems, is likely to be seen in an expansion of workshops, idea-sharing etc. in many NAB conventions to come. □

Author Bob McKune moderated two sessions at NAB-'80 related to business automation: *Should you have an electric bookkeeper?—business automation for beginners*, and *It's really difficult to find someone to service my "Wind-Up" computer—advanced business automation.*

The AM Stereo panel (Radio session) (from left): Richard Mertz, WBT/WBCY; Charles Wright, WBYS; Jim Loupas, Loupas Associates; and Wilson LaFollette, FCC. AM Stereo: When? What System? How much will it cost?

AM Stereo warms up NAB

By Bill Rhodes, editorial director and Brad Dick, chief engineer, KANU

By the time that NAB-'80 opened, the word had been passed that the FCC had given a nod to the Magnavox system for AM Stereo—and the stage was set for questions and sparks in Las Vegas. FCC approval of the Magnavox system came during its regular meeting on Wednesday, April 9th.

NAB, anticipating the FCC decision, had scheduled meetings during the Radio Sessions and the Engineering Sessions to cover implementation of AM Stereo for broadcasters. Both sessions were well attended and served as forums for questions and comments, some with strong feelings.

The AM Stereo Panel (Engineering Session, from left): Robert Reymont (hidden behind podium); Chris Payne, NAB; Wilson LaFollette, FCC; and Bob Streeter.

Radio Session

Radio broadcasters attending the annual convention had an opportunity to discuss the timetable for implementation of AM Stereo and how it will change competition.

Charles Wright, WBYS, Canton, IL, moderated the session titled "Your Competition is Ready for AM Stereo...Are You?" Panelists were: Wilson LaFollette, FCC, Washington, DC; Jim Loupas, Jim Loupas Associates, Chicago, IL, and Richard Mertz, WBT/WBYC, Charlotte, NC.

Mertz began by describing AM stereo as more than "an engineering extravaganza." He said it would have to be a team effort involving equipment changes, different music libraries, promotional efforts, receiver modifications, and different techniques in producing commercials. He also suggested that broadcasters begin considering whether they will be able to modify equipment or will need to order new equipment, which sometimes takes time.

Loupas called AM Stereo a unique opportunity for AM broadcasters but warned it will be a new medium —not a return to the past.

LaFollette, chief of the FCC Technical and International Branch of the Broadcast Bureau's Policy and Rules Division, said that since the Commission approval of AM Stereo, he is most frequently asked when it will be a reality. He said that assuming there were no petitions for reconsideration to the FCC it is possible that conversion could begin in "the next several months."

Loupas and Mertz stressed AM Stereo as an opportunity for AM broadcasters to compete more effectively in the battle with all types of media. They also agreed that cars will provide an excellent environment for the new service.

There were questions as to what procedures would have to be followed to get permission to broadcast in stereo, but at this point no procedures have been set up. Perhaps one broadcaster best summed it up by saying that he was deeply depressed by the events surrounding AM Stereo. He felt that the approval of the Magnavox system was not a "happy one." He further considered the specifications and limitations placed on the AM stereo system would not bring new life into AM radio, but rather cause loss of present audience, cumes and, therefore, money. Applause from the audience was the immediate response, indicating concurrence with his frustrations. Loupas responded by saying that, in most cases, AM Stereo will improve the aural service to the listener, but may in some cases lose another listener in the null or fringe areas. "Those are choices we have to make," he said. He did feel that in total, AM Stereo was a positive step rather than a negative one.

The panel briefly discussed the costs involved with bringing an AM station into the world of stereo. Loupas called it G.I.G.O. (Garbage In results in Garbage Out). A station will have to examine the sophistication desired to begin stereo broadcasting. The studio costs will depend upon the amount and quality of equipment desired. Transmitter costs will vary according to the particular transmitter and these costs could run from $10,000 to $12,000 for the exciter and stereo modula-

tion monitor. Furthermore, if the studios are located away from the transmitter site, the additional costs of an STL or telephone loops would be necessary. A member of the audience stated that Harris was estimating the cost to modify a MW5 transmitter to stereo to be around $7500 plus the audio processing.

One person summed up his feelings by saying that he would prefer that the FCC give him something, i.e. any AM Stereo system, rather than nothing by further delaying a final decision on the subject. He preferred someone who would do something, even if it was wrong rather than use excuses that could cause a withdrawal from the objective—which is a working AM Stereo system for the broadcaster.

Engineering Session

A packed house full of anticipation describes the atmosphere as Chris Payne from the NAB began the engineering session on AM Stereo. Only shortly before the convention, the FCC had announced its decision to adopt the Magnavox AM Stereo system. It was at this session that many engineers hoped to find out more about what would be required not only to modify their systems to stereo but also to discover why the FCC made the decision it did.

Wilson LaFollette from the FCC made a short presentation on how the decision of AM Stereo was reached. He stated that the decision was more than just selecting a particular proponent for AM Stereo; rather, the real decision was whether or not to let the marketplace decide and select a particular vendor. The FCC has, in fact, adopted a "marketplace philosophy." He stated that the Report and Order will include a discussion on this matter and how it may be used in the future. He continued by stating that this was a learning process for everyone.

Naturally, many engineers were concerned about when the effective date for implementation of the AM Stereo standards would occur. If no appeals are filed against the FCC decision, then about two months would be required to make the final rules effective. It would require another one or two months for the proposed equipment to be type accepted, and then it would be up to the manufacturers to set timeframes on delivery of equipment.

Since there are no present stereo AM modulation monitors, it might be possible for the broadcaster to use any appropriate means to monitor the stereo modulation. It turns out that this can be a rather complex problem, and a simple oscilloscope will not be sufficient. It may be some time before modulation monitors have available the add-on units for monitoring stereo modulation. Many of the questions presented to LaFollette were not answered because the Report and Order has not yet been written.

One of the problems that the broadcaster will face will be that of adapting his transmitter to stereo transmission. Robert Reymont from WGAR outlined his experiences in interfacing the Magnavox system to his two transmitters. It turned out that one of his transmitters was not usable with the Magnavox system and the other experienced some problems that were never completely solved. He did say that one of the transmitters was able to operate at low power effectively and that his staff was generally pleased with the results. Since the station was using single band audio processing, it may be that better acoustical results would have been possible with another audio processor. The station also received generally positive feedback from the public about the tests.

Of the problems that engineers will face, the most critical seems to lie in the area of the time and phase delays in the total chain. In other words, the transmitter must have minimal incidental phase modulation in order for the system to even have a chance of working properly. Each transmitter manufacturer will have to provide some method of allowing for adjustment of the time delay in the AF chain in order to exactly match the RF chain. The transmitter will also have to be properly neutralized or phased modulation will be a problem. Since most transmitters on the air today were never designed to minimize *phase noise* it could be a problem to properly interface the modifications necessary to achieve good AM Stereo. There were, however, many transmitter manufacturer present in the session, and they all expressed interest in providing the necessary modifications and parts for their equipment to adapt them to AM Stereo.

At this point, all the engineer can do today is to be sure his system is clean from an audio standpoint. Check the audio frequency response to be sure it is flat, and be sure that

Magnavox to grant Am Stereo broadcast licenses

In a press conference following NAB, Magnavox announced that it will not assert its AM Stereo broadcast patents against broadcasters or broadcast equipment manufacturers. According to Kenneth C. Meinken Jr. president of the Magnavox Consumer Electronics Company, this amounts to a free license for the more than 4500 broadcasters nationwide.

"As we have said repeatedly, Meinken stated, "we will cooperate with broadcast equipment manufacturers to produce new equipment for our system in any way we can. Already, we've furnished a great deal of technical information and assistance to manufacturers of audio processors, monitors, and transmitters. There will be a reasonable license fee charged to receiver manufacturers."

The Magnavox AM Stereo system was designed by Robert Streeter and Albert Kelsch. Streeter, a design engineer at Magnavox for 15 years, received a patent on the system. He also received a patent on an error control technique for a satellite communications system currently in marine operation. Both patents are assigned to Magnavox.

The impact of AM Stereo on the broadcast industry will, in large part, depend upon the imagination of programmers. Certainly, it opens up an uncharted vista for innovative exploration.

For the consumer, the greatest benefit will be realized by the millions of people who listen to radio in their automobiles. The FM band has problems with its multi-path reception since its signals are alternately reinforced and interfered with due to refections off buildings. The AM Band, however, has a longer wavelength not affected by such reflections and generally provides the automotive listener with a more consistently pleasant signal.

Magnavox plans to have a public demonstration of its AM Stereo system in the near future. The details of this demonstration will be announced shortly. •

any possible causes of phase noise—neutralization, power supplies, etc. —are minimized. It may also be wise to consult with the manufacturer of your transmitter to get his input on the adaptation to AM Stereo. You may find that he will recommend (for some very sound engineering reasons) that you look into the possibility of replacing your present unit. Some old transmitters will simply not be capable of the IPM (Incidental Phase Modulation) criteria necessary for AM Stereo.

The present battle in the AM band for maximum loudness was of real concern to those broadcasters who see AM Stereo as a way to improve on a presently minimal fidelity system. This would require a completely different outlook in the area of audio processing. Payne stated that there is presently a committee working on developing a recommended practice for audio processing which would include such things as frequency response and dynamic range. It is currently the practice of some stations to use as much as 15dB of equalization at certain frequencies to achieve a particular sound, and obviously this will not be advisable with AM Stereo.

The audio processing will also have to be specialized in order to allow for as much modulation of the L + R channel as possible. This may require that audio processing equipment will be equipped with some sort of decision-making circuitry to ensure that most of the modulation is in the L + R channel to avoid loss of coverage area. Since the Magnavox system will only permit 95% negative modulation, the audio processing may have to be even more sophisticated than first anticipated. As Payne expressed, this is a chance for all AM broadcasters to improve the sound of the AM band.

The other aspect of AM Stereo is that the receiver manufacturers will have to come out with products capable of reproducing the quality the broadcaster hopes to transmit. Of the receiver manufacturers present, only Magnavox promised to have equipment available to the public by the first quarter of next year. General Electric stated that it would adopt a wait-and-see attitude. It is interesting to note that there were not as many receiver manufacturers willing to stand up and be counted this year, now that an AM Stereo system has been adopted. Attendees at last year's NAB may remember that there were several receiver manufacturers who stated that they were "ready and waiting" to bring out equipment. It is likely that some have had to adopt a more conservative position because of the cloud of uncertainty that still remains above AM Stereo.

Leonard Kahn was, of course, present and presented several questions to the panel, most of which were left unanswered. He again pointed cut the vast experience that

AM Stereo Personnel Ad at NAB

The following ad on the press-room bulletin board at NAB-'80 (with station ID deleted) may well be the starting of a new trend in broadcast history:

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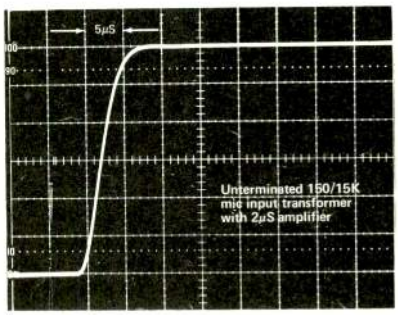

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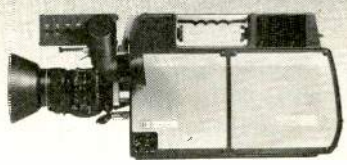

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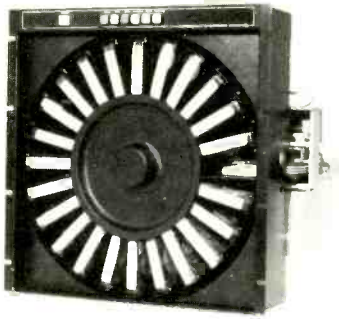

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AM Stereo Survey

A survey by Weeks Research Associates of 250 broadcasters in 233 cities found that 55% of respondents were strongly opposed to the FCC's selection of Magnavox system for AM Stereo. Another 41% of those polled considered Magnavox a poor, but probably acceptable, choice. Only 4% of those interviewed were satisfied with the decision.

The Weeks' survey, commissioned by the Broadcast Products Division of Harris Corporation, further revealed that nearly 80% of the respondents favored the FCC reconsidering its position on AM Stereo. Respondents included 112 general managers and 138 chief engineers. All interviews were conducted by professional level personnel with actual broadcasting experience. The survey, considered to be statistically valid and representative of the US potential marketplace, included inputs from each of the continental 48 states.

Respondents were *not* asked to rate their preference of the system except in regard to Magnavox. However, a number did volunteer this information. Most rated Magnavox at the bottom of the list, inferring that all others are preferable. A high percentage of all stations interviewed planned to convert to stereo, 46% intend to do so within one year of FCC approval. However, selection of a system that has serious deficiencies would cause many to reconsider.

The principle concern for broadcasters was that the Magnavox system would reduce coverage and/or loudness, not be compatible with directional antenna array systems, and degrade the monophonic signal.

The consensus of the research survey was a general feeling of bewilderment and wonder about the commission's decision process. Respondents used such terms as shock, surprise and dismay in describing the reaction to the FCC decision of Magnavox. Several stated that the decison was the worst thing that ever happened to AM radio.

Harris Corporation is concerned that a final selection of the Magnavox System would seriously hinder the growth of AM Stereo. For further information contact Roger Burns, Marketing Planning Department, Harris Corporation.

AM Stereo

he has had in the area of AM Stereo and "that, with 14 stations over 20 years all of the transmitters worked with his system." He addressed LaFolette by reading a statement from Magnavox that "a 5kHz filter in the L + R appears to be necessary" and followed with the question of what would happen if the US went to 9kHz. When he ended his oration by stating that "we want to give you an AM Stereo system that works," he was given supportive applause, and many engineers stood and cheered.

It was obvious from other questions at this session that engineers, in general, were not happy with the FCC decision. Whether or not there is a consensus among AM engineers as to a preferred system is unknown. It is apparent, however, that Magnavox, the FCC and the NAB have a lot of questions to answer to the broadcaster.

AM Stereo was to be the savior for many broadcasters. In many markets, former top stations which were AM have now been replaced by FM stations. FM stations now capture such a large share of the market that most AM broadcasters see AM Stereo as their only hope for survival. If AM Stereo is to survive, then everyone is going to have to work at it. Magnavox is going to have to convince not only engineers but also astute managers that the 95% modulation limitation and possible audio frequency limitation will not be a problem. The FCC is going to have to move forward with speed to implement the necessary channels of communication and departments so that quick approvals can be given to stations to begin broadcasting in stereo. Finally, the manufacturers are going to have to be convinced that there is a market for AM Stereo receivers.

Flak on system chosen

At a packed engineering luncheon Commissioner James Quello of the FCC acknowledged that the FCC was experiencing sharp criticism for its selection of the Magnavox AM Stereo system. As a result, he indicated that the doors for filing comments were still open and urged interested broadcasters to submit their views to the FCC for consideration.

While it was not implied that the FCC would alter its decision on AM Stereo system selection, merely the thought that further inputs may sway the FCC's decision is enough to warrant caution. □

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Earth Station: New Dish on the Block. Leslie Arries, Jr. (right) moderated session. Panelists E. E. Bormann (left), Western Union, and Harold Protter, KPLR, St. Louis, MO provided practical hints for successful operation of earth stations. (In another session, Arries presented a report of the All Industry Television Music License Committee.)

Improving TV's Community Image: Competitors Create a New Approach. Laurie Leonard, WMTV, Madison, WI moderated the panel discussion on how broadcasters could enhance the image of their station locally. Panelists were (l. to r.): Terry Shockley, WKOW, Madison, WI; Steve Herling, WISC, Madison, WI; and Roy Danish, Television Information Office, New York.

Television workshop highlights at NAB '80

By Bill Rhodes, editorial director

The listing of sessions and workshops at this year's show is impressive, but not particularly exciting. The heat from AM Stereo in the radio sessions and the possibility of major advances being announced for digital video in the engineering sessions rather robbed the TV general sessions of their normal air of excitement.

Consequently, this chapter of our NAB coverage will be limited to excerpted sessions and addresses, a photo coverage of the television panels, and a report updating teletext. (The February issue of **BE** contained a major report on the KSL teletext work by Bill Loveless, a review of the CEEFAX system, and notes on the CBS teletext work at KMOX in St. Louis, MO. The CBS research was reported in detail in the November 1979 issue of **BE**, pp. 62-65).

The television gathering at NAB-'80/Las Vegas was treated to a review of the evolution of teletext in the US through the experiences of several specialists. The panelists were: D. Thomas Miller, CBS Broadcast Group; William L. Putnam, Springfield Television Corporation; William Loveless, Bonneville International; and Hartford N. Gunn, Jr., KCET, Los Angeles.

Miller: In the beginning...

A couple of years ago the NAB formed "the committee with the funny name:" the Committee for Ancillary Uses of Broadcast Signals. So we have other things we talk about other than teletext, but very little. Thus, subcarriers have dropped out of most meetings, and almost everything is dedicated to teletext. The original chairman was Bill Putnam, and, at the outset, he and I were the only non-technical, non-engineers on the committee. After a few years, we discovered that teletext *could* work in the US. So we stopped listening to people talk about bit rates and bandwidths and the committee became more management oriented. Today Bill Loveless is the only engineer on the committee.

Putnam: As to why and how...

It was determined early that major projects were possible to significantly improve the enjoyment and usefulness of television services. We felt that, basically, anything that could enhance the usefulness of TV was not only a service to the public but it offered job security for those providing the distribution. We found that there was a possibility of a discrete second audio channel that could be used for stereo

Television at NAB
- **General Sessions**
- **Workshops**

GENERAL SESSIONS

Monday
Call to Order
Stewardship report
Conservation with...
Children's TV
Corporate TV ads
Who will Buy?
Music licensing

Tuesday
Fragmented future

Wednesday
Van Deerlin speaks
Grover Cobb award
America's future
Ferris speaks

WORKSHOPS

Monday
News for U's: technology
Cable: rules, royalties
Courtroom coverage
FCC crystal ball
EEO programs

Tuesday
Building a facility
Earth stations
Teletext update
Libel insurance
How bills become laws
Technical jargon
Creative IDs
Political clinic
Localism game plan
Audience of the '80s
The executive ladder
The community image
The Washington scene
Government relations
Low budget, big clout
Helicopter ENG briefing

Wednesday
Creative financing

David Brinkley (center) with Robert King (left) and Tom Bolger (right).

David Brinkley told television executives at the convention that the country is experiencing a conservative trend.

Brinkley, co-anchor of "NBC Nightly News," keynoted the television luncheon of the NAB convention. Brinkley said that judging from the mail he receives and from results of NBC's and other polls, "it is clear now there is a conservative tide running in this country. We can see it in the polls. We can see it in the voting on such local questions as Proposition 13 in California and others like it in other states."

Brinkley said while there is a conservative trend in the country, "the American people have not... turned against feeding the poor and helping the elderly. What they have turned against is our vast and expensive welfare bureaucracy that is more beneficial to the people running it than to those it's supposed to help." Brinkley told the group that the American people have turned against "an expensive governmental industry that somehow disposes of billions of dollars saying it is solving problems, but never solving any."

Brinkley ended by reminding broadcasters of the importance of listening to the response of the audience.

NAB Television Board Chairman Robert K. King, Capital Cities Communications, Philadelphia, PA, introduced Brinkley.

Children's TV

The National Association of Broadcasters' convention featured a panel for television broadcasters called "Toward a Fuller Definition of Children's TV."

The panelists, Michael Young, host of ABC TV's "Kids Are People, Too;" NAB executive vice president and general manager John B. Summers; Nancy Carey, legal assistant to Federal Communications Commissioner Abbott Washburn, and David Morgan, executive vice president and general manager of the Federation of Australian Commercial Television Stations, all agreed that the FCC needs a broader definition to accurately reflect what is available to children.

Summers opened the discussion with background on how the FCC arrived at its present proceeding requiring TV stations to air a fixed number of children's programs each week. This proceeding, Summers said, is based on the Commission's 1971 definition of children's TV, which emphasizes commercial time. As a result, he said, broadcasters are not being credited with the quality programs they presently provide.

Carey delivered a message from Commissioner Washburn which also recognized the Commission's narrow definition as a problem. Washburn's statement suggested expanding the FCC definition to include language such as: "Programs contributing to the learning experience of young people...17 years old and below."

Young told the TV executives that he believes children watch an enormous amount of television which is not defined for them. His approach is to look at what children like on television and produce something similar with modifications for the age of the audience. The talk show format can be successful with children using, for example, celebrities who discuss the problems of their youth, he said.

Morgan traced the government regulation of children's television in Australia where each TV broadcaster now must present a certain number of hours of children's programming each week between 4-5 pm. Morgan discussed how such requirements actually result in poorer programs for children.

Irwin Starr, KREM-TV, Spokane, WA, moderated the panel. Leonard A. Swanson introduced the discussion by a film which illustrated how much progress has been made by the networks in children's programming since television began. Swanson is vice president and general manager of WIIC-TV in Pittsburgh, PA.

sound or for a foreign language transmission simultaneously with the regular TV program. Having determined that this was technically feasible, we pointed that matter to the EIA, and it formed a broadcast technical study committee.

The EIA has made significant progress in getting technical studies under way to determine precise methods to implement teletext without obsoleting present receivers.

A second potential area, called adaptive equalizing transmissions, (which Tom Miller and I call the exorcist) offers an easy way to get rid of ghosts. So we took the cue left over from Bob O'Connor's magnificant report as chairman of the JCIC and said this was an area that should be developed. Thus the BTS subcommittee was formed that is now making real progress. We soon found that the engineers could do whatever we asked them to do, but it was important for broadcasters that the most cost-effective service be provided for delivering teletext (basically an alpha/numeric system) to the people. We were seeking the most quality, the lowest consumer cost and the most trouble-free system. These were our basic criteria for trying to evolve something that would make sense in this country.

And so we have devoted considerable effort—largely through the good work of CBS, which has the resources and the desire to pursue this subject—and we may have come fairly close to establishing an American standard that combines the best elements of several other systems and includes a few ideas of our own. That is where we are today.

Loveless: Teletext can...

As civilization advances, its information needs increase. The reason for teletext is to provide some of these information resources. But teletext seems to be so glamorous that we want all the answers before we even know the questions. I'd just like to ask some of these questions about teletext.

Do broadcasters really want to become an information utility, taking on some attributes of newspapers? This is a fundamental question because that's what's involved.

How much investment in equipment and staff are required? What return on investment is required? And, what kind of return on investment can be expected? What market studies have been done? How is acceptance related to the price of the decoder? What are the broadcasters' commitments to the electronic newsroom and the concept of script-

ing using electronic devices, because this is the lead in into a teletext operation? In other words we are going to merge these media together. Do we want to be involved in this type of an industry?

Then, is the TV set more of an escape vehicle or an information machine? How long will the gee-whiz and novelty effect last? How much real testing can be done before standards are adopted? For example, Australia has put a hold on teletext until standards have been adopted. But how can standardization be done when technology is moving faster than the standardization?

If teletext is to become a mass communication media, then standards must be established or it will die. Is the open marketplace the best place to do it, or is it a regulated environment?

What is the future lifespan of teletext? What is the lowest form of life and what is the highest form of life? Should teletext be optimized to serve the networks, or local stations, or educational stations, or business establishments, or consumers? What is best, to have more pages of information or more information on each page with fewer pages? What is the best display format for readability? How does one measure a teletext audience? What kind of government regulation do we want? What is the optimum mix of perishable information or non-perishable information? What is the value of improved graphics? Does it decorate the information or does it provide it? And at what

Are corporations entitled to advocacy advertising on TV? Gert Schmidt (right) of WTLV, Jacksonville, FL, moderated the debate between Gene Mater (left) of the CBS Broadcast Group and Herb Schmertz (not shown).

Editorial ads by corporations

Gene Mater, vice president and assistant to the president, CBS Broadcast Group, debated Herbert Schmertz, vice president public affairs, Mobil Oil, on the merits of editorial advertising. Mater said, and Schmertz disputed, that the Supreme Court in a landmark decision has already answered the question of whether broadcasters were required to sell time to corporations for issue advertising and the answer was no.

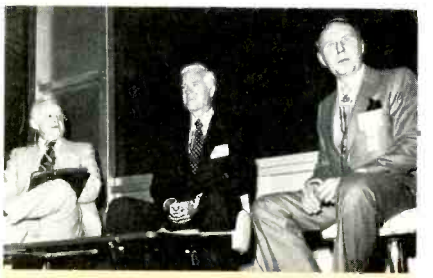
Schmertz held that the decision to air issue advertising was solely at the licensee's discretion and that there was no legal proscription against it. "This is pure censorship on the network's part," Schmertz said. "CBS News decides what gets aired and what doesn't."

Schmertz said that the network news structure was totally inadequate to handle complex oil and energy problems. He outlined the reasons why: the networks' emphasis on visually exciting material; time constraints; and the lack of expert reportage. This situation could be corrected, he said, by allowing corporations to air editorial advertising.

Mater explained why CBS and other broadcasters don't accept advocacy advertising. "...Those with the most money would talk the loudest most frequently, and the airwaves might carry viewpoints whose only claim to broadcast time would be the ability of their proponents to pay the price."

To support Mobil's position that corporations and other groups are entitled to access, Schmertz quoted the First Amendment. Mater countered that the key to their differences was that the First Amendment only allows Mobil the right to express opinions; it does not imply a right to an audience.

In summation, Mater said that it is in CBS's economic interest to accept issue advertising but that it doesn't because of a basic journalistic freedom: the right of a broadcaster to decide the format on the basis of the nature of the medium and the interests of the audience. Schmertz said he had no intention of interfering with CBS's journalistic freedom: "All Mobil wants to do is to make more information available to the public."



In the opening general television session, George Koehler (left) of Gateway Communications and Robert King (right) of Capital Cities Communications held open conversation with The Honorable Ernest Hollings (center, D-SC), chairman, Senate Subcommittee on Communications.

Remarks by Senator Hollings

Senator Ernest Hollings (D-SC), chairman of the Senate Communications Subcommittee, said he was optimistic that the senate will have a good communications bill that will include broadcast amendments that he hopes will include a 5-year license for television stations and a deregulation of radio.

Hollings was questioned on several broadcasting issues by Robert K. King, senior vice president, Capital Cities Communications, Philadelphia, PA, and George Koehler, president, Gateway Communications, Cherry Hill, NJ. Mark Smith, vice president and general manager, KLAS-TV, Las Vegas, and vice chairman of NAB's Television Board of Directors, moderated the session.

Asked by Koehler about the "intensely unfair competition" from cable television systems and whether there would be copyright legislation to protect broadcasters, the senator said if the Federal Communications Commission changes its policy on program exclusivity then Congress might take a look at the situation.

Responding to King's comment that the COMSAT proposal to provide direct satellite-to-home programming in the late 1980s would be a direct satellite-to-home programming in the late 1980s would be a major shift away from local service, Hollings said he did not know if COMSAT had the authority to go through with its intention and such a move would definitely warrant Congressional hearings.

The senator also questioned the FCC's possible move into regulating children's programming and said there should not be a mandate at this time. Instead, he asserted, the networks and local broadcasters should voluntarily improve the fare of their children's programs.

cost?

What are all these interlocking trade-offs? Do we invent a technology and then find a use for it or do we define a common need and then design a technology to satisfy that need? Is an advertiser-sponsored system or a subscription system the best way to go?

KSL became involved with teletext when our corporate president, Arch Madsen, visited England, saw a CEEFAX, and asked our engineering department to build one. Using a Texas Instruments decoder, we built a computer that transmitted teletext information according to the modified standards that the British were using.

We are transmitting about 120 pages in a rotating sequence, and the viewer can pick up any one of those pages by calling it up on the decoder. Examples of these types of pages are automobile ads, weather reports, supermarket ads, etc. Touch-Tone teletext, a system that we proposed, would allow many thousands of additional pages to be put into the system and accessed very much like Viewdata: using the telephone with no connection to the phone. You call up a menu page, and, using the buttons on the telephone, you decide to go out to dinner. You search for a restaurant and, by punching buttons on the phone, you eventually come down to the target information of where you would like to go eat, with a target menu. This is just one extention that KSL has proposed, which we call

What's going on in Washington? Moderated by David Markey, NAB Legislative Counsel; Panelists (l. to r.): Rep. Homas Luken (D-OH); Rep. James Collins (R-TX); Rep. Timothy Wirth (D-CO); and Carlos Moorhead (R-CA).

The Washington Scene

Television broadcasters were told that although Congress will not pass any broadcast amendments during the convention, Congress-they should closely examine HR 6121, a bill regulating telecommunications, and the Federal Communications Commission's inquiry into the computer industry for their strong broadcasting implications.

During a panel discussion held during the convention Congressman James Collins (R-TX), Thomas Luken (D-OH), Carlos Moorhead (R-CA), and Timothy Wirth (D-CO) informed broadcasters about "What's Going On In Washington."

When questioned on the subject of financial disclosure, Congressmen Moorhead and Luken agreed the bill now in the House is "unnecessary." "The concept," Moorhead said, "is ridiculous in any field." Luken added that the bill would not get the support of the House because it leads to the "faulty correlation between profits and programming." Although Congressman Collins feels it is "a headache in many ways," if oil companies and elected officials must reveal their financial information, then broadcasters are the "third logical group to share this requirement."

In the area of cable/copyright legislation, the Congressmen agreed that any dispute arising between cable and broadcasters should be resolved by the Copyright Commission, not the FCC. Congressman Wirth said that the problems "will be hammered out by the Copyright Tribunal. That's where the problems will be resolved and fair fees for programming will be set." The FCC, Moorhead noted, has been asked to put off any decision concerning the deregulation of the cable industry until the House Subcommittee on Communications has had an opportunity to look at the copyright issues.

Comsat's proposal for direct satellite-to-home transmission of programming should receive the "careful scrutiny" of the Congress before it is allowed to compete with broadcasting, said Moorhead. Wirth suggested that Congress establish a "clear definition" of Comsat's operation and determine its effects on the marketplace before taking any action. Luken agreed that Congress should review the proposal. "We should not abdicate our authority to the FCC on this item," he said.

FCC's crystal ball

Federal Communications Commissioners Tyrone Brown, Joseph Fogarty, Robert Lee, and James Quello made some predictions for television broadcasters during the NAB convention and exposition.

Responding to questions from moderator Vincent Wasilewski, NAB president, the commissioners commented on subjects ranging from direct satellite to home program transmission, ex parte rules, advertising on public broadcast stations, ownership rules, and prime time access.

During the "FCC's Crystal Ball" workshop, Commissioners Lee and Quello stated that they would oppose any requirement for financial disclosure of broadcast stations at the FCC, while Commissioner Fogarty indicated his support for it. Noting that telephone companies are required by the commission to disclose financial data, Fogarty questioned why broadcasters were not.

On the subject of direct satellite-to-home transmission of programming, the commissioners were united, agreeing that the FCC should give it careful consideration. But while Lee called upon Capitol Hill to answer the questions concerning direct satellite transmission that he feels are beyond the commission's authority, Fogarty said he was certain the commission could reconcile local broadcast service with this "brilliant development." Commissioner Brown added that since the Comsat proposal this type programming is targeted toward competition with the various pay services, and local broadcast service would not be jeopardized.

Concerning ex parte rules at the FCC, Commissioner Lee explained that they "make it difficult for me to do a better job." Requiring visitors to submit a memorandum outlining any discussion that falls under the ex parte restrictions "discourages people from visiting us," he said.

When questioned on whether public broadcasting stations should be allowed to sell commercial time, Fogarty said he believes that they should be funded 100% by tax dollars in order to "take them out of the fund raising business." Quello and Brown agreed that public stations should continue to take institutional ads alone.

The broadcast ownership rules at the FCC, Lee said, have been "set in cement for quite a while, and they're working." Quello concurred. The rules, he said, are "reasonable, do an adequate job, and they make sense."

Commenting on the FCC's prime time access rule, Fogarty said that it is a concept that was "foisted" on the American public. And while he believes its only success was to make many syndicators millionaires, the other Commissioners agreed that it had a positive effect in reducing network dominance of prime time and encouraging more local programming, such as the Group W *PM Magazine*.

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Graphics, impressive on teletext, are used to decorate the information. We've experimented with advertising, first aid information, national headlines, and captioning for the deaf. We've been trying to do sighting for the blind, but we haven't come up with anything on that. The weather bureau computer was tied into our computer to rapidly transfer weather reports into the teletext system.

King: Bring on the new technology; television is ready for it.

KING: TV WELCOMES CHALLENGES OF THE '80's

NAB television board chairman Robert K. King, challenged the future when he stated, "Bring on the wave of new technology. It started to swell nearly 60 years ago and has yet to peak. Broadcasters were and will be on the crest."

King, senior vice president, Capital Cities Communications, Philadelphia, PA, offered the challenge during opening remarks at the television session of the NAB's 58th annual convention.

He noted that television membership in the association—657 stations—is at an all time high. Many of the newest members are UHF stations—the result of a recently completed membership drive aimed at these facilities, he said.

Noting the many activities NAB conducts, King added, "If I listed all the issues and on-going activities we would be here all day."

He did make a special plea to television broadcasters to participate in a children's programming conference jointly sponsored by NAB and NATPE (National Association of Television Program Executives) scheduled for June 25-27 in Washington.

His speech, which was in essence a stewardship report to the television membership, also complimented the association for the quality of its staff and wide range of on-going activities.

Miller: At CBS...

There has been a lot of press about KMOX-TV's tests, but that is only a little bit of it. We did some testing at KMOX-TV and on a UHF station in St. Louis. Those tests are over, although there is still a signal being radiated in St. Louis, and they turned out well. We tested about 100 locations and there was a very low error rate. (This is both the CEEFAX and the Antiope systems.)

We are currently sending a signal by satellite from New York to Los Angeles and radiating it on KNXT to find out what the ocean and the mountains will do to these signals, and also to see if satellites work. We are sending it out to our affiliates to put out over the air for the benefit of set manufacturers. I believe we will now go to a city with big tall buildings and see what kind of multipath problems we have. In short, we're trying to see what the problems are with the various systems.

Gunn: on captioning

Before discussions began in the US on teletext, there was work underway at the National Bureau of Standards and at the Public Broadcasting Service to help people with hearing impairments enjoy TV. There are some 14 million Americans with hearing impairments, about 2 million are totally deaf.

There are two approaches to provide hearing impaired with enjoyable programming. One provides *open captions*, captions or subtitles of the dialogue that appear on the screen as the program is being broadcast. We have done, and continue to do some of that at KCET, as do a number of other public television stations. However, the problem with open captions, is that people without hearing impairment find these captions a distraction.

So a search began six or seven years ago to see if there could be a way or method by which the captions could be encoded in the television signal and only decoded by those people who needed to have access to the captions or subtitles. So a system was devised for *closed captioning* in which the captioning information is encoded in the vertical interval of the TV picture, transmitted to all homes, and then decoded by those who have hearing impairments using a black box or special chip.

This system, now operational, uses line 21 of the vertical interval. Producers bring their programs to a National Captioning Institute Center in Falls Church, VA, or in Los Angeles, where skilled staffs convert scripted dialogue into captions on the various frames of the picture. This is done by working at a console with a script and literally typing this information onto a magnetic disc. When this work is complete, the magnetic disc and the program script are sent back to the producer. Then, the broadcaster transfers the magnetic disc information onto an encoding device that puts digitized subtitles or captions onto the television picture over normal broadcast signals.

At the moment, there are three sets of programs being captioned and there are three organizations involved in captioning. There are about five hours a week on ABC television network, including: *Barney Miller, Eight is Enough, Soap, Sunday Night Movie* and *Vegas*; NBC has another five hours in the *Monday Night Movie, Tuesday Night Movie, Wonderful World of Disney*; and PBS has about six hours with *3-2-1- Contact, Masterpiece Theatre, Nova, Odyssey, Once Upon a Classic* and *Over Easy*.

So, whether we know it or not, most of us are now broadcasting what amounts to a very limited form of a kind of teletext system. It is a system designed for the hearing impaired, with decoders available through Sears, Roebuck and Company's catalog. Beginning next fall, Sears will actually have decoders in their own television receivers, and others may follow suit. The promise of the future, though, is much greater. When you look at a full scale teletext system, it is possible then to not only caption in several languages simultaneously but it also becomes possible to provide a wide range of news and consumer information, emergency information, traffic information, etc.

Miller: Other activities...

I should say there are some teletext services available on some MDS systems, and the Southern Satellites Systems has UPI and AP on the blanking interval available to cable systems. Also, WETA in Washington plans an experiment to determine primarily consumer requirements. They are doing this in conjunction with the NTIA, and I think most of their interest has to do with government services.

Thus, the television teletext session provided an insight into how this technology has evolved in the US, some of its unanswered questions, and what the future may offer.

In addition, exhibitors were busy on the floor promoting various teletext systems.

Teletext: An update. The panelists, caught here in a relaxed moment, included (from l. to r.): William Putnam, Springfield Television; Hartford Gunn, Jr., KCET-TV, Los Angeles; William Loveless, Bonneville International; and D. Thomas Miller, CBS Broadcast Group, New York.

News for U's, Part 1: Technology. Dick Block (left), Broadcast Consultant, and Dan Wells, Public Broadcasting Service, were part of the team that addressed the theme of new technology for broadcasters.

An Eye and Ear in Court. Steve Nevas (right), NAB First Amendment Counsel, and J. Laurent Scharff, of Pierson, Ball & Dowd, discuss broadcast courtroom coverage. (In a separate session, Nevas talked about how to get and keep libel insurance).

How to Build and/or Modify a Broadcast Facility. Moderated by Eugene Bohi, WGHP, High Point, NC. Panelists (l. to r.) Robert Story, Austin Company; David Steele, Greenwood Point Corporation; and Wade Hargrove of Tharrington, Smith & Hargrove discussed key factors to consider in building or modifying a successful broadcast facility. □

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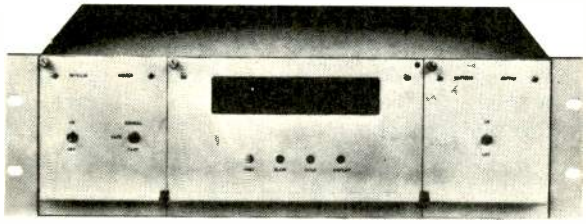

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Engineering Workshops at NAB '80/ Las Vegas

By Bill Rhodes, editorial director; Brad Dick chief engineer, KANU; and Wallace Johnson, executive director, Association for Broadcast Engineering Standards.

Even before the convention opened in Las Vegas it was known that the FCC had settled on an AM Stereo system and that SMPTE was scheduled to present a workshop on digital video. So the stage was set for fireworks and great strides forward in radio and television. Right? Wrong again.

Fireworks, yes. The FCC's decision to approve the Magnavox AM Stereo system drew sparks and sharp criticisms. As a result, the final system to be selected is still very much up in the air...as reported elsewhere in this issue. So the quick stride forward is now paused, perhaps indefinitely, before further progess is expected.

As to the digital standardization advances, the SMPTE committee didn't have much to offer there either; but they did present a clear picture of their efforts to date. Perhaps the expectations of a significant advance on a digital video standard coming so quickly after the SMPTE Converence in Toronto in January was optimistic. Nevertheless, television broadcasters are still questioning when the all-digital studio will be a reality.

Other sessions

The list of Engineering Workshops (see the accompanying panel) shows that NAB scheduled meetings on the important issues facing today's progressive broadcasters. Also, unlike the radio and TV sessions, the engineering sessions included technical papers on selected topics.

This chapter highlights the advances and problem areas brought out in the NAB engineering workshops, and includes photo replays to capture the spirit of enthusiasm permeating this year's giant convention.

Audio Processing

The session on audio processing was well attended, indicating a tremendous amount of interest in audio processing. The intent of the panel was to discuss the present state of audio processing and trends for the '80s.

The panel, moderated by Andy Laird, KDAY, Los Angeles, comprised panelists from many disciplines: Karl Lahm, Golden West Broadcasting; Thomas Rosbach, Harris; Ronald Jones, Circuit Research Labs; Vladimir Nikamorov, Bonneville Broadcast Consultants; and Robert Dietsch, WABC/WPLJ, New York.

Lahm pointed out that different stations have different needs in terms of audio processing. Naturally, an all-talk station will need a much different type of audio processing than that of a disco or beautiful music station. He felt that stations should use audio processing that would make the sound *attractive* to listeners. He felt that many stations would find that mere loudness would not, or even should not, be the most important aspect to the station's sound.

The audio quality yardsticks presently used by the industry are not adequate for today's markets. The old idea of looking at the VU or modulation meter does not tell much about the station's signal; it does not reveal the density, distortion or dynamic range of the station. And for many stations, these factors may be not only important, but *the* deciding factors in terms of setting up the audio processing.

In past years, the type of audio processing was very limited, and even the type of controls available to tailor sound was restricted. However, today audio processing equipment can have enough knobs and switches to make any program director happy. The trouble is that most people do not know how to properly use the sophistication manufacturers have made available.

Roshbach stated that not only was processing much more sophisticated today, but that digital technology would even further improve the amount and type of adjustments available. He felt that one of the primary concerns of any station attempting to properly use audio processing should be that of listener fatigue. However, there is no readily usable technique to measure such phenomenon. In fact, listener fatigue may actually be an unconscious problem for many stations.

In order to even have a chance of coming to grips with the problem of keeping a clean air sound, everything in the total system must be considered. This includes not only the console, but also turntable preamps, cartridge machines, tape recorders and any other equipment that may be in the circuit between the sound source and the listener. Present methods of testing or proofing the station are simply inadequate. If the station engineer will keep in mind that there is more to the system than the transmitter, he at least has a chance of resolving the problem of providing not only a clean sound, but also the kind of sound desired by the station management.

Nikamorov cited statistics that "overall listenership has declined 1% from 1973 to 1976." Furthermore, according to Arbitron, "the average quarter hour listenership is going down in markets." In Los Angeles, for example, "only 16.8% of adults older than 18 listen to radio in any average quarter hour from Monday to Sunday, 6 o'clock am to midnight. In other markets the figure is between 15 and 20%."

At the same time, however, he pointed out that beautiful music and classical music stations had shown tremendous increases in popularity during the same period, but music was only one of the factors. He pointed out that in New York a beautiful music station was listened to over 59% longer per occasion than the most popular rock station. He suggested that one of the reasons for the longer period of listenership was that less objectional audio processing was used by the beautiful music station.

The whole question of listener fatigue is only now coming to light. In fact, the mere definition of the subject is not easy. Rosbach called listener fatigue "non-musically related components." He stated that females seem to be more sensitive to IM that males. He emphasized that, when talking about listener fatigue, it was not the percent figure of distortion that was important but rather the type of distortion. It seems that IM distortion is much more annoying to the listener than THD.

The question of distortion and peak density also contribute to listener fatigue. Long ago background music companies found that in order to release tension, the music had to have full dynamic range. They found that a constant level did not relieve tension no matter what the music, but rather created tension. Given these facts, the whole area of listener tune-out now becomes not only a question of format, but also of audio processing.

Station management and engineering must recognize that 100% of all pre-recorded music used on the air today is already heavily processed and will be limited to around 45dB dynamic range in order to fit

on the record. This is also approximately the same dynamic range of an FM station. Since people can hear about 110dB of dynamic range, Nikamorov felt that further reduction of dynamic range was not necessary, that "loudness is the intensity attributed to a literal sensation in terms of which sounds may be ordered on a scale from soft to loud." Given the amount of processing used on many rock stations, he felt that they were not preceived as *loud* simply because there was never any *soft* to which the listener could compare. He summarized his comments by stating that "....use of heavy processing may be the worst thing that ever happened to American broadcasting."

One of the most controversial topics turned out to be that of composite baseband clipping.

Jones, manufacturer of a composite clipper, felt that there was a valid use for such devices. Furthermore, he felt that, when properly used, the station would receive beneficial results. He stated there was a need for such a device on many STLs because of the overshoot that occurs in some of the models in use today.

Dietsch stated that his reasons for making decisions on audio processing was not apparent loudness, but rather changing background levels. He made two major points during his initial presentation that were discussed later in the program. The first was that the FCC is presently looking into the area of composite clipping. Bob Orban, of Orban Associates, had submitted a paper to the FCC outlining his feelings on the subject, and some word from the FCC may be forthcoming. Dietsch felt that the FCC might rule that the use of a composite clipping system would have to be type-approved (as a system) and that might prohibit the smaller stations from using the equipment because of the cost.

His second point was somewhat off the topic of audio processing, but he referred to the FCC decision on AM Stereo as "an unmitigated disaster" to which a round of applause resulted. He further criticized the NAB Stereo Committee for "not doing its homework." Dietsch pointed out what he saw as some of the problems inherent with audio processing necessary for use with the Magnavox AM Stereo system. His concern was that there is not available (nor did he foresee the possibility to make available) an audio processor that could effectively limit negative modulation to less than 100%. Furthermore, even if the modulation were properly set at 100% at the transmitter site, some locations that are miles distance from the station might receive different levels of modulation. If those levels were to exceed the 100% negative level, then a "pop" in the receiver would result.

Dietsch felt that one of the major problems faced today by the broadcaster was the lack of a truly high-quality method of getting the studio signal to the transmitter. Naturally, the standard equalized telephone lines available are beset with their own problems, and, as noted before, even STLs are not perfect. He suggested that perhaps digital transmission was the answer. He is presently working with a manufacturer and has found that digital transmission over wideband telephone lines can result in superior results.

When questions were asked from the floor, most of them centered around the area of composite clipping. One representative from a transmitter manufacturer stated that RF engineers had spent much effort in coming out with ultra-linear modulators in order to reduce IM distortion. He felt that the addition of composite clipping was wrong and that all processing should be done on the individual channels before the lowpass filters of the exciters. To do otherwise, in his opinion, would negate the capabilities of the new type modulators

Roshbach from Harris showed a series of slides demonstrating the results of his work in both audio and composite signal clipping. He attempted to show that even 1dB of audio clipping on the left channel of an audio signal creates a certain amount of *grunge* in the baseband. His investigation showed that 1dB of audio clipping of the left channel resulted in about 1% distortion, and the correlated products were at the 1% level. The uncorrelated products were another 20dB below the correlated products. He then showed a slide with 1dB of composite baseband clipping, which he felt showed that there were many more uncorrelated products present. He stated that clipping a composite signal could even result in creating low frequency distortion components being generated. He noted that this method of clipping would indeed sound louder, but "less musical." Care also must be taken to ensure that modulation of the pilot signal does not take place with composite clipping, or out-of-band modulation might occur.

Jones replied that conservative amounts of composite clipping should be used to solve some of the

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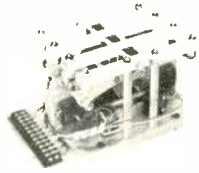

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problems inherent in the STL, not simply for achieving loudness. Dietsch and Laird agreed that they had used composite clipping and found that any distortion was "not audible" when the devices were used properly.

Orban spent some time outlining his tests around composite clipping. His concern was that, first of all, STLs should not overshoot, and second that, in some receivers, the pilot can disappear if too much composite clipping occurs. As a last note, he empha-

ENGINEERING WORKSHOPS

Audio Processing (Radio)

Digital 1980 (Television) SMPTE Workshop

Radio Facilities: Acoustical Treatment and Design (Radio)

Purchasing and Maintaining Digital Equipment and Software Today (Television)

Broadcast Systems Maintenance: Changing Relationships between Manufacturer and Broadcast Station (Radio)

Earth Station Technology (Television)

Television of the '80s: Production and Post-Production (Television)

Telephone Talk Shows (Radio)

TV Test Equipment: Overview of the '80s (Television)

AM Stereo Implementation (Radio)

Frequency Coordination (Radio/Television)

The Impact of the Region 2 Administrative Radio Conference (Radio)

TV Receiver Developments (Television)

Audio Proofs and Test Equipment (Radio)

TV Ancillary Signals-Teletext, Captioning, etc. (Television)

AM Directional Antenna Systems —Partial Proofs (Radio)

Major Market ENG: Innovative Approaches (Television)

Radio Recording and Reproducing Techniques (Radio)

ENGINEERING PAPERS AT NAB—'80

Joseph A. Maltz, ABC, New York. "Focusing on the reality of the new 1" videotape machines with its operational advantages."

Robert E. Klein, Harris Corp. "Keep your cool."

Emil Torick and **Bronwen Jones,** CBS Technology Center. "The measurement and control of loudness in broadcasting."

Lee V. Hedlund, RCA Corp. "The application of microcomputers in the design of an RCA 1" helical VTR."

Richard Edmonson, NBC, New York. "Rationalized SMPTE drop frame time code."

Howard Lilley, Ampex Corp. "1-inch helical videotape experience: a manufacturer's perspective."

sized that this was receiver dependent and that the L+R channel was most sensitive to composite clipping. Since most of the material aired today maximizes the L+R information, he foresaw a possible problem in this area.

Jim Tonne, Moseley Associates, countered that STLs overshoot at the rate of 2-3%. He felt that some people were feeding 10kHz square waves into the STLs and then claiming that the systems were grossly overshooting. He emphatically stated that this was an improper method of measuring overshoot. Furthermore, he felt that modulation monitors could also cause overshoot. In one case, he found a particular monitor with 31% overshoot with a 10kHz square wave. He pointed out that if a 10kHz square wave input to the STL was used, and then filter the output of the STL receiver to a level that would meet the FCC specifications of 40dB in the L-R region, only about 2-3% overshoot would be seen.

The final point addressed at the session was that of communication between the different members of the station's staff. As the equipment becomes more sophisticated, it may become more difficult to achieve the desired results. The panel suggested that a good technique was to ensure that there is a location where several people can gather and listen to sounds through a quality monitoring system. The engineer can also assemble a demonstration tape with different levels of distortion and compression. These techniques allow for opening up lines of communication between the members of the staff. Avoid terms like "punch, dull and lifeless," which mean different things to different people. Working together, letting the staff listen to sound sources in one place, will do much to bring everyone to a common ground not only on definitions but also on goals for the station's sound for the '80s.

Broadcast systems maintenance: Changing relationships between manufacturer and broadcast station (radio)

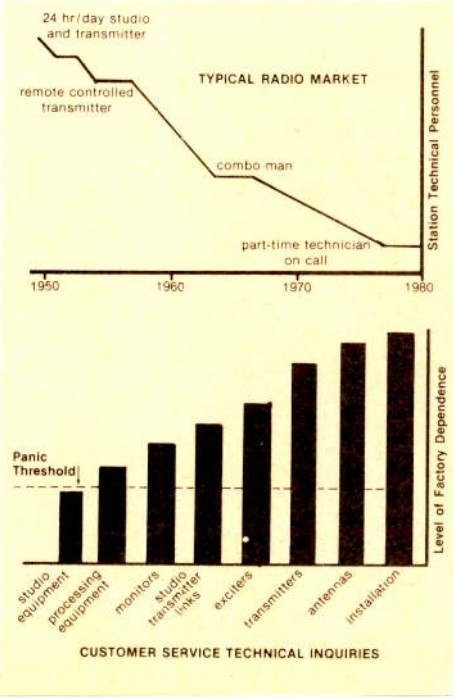
This session had an outstanding panel of manufacturer representatives and engineers, and they outlined some of the problems faced by manufacturers and broadcasters trying to stay abreast of today's technology. Those problems turned out to be centered around a couple of major areas.

Charlie Goodrich from McMartin Industries pointed out that, over the past 30 years, the number of engineers at each station has gone down drastically: today there is perhaps less than one engineer per station (see Figure 1). He pointed out that FCC deregulation would continue to erode the number of engineers at stations. Because of this factor, the role of manufacturers is also changing. Figure 2 shows where the manufacturer has had to shift the in-plant technical support staff in order to accommodate the changing demands.

As technology increases the complexity of the circuits, it also increases the reliability of the equipment. This causes many engineers to "install and forget" as Jim Hoke of Southern Broadcasting noted. The problem with this approach is that when an item does fail, the engineer does not usually have enough first-hand knowledge to rapidly make repairs. It is likely that he has not even opened up the box since it was first installed, and certainly can't remember much about the circuitry.

The question also has to be answered as to how far into the equipment the engineer must go in terms of repair. Does he simply replace the complete unit, or perhaps only replace a card? If he reaches this point, does he continue and attempt to effect repairs all the way down to the component level? These decisions are predicated on many factors, not the least of which is the ability of the engineer. The amount of test equipment, spare parts, replacement cards, and even time available are also important in making the correct decision as to how to best make necessary repairs.

Hoke suggests that the engineer get an advance copy of the instruction manual and study it. This will afford the engineer plenty of time to become familiar with the new equipment, plan for its installation and design any interfaces that may be necessary. Many times, management will not understand the cause for delays in installation of a new multi-thousand dollar box, so it is best to be prepared.



The engineer should also open up the new equipment and inspect it for damage, loose connectors, and anything that may look out of the ordinary. Make measurements and checks while at the same time noting these measurements on the schematic. At this point, run a complete proof of the equipment to be sure it is operating properly. This is the time to become familiar with the new unit, not later when it fails, Hoke stated.

Don Mager from RCA pointed out that any manufacturer hoping to be successful in today's market must develop 24-hour-service capabilities. This means that someone must be at the other end of the phone anytime a broadcaster needs help, advice or parts. Computerization at the manufacturer's level has helped the parts problem. Cross reference of part numbers, updates and model changes are now much easier to handle, and more efficient for both the manufacturer and broadcaster.

It was unanimous among the manufacturers that documentation will have to improve. Only a few manufacturers are presently making available top-quality manuals for their equipment. As the sophistication of the equipment becomes greater, the necessity of proper, up-to-date documentation will become even more necessary. Several questions were directed to the panel about poor documentation. The response was typical in that both time and cost were factors in providing documentation. It costs a great deal of money for the manufacturer to properly produce a top-quality manual for a piece of equipment. Most manufacturers rely upon the engineers involved with the development of the equipment to write the

Radio Broadcast Systems Maintenance. Jack Moseley of Moseley Associates moderated the engineering discussion of the changing relationships between manufacturers and broadcasters.

documentation. Those people are usually so close to the equipment (since they built it) that they do not supply enough information to the engineer who has to maintain it. As engineers are not necessarily writers, only the larger companies can afford skilled technical writers to produce good manuals.

The second part of the documentation problem is that of time. By the time a manufacturer has developed a product for sale, he wants to get it into the field as soon as possible. It would be very unusual for a manufacturer to withhold a piece of equipment from the marketplace simply because proper documentation was not available at the time of sale. Typically, engineers purchase a piece of equipment only to find the manual marked *Preliminary Document.*

Mager continued that his company has many seminars available to RCA equipment purchasers. While many seminars are not filled, broadcasters still call the RCA with problems that would have been explained in the seminars. He felt that there were many good ways of training engineers on the more sophisticated equipment that were not being used by the purchasers. Many firms hold in-plant seminars at no charge to the buyer, and videotapes are available to those who need them to train personnel.

Al Crego from Harris Video Systems pointed out that we have now entered a completely new area of engineering problems. Engineers may not only be faced with hardware failures, but also software failures. Yet, it still falls on the shoulders of the engineer to be able to recognize these failures and be able to deal with them effectively. Consequently, as the level of equipment complexity increases, the level of engineer competence must also increase.

Harris has developed a structured training program to help properly train new engineers with the workings of broadcast electronics. Presently, people enrolled in college classes in Quincy, IL, also spend time at the Harris facility getting actual hands-on experience. It was noted, however, that this example is an isolated case.

The practicing engineer is now facing a dilemma. The reliability of his equipment is much better than ever, requiring his attention less often. However, when it fails it is likely to be much more complex than older equipment and he may not, for a variety of reasons, be able to effect repairs. Is there a solution to the problem?

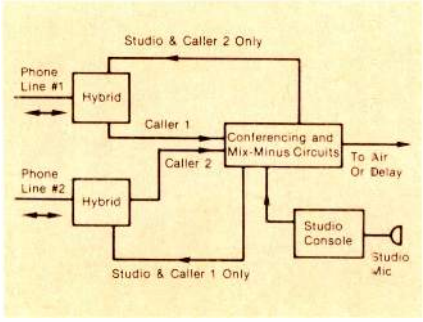
Yes, manufacturers must realize that documentation is as important as the fact that their name is on the front panel. They must be willing to admit when mistakes or updates have been made and supply change bulletins to the purchasers of the equipment. Manufacturers must provide 24-hour support seven days per week, including technical support and spare parts. Complex equipment should have some sort of training available to the buyer. When a company spends $50,000 for a piece of equipment, then the company should recognize the need to help train the buyer in the proper maintenance of that equipment.

The engineer must also accept responsibility for today's dilemma. He must be willing to open up his new equipment, and be ready to call the manufacturer and ask intelligent questions when the problems develop. He must realize that the field of electronics is advancing at a breakneck pace. Failure to keep abreast of technology development will certainly cause him to become as obsolete to an effective management team as an old 4-pin tube.

Telephone talk shows for radio

The telephone talk show has been the enigma of the radio engineer for years. It seems that, for the most part, nobody has been able to solve the many problems that exist when attempting to interface broadcast equipment to telephone equipment. For a number of reasons, most attemps end in less than satisfactory results, both for the caller and the radio station.

The panel presenting the information relating to telephone talk shows was truly top notch in their knowledge of how to solve the problems for broadcasters using telephone equipment. Norm Graham from Westinghouse said that there were three major problems to be faced when considering the proper interface necessary for radio-telephone communication: (1) caller input levels, (2) studio quality output to the audience, and (3) proper levels



Telephone Talk Shows for Radio. Norm Graham, Westinghouse Broadcasting, moderated the session on how to implement and improve quality of the telephone talk show format. Panelists were (l. to r.): Tim Brown, Comrex Corp.; John Lyon, RKO General; Peter Lomath, McCurdy Telecom; and Vern Munson, Bell Labs.

being fed back to the caller. Graham thought that the present state-of-the-art in telephone talk shows was pretty good and that there was sufficient equipment available for the engineer (if given sufficient information) to develop a good sounding system.

John Lyons from RKO General provided a unique demonstration by playing audio examples of the advances made over the years at his station in the way of talk programs. It was very interesting to hear the quality difference between the early 1950s sound and today's. One of Lyons' tapes showed how even a wireless microphone connected to a pay telephone could provide the listener with on-the-scene audio that might not otherwise be available.

Basically all of the systems used today in broadcast installations rely on the use of hybrids (see Figure 1) for the interfacing of signals between the telephone circuits and the studio equipment. The hybrid is simply a device that separates the audio signals that are traveling both directions (on the input) into two completely separate audio signals. One of these signals contains only the caller's audio for transmission to the mixing console; the other provides a way to feed back to the caller the studio audio signals from the mixing console.

The problem with the use of a hybrid is that, in order to work properly, it must be perfectly balanced. This means that the impedance of the circuits within the hybrid must exactly match that of the telephone loop being used by any particular caller. Since this is not possible in the real world, there are limitations on what can be expected with the use of this equipment. Even if a perfect balance cannot be achieved, it is possible to achieve an adequate balance for most purposes. It is only when exceptional amounts of gain are required that the hybrids begin

to cause echo problems and feedback type signals. As the panel pointed out, however, it is possible today to achieve quite acceptable results with readily available equipment.

Peter Lomath from McCurdy Industries suggested that before any equipment purchase can be contemplated, the particular format of the station must be considered. Actually, this is nothing more than deciding on exactly what the final system is expected to do for the station. He listed five choices to be faced by the station: (1) 1-on-1, or a single call-in to the studio; (2) call-in 3-party, where there exists a caller, moderator and one or more studio guests; (3) caller, moderator and a remote guest; (4) polling, or quick responses from a number of callers; and (5) conferencing, where a large number of remote callers would be electrically interconnected at one time.

In order to accomplish the desired tasks, Lomath saw three distinct pieces of necessary equipment: a call director to take the calls and route them to the hybrid; the actual hybrid that changes the 2-wire circuit into a 4-wire circuit; and, finally, the necessary processing to be used after the hybrid and before the console. In recent years, this equipment has become available to broadcasters through a number of sources. It still remains up to the broadcaster to decide how complicated his particular system needs to be. For instance, the choice of a call director will be predicated on whether or not the station needs the capability to conference callers. If not, then simpler equipment can be used. It was pointed out that some call directors can provide what is referred to as 2-wire conferencing. The audience was warned, however, that this causes real problems because there is no way the levels can be properly controlled or balanced between callers. The 4-wire conferencing will allow individual level setting on each of the incoming callers but has the disadvantage that it is necessary to process each line independently, which of course increases the cost and complexity of the system.

Tim Brown from Comrex explained his firm's method of solving the problems surrounding radio talk shows. His equipment is complete with hybrids and audio response contouring to avoid any ringing or feedback that might arise in calls. He felt that the station would be best advised to consult with those companies that specialize in the manufacture of this type of equipment if the engineer is not familiar with the problems that can exist when hybrids and associated equipment are interfaced with the studio console.

Finally, Vern Munson from Bell Telephone Labs spoke of the present-day technology available from the phone company. He felt that there was little in the way of problems when the proper equipment was used. Ironically, recent tariffs now prevent the telephone company from custom installing equipment and systems for customers as they have done in the past. Because of the tariffs, every piece of equipment used must now be registered, restricting the local company from customizing systems for stations.

Munson felt that there was another option open to the station not yet mentioned: the 4A speakerphone. With this method, the station simply connects the speakerphone output directly to the console and the caller hears the moderator on the telephone company microphone. This provides a simple, yet effective, method of achieving a telephone connection to broadcast equipment. It is, however, a switching system, which means that the caller's voice will be overridden should the moderator speak or any noise occur in the studio. Munson stated that the telephone company was presently working on some equipment in this particular area, and information would be made available as soon as possible.

Parker: World changes inevitable

James D. Parker, retired staff consultant, telecommunications, CBS Television network engineering and development department, noted the growing interplay between the US' communications regulations and international treaty regulations.

Parker was the recipient of the NAB's 1980 Engineering Achievement Award which was presented at the engineering luncheon by George Bartlett, NAB senior vice president for engineering.

Parker said that, "Sometimes changes in the international regulations have little or no impact upon our domestic operations, and sometimes changes have no immediate impact but serve to indicate technical trends elsewhere in the world which might be forerunners of changes which could later impact upon our services." Most important, he added, "major changes such as those in spectrum availability and/or spectrum sharing with other services could have a major impact even though WARC-79 (World Administrative Radio Conference '79) has been concluded."

He encouraged his audience to participate in industry activities which deal with the International Telecommunications Union's international radio regulations.

Impact of the Region 2 Administrative Radio Conference*

The panel discussion on the results of the conference held in Buenos Aires was scheduled as a technical session, but, as one of the attendees remarked, it should have attracted a large number of management people or should have been held as a management session. The results of the first conference produced the evidence, and the second conference to be held in November 1981 will conclude a hemispheric agreement which will have an impact not only on the operation of existing stations but also on the FCC's processes for several years to come.

The five panelists and moderator

*Contributed by Wallace E. Johnson, executive director, Association for Broadcast Engineering Standards, Washington, DC and moderator for the NAB Engineering Workshop on Region 2 Impact.

Region 2 Administrative Radio Conference. Wally Johnson, executive director, Association for Broadcast Engineering Standards, moderated the discussion of impact of the Region 2 radio conference on broadcasting. The panelists (l. to r.) were:

- Don Everist of Cohen and Dippell;
- Harold Kassens of A.D. Ring & Associates;
- Wilson LaFollette, FCC Broadcast Bureau;
- Elizabeth Dahlberg of Lohnes and Culver; and
- Robert Niles of Capital Cities Communications.

attempted within the hour time limit to acquaint the audience with the details of the agreements reached and the anticipated impact on broadcasting in the US. Ther was a summary of the preparatory work that led up to the conference, a description of the technical matters considered, impact on clear channels, and planning matters required before the second Conference.

There was considerable discussion, pro and con, of 9kHz channel spacing. The official US position was defended, and one broadcaster wanted to know what broadcasters could do to prohibit the implementation of 9kHz spacing.

The new agreement will be in the metric system, so the FCC eventually will change all of its rules and technical standards to comply.

Additional interference anticipated from the use of 50% of the time interfering curve, instead of the present 100% curve, together with impact on secondary service from clear channel stations with the new technical standards proposed was a subject of concern to many.

Two inventories of existing and proposed stations are in process. The first or basic inventory has already been submitted and corrections or additions had to be submitted to Geneva by May 31, 1980. The second inventory to cover stations between the period 1983-1987 must be submitted by May 31, 1981. This provides a very short period for the FCC to determine additional assignments desired, so considerable discussion was held on this point. Questions regarding the possibility of a freeze on existing assignments, potential of an assignment plan, and how broadcasters and industry can be integrated into the process in a meaningful way were considered.

Many other technical details of the first report were discussed. One of the important ideas was the invitation for engineers to participate in the activities of the Industry Advisory Committee. This Committee is studying the technical provisions in the report and analyzing the impact on US broadcasting. As a result of this activity it should be possible to identify problem areas and, hopefully, present them to the FCC so they can be modified, or eliminated. Commission processes are also being reviewed toward the end that recommendations will be formulated in an attempt to develop a procedure by the FCC which will result in meaningful assignments which can adequately compete with requirements from other countries in our hemisphere.

TV Ancillary Signals—Teletext, Captioning, etc.

The engineering session on use of ancillary TV signals was moderated by Robert O'Connor, CBS Television Network, New York. As noted in the television session on teletext, O'Connor has helped pioneer work in this area and well deserved to direct this NAB panel. Panelists were: Tom Keller, Public Broadcasting Service; Carl Eilers, Zenith Radio; Gregory Harper, Videotex Consultants; and Kevin Hamburger, ABC, New York.

O'Connor led off the session by introducing the panel, observing that multi-channel sound would be considered part of this session, and reported the status of the EIA teletext subcommittee.

O'Connor: teletext growth

This subcommittee, established about a year and a half ago, was charged with development of a single technical standard for US Teletext Service for recommendation to the FCC. In view of the accelerating interest in teletext and its complimentary service videotex (sometimes called viewdata), the subcommittee was charged with completing its task in the shortest possible time in order to preclude the defacto establishment of a multitute of "standards." (The subcommittee had initially expected to have completed its task by this time, but, due to rapidly changing teletext scene, this has not been possible. A new target date of mid-August was recently established by the subcommittee.

For the selection of a basic system the subcommittee has been conducting an extremely detailed analysis of the British CEEFAX system, the French Antiope System and the Canadian Teledon system.

For the selection of the key parameter of data bit rate the subcommittee is depending largely on the results of the CBS-VHF-UHF field test in St. Louis as well as the results of the measurement program conducted by the Sony Corporation in St. Louis. With respect to vertical interval, lines 15 and 16 appear to be suitable, and others may be possible.

In cooperation with the subcommittee, KCET in Los Angeles recently conducted a test involving signals of varying amplitudes on lines 10 through 14. The test was a phenomenal success, and the station received about 5000 completed questionnaires, which are now being analyzed. The results should provide data on what point in time some of these other lines may become available and perhaps will indicate what line allocation should be established.

The three proponents have been extremely cooperative, venturing across the ocean and down from Canada to answer our many questions. It should be noted that all systems have much in common. All generate alpha/numerics and graphics with basically similar features, such as seven or eight or more colors, double-height characters, etc. But some fundamental differences do exist and, although much effort is underway internationally to unify the systems, basic differences will continue to exist.

Lee: On Region II

Robert E. Lee, a member of the Federal Communications Commission, said he was confident that during next year's session of the Region II Radio Conference members would favorably vote on reducing AM channel spacing from 10kHz to 9.

Lee, who was chairman of the US delegation in Buenos Aires, said the US position favoring adoption of the proposal was supported by daytime broadcasters, the White House, Congress and the National Telecommunications and Information Administration as a means of making way for more stations for minority ownership. He expressed regret that some have criticized the delegation for being unprepared and said it "is frustrating to come back from a conference and hear, "Why didn't you win?'"

Speaking at the engineering luncheon, the Commissioner said this nation "just cannot go it alone" in international conferences, adding that "we have to live in the real-world community." He also said he was encouraged by Cuba's interest to participate in future negotiations.

Lee said the US held its own on the technical end of the Buenos Aires meeting and that the clear channel concept is subject to revision. There will be bilateral conversations on the subject, he said, but there will not be radical changes in the near future.

The Commissioner also said the FCC will try to give preference to minorities and daytime stations in allocating frequencies. He hoped a system of priorities would be developed but did not expect any action for two or three years.

The recommendation that the subcommittee submits to the FCC will have to meet two conflicting requirements. One, it will have to be general enough to allow for future improvements in this rapidly-developing technology. Second, it will have to be sufficiently specific to indeed establish a single standard and provide the incentive for receiver manufacturers to build a decoder. The subcommittee feels that this can be done, and is working diligently to this end.

Keller: On standards

At the same time the EIA/BTS set up the subcommittee for teletext, it also set up a committee for multichannel sound to establish (if possible) a single standard for multichannel sound. The original objective also was to have a report out by about now, but it is late due to the same problems that the teletext committee has been experiencing with changes in technology.

The group was broken down into four task forces and the two task forces that are most active at the present time are the technical systems chaired by Carl Eilers (on the panel) and the laboratory and field test task force chaired by Mike Palladino of General Electric.

There were initially four proponents, but one dropped out about a month ago. The remaining three proponents are: the EIAJ, the Japanese system; the Telesonic system, in Chicago; and Zenith Radio, also in Chicago.

Keller used slides to discuss the circuitry and technique used by each proponent's decoder for the teletext circuit.

The technical systems committee is about half-way through their technical analysis comparing the systems. The laboratory test will be conducted in the Quasar facilities in Chicago.

WTTW, the public TV station in Chicago, will be the transmitting facility for the test. A microwave inner-connect from the laboratory site to the Sears Tower will be constructed; the video signals will come from WTTW's facilities and the audio will come from the laboratory at Quasar. The test will obviously be conducted at off hours. There will be duplicate transmitter exciter facilities at the laboratory location and at the transmitter. The system will be as transparent as possible. The present schedule is: tests well underway by the middle of the summer; report sometime this fall; and around Thanksgiving, the final report into the parent PTS committee.

Eilers: the consumer set

Two topics are of concern: teletext and multi-channel sound. In the case of teletext, receiver manufacturers are concerned that it be a mass consumer item to lower the decoder costs.

It's the feeling of most people in the receiver industry that customers should pay not more than $150 beyond the price of the normal receiver. And this is particularly because it would undoubtedly go into the top of the line model, already in the $500 to $700 region. Thus, a $300 premium would be dangerous because the mass consuming public will probably not buy it.

The receiver, technically speaking, should have several facts accounted for in the design process. The transmission of the teletext signal is in the vertical interval at a data rate typically in the area of 5 or 6 megabits per second. At least the committee wants to have the highest data rate possible so that the waiting time per page than can be reduced.

Other aspects of the transmitter/receiver system touched on by Eilers in detail were: (1) use of synchronous detectors in the receiver; (2) use of saw filters to control group delay, as is done in Europe; (3) dividing the response requirements between transmitter and receiver to optimize the system parameters; (4) problems of recording teletext on present home VTRs; and (5) stereo TV audio—especially high fidelity sound, comparable to current FM stereo—and techniques for removing buzz in TV audio.

Hamburger: closed caption broadcasting

In March 1980, ABC, NBC and PBS began broadcasting about 20 hours of programming using closed caption for the deaf system. There are 14 million impaired people, over 2 million completely deaf, in the US that now have a way to enjoy television.

The background behind this service is as follows:

(1) In 1971, the networks began time and frequency tests with the National Bureau of Standards (NBS).

(2) Later in 1971, ABC demonstrated the feasibility of closed captioning at a National Conference on Television for the hearing impaired using the NBS system.

(3) Early in 1972, an NAB engineering subcommittee was formed to begin investigations of this type of a system.

(4) In February 1972, ABC did a test over the air at Gallaudet College (Washington, DC), which is the country's largest institution of higher learning for the hearing impaired. Response was overwhelming. As a result, PBS took over development of this system under an HEW contract.

(4) In 1974, PBS began on-the-air tests that led to a petition for rule making in 1975.

(5) In 1976, the FCC granted approval for full use of closed captioning on line 21.

(6) In 1979, the National Captioning Institute (NCI) was formed with offices in Falls Church, VA, and in Los Angeles to provide the service of captioning programs.

The system works as follows: (1) the program producer, or network, puts the program on videocassette with time code; (2) the cassette is sent to NCI where it (plus script, if available) is used to produce the captioning data on floppy disc; (3) the disc is sent back to the producer/network where it is played back through a microprocessor system to insert captioning data on line 21 of the video.

Hamburger then showed slides of a typical captioning editing console with light pen editor, and of the Sears decoder, available for about $250, that is based on an IC chip from Texas Instruments. Later this year, Sears is expected to market TV sets with this decoder built-in at a premium of about $75-$100.

Other efforts underway, noted Hamburger, are putting captioning on 35mm film, with time code track; live-program captioning; and use of the second channel capability of captions for another language.

Harper: The international scene

Using slides, Harper gave a quick sketch of what is happening worldwide in teletext efforts. In Great Britain teletext has been operating for several years, with a standard set in '76. Also, the French, Germans, Japanese, Swedes, Italians, Swiss and Australians are all working on teletext...it's literally happening all around the world.

He reviewed the CEEFAX and Oracle systems in Great Britain, plus the Prestel system which operates over telephone lines; the French Antiope system with its improved memory system; the Canadian Teledon system with its improved graphics display; and the Japanese (Captain) system designed for their complex problem in handling characters.

He summarized some activities at the recent Viewdata-'80 conference devoted to teletext and held in Great Britain. The French took this oppor-

tunity to show how they could place the telephone book on the Antiope system and save enough money in printing to buy every Frenchman an Antiope terminal.

Harper pointed out that both the CEEFAX and Antiope systems were on display at NAB-'80, the former at the Philips booth and the latter at its own booth.

There's a lot of creative effort underway now with teletext systems, such as: specialized character sets and fine graphic capabilities; light pen writing as system input; remote control techniques to activate home recorder, appliances, etc; and hard copy printers for permanent recorders.

In the questioning session following the panel presentations, there was concern expressed about the conflict between closed captioning and teletext, and about cost of the decoder relative to system complexity. There are still no clear-cut answers to these problems/questions because the technology is growing so rapidly. However, it was generally felt that the captioning system and teletext would remain independent systems so as not to obsolete equipment already marketed. Furthermore, by 1985 there may be a law requiring all sets manufactured to be equipped for teletext, but there were objections to the wisdom of such legislation.

Radio recording and reproducing techniques

As the technology of the industry advances, and the quality of equipment at some stations begins to equal that of some recording studios, many stations today are attempting to get into the recording business. Hence, the logic might seem to indicate that a station could relatively easily enter the area of providing recording studio services with little additional effort. However, Sidney Feldman of Mastertone Recording Studios warns that "broadcasters can't make money by trying to go into the recording business as a money-making venture." He warned that the recording aspect be approached only as an auxiliary service since many pitfalls can occur to the broadcaster who attempts to become a "recording studio." He suggests that a survey of the local market and market needs should preclude any decision to enter into the recording business.

Broadcasters will also have to develop what Michael Collett from Booneville Productions calls "better knowledge of the system approach." His concern is that any equipment purchased should properly interface with the present facilities of the station. Piece-meal addition of super-quality equipment will not likely afford the results desired.

One of the most critical aspects to consider for any additional services to be provided by a station should be that of cost *vs.* use. For example, a high-quality automated console may cost upwards of $60,000. Unless a facility can make regular use of this and its associated equipment, perhaps the total project needs to be re-examined.

When deciding to proceed with the project of adding studio capability, it was emphatically stated that experts should be called upon for the acoustical treatment of the facilities. Home-brew attempts are not likely to afford satisfactory results and, as was stated in another session, the dollars saved will not likely be appreciable.

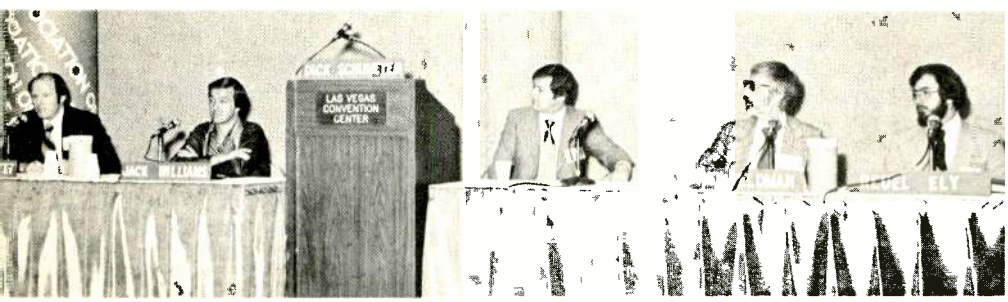
The second portion of this session was devoted to the continuing work of the NAB standards committee. It turned out to be a lively discussion with some members of the audience wanting definite answers to questions that the panel was unable to supply.

Much concern exists today about the quality of the broadcast cartridge machines and the associated carts. Jack Williams from Pacific Recorders & Engineering described his company's approach to the design of their new Tomcat cartridge machine, and noted that no present cartridge manufacturer even meets all of the present NAB standards.* He felt that the head openings and pressure pads of today's carts were the major cause of the problems encountered.

It was felt by all on the standards committee that cartridge tape machine performance should equal that of reel-to-reel equipment. Williams felt that the key might lie in treating the heads and guides of the cart machine as a system similar to that of reel-to-reel recorders. Also, if some method of maintaining repeatability from cart-to-cart quality were possible, then a large step would be made towards improvements in the sound quality. Presently the cartridge performance changes, for any of a number of reasons. One example was given where the cartridges used in one manufacturer's machine were positioned by screw heads on the tape guide mounting bracket. Naturally if these screws were replaced with dissimilar screws, then the positioning of the cartridge would be incorrect. Also, worn spots might develop on the carts used with this method of positioning, and again the positioning of the carts would be incorrect. There was real concern shown at this meeting about the quality presently available from carts. Since both equipment and tape cartridge manufacturers are aware of some of the problems, positive results will hopefully be forthcoming.

Other topics of concern centered around standardization of levels, new equalization curves and proper measurements technology. Although there was some significant disagreement as to exactly what some of these parameters really should be, there was a consensus that something should be done to effect change. The committee stated that although new standards are necessary, properly defining them would be difficult.

Furthermore, station engineers must become active and support the work of the committee. This support can be in many ways. Dick Schumeyer, session moderator, suggested that those people interested in supporting the committee's efforts contact him (Capital Cities Communications, Philadelphia, PA) for further information. Failure on the part of those engineers in the field could result in the situation evident in the AM Stereo sessions—few are happy with the results.



Radio Recording and Reproducing Techniques. Shown here (l. to r.) are: Michael Collett, Bonneville Productions; Jack Williams, Pacific Recorders & Engineering; Richard Schumeyer (moderator), Capital Cities Communications; Sidney Feldman, Mastertone Recording Studios; and Ruel Ely, MCI Corp.

*A check with the NAB Cartridge standards group refutes this statement: there are products that meet the tape standards.

FM Transmitter Roundup

Part II.

By Bill Rhodes, editorial director, and Don Markley, facilities editor

Part I of this FM transmitter roundup appeared on pages 30-42 of the May, 1980 issue of **BE** and included tables for 5kW and above transmitters and 1-5kW transmitters. The series is concluded here with a table for 1kW or less transmitters. This final section is intended to be used in conjunction with Part I, which includes a description of terms and notes on status of the industry.

This two-part article is one of a series of roundup articles on transmitters. Other roundups are being planned for future issues of **BE**, but an exact schedule has not been established. An announcement of these articles will be made when the data are gathered and organized for publication.

FM Transmitters, 1kW or less (excluding 10W)

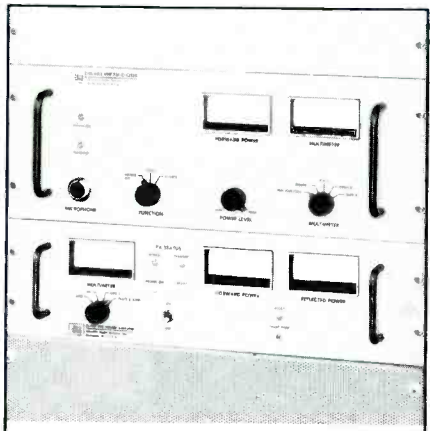
Manufacturer	Model Number	Power (kW)	Frequency Response (dB)	Harmonic Dist. (%)	IM Dist. (%)	Separation (dB)	Crosstalk (dB)	FM Noise (dB)	AM Noise (dB)	No. of Tubes	Power Used (kW, max)	Inquiry Number*
Bayly/AEG	S3161	0.01-0.1	±0.2 (40Hz-43kHz)	≤0.3	—	>40	>40	>63	>55	0	0.2	274
	S3149	0.3	"	"	—	"	"	>62	>50	0	0.6	
	S3169	0.5	"	"	—	"	"	"	"	0	0.95	
	S3157	1	"	"	—	"	"	>64	"	0	1.9	
CSI Electronics	T-1-F	-1.5	±1.0 (30Hz-15kHz)	≤0.5	—	>40	46	>68	>55	1	1.7	275
CCA Electronics	FM-100E	0.02-0.14	±1.0	<0.5	<0.5	>35	>40	>60	>50	0	0.38	276
CETEC Broadcast Group	80-250M	0.1-0.3	±0.5	<0.25	<0.25	—	—	>65	>50	0	0.8	277
	SS500F	-0.6	"	"	"	—	—	"	>55	0	1.3	
	601A	-1.5	"	"	"	—	—	"	"	2	3.3	
Harris	FM-100K	0.1	±0.5	≤0.4	0.4	≥40	45	≥65	≥50	0	—	278
	FM-300K	0.3	"	"	"	"	"	"	"	0	(Note 2)	
	FM-1K	1.0	"	"	"	"	"	"	"	1	2.1	
LPB	FM-150SS	0.1-0.15	±1.0 50Hz-15kHz)	≤0.35	—	>40	—	>70	>60	0	0.3	279
McMartin Industries	BFM-50	0.05	±0.5 (30Hz-15kHz)	≤0.3	0.2	>40	40	≥68	≥65	0	0.175	280
	BFM-100	0.08-0.12	"	"	"	"	"	"	"	0	0.275	
	BFM-1M	0.25-1.5	±0.75	"	"	"	"	"	≥55	1	1.7	

continued on page 146

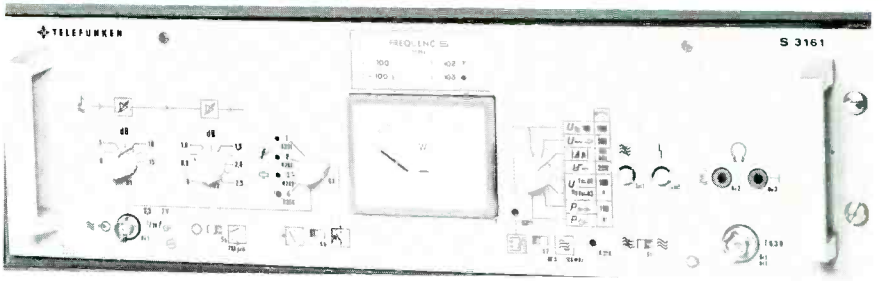
FM Transmitters, 1kW or less (excluding 10W) *continued from page 145*

Manufacturer	Model Number	Power (kW)	Frequency Response (dB)	Harmonic Dist. (%)	IM Dist. (%)	Separation (dB)	Cross-talk (dB)	FM Noise (dB)	AM Noise (dB)	No. of Tubes	Power Used† (kW, max)	Inquiry Number*
NEC America	FBN-7001S	0.15	±0.3 (30Hz-53kHz)	0.5	0.4	>39	40	63	53	0	0.5	281
	FBN-7003S	0.3	"	"	"	"	"	"	"	0	1.0	
	FBN-7005S	0.5	"	"	"	"	"	"	"	0	2.0	
	FBN-7010S	1.0	"	"	"	"	"	"	"	0	2.5	
	FBN-1010E	1.0	"	"	"	"	"	"	"	0	2.5	
Rockwell Int'l.	831C-2	1	±1.0	≤0.5	≤0.5	35	—	65	55	1	2.0	282
Versacount Engineering	LA-150	0.15	—	—	—	—	—	—	—	0	—	283
Wilkinson Electronics	FM-60E	0.06-0.1	±0.5	0.35	—	50	50	65	60	0	0.25	284
	FM-250E	0.25	"	0.5	—	"	"	70	"	1	0.65	
	FM-500SS	0.05	"	0.2	—	"	"	66	"	0	0.85	
	FM-100SS	1.0	"	"	—	"	"	"	"	0	1.6	
	FM-1000E	1.0	"	0.5	—	"	"	70	"	1	2.56	

†Some Power Consumption levels are listed for nominal, rather than maximum, output.
*To obtain complete FM transmitter data from each manufacturer, use the reader service card and circle the appropriate inquiry number indicated.



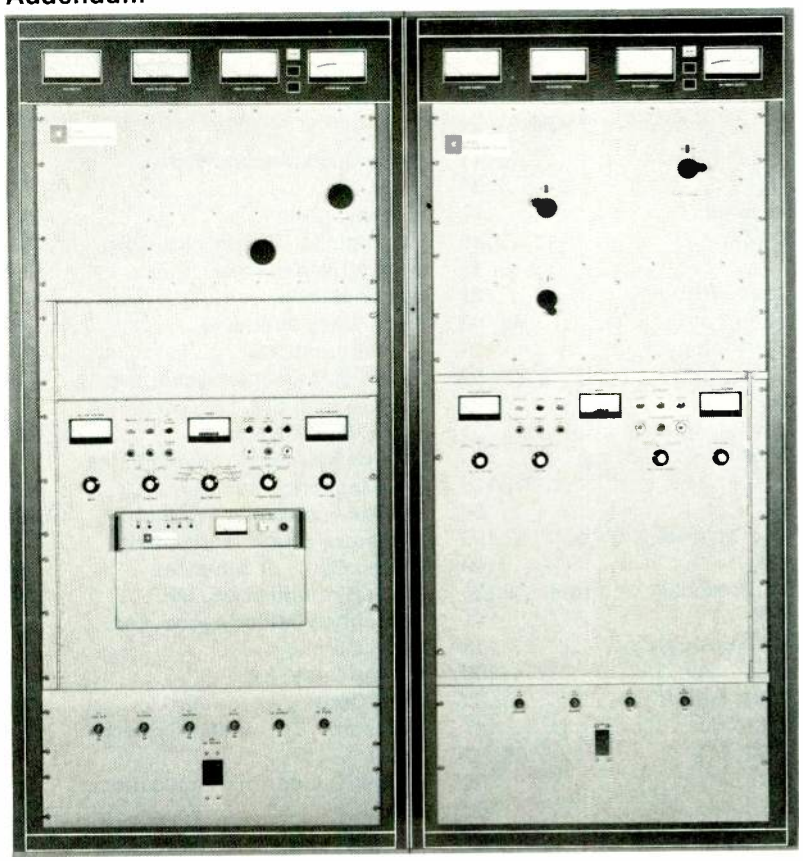
Scientific Radio Systems. This SR-416 1.25kW VHF-FM transmitter, not included in the broadcaster transmitter tables, has been developed for the National Weather Service. It broadcasts continuous weather/disaster information on 162.40, 162.475 or 162.55 MHz. If you would like data on the transmitter, or SR-401 antennas/receivers, use 300 on the reader service card.



Bayly Engineering/AEG-Telefunken. The S3161 (above, 100W) and S3168 at 3kW are 100% solid state; the S3152 at 10kW use only one tube (an RS1032CL tetrode) in a grounded cathode circuit. The S3161 will operate as low as 20W to satisfy low-power applications. In addition to power saving and freedom from maintenance inherent in the solid-state design, these transmitters serve as building blocks: power increases are obtained by adding amplifiers without obsoleting the original transmitter.

Claimed to the world's first solid state 3kW FM transmitter, the AEG S3168 system (right) is scheduled to be on the air in the Spring of 1980 at the Hardtberg, GR station.

Addendum



Front view of the Model 625A. Left cabinet houses 2kW driver transmitter; right cabinet houses power amplifier.

Inadvertently, the high power Cetec FM transmitters were omitted from the High Power FM transmitters table in May's issue. Details on these units are presented below.

Cetec FM Transmitters

- Model 610A—7.5-13kW
- Model 625A—17.5-25kW
- New 690PLL phase-locked loop exciter
- Final amplifier driven by lower-power transmitter
- Suitable for Class B and Class C station application

The Cetec 610A and 625A FM transmitters comprise a family of highpower units for a nominal output power range of 10-25kW.

Both are suitable for Class B and Class C station use. And they can be combined for a nominal 20-50kW for redundancy and special high power/minimal number of antenna bays application.

Both transmitters use a grounded grid triode final amplifier driven by a lower power transmitter employing the Cetec Model 690PLL phase-locked loop exciter; the 610A uses a Model 601A as its driver, while the 625A is driven by a Model 602A. These driver transmitters are capable of operating directly into the antenna feed should it ever be necessary. □

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REMOTE TRUCK, STEP-VAN, air-conditioned, with VIX-1 switcher, 3 CEI 280A cameras, Ampex AVR-2 recorder with TBC, Robins Fairchild audio console, Datatron SMPTE time code generator and reader, monitors, vectorscope, microphones, tripods, dollies, cables and more. $125,000. Write or call Dennis Doyle, Chief Engineer, WEDU Television, 1300 North Boulevard, Tampa, Florida 33607; (813) 253-2736. 6-80-1t

USED BROADCAST CARTRIDGES, Fidelipac $35.00, Audiopak $45.00 per hundred, as is, freight paid. Miscellaneous parts reasonably priced. CART MART, BOX 3066, FORT WORTH, TX. 76105. (817) 536-6437. 5-80-3t

COLOR CAMERAS: Two IVC 300A Camera Chains each complete with 10 x 1 zoom lens, mini-cable, pan head, dolly, tripod, etc. Plumbicons in good condition. Very reasonably priced. Call Engineering—904/354-2806. WJCT-TV, 2037 Main Street, Jacksonville, FL 32206. 6-80-2t

COPPER STRAP, Ground Screens and #10 wire, BCA, (404) 487-9559. 1-80-tfn

EQUIPMENT FOR SALE (CONT.)

SYSTEM ASSOCIATES

5801 Uplander Way • Culver City, California 90230

USED BROADCAST TELEVISION EQUIPMENT WANTED AND FOR SALE

If you are not receiving our free flyer of equipment listings, please call or write to be added to our mailing list.

(213) 641-2042

SCHAEFER 800T STEREO BRAIN, logger, network joiner, Random Select Carousel, in 4 Schaefer racks. $2500. (209) 223-0241. 6-80-1t

RCA TT-10AL VHF TRANSMITTER—Working good, Channel 6, many spares, $5,000.
RCA TT-35CH VHF TRANSMITTER—All spares, good condition, Channel 10, $20,000.
RCA TT-50AH VHF TRANSMITTER—Excellent, many spares, Channel 11, $12,000.
COMPLETE FILM ISLAND—PE 240, Eastman 285's, TP7, Eastman Multiplexer, $30,000.
CVS 504B TIME BASE CORRECTOR—Recently reconditioned, $4,000.
GE PE-400 COLOR CAMERAS—Pedestals, racks, super low price! ea. $7,000.
GE PE-350 COLOR CAMERAS—All accessories, good condition, ea. $4,000.
GE PE-240 FILM CAMERA—Automatic gain & blanking, $8,000.
ADC 558-3 SWITCHER—$40,000 if new, loaded, perfect, $20,000.
CDL VSE 741 SWITCHER—12 input, chroma key, $4,000.
RCA TK-27A FILM CAMERA—Good condition, TP 15 available, $12,000.
RCA 1600 FILM PROJECTORS—New, factory cartons, TV shutter, ea. $900.
EASTMAN 250 PROJECTORS—Recently removed from service, ea. $2,000.
EASTMAN CT-500 PROJECTOR—Optical and mag sound, ea $7,000.
RCA TP-6 PROJECTORS—Reverse, good condition, ea. $1,000.
AMPEX 1200A VTR's—Amtec, Colortec, one with editor, ea. $22,000.
IVC 960C VTR's—Portable model, working good, ea. $3,000.
NORELCO PC-70 COLOR CAMERA—16x1 200M lens, 2 available, new low price, ea. $14,000.
NORELCO PCP-70 COLOR CAMERA—Portable or studio use, $4,000.
VHF ANTENNA—RCA BATWING, available now, $4000.
UHF ANTENNAS—Various models and prices. To buy or sell, call Toll Free (800) 241-7878, Bill Kitchen or Charles McHan, Quality Media Corporation. In GA call (404) 324-1271. 6-80-1t

3M BRAND ELECTRON Beam Recorder. Used for television image recording, both live and duplication of taped material. Also used for satellite & spacecraft transmission. Electronic image generation & medical research applications. Sacrifice (212) 388-4024. 6-80-1t

2 RUSCO TURNTABLES, 20 hrs., w/tonearms, Stanton 600EE. 305-689-2481, AM. 6-80-1t

ANDREW LINE & CONNECTORS READY FOR EMERGENCY SHIPMENT ANYWHERE BY AIR. Broadcast Consultants Corp., (703) 777-8660, Box 590, Leesburg, VA 22075. 10-79-tfn

4 SALE: (5) PC-70 CAMERAS, all or any part, updated, top condition, plenty of spare modules, (2) 18:1 zooms, (1) 16:1 zoom, (3) 10:1 zooms, including one servo. 3000' of camera cable. Please call Clair Higgins at Video Tape Enterprises, Hollywood, CA, (213) 659-4801. 6-80-1t

TEKTRONIX like new 1480-R-01 waveform monitor, R-520-A vector scope, 1410-R/SPG2/TSG1/TSG2/TSG3 modular generator system. Purchased for lease-rack mounted but never actually put in service. Immediately available. Afternoons (913) 722-5633. 6-80-1t

EQUIPMENT FOR SALE (CONT.)

AMPEX AVR-2 VIDEOTAPE RECORDERS: Three fully loaded nearly new VTRs (two with editors), equipped with dropout comp., Autochroma/velocity comp., auto tracking, and full color monitoring, interfaced to CMX-300 system, plus three spare heads. Contact Rod Hall at (213) 577-5400. 3-80-4t

REMANUFACTURED AMPEX 1200B VTR, Amtec, Colortec, Mark II Editec, overhead bridge, spare head, compressor, Venturi vacuum system, manuals, and extenders. Less than 125 hrs. use since AFA rebuild, mint condition. Call Bob Chetrick, (616) 774-8338. 6-80-2t

40' TV VIDEOTAPING PRODUCTION UNIT. Latest network & engr. maintenance equipment, etc. (213) 397-5922. 6-80-tfn

NEED A SPARE CRYSTAL? We have a money saving sale on in-stock crystals for AM, FM, and TV transmitters. Many types and frequencies for R.C.A., Collins, G.E., Gates/Harris, H-P monitors, etc. Write us details of types and frequencies needed for quotation. Eidson Electronic Co., Box 96, Temple, Texas 76501, (817) 773-3901. 6-80-1t

RCA TT-10AL TELEVISION TRANSMITTER operating on Ch-2, $15,000.00. Buyer moves. Contact KNOP-TV, P.O. Box 749, North Platte, Nebr. 69101 or phone (308) 532-2222. 6-80-1t

FOR SALE, NORELCO PC-70, studio camera (never on mobile) $14,990.00, financing available for qualified principals, North American Video, (212) 369-2552. 6-80-3t

Red Hot Specials on BROADCAST TUBES. Every tube factory guaranteed! LEAD-OXIDE CAMERA TUBES: Equal to XQ1020R-G-B*, XQ1023R*, XQ1025R*, XQ1070R-G-B*, XQ1075R*, XQ1427R-G-B*, 55875R-G-B* VIDICONS: 4493-4-5, 7735A/B, 8134V1, 8480V1 8507A, 8541A/B. IMAGE ORTHICONS: 4536, 5820A, 7295B, 7389C, 8673/S. TRANSMITTING TUBES: 3CX2500A3/F3, 3CX-3000A1/F1, 3CX3000A7, 3CX10,000A7, 4CX5000A, 4CX10,000D, 4CX15,000A, 4W20,000A, 4CX-35,000C, 4CX1500A, 833A, 892R, 5762, 6076, 6166A/7007, 6251, 8807, TH331. Inquire about new and used broadcast equipment. Extended credit terms/leasing available. **Famous 3000 hour warranty Spectracon tubes.* Toll Free: 800/645-2300, New York: 516/599-6400. TEMTRON ELECTRONICS LTD., 15 Main Street, East Rockaway, New York 11518. 6-80-1t

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ENGINEERING POSITIONS

We specialize in the placement of TV and Radio Engineers with Broadcast Stations, Manufacturers, Industrial TV, Production Facilities and Dealers; all levels, positions and locations nationwide. Professional, confidential - no fee. Best Industrial Reputation - over 1000 client contacts. To discuss your employment possibilities phone Alan Kornish at (717) 287-9635 or send your resume' now.

KEY systems

NEW BRIDGE CENTER, KINGSTON, PA. 18704

TRANSMITTER TECHNICIAN and studio maintenance engineer needed for well-equipped small market TV station in Idaho. Get away from the crowds and to the good life. Excellent pay, fringe benefits, an equal opportunity employer. Resume to Dept. 502, Broadcast Engineering, Box 12901, Overland Park, KS 66212. 5-80-2t

HELP WANTED (CONT.)

RADIO ENGINEER FOR WKYU-FM, Western Kentucky University's new 90KW public FM station. Duties will include routine maintenance of the studios and transmitter, regular performance tests, and completion of tests, logs, and engineering reports required by the FCC. Successful applicant will assist in the construction of the station. Qualifications required are as a First Class license and a minimum of three years experience radio and related areas. The position is a twelve month faculty position with a competitive salary. Send resume and references to: Dr. Charles M. Anderson, Director of Media Services, Academic Complex 153, Western Kentucky University, Bowling Green, Kentucky 42101. An Affirmative Action/Equal Opportunity Employer. 6-80-1t

BROADCAST ENGINEERING TECHNOLOGY INSTRUCTOR: For two-year associate degree program training technicians in maintenance of broadcast equipment and facilities. Formal teaching experience not required. Excellent opportunity for the person who likes to work with young people. Program presently one of fastest growing in Ohio's fourth largest technical college. College has own studio. Experience in the broadcast engineering field and First Class FCC license required. Salary commensurate with experience and education. Affirmative action, equal opportunity employer. Send resume or call Personnel Office, Hocking Technical College, Nelsonville, Ohio 45764, (614) 753-3591. BP/Ims. 6-80-2t

TELEVISION MAINTENANCE ENGINEER: Degree in Engineering or two years of formal electronic schooling required. First Class FCC License preferred. At least one year experience in TV studio and video maintenance. Duties: Installing, repairing & maintaining TV studio cameras, VTR, station video distribution, and studio production equipment. Excellent benefits. Send resume: WHRO, Personnel Department, 5200 Hampton Boulevard, Norfolk, Virginia 23508. Deadline June 16, 1980. Equal Opportunity Employer. 6-80-1t

HELP WANTED (CONT.)

LOOKING FOR GOOD ASSISTANT chief engineer, familiar with RCA transmitter—TR 600, TK 630 Sony, Phillips engineer. Contact: Jim Robinson/WECA-TV, 904-893-3127. 6-80-tfn

HELP WANTED (CONT.)

MAINT. ENGR. ENG. Expr. with Sony 2850A-200A-50 Machines/HL-77 & HL-79 cameras, microwave. 1st FCC. TV studio & transmitter expr. desirable. KFMB TV AM FM, P.O. Box 80888, San Diego, California 92138. Attention: J. D. Weigand. An Equal Opportunity Employer M/F. 6-80-2t

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At TPC the stars behind the camera count as much as those in front. So, we have a constellation of creative technical talent whose business it is to make everything just a little brighter.

If your engineering talent shines very brightly in—

- **Computer video tape editing**
  (HVS EPIC)
- **On location video**
  (RCA TK-76)
- **Electronic Film Color Correction**
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Production Plaza, Sewickley, PA 15143

Engineers

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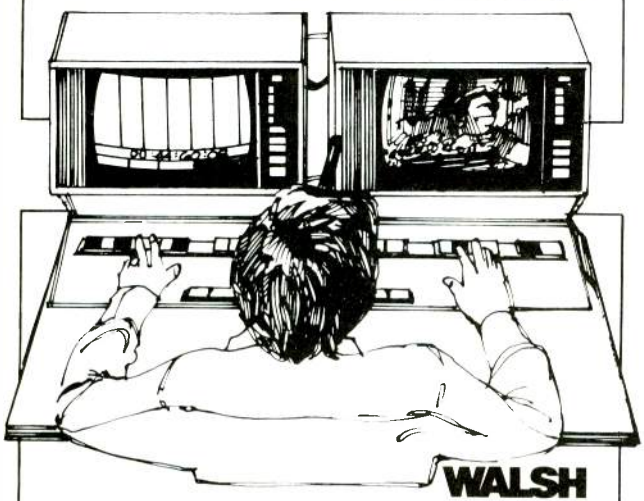

We represent a major electronic corporation. Our client is looking for additional outstanding talent to continue a tradition of excellence. You'll be joining a well established world-wide equipment manufacturer. Immediate openings in the following areas:

SENIOR TRAINING SPECIALIST

You'll interpret new engineering developments for manufacturing and marketing as well as the customer; develop training manuals & audiovisual training tools. You should have a BSEE and the ability to communicate effectively verbally and in writing.

PRODUCT ASSURANCE ADMINISTRATOR

You'll be liaison between engineering and manufacturing staffs and customers in all areas affecting quality. Assure technical compliance with customers' quality requirements. You'll also handle customers' problems and review quality control specifications and assurance procedures. Product assurance experience in broadcast systems is helpful.

FIELD PROJECT ENGINEER WORLD WIDE ASSIGNMENTS

You'll direct technical projects in a field that extends around the world! You should be willing to travel WORLD WIDE 50% of the time. To qualify you must have understanding of the latest generation of TV Broadcast equipment.

If you have these qualifications and are interested we are waiting to hear from you. Call collect or send resume.

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Broadcast Placement Service
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Dept. BE
638 Newtown Yardly Road
Newton, PA 18940

HELP WANTED (CONT.)

WANTED—Experienced combination lighting and cameraman for expanding Mid-West production facility. Top salary and benefits. First Phone required. Send resume to Bob Aaron, Engineering Operations Manager, KPLR-TV, 4935 Lindell Boulevard, St. Louis, MO 63108. 5-80-2t

SOUTHEAST VHF NEEDS experienced maintenance engineers. Competitive salaries, advancement opportunity, full benefits including profit sharing. WIS-TV is presently building new studio facilities, construction complete in Fall 1980. We are 3 hours from the beach and the mountains. Get in on an expanding state-of-the-art operation. Send resume to P.O. Box 367, Columbia, South Carolina 29202, or call Danny Brown at WIS-TV, (803) 799-1010. An Equal Opportunity Employer. 6-80-1t

NEEDED IMMEDIATELY. Two good TV supervisors, **HEAVY** on maintenance. One studio and one transmitter with studio responsibilities. Salaries low 20's. Opportunity Assistant CHIEF ENGINEER. Contact Bob Hardie, 918-583-3344, 507 S. Main, Tulsa, Oklahoma 74103. EOE. 6-80-1t

OPERATING ENGINEER. 1st Phone required. Experienced in video tape editing, master control operations, production, and studio support. Aggressive TV operation in South Florida, a great place to be. EOE, M-F. Send resume and salary requirement to Personnel Department, WPEC, Fairfield Drive, West Palm Beach, FL 33407. 6-80-1t

MAINTENANCE ENGINEER needed by a large innovative CATV and teleproduction facility. Video maintenance experience necessary. Full benefits and technical training provided. Interested parties please submit resume to: Employee Relations Supervisor, Warner-Amex QUBE, 930 Kinnear Road, Columbua, Ohio, 43212. 6-80-1t

CHIEF ENGINEER: Growing network VHF station in deep South seeking Chief Engineer. Must be experienced with studio, transmitter, tape Eng., microwave. Will consider young, ambitious asst. chief or technician who has the knowledge and wants to advance. Reply to Dept. 499, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. Equal Opportunity Employer. 4-80-3t

MAINTENANCE ENGINEER: Minimum requirements—FCC 1st phone, 3-5 years TV maintenance experience, preferably with some R-F, for group owned VHF independent. Send resume to Bill Strube, KPHO TV, Box 20100, Phoenix, AZ 85036. 6-80-3t

TV ENGINEER: Operating and maintenance VHF transmitter facility. Send resume to: Don Smith, Chief Engineer, WRDW-TV, Drawer 1212, Augusta, GA 30903. EOE. 6-80-1t

SOUTHEAST TELEVISION STATION has an opening for Studio Supervisor. FCC First Class License required. Studio equipped with RCA tape, Philips and RCA camera, Grass Valley switcher, ¾" Sony, etd. Send inquiries to Dept. 504, Broadcast Engineering, P.O. Box 12904, Overland Park, Kansas 66212. We are an Equal Opportunity/Affirmative Action employer. 6-80-4t

T.V. BROADCAST TECHNICIANS wanted for new independent station in major market in Sunbelt. Duties include, maintenance and operation of state-of-the-art equip. Minimum 5 yrs. experience in TV studio equipment and/or TV Transmitters; and 1st phone license a must. Send resume and salary requirements to Dept. 505, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 6-80-1t

BROADCAST ENGINEER: Dutles: master control, transmitter, production, microwave, & earth station maintenance. Rotating shifts, first class license. Salary range: $12,720 to $15,532 per year. Contact Kirk, WDSE-TV, 1202 East University Circle, Duluth, Mn. 55811. Phone 218-724-8568. An Equal Opportunity/Affirmative Action Employer. 6-80-1t

VIDEO TECHNICIAN NEEDED, young, aggressive —for growing video production company authorized service center and manufacture rep's for most major video products. Call (413) 525-3368, ask for Walter. 6-80-1t

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Excellent career opportunities are immediately available with the Grass Valley Group, for talented people with television industry experience in these areas:

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These challenging positions combine chances for U.S. travel plus marketing and engineering career opportunities. Individuals with experience designing and/or maintaining television broadcast systems are required to provide after-sales support for our wide variety of complex systems.

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Here's an opportunity to design custom systems for a variety of GVG customers. Candidates should have a strong technical background in television systems with good basic circuit design knowledge.

Project Engineer

This excellent growth opportunity requires an individual with video project experience plus BSEE or equivalent, to assume responsibility for challenging research and development projects.

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This key position requires someone with an excellent technical background in broadcasting. Preference will be given to people with proven sales experience. Excellent company benefits plus sales and commission program are available to the successful candidate.

The Grass Valley Group offers a state-of-the-art technical environment in a serene rural setting. We are located at the foothills of California's Sierra Nevada mountains, where you'll find a relaxed lifestyle and abundant recreational activities.

Interested and qualified candidates are invited to send a resume in confidence to Sylvia Smith, The Grass Valley Group, Inc., P.O. Box 1114, Grass Valley, CA 95945. An equal Opportunity Employer M/F/H.

Grass Valley Group

A Tektronix Company

HELP WANTED (CONT.)

TV PRODUCTION CO. NYC CHIEF ENGINEER: Top salary and benefits for right person. Video production company New York City, seeks top drawer energetic management level individual. Must have minimum 2 years experience as supervisor of engineering-production, maintenance and design. Experience with quads, IVC 9000's cameras and knowledge of computer animation equipment valuable. Call Bruce Davis 212-628-5986. 6-80-1t

BROADCAST TECHNICIAN: Experienced in master control, video tape, telecine operations and studio maintenance. Must have first class FCC license and a minimum of 3 years practical experience. Send all replys to the attention of Chief Engineer, WSNL-TV, 3200 Expressway Drive South, Central Islip, New York, 10022. An equal opportunity employer. 6-80-1t

ASSISTANT VIDEO ENGINEER—Assistant Video Engineer needed to work on state-of-the-art Sony broadcast 1" and ¾" video systems as well as standard audio/visual equipment. Requires background in electrical and electronic theory, ability to read schematic drawings and understand circuit construction and layout. Should be capable of performing most maintenance work on U-Matic machines and some routine maintenance and alignment of broadcast video equipment. Midwest location. Send resume to: Dept. 503, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66215. 6-80-1t

WANTED

WANTED: Pre-1926 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-76-tf

WANTED: RADIO TRANSCRIPTIONS 16" "Eddy Arnold Purina Shows" by Brown Transcription Service. Would purchase all or tapes made from same. Want other 16" and 12" transcriptions and Radio Station Library's of Records, 78's, 45's, L.P.'s, etc. Boyd Robeson, 2425 W. Maple St., Wichita, Kansas 67213, (316) 942-3673, 722-7765 nites. 6-80-tfn

HIGHEST PRICES PAID for 112 Phase Monitors and for clean, 12 year old or less, 1 KW and 10 KW AM Transmitters. All duty and transportation paid. Surplus Equipment Sales, 2 Thorncliffe Park Dr., Unit 28, Toronto, Ontario, Canada, M4H 1H2. 416-421-5631. 2-79-tfn

INSTANT CASH FOR TV EQUIPMENT: Urgently need transmitters, antennas, towers, cameras, vtrs, color studio equipment. Call toll free 800-241-7878. Bill Kitchen, Quality Media Corporation (In Georgia call 404-324-1271). 6-79-tfn

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Phone: (913) 888-4664

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Los Angeles, CA 90010
Phone (213) 387-0639

LONDON, ENGLAND
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Leicester Square, London, WC2H 7AS,
England;
Phone: 930-0525
Telex: 895-2387

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John Ashcraft & Co., John J. Lucassen,
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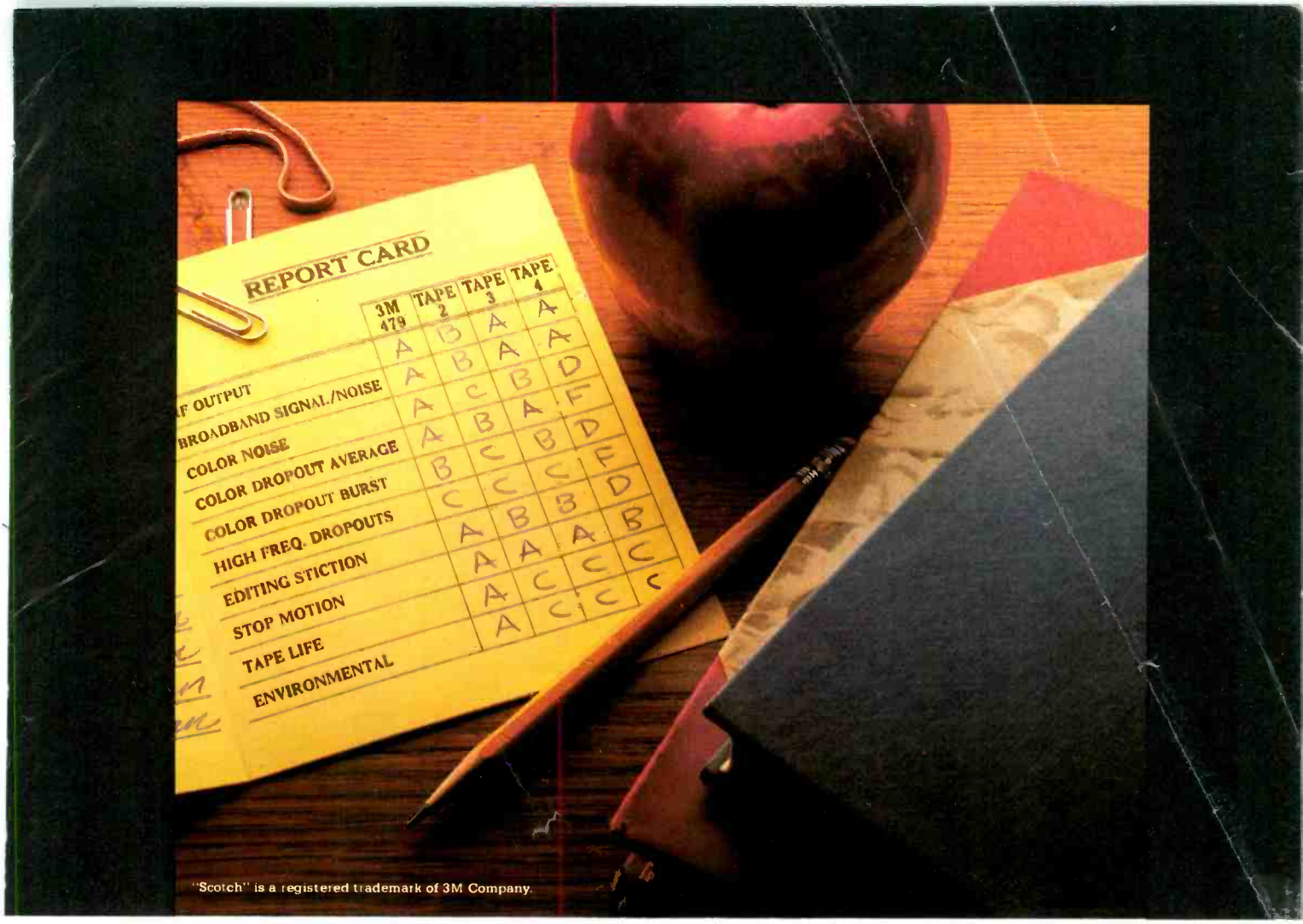

IN A TEST OF ONE-INCH VIDEO TAPES, WE ACED OUT THE COMPETITION.

When we tested the top four brands under strict lab conditions, the overwhelming performance leader was Scotch 479 Master Broadcast Video Tape. In fact, we came out on top in all ten performance categories.

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We're the people who pioneered the development of video tape 25 years ago. And according to the pros who know video tape best, we're still the best video tape. Give or take an inch.

3M

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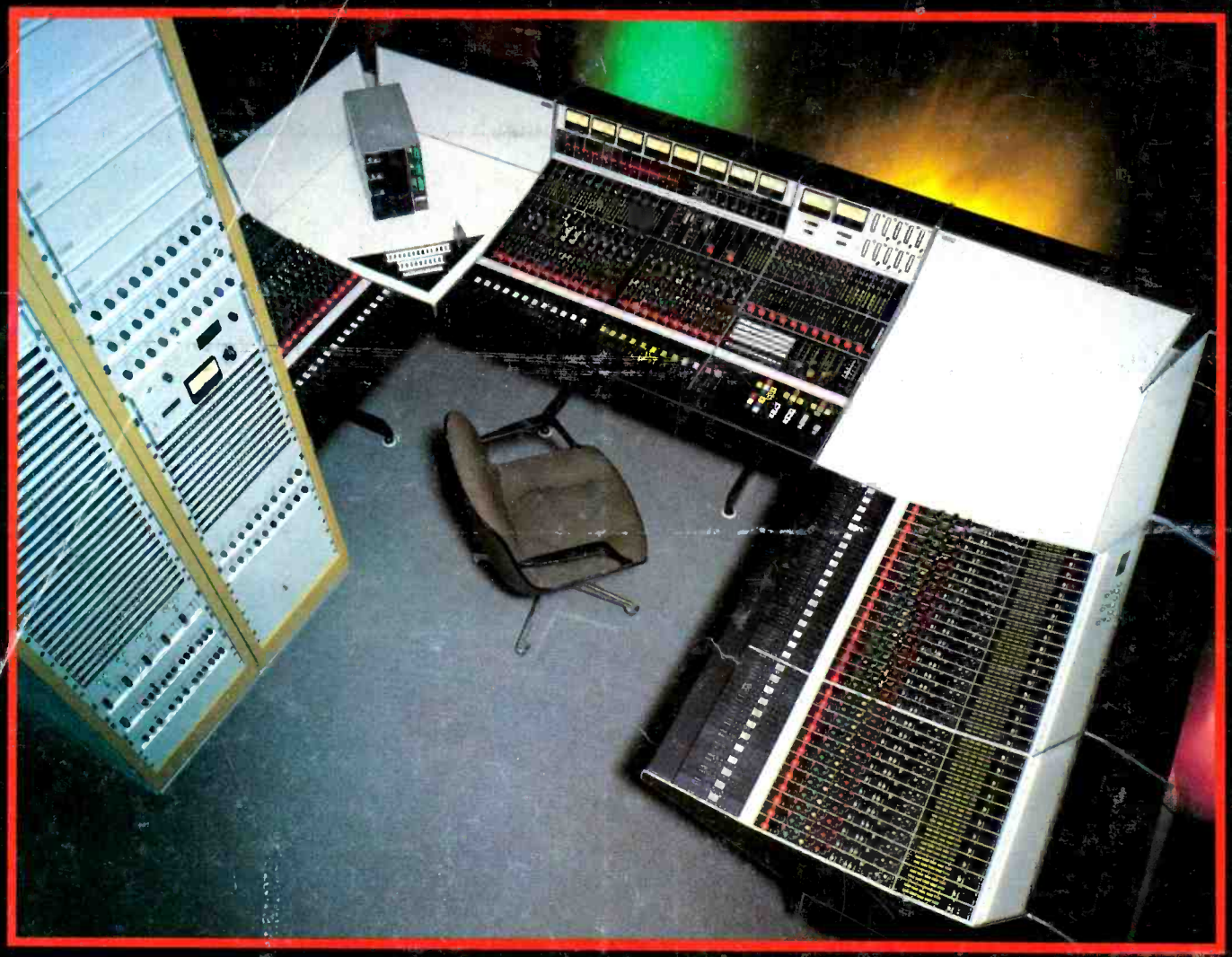

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