1979 BUYERS' GUIDE ISSUE

The broadcast industry's comprehensive product directory
Wherever reliability, transparency, power and size conservation are of critical importance, NEC's Television Routing Switcher takes first place honors. The TKA-105 is capable of behind the scene operation in any 60X60 matrix or larger application, from fixed station to Olympic coverage.

All audio signals are digitized in the TKA-105, with provisions for up to 4 discrete audio channels for each video input. Major design advancements include 8X1 crosspoint chips, 1X6 video distribution amplifier chips, and full microprocessor logic in every controller. Optional NTC-7 VITS signals may be added asynchronously to each input for automatic signal verification. Controllers are available in a variety of styles including touch-pad with the ability to select any of the four audio channels and perform A/B comparisons.

The TKA-105 Switcher offers performance specifications far superior to the equipment signals it routes, and is capable of outside data interface, permitting computer, mini-computer, or microcomputer switching commands plus switch station feedback loops. Whatever events you want to cover you can "make the scene" thanks to LSI technology, from NEC, the world's leading manufacturer of semi-conductors.

Call Toll Free 800-323-6656
24 hours a day. In Illinois call 312-640-3792.

NBC will be using the TKA-105 in their coverage of the Moscow Olympic Games in 1980.
Put your heads in the most capable hands in the industry.

Our Years of Technical Expertise Have Made Us The World's Largest Independent Head Refurbisher

Over 10 years and 18,000 video heads ago, we decided we were going to be the leading independent in quad head refurbishing. To accomplish this, we knew we had to do things better than Ampex and RCA. Our location in the center of U.S. video technology made it possible for us to put together a marvelous marriage of people and technology. It also made it possible for us to achieve our goals.

Many of our technical experts and production people have been with us from the beginning. It's people like this, with their special skills, who put their heads together to provide over 1,000 customers all over the world with the most technically perfect refurbished video heads and the finest service support anyone could possibly ask for.


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THE COVER

The 1979 Broadcast Engineering Buyers' Guide cover reflects the two major markets for manufacturers of broadcast equipment: television and radio.

Counter-clockwise from upper right,
the cover depicts:
• a simulated TV news studio as demonstrated at NAB '79 in Dallas (Photograph by Christopher Cave, One to One Photography, Dallas, TX);
• the Mt. Sutro transmitting tower which dominates the San Francisco skyline (Photograph by Don Lincoln, KPIX, San Francisco, CA);
• the WABC/Radio studios in New York (Photograph by Robert Deitsch, WABC/Radio, New York, NY); and
• a directional antenna array for radio (Photograph by Harris Corporation, Quincy, IL).

NEXT MONTH
• Preview of SMPTE and AES meetings
• TV automation: Case study of KOMO
• Audio processing: Keeping the sound clear and punchy
• Audio processing: Technology trends
Best In The Field

HITACHI SK-90
Outside the studio, the remarkable Hitachi SK-90 does it all. For EFP, it sports a studio style 5" viewfinder. All key functions can be controlled with your choice of Remote Operating Unit (ROU) or Digital Command Unit (DCU). For ENG, slip off the SK-90's studio viewfinder, slip on the 1.5" viewfinder and shoulder mount. Your SK-90 is now a compact, lightweight self-contained portable!
ENG with EFP image quality. And EFP with total remote control. SK-90 has the field covered!

Hitachi...
Tomorrow's technology today.

7 Regional Centers for 24-Hour Parts and Field Service
- New York (616) 921-7200
- Chicago (312) 344-4020
- Los Angeles (213) 328-2110
- Atlanta (404) 451-9453
- Dallas (214) 223-7623
- Denver (303) 443-9186
- Seattle (206) 575-1680

HITACHI
Hitachi Denshi America, Ltd.
175 Crossways Park West
Woodbury, New York 11797
Circle (5) on Reply Card

HITACHI SK-90: portable ENG mode
Digital Command Unit (with coax/brass option)
Remote Operating Unit (features RGB out)
Play by play, Color or Interview... Sportscaster Headsets cover them all.

Sportscaster Headset CS-91
Perfect for booth, track or field or whenever you want background color and the excitement of a crowd added to the clear sound of an announcer's voice. Omni-directional dynamic mike. Binaural headphones receive cues and monitor program while screening out ambient noise. Equipped with "push-to-cough" switch.

Sportscaster HearDefender™ HD-4
For interviews in a speedway pit or play-by-play on the sideline, the announcer's voice cuts through the din with this noise cancelling electret mike. High noise attenuating monaural receivers deliver clear cues, monitor the program and eliminate the tendency to shout over the noise. His voice sounds crisp, clear and natural. Equipped with push-to-talk switch.

Sportscaster Headset LW-1
In an open broadcast booth or in the hush on a tennis court, the announcer's natural voice is transmitted crystal clear with a close-talking, noise cancelling electret mike. Unobtrusive even on camera, this super lightweight single side receiver headset is worn with headband or clips to eyeglass bow. Unmatched for comfort and equipped with push-to-talk switch.

In the booth or in the crowd, on track, field or court. Telex Sportscaster headsets cover it all. Write for free information.

Quality Products for the Audio Professional

9600 ARLDRICH AVE. SO., MINNEAPOLIS, MN 55420 U.S.A.
Telephone: 812-954-4051, telex: 29-7063
EUROPE: 22, rue de la Légion d'Honneur, 92000 St. Denis, France. Telephone: 820-96-49, telex: 02-0013
CANADA: Telak Electronics Ltd., 100 Midwest Road, Scarborough, Ontario M1P2B1. Telephone: 416-752-8579

Circle (6) on Reply Card
You don't need a "gorilla" to carry the portable HBU-4400. It weighs only 22 lbs., without the battery and provides 10 full minutes of recording time per cassette. Cassettes are preferred for portable applications because you don't have to monkey around with reel-to-reel tape. High band "quad" quality is achieved by tripling the head-to-tape speed of the U-format tape by adding Recortec electronics to a transport with proven interchangeability. For reliability reasons the capstan and scanner speed increase is achieved without any change in motor rpm and, of course, all bearings are still well within their design limits.

And when you need a studio machine for playback and editing there is the HBU-2860 that will faithfully reproduce your high quality HBU tapes. We kept the 2860 remote control interface unchanged so it can work with your computerized editing system.

The HBU format is economical to own and economical to use. The HBU costs less than a third of machines of other formats with the same video quality. Tape costs are lower too. CONCLUSION: Buy the HBU and donate your "gorilla" to the zoo.

Other products from Recortec are: Video Tape Conditioners and Video Tape Evaluators for all tape widths, Video Cassette Evaluators, Video Tape Timers and Reel Servo Modifications (R-MODs) for quad recorders and Video Tape Addressors which record time code on two-inch tape at high speed.

Circle (7) on Reply Card
How can we convince is really a total

Perhaps we should begin by telling you that the Arviv-Echo Slo/Mo-1 is one of the best investments you can make.

It's a great investment because it will allow your staff to offer production techniques that add up to increased business. And increased business means Slo/Mo-1 will pay for itself in a short period of time!

Regardless of your activities—Sports, News, or Commercials—Slo/Mo-1 can make a big difference.

A difference like Animation! Imagine being able to incorporate Animation from any source into your productions!

If that's not enough, let's add the fact that Slo/Mo-1 uses our unique Discassette® rather than a hard disc or 1" tape. Because it is a disc, it operates equally well in either forward or reverse. And that means even the most difficult editing job can be greatly simplified!

So add complete editing to Slo/Mo and Animation!

**We don't call Slo/Mo-1 a production tool without good reason!**

We set out to design the best Slo/Mo possible. And we built in the features that will make your productions stand out from the competition!

Features like Field/Frame Select, Time Lapse Recording, Digital Comb Filter, High Band Color. And configured to be so small, rugged, and portable that two men can easily transport it to almost any location. Plus Slo/Mo-1

Don't get wrapped up with 1"
you that our Slo/Mo-1™
production tool?

is expandable to meet your system requirements!

So how can we convince you?
In addition to owning one of the best Slo/Mo's on the market, you'll be able to provide services, either in your studio or on location, that will make you Number One with viewers and customers.

Yet, now that we think about it, there's really only one way to convince you.

Give us a call today for a complete, no obligation demonstration and quotation on a lease or buy program!

ask for the Disc Marketing Team

ARVIN/ECHO™

ECHO SCIENCE CORPORATION
an ARVIN company
485 E. Middlefield Road
Mountain View, California 94043
Tel: (415) 961-7145  TWX: 910-379-6499

Circle (8) on Reply Card
AM stereo: Which system?
I hope you have information on the situation of AM stereo broadcasting. KEZY Radio, licensee of KEZY/AM, would like to go to the stereo mode of transmission the day it is approved. To do so, we need advanced knowledge on the subject of which system or combination of systems the FCC is favoring, based on performance and technical compatibility with existing receivers.
I would really appreciate obtaining any papers or other literature at your immediate disposal.

Mark R. Moceri
KEZY Radio
Anaheim, CA

Editor's note: Mark, the whole industry would like to know which way the FCC will rule. We will just have to wait and see. There are five systems being considered, and any one might get the FCC nod.

From Ontario
I was interested in the article in the February 1979 issue of Broadcast Engineering dealing with "FM antenna and line measurements."
The techniques and equipment setups described also have been successfully used in cable television. We have used the techniques on FM broadcast antennas as well. Recently we purchased a new HP 8568A spectrum analyzer system with controlling computer, digital plotter and printer and have found that it facilitates the measurements described. The excellent calibration and stability of modern electronic instruments remove the needs for the comparator setups described.

I. Switzer
Switzer Engineering Services
Mississauga, Ontario

"Doc" Herrold's station
The radio pioneer section in your May issue was of great interest.
You show the picture of Dr. Charles D. Herrold's pioneer station located on the roof of State Bank Building in San Jose. I turned that picture over to CBS along with the complete history of KQW-San Jose that was established by Dr. Herrold.
I pioneered KFWM in Oakland, CA, going on the air in February 1925, and in 1926 Dr. Herrold went to work for us at KFWM, having sold KQW at San Jose.
I organized, in 1927, the first network of stations to carry a coast-to-coast program from the West Coast. There were 300 stations carrying it in the United States, nine in Canada and four international shortwave.
Dr. Herrold successfully completed a microwave in
When you need to know about distortion, pick from the analyzers that are easier, faster, and tell you more

The performance leader
When you talk to Sound Tech, you're talking to the firm that introduced a new era in improved distortion measurements with its 1700 Distortion Analyzer.

Now you can choose from three separate Sound Tech analyzers plus several options.

In Sound Tech Analyzers you can get conveniences that simply aren't available elsewhere — conveniences like these:

- RMS, peak, and average responding meter circuits. Different standards require different type meter circuits
- Higher sensitivity — measure distortion as low as .0005%
- Faster and more repeatable — pushbutton frequency selection measures in 5 seconds
- Balanced and bridging VM for measuring from 30 µV to 300 V even on floating circuits
- Very-low distortion internal test oscillator with high output level of +26 dBm — adjustable down to -90 dBm in 0.1 dB steps
- Balanced, floating, center-tapped but transformerless output for low distortion
- Intermodulation distortion measuring option

- 150-ohm and 600-ohm outputs
- Two-year parts and labor warranty

See about our new easy purchase plan
We also have both an easy purchase plan and a lease plan that can help when budgets are running low. So contact Mike Hogue/Larry Maguire now. Arrange for a demo and see how useful these analyzers are — not just for measuring distortion but as high-sensitivity balanced voltmeters and as low-distortion signal sources.

Call today.

SOUND TECHNOLOGY
1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008

In Toronto: The Pringle Group
Circle (9) on Reply Card
Feedback

April, 1999. So, he used Victrola and Edison phonographs to play recorded music, plus a piano (he was a fine musician) on the first broadcast ever on earth of modern radio. On this day, the staff (as shown on page 98 of your May issue) began playing music and Dr. Herrlold, standing in the studio door, announced the records DJ-style while the operator ran the records.

After about two hours of this, the first broadcast recorded in history, the telephone rang. It was the More Island Navy Yard. Mare Island's wireless operator asked, "Are you playing music on our wireless channel?" The answer was yes and the boys went wild.

I am 82 and still active managing my station KICO in the Imperial Valley.

W. L. Gleeson
President, KICO
Calexico, CA

From Illinois

Please allow me to hand you some flowers. Yours is one of the finest publications for our industry. When time allows, I read virtually every word, and very often save complete issues for future reference. Many thanks from a working engineer for a fine, up-to-date, and informative magazine.

E. Neil Pike,
WSIE,
Edwardsville, IL

From New York

Request you clarify circuit changes in steps 6 and 7 of Station to Station, "Transistors solve tube problems for 529" (Broadcast Engineering, December 1978). Both paragraphs indicate installation of a 10 uF silver mica capacitor from pin 3 to V-264 socket to ground. I believe you meant to say V-164 in paragraph 6 and V-264 in paragraph 7.

S. Charles Campione
APO New York

Editor's note: The article was in error and thanks to Mr. Campione the error has been corrected.

From Illinois

This is a letter that I have been meaning to write to you for some time because it appears to be too good to be true.

As president of a communications consulting firm and a video production company, the Kapco Communications division, I need to know what developments are taking shape in the field of closed-circuit video. Because I'm intrinsically involved in the communications process, I also want to keep up with the broadcast and technical aspects of my business. Consequently, I read both Video Systems and Broadcast Engineering magazines and find them to be way above the quality of other like publications.

My only criticism is with the lack of letters column. I think it would be great to have some method for feedback. Anyhow, keep up the good work!

Kenneth Rubel
K. L. Rubel and Associates,
Chicago, IL
We've got you covered...

24 hours a day.
Every day!

Cinema Products wrote the book on after-sales backup and reliable service when we introduced our CP-16 line of news/documentary cameras to the television industry. And we're doing the same for our MNC-71CP broadcast-quality ENG/EFP video cameras!

When you buy an MNC-71CP, you are automatically covered by Cinema Products' outstanding around-the-clock video service program. Twenty-four hours a day. Seven days a week. Nothing offered by anyone else in the television industry even comes close!

Note and compare:

-The MNC-71CP is covered by a full one-year warranty — unprecedented in the broadcast industry! (And there's no service charge ever for warranty work.)

- Replacement parts available anywhere in the United States within 24 hours!

- Factory-sponsored MNC-71CP maintenance training seminars for your service technicians at no charge.

- An extensive network of MNC-71CP dealers in 15 locations around the country with “stand by” loaner/rental cameras... just in case.

- An easy-term “state-of-the-art” lease/upgrade program provides built-in insurance against obsolescence.

For full details, call toll-free: 800-421-7486.
FCC rearranges and adds to broadcasting rules in “reregulation” effort

With the death of the Communications Act rewrite, H.R. 3333, and little hope held out for Senate bills S-611 and S-622, broadcasters must rely on the mercy of the FCC for any deregulation. The commission expects to have its own proposals ready later this year. Until then, the commission has been pursuing a path it calls “reregulation,” or restructuring the broadcast rules.

So far, the FCC has reshuffled its “Broadcast Applications and Proceeding” from Subpart D of Part 1 to Subpart H of Part 73 (substantially the same rules—different location); it has referenced some of its policies to its rules; and it has amended 32 separate rule sections of Parts 73 and 74.

The new amendments include the following:
- Delete the requirement for annual skeleton proof of AM station directional antennas used with remote control operation for all stations having approved antenna sampling systems;
- Permit AM stations to use the indirect method of power determination whenever there is a temporary malfunction of a remote reading, remote control or extension meter indication of antenna or common point current;
- Provide guidance in obtaining data necessary to correctly design approved sampling systems for AM directional antennas, with sampling transmission lines of unequal length;
- Clarify the technical requirements for TV remote control and failsafe circuits to avoid use of unnecessarily complex devices that could result in loss of program service to the public and unnecessary expense to station licensees;
- Resolve ambiguity in tolerance specifications for TV video waveform equalizing pulses, by redefining the tolerance in terms of duration rather than area of the pulse;
- Restructure and rewrite the rule on rebroadcasting of signals from other broadcast and non-broadcast stations with editorial corrections requested by the National Bureau of Standards and the Naval Observatory on the use of standard time signals;
- Permit the use of automatic Morse Code for station identification of remote pickup stations for licensees wishing to do so for operating convenience. The code identification procedures are identical to those adopted previously for stations in the Private Radio Services;
- Relax the station identification requirements for auxiliary broadcast stations to agree with previous relaxations in the AM, FM and TV rules;
- Clarify the operator and station identification requirements for fixed microwave links used by broadcast licensees. These stations may now operate fully unattended, similar to

SMPTE Edit Code Generator and Reader

Generator/Reader, Slave Gen, Edit Code/Computer Interface, Character Generator, Syndicated Tape Programmer.....

Single Line Broadcast Equipment Control System

Allows easy expansion and relocation of control of any number of film chains and VTRs in a TV studio.

Programmable Memory Control

A versatile instrument for any machine control application.

It provides 128 coincidence comparators, 8 control outputs for pre-programming any combination of operational sequences.

SMPTE edit code or clock time version.

Digital printout and keyboard entry (optional).

KAITRONICS

1540 Gilbreth Rd., Burlingame, CA 94010 / TEL. (415) 697-9102
MICROTImE
For Video Processing

2525 Video Signal Synchronizer
Synchronizes any video source, 3/4" heterodyne; 2" quad, satellite feeds, to station sync; provides field 1, field 2 or frame freeze for digital video effects. Auto freeze on last field of active video. Infinite H phase resolution and RS-170A sync generator for interfacing with any switcher.

2100 Video Image Processor
Provides 50 dB video noise reduction in luminance and chrominance, horizontal and vertical detail improvement, color crispening and chroma hue error reduction. Automatic Chroma/Luminance delay compensation corrects chroma smear inherent in most heterodyne VTRs. Improves the overall picture quality of any video picture.

1600 CCD Time Base Corrector
The Standalone TBC uses charge-coupled device technology to provide high performance at low cost. 55 dB Signal-to-Noise Ratio, 4 H line correction range. Auto Trac 2 and automatic sync advance are standard.

Digitrol 2 Video Source Control System
Highly versatile, automated programmer for use in studio applications, CATV automation, video tape duplication, automatic commercial insertion, editing control, and off-air recording and delay applications.

2020 Video Signal Processor
Time base corrects any video source using digital technology. 58 dB Signal-to-Noise Ratio. 4 H line correction range. Auto Trac 2 and automatic sync advance are standard. Line Error Detection, Velocity Correction, 24 H line Wide Window correction range. Dropout Compensation, Image Processing and Noise Reduction Options available to fit your particular needs.

MICROTImE

Microtime, Inc.
399 Blue Hills Avenue, Norwalk, CT 06852
Telephone (203) 242-2761
Telex 710-429-1165

Circle (10) on Reply Card

www.americanradiohistory.com
CUERAC SERIES 1A

FUTUREJOCK

CUERAC is the world's first complete random access cartridge automation system.

- Fully automatic computer controlled random access library of 500 cartridges.
- Computer expandable to control up to five (5) CUERAC libraries giving random access to a total of 2500 cartridges or 1-4 CUERACS and up to 40 single source replay units.
- Continuous visual display of program: current status, next 10 selected events, lapsed time, actual time, system alarm, syntax error.
- Simple programming for last minute scheduling.
- Provides FCC and diagnostic hard copy logging.

CONSOLIDATED ELECTRONIC INDUSTRIES INCORPORATED
Waterview Building, Suite 906
1925 North Lynn Street
Arlington, VA 22209
703-524-8611
Circle (230) on Reply Card

Industry news

- the unattended operation of similar stations in the Common Carrier and Private Microwave Services;
- Relax the requirement that licensees of remote pickup station transmitters attach or display full license information on the portable or mobile transmitter units. Similar identification and license posting requirements were previously deleted for the Private Radio Services as no longer having any regulatory purpose; and
- Revise or add technical definitions for frequency modulation, frequency tolerance and radio frequency radiation to conform with American National Standards definitions and with other FCC rules.

FCC wants to know why commercials seem loud

The FCC has begun another inquiry to obtain information and comments on measuring the loudness of commercials broadcast by radio and television stations. (The last inquiry lasted three years and ended 14 years ago.) The commission said it would prefer that the industry resolve the problem of objectionably loud commercials itself, but threatened regulatory action if industry measures are likely to be ineffectual.

Some of the questions on which the FCC is seeking comments from the industry (due December 15) include the following:
- What methods (devices) are suitable for measuring the instantaneous loudness of complex sounds such as voice or music?
- How can a sound segment be characterized in terms of loudness?
- How can two sound segments be compared in terms of loudness?
- To what extent (how loud and how many) are commercials objectionably loud?
- To what extent is there objectionable loudness in other types of material such as public service announcements or station promotions?
- What causes objectionable loudness in commercials?
- Do listeners confuse loudness with noisiness or annoying sound?
- Is there some factor that is primarily the cause of excessive loudness?
- Is modulation the key, only one of several factors, or an unreliable indicator of loudness?
- What forms should loudness standards take and what limits are reasonable?
Second Generation

Tini “Q-G’” — The New Switchcraft Connector That Has Less Bulk! Less Weight! And Low Cost! It’s designed for today’s miniaturized lavaliere microphones and instrumentation. Disconnect is quick and easy!

Take it apart. See Tini “Q-G’” quality. Silver-plated pins and contacts for starters. “Non-scooping” plugs and receptacles have recessed pins to protect against accidental damage. They’re keyed for proper mating. Tini “Q-G’” reflects the proven quality of Switchcraft “Q-G’” and “QGP’” professional audio connectors.

Choose either three, four, or five pin/contact styles in both cord plugs and receptacles. The cord plug diameter measures a mere .413”... accepts cables up to .115” dia. with flex relief bushing 170” dia. without bushing.

Tini “Q-G’” receptacles are available with PC terminations and a choice of seven trim, colored panel escutcheons for quick, easy identification. The rich metal cord plug housing has a nickel finish that minimizes glare and lighting “hot spots.”

Compare! You’ll easily see why Tini “Q-G’” gives you more. But then it’s from Switchcraft... a leader for decades in audio connection design.

Call Ron Larson at (312) 782-2700 for full details and Catalog No. NPB-341.
Industry news

- Is there some root factor which, if controlled, would minimize the problem?
- In what way are the marketplace forces delinquent in this area?
- In what way could government regulation and marketplace forces act together to minimize the problem?
- Should the FCC control loudness solely by regulation, what specific form should such regulations take, and do current regulations aggravate the problem?
- Could an automatic loudness control be incorporated into TV sets that would be adjustable for the receiver location and listener preference?

1978 is record year for TV ad revenues

Advertisers spent $8.06 billion, or 17.8% more on television in 1978 than in the previous year, according to figures released by the FCC. Total industry revenues, less agency commissions, were $6.9 billion. Industry expenses increased 17.3% to $5.3 billion and pre-tax profits rose 17.6% to $1.65 billion.

Of the $8.06 billion of television advertising expenditures, $3.72 billion were for network advertising, up 14.9% from 1977; $2.30 billion were for national and regional advertising, up 16.8%; and $2.03 billion were for local advertising, up 24.5%.

The three national networks reported revenues of $2.06 billion, up 14.8% from 1977. But, profits from network operations were $373.5 million, down 8% from 1977. The three networks reported spending $265 million on their news and public affairs operations. This compares with $207 million in 1976.

FCC releases station and complaint totals

The FCC has released the following totals for broadcast stations on the air as of June 30, 1979: 4548 AM radio (no change from May), 3111 FM radio (no change), 993 FM educational (down one), 220 UHF commercial (no change), 517 VHF commercial (no change), 158 UHF educational (no change), and 105 VHF educational (no change).

The commission also reports that broadcast complaints totaled 14,400 in May 1979, a decrease of 814 from April. Other comments and inquiries for May totaled 2694, a decrease of 11,810 from the previous month. The FCC sent 2079 letters in response to
1979 BROADCAST PARTS CATALOG
Supersedes all other catalogs and price lists.

RF GAIN, LTD.: YOUR ONE STOP SOURCE FOR RF POWER DEVICES
BE SURE WITH QUALITY, DELIVERY, AND SERVICE

TRANSMITTING TUBES USED IN BROADCAST

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RF Gain Ltd.
Call: TOLL FREE 800 645-2322
or 516 536-8868

100 Merrick Road
Rockville Centre, N.Y. 11570

Contact us on Types not listed and for competitive up-to-date price and delivery.
### Solid State Replacements For Vacuum Tube Rectifiers

All solid-state replacements are the **FINEST QUALITY** made. Our tremendous buying power allows us to offer these at the **LOWEST POSSIBLE PRICES**!

<table>
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<tr>
<th>TYPE</th>
<th>REPLACES TUBE TYPES</th>
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### SOCKETS AND CHIMNEYS

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## BROADCAST QUALITY CAMERA TUBES

**RCA**

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**EEV Types, Industrial types not listed; CCTV, Industrial and X-Ray Grade available upon request.**

## RECEIVING TUBES FOR BROADCAST SYSTEMS

### MAJOR BRANDS, FACTORY BOXED

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### Additional Tube Information
- 6L86 to 6L96: $3.92
- Other tubes: $3.59
- 6N6E to 6N70: $4.10
- 6Q5 to 6R6: $3.63
- 6R6 to 6R9: $2.62
- Additional types: $3.59

*Note: Prices are subject to change and are subject to availability.*
Dear Friends:

If you’ve been wondering where Dave Gilden went, please read a little further. I’m going out on my own. The name of my new corporation is “R.F. GAIN, LTD.”. We are located in Rockville Centre, N.Y. just 15 minutes from JFK Airport.

I hope to provide you with the service, speed, and accuracy you’re accustomed to. I have taken all the feedback you’ve given me and will provide some new ideas to cater to your needs.

Our product line will be expanded in the beginning to provide you with integrated circuits at reasonable prices. My Transistor cross-reference list is expanded with an emphasis on cross-referencing RF Power Transistors. Finally, we will provide you with Tubes of all major manufacturers with more choices available. Our inventory will be the largest in the country.

As before, we request everybody to call us on our toll-free number - 800-645-2322. We will have sales engineers familiar with the products we sell so, remember “Dave is Back” to provide you with more savings per order, fast delivery, prompt warranty service, and a friendly voice.

If you’ve been pleased with my service in the past, let me continue to supply your firm in the future.

Sincerely,

Dave Gilden

POLICY STATEMENT

Terms: - Rated Firms — Net 30 Days
Other — Furnish Trade References — 2% Discount if payment accompanies order
All shipments F.O.B. RF, usually within 24 hours of order. Emergency Shipments Our Specialty.
All products carry Standard Factory Guarantee.
All prices subject to change without notice.

RF Gain Ltd.

For Off-The-Shelf Delivery
on Factory Boxed
Current Code
Transmitting Tubes.
Industry news

these comments, inquiries and complaints.

MDS report guidelines

The FCC has released guidelines on what information MDS interference studies should contain in the event that the location of the transmitting antenna of a proposed MDS station is less than 50 miles from an authorized or previously applied for station. This includes the following:

- A map showing the contour of a 45dB carrier to interference level around both the proposed station and any authorized or previously applied for transmitting antenna sites.
- If the applicant believes that other factors will significantly alter the above contour, these factors shall be listed along with a second 45dB contour illustrating their effect.

In cases where the existing previously authorized or proposed station is or would be affected by other authorized or proposed stations within 50 miles of it, the following should be provided as part of the engineering statement:

- A map showing the contours of the 45dB carrier to interference levels around all such authorized or previously applied for stations without the effect caused by the new applicant, assuming the stated transmitting site characteristics.
- A map showing the contours of the 45dB carrier to interference level taking into account both the authorized or previously filed for stations and the station proposed in the new application.

For more information, contact Herb Wilson, FCC, 1919 M. St. NW, Washington, DC 20544, (202) 832-6440.

Channel use study out

Television Channel Utilization as of December 31, 1978, is a FCC report showing by market, how commercial and noncommercial channels are being used. It details the number of VHF and UHF channels licensed, the number for which construction permits have been granted, the number for which an application has not been filed, the number of UHF channels allocated for television but not available until further FCC action, and the total number of channels allocated.

The report shows that, as of December 31, 1978, applications were pending for 42 UHF commer-
Philips called it, "Focus on Technology" at NAB '79 in Dallas. Simply put, it was a demonstration of the single, most important reason for the basic superior technology and design advantages that make Philips the acknowledged leader in color television:

"Philips is the only camera manufacturer who designs, develops and produces all four, critical, picture-determining components — Pick-up Tubes, Prisms, Deflection Yokes, and Electronic Circuitry — each designed for optimum, total camera system performance."

This basic technological advantage enables Philips to continue offering the world's finest line of broadcast cameras. The most diversified camera family in both price and application. The Technology Family.
Technology Family

LDK-14—Newest technological breakthrough.

LDK-25 Family

VIDEO 80...innovative convertible camera system for multi-use applications. Unique, three 2½-inch Plumbicon camera head converts in seconds from studio mode (available with optional, multiposition, tiltable viewfinder) to new, lightweight EFP field production mode with 1½" viewfinder to totally self-contained ENG portable. Even to special application modes for telecine, microscopy, endoscopy, etc. Easy set up and operation by non-technical personnel and automatic features for total mobility. VIDEO 80 also offers a complete expandable production system for start up or expansion of existing systems.

I.F. Transmitters...Philip is also the recognized world leader in transmitter technology, now with the fastest growing UHF/VHF transmitter line in North America. Output ranges up to 110kW. Equally suited for single or parallel operation with automatic or remote control for unattended operation.

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Also included in Philips “Focus on Technology” and part of our growing family of system products:

- One-inch Video Recorders to meet your specific requirements.
- New digital Video Noise Reducer—Fully automatic.
- A state-of-the-art Tape Synchronizer for totally integrated systems operation.

It all adds up to the widest range of cameras and television equipment in the industry. More information is yours simply by writing today on your company letterhead (indicating product interest) to: Philips Broadcast Equipment Corp., 91 Mckee Drive, Mahwah, N.J. 07430 (201) 529-3800. (Canada: Philips Broadcast Equipment, 601 Milner Ave., Scarborough, Ontario M1B 1M8).

Innovative Leader in World Television

PHILIPS

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Industry news

Official channels located in the top 50 markets, and for nine channels in the second 50 markets. In the top 100 markets, 111 UHF commercial channels had not been applied for. In markets 101-200, applications were pending for 23 UHF commercial channels; 90 channels were vacant and not applied for. Of the 61 vacant and not applied for VHF commercial channels, 5 were located in markets 101 through 200 and the remaining 56 were outside 200 markets; applications are pending for 11 VHF commercial channels. Copies of the report may be obtained from the Office of Public Affairs, Room 207, 1919 M St. NW, Washington, DC 20554. (212) 632-7260.

French television pioneer wins ITU Centenary Prize

The International Telecommunications Union (ITU) has awarded its first ITU Centenary Prize to Georges Velensi, a French engineer and scientist, for his contribution to the development of international telecommunications.

Besides playing a cardinal role in developing international telephony and the world telecommunications network, Velensi contributed to the emergence of color television. His detailed research in physiological optics and colorimetry led to a French patent in 1938 which was the basis for British and American patents validating his reverse compatibility concept for color signal transmission. NTSC, PAL and SECAM make use of this underlying principle, even though the coding methods differ.

The prize will be presented September 23, 1979, in conjunction with the 3rd World Telecommunications Exhibition, Telecom 79, in Geneva.

The ITU is the United Nations' specialized agency for telecommunications. It was founded in 1965 and has 154 member countries.

US and Canada negotiate for UHF-TV allocations

Negotiations are being conducted between Canadian and United States representatives to relocate Canadian UHF-TV allocations to channels below Channel 70. This is a result of steps to implement Land Mobile operation in the 806-860MHz band (TV channels 70 through 83). Some conflicts remain between US allocations and some of the Canadian proposals listed in the new plan. Negotiations to resolve these conflicts are continuing and corresponding adjustments to the plan will be developed as necessary.

Inter-satellite links ahead

INTELSAT has awarded a US $170,000 contract to the Electron Dynamics Division of the Hughes Aircraft Company for the design, fabrication and testing of a feasibility model of a Travelling Wave Tube (TWT). The TWT would be a vital component of the on-board satellite equipment required to operate an inter-satellite link.

This is the 102 member-country organization's first step towards establishing inter-satellite communications links within its systems. The objective is to advance technology in this area sufficiently to enable it to install facilities for inter-satellite links on its satellites launched after 1984.
Take the purity, quality and precision of nature and incorporate it into Ikegami's broadcast monitor capable of providing the most excruciatingly realistic images ever and you'll have created the Ikegami Broadcast Color Monitor, All Natural because what you'll see is a picture in its purest form. Down to the finest detail or defect. Ikegami Broadcast Color Monitors maintain a healthy image. It's why more and more engineers are specifying Ikegami Broadcast Color Monitors. With features like our comb filter which results in resolution at 600 plus lines, shadow mask CRT's, power-protective circuits to avoid damage to the picture tube, an active convergence circuit, a phase lock system which eliminates horizontal hold control, sturdy construction, modular PC boards for simple servicing and maintenance, a built-in degaussing circuit and magnetic shield to permit movement without affecting picture quality, and a wide range of models including 25, 20, 16, and 14 inch units (14 and 20 inch units offering standard and high resolution models) isn't it time you got into shape with Ikegami Broadcast Color Monitors? For high-end, precision broadcast color monitors, it's Ikegami—naturally!


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Video Products Built To Ideal Standards

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Industry news

The organization claims that such links would have significant advantages. At present, direct satellite transmissions can only be provided between points within a single satellite coverage area—about one-third of the earth’s surface.

Communications bound for destinations outside the coverage area must complete their journey via land-based links or through a second satellite hop.

With inter-satellite links, these signals could be switched directly from the first satellite to the second—thus saving one down and one up link transmission, freeing this capacity for other communications.

INTELSAT says it also would enable one earth station to communicate through more than one satellite in each area, improving system flexibility by increasing the number of receive stations which can be accessed directly.

FCC fears limited powers if RF radiation regulated

Controversy over the effects of low-level and long-term exposure to RF radiation is on the increase. So, the FCC has opened an inquiry on how to discharge its regulatory duties if a health and safety agency should limit allowable RF radiation exposure levels.

The commission said a parallel purpose of the inquiry is to provide documentation so that it can participate in rulemaking proceedings of the health and safety agencies and ensure that any new standards adopted take into account the impact on the licensees and equipment regulated by the FCC and on the public.

Comments are due by December 15 and replies by March 15, 1980.

Radiation is classified in two types for health and safety purposes. High frequency-high energy radiation such as x-rays and gamma rays, which are beyond the range of frequencies the FCC regulates, are capable of causing harm through ionization of atoms in living tissues. FCC-regulated frequencies do not have sufficient energy to cause ionization, but in sufficient amounts are capable of causing damage through generation of heat.

A spokesman at one electronic manufacturing company says the level of worldwide radio frequency radiation has risen from virtually zero a few decades ago to today’s “pollution-level index.” Arnold Zais of Keene Corporation, calls it “radio frequency pollution” and says it is increasing at the rate of 50% a year.

Sources of radio frequency radiation include commercial radio and television; radar and microwave communications; military, amateur, citizen’s band and police radios; communications and other satellites; high voltage electrical transmission lines; industrial and military equipment; lighting systems; and natural radiation phenomenon from outer space.

FCC enters environment assessment business

After consulting with the Council on Environmental Quality, the FCC has proposed amendments to its rules covering the environmental impact aspects of communications facilities it authorizes.

The proposed commission rules provide that, before action is taken
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Join the ferrite generation.

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Superior pictures and significant savings are yours when you specify state-of-the-art high technology hot-pressed ferrite quad video heads from Spin Physics. Bring your quad machines into the new generation — the ferrite generation. The money you save on refurbishing may help toward new generation equipment in some other aspects of your operation. Our steadily growing customer list includes smart operators in all sizes of stations and production centers, and in NTSC, PAL and SECAM standards. You owe it to yourself to compare Spin Physics' advantages.

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DC-38: 5, 8 or 10 mixers, up to 40 inputs. $2,447 to $4,980.

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PSM: Portable, 5 mixers, 8 inputs; built-in compressor. $545.

DC-12: Remote control; up to 12 mixers (expandable to 20) with 2 inputs each. $4,200 to $5,200.

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PhaseMaster:
Phase-error-free record/reproduce/duplicate; full complement of broadcast features and construction.

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L Series: Line amps, with or without equalization, up to 10 mono, 5 stereo ch., solid-state balanced and unbalanced inputs; +21 dBm max. in and out; response 10 Hz to 50 kHz +0, -1 dB; distortion 0.008%. $435 to $453.

MLA Series: Mic/lne inputs; studio or remote. $128 to $185.

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MP-8 & SP-8: Mono & stereo, S/N -77 dB, 0.01 dB RIAA, $98 & $144.
ESP-38: 0.03% distortion, S/N -85 dB, ± 25 dB RIAA. $325.

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ARA-16X: Up to 16 in, 12 out; LED status display. $1099 to $2296.

Prices subject to change without prior notice.

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Play with the cart/cassette record/playback/duplication center that eliminates stereo phase shift error once and for all. The most advanced turntable preamp in captivity. Consoles so advanced, so silent you’re not going to believe them until you try them. Or an audio router that makes whatever you’ve got now look—and sound—like so much spaghetti.

Then, if it’s not for you, just ship it back.

But in all fairness, we have to warn you—once you’ve tried Ramko, chances are you’re hooked for life.

Phase shift doesn’t matter in mono.

So instead of adding failure-prone electro-mechanical components or re-inventing the cartridge, in the Ramko PhaseMaster Cart/Cassette Duplicating Center, we simply encode the stereo before it ever sees the heads or tape, then decode the signal after it leaves these two major sources of stereo phase shift error.

The result is phase-error-free recording/reproduction/duplication, and performance specifications that meet or exceed whatever cart drives you’re using now.

Features include: an A and B cart deck; an A cart deck; and a cassette deck. Simple cassette-to-cart(s) and cart-to-cassette duplication. Automatic switching of record/playback, encoding/decoding and mono/stereo. Left, right and phase analysis meters. Front panel input selection. Three cue tones. And so much more that you’ll just have to contact us for details and a demonstration.

Ask for the Ramko PhaseMaster.

Just another turntable preamp?

Look at what one user wrote:

“Three days ago I replaced the (brand name) preamps in our studio with your ESP-38 preamps.”

“The result was astounding. The next day we had six unsolicited calls from local stereo stores. All commented on our improved disk reproduction and wanted to know what we had done.”

“The comments from listeners have been excellent.”

Try it. You’re going to like it a lot.

For AM stereo, or an FM station upgrade.

Ramko consoles come with features you won’t even find in more expensive competitive units.

Total dc control of all mixing and switching function means no more noisy pots and switches, no stereo tracking error, and much more resistance to RFI.

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And then we backed everything with a 2-year warranty (4 years on the DC-38 and DC-12).

Kiss your patch panels good-bye.

Because with the Ramko ARA-1612 Audio Router/Amplifier you use front panel pushbuttons to route 16 inputs to any of 12 outputs, simultaneously or individually, with an instant LED display of what is going where. You’ve never seen anything like it.

IC switching and isolation buffers mean no loading and no degradation of S/N or frequency response with multiple feeds (stack them for up to 45 in and thousands out). On-board switches change stereo to mono instantly. Individual gain control on all inputs allows precise level matching. Frequency response is 20 Hz – 20 kHz ± 0.5 dB; S/N is – 75 dB; distortion < 0.3%; and input/output levels are +21 dBm max.

And all this is yours at the lowest cost per crossover point in the industry.

The music goes ‘round and ‘round…

For moving sound around, we offer more different kinds of amplifiers than anybody.

Ten models of Audio Distribution Amplifiers, each with 10 Hz – 20 kHz ± 0.5 dB frequency response, less than 0.1% distortion, and more inputs and outputs for the size and price than any other comparable ADA.

Four different Line Amplifiers with 20 Hz – 50 kHz ± 0.1 dB frequency response, 0.008% distortion, balanced in and out, and +21 dBm max out.

Portable and studio dual function MIC/LINE amplifiers with balanced in and out, built-in RFI suppression, 20 Hz – 20 kHz ± 0.5 dB frequency response, gain from 64 dB on MIC to 26 dB on the high level channels, and distortion at an inaudible 0.1%.

And isn’t that music to your ears? To hear more, contact Ramko Research, 11355 Folsom Blvd., Rancho Cordova, CA 95670.

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Industry news

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on authorizations for facilities classified as "major" because of their location, an environmental assessment will be prepared and published.

FCC commissioner Abbott Washburn was alone in dissenting the action and issued a statement saying that the FCC doesn't know anything about environmental protection and that FCC person-hours should not be tied up in reading environmental assessments which the FCC is not compelled by law to require.

For more information on the proposed rule, contact Upton Guthery, FCC, (202) 254-6390.

TV experiments for deaf

Captioning for the hearing impaired is a subject that has been on the FCC's agenda lately, but the commission says it is awaiting the outcome of voluntary closed captioning before making any moves. In upholding a recent denial of a complaint by the Los Angeles Council on Deafness against eight TV stations, the FCC claimed that if closed captioning should not be successful, it might be necessary to regulate.

One such voluntary closed captioning project the commission is watching is being undertaken by the Public Broadcasting System, the National Broadcasting Company and the American Broadcasting Company. If successful, a total of up to 20 hours of captioned programming for the hearing impaired will be broadcast weekly by 1980. Special decoding devices needed will be provided by Sears, Roebuck & Company, with no mark-up for profit. The Department of Health, Education and Welfare will help establish and fund a nonprofit National Captioning Institute that will caption programming for the networks.

In the meantime, the FCC has made available a videotape of a meeting it held on the subject last April. The meeting included a briefing on plans for closed captioning of TV programs and a panel discussion among representatives of the broadcast industry, the Public Broadcasting Service and the federal government.

Copies of the 4-hour tape may be taken out on loan from or viewed at the FCC's various field offices. For more information, call Jon Crowe, Public Service Branch chief, at (202) 634-1940.

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Do the decks lock in place to a bulkhead permitting operation with the front panel down?

Plug-in removable decks and superb electronics make this the most up-to-date monaural or stereo three deck cart machine available. Rugged machined deck, quiet air-damped solenoid, unique cartridge guidance system, drop down front panel and run lights next to each deck. The improved 5300B now includes individual level controls for each cue tone.

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For more information on OptiMOD-FM circle (51) on reply card

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business news

Bell & Howell purchases Mach One video editing

Bell & Howell's TeleMation division has acquired the assets and business of Mach One Digital Systems. The company's Mach One videotape editing systems will complement TeleMation's existing line of broadcast and teleproduction equipment, according to Bell & Howell Video Group president Robert B. Pfannkuch. The editor will be sold and serviced through TeleMation, which also will start to manufacture the Mach One system at its Salt Lake City plant by the beginning of the fourth quarter of 1979.

Bell & Howell also has announced its entry into the field of designing and manufacturing display monitors for the computer terminal, word processing and medical markets. The products will be marketed to the computer industry and other OEM markets under the Bell & Howell name and will be marketed to the professional video markets under the TeleMation brand name.

3M Minicom wins Maker of the Microphone award

The Maker of the Microphone Award has been presented to 3M's Minicom division for "outstanding contribution to the world of sound." Specifically, the division was commended for its development of a practical digital audio recording system with electronic editing and disc-mastering interface.

The award is a trophy presented annually in memory of Emile Berliner, who invented the microphone, the disc record, the disc record player (gramophone) and the method of mass producing discs from a single master record.

The award was presented by his grandson, Oliver Berliner (left), to Marshall Hattfield, vice president of the division.

CFRN CFRY CKCY KBOX KGRO KLOE-TV KINT KLIN
KNXV KPAR KRVN KYAK KYXY WATD
/BOK WCBQ WFLN WDAR WDLB
/WFTN WHAT WHP WIBF WIBX WIKZ WRAG WJW
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32 Broadcast Engineering September 1979
If you want Plumbicon* picture quality from your ENG camera—specify Plumbicon TV camera tubes.

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* Registered trademark N.V. Philips of the Netherlands.
Business news

TeleMation recently signed a marketing agreement with Dytek Industries of Denver, CO. TeleMation will distribute Dytek's production switcher line, known as the SL Series Video Controllers and its DVC Series switchers.

Harris plans to buy CVS

Harris Corporation has purchased Consolidated Video Systems (CVS) of Sunnyvale, CA, for approximately $13 million. Harris said the move will enable it to enter the digital video equipment market. CVS, with current sales of about $9 million annually, produces video equipment for television stations, cable TV companies and industrial, educational and government TV users.

In 1974, CVS won an Emmy for the technical contribution to television provided by the company's digital time base corrector. The Harris acquisition plan calls for CVS to remain in California and to be operated as part of the Harris Broadcast Products division.

In other news at Harris, the company has formed a new division to market information systems overseas. The new unit, the Harris Information Systems International Division, will handle sales and customer service for computers, distributed data processing systems and interactive and remote batch terminals in all countries outside the US and Canada.

M. Andrew Haladej has been named president-general manager of the new division.

Microwave Associates

Microwave Associates has entered the semiconductor service business to be headed by Walter Sobie. The new operating group will market services which include custom metallization, photo-resist scribing techniques using lasers, diamonds and saws, scanning electron micro-scropy, energy dispersive x-ray analysis and atomic emission spectrometer services.

Black Africa to invest heavily in communication

According to a 530-page study by Frost & Sullivan, Black Africa will invest between $12.5 billion and $15 billion in telecommunications systems and equipment through 1980 (1978 prices). Black Africa comprises 41 separate states covering 12 million square miles.

Only some $2.1 billion in contracts...
Business news

have been placed so far, the study finds, with British companies having secured the biggest market chunk.

The study warns, however, that "there is a high probability that investment will be delayed either as a result of inflation or through difficulties in raising funds." The market outlook also shows a wide disparity among countries, from the least-developed country, the Republic of Benin, to oil-rich Nigeria.


Tube company formed

Dave Gilden has formed RF Gain, Ltd., which will supply transmitter and other tube to the broadcast industry. The company is located at 100 Merrick Road, Rockville Center, NY 11570, (516) 536-8868.

INTELSAT reports 25% increase in satellite use

Demand for worldwide international telecommunications via the INTELSAT satellite system increased by more than 25% during 1978. This does not include occasional use services such as international satellite television, which jumped by 53.3% to over 11,600 channel hours. INTELSAT is the 102-member country organization which owns and operates the telecommunications satellites used by countries around the world.

The organization also predicts global international telecommunications via satellite to increase by about 100% by 1983. This prediction came out of the 1979 Global Traffic Meeting in Washington, D.C. More than 200 delegates representing over 100 countries attended the week-long meeting with the purpose of determining short, medium and long term demand forecasts for the telecommunications service provided by the INTELSAT global satellite system.

Ampex: Belgium VTRs; scraps duplication plans

Ampex has announced that it will begin producing VPR-2 helical scan VTRs and TBC-2 digital time base correctors at its Nivelles, Belgium, facility. The facility will produce VPR-2s in the PAL and SECAM broadcast formats.

The company also has reached an
In 1964 Vega developed the first wireless microphone system that offered full-fidelity sound, the first real innovation in microphones in over 50 years. Now we are proud to introduce our latest innovation... Dynex!

Dynex adds dynamic input range expansion to wireless microphone operation thereby eliminating the need for continuous mic gain adjustments. Set it and forget it... it's that simple. Two years of extensive field use with the Dynex option enables us to guarantee the same proven reliability, quality and performance that you have come to expect from Vega.

We have continually improved our systems during the past 15 years, so you can be assured that today's Vega systems are designed with the latest in high-technology electronics and sophisticated audio engineering. Besides offering you the finest systems available, Vega is constantly working with the industry to further the art of audio processing. One example is Vega's F.C.C. petition which resulted in obtaining clear wireless channels for broadcasters and filmmakers last year.

Vega offers a variety of systems that give you a new order of freedom and that foster new confidence in your performance. When new techniques are developed... they're from Vega.
“FINALLY THERE’S A ONE-INCH AS WELL UPSIDE DOWN"
Opryland Productions is one of the largest video production houses east of the Mississippi. The company’s facilities have been used for shows as varied as “Nashville on the Road,” “Big Ten Basketball,” and “Dance in America.”

David Hall, General Manager of Opryland Productions, has been using the Sony BVH-1000 video recorder for close to two years and two BVH-500 portable recorders for about six months.

“Sony one-inch equipment has expanded our capabilities considerably,” says Hall. “With a BVH-500, we were able for the first time to get broadcast quality tape on a roller coaster for an upcoming special.

“We also took the BVH-500 on a Ferris wheel and in a helicopter to tape Superstars at the Ohio State Fair. It performed as well as they did.

“Now we’re using Sony on almost all shows we tape in the field. The big advantages are portability and cost. Durability, too. Sony even bailed us out when we were taping a production and our equipment broke down. We used Sony to finish the job, then transferred the results to quad. The client was more than satisfied.

“And when the Dominican Republic asked us to tape the visit of Pope John Paul II, we couldn’t have done it without our Sony video recorders,” Hall adds.

“Because they travel so well, we could get down there fast and do a professional job.”

Of course, Sony makes a full line of one-inch broadcast equipment, all of it backed by state-of-the-art technology. We have video recorders, camcorders, editors, and the BVH-2000 digital time base corrector.

For information, write Sony Broadcast, 9 West 57th Street, New York, N.Y. 10019. Or call us in New York at (212) 377-5800, in Chicago at (312) 792-3600; or in Los Angeles at (213) 527-4300.

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The only portable SMPTE Code Generator. Shintron Model 640 SMPTE Edit Code Generator.
• Goes anywhere with your ENG crew.
• Light and rugged. It attaches to your VTR and produces accurate edit code as you shoot important scenes.
• You cannot enjoy all advantages of ENG unless you have the 640 SMPTE Edit Code Generator.
• EBU European Standard version available.

Model 644 Edit Code Reader
When Shintron builds a new product, we think of our customers' convenience first. Good Edit Code Readers are a dime a dozen today, but which one can generate an instant shot list? The only one is Model 644 Edit Code Reader / Raster Display and Shot List printer.

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SALES CONTRACTS

Bosch Fernseh
Sales of Bosch Fernseh's BCN range of 1-inch VTRs continue to rise rapidly, according to the company. Over 100 orders were received for BCN units in April.

Robert Bosch GmbH, Darmstadt, is scheduled to deliver two high-speed reporter vehicles for the 1980 Moscow Olympics. The ENG/EFP vehicles will travel about 100 mph at fully loaded top speeds. They will be equipped with two KCA cameras with base stations. Monitoring, VTR, audio mixing and radio link equipment is built into the car.

Coastcom
Coastcom has received an official notice to proceed from the Collins Transmissions Systems Division of

Business news

agreement to sell the machinery and related inventory of its custom duplicating facilities in Elk Grove Village, IL, to CBS Records.

Poniatoff awards
Ampex presented four 1979 Alexander M. Poniatoff (AMP) awards to its employees for technical achievements. Winners were Peter Jensen, engineering section manager, audio-video systems division; Billy Baker, senior staff engineer, data systems division; Chi Chao and Bhupendra Shah, project engineers, magnetic tape division.

Jensen was honored for contributions to the development of video time base correctors. Baker received his award for the invention of the super high bit recorder automatic tracking system for instrumentation recorders. Chao and Shah shared an award for their development of the sandmill process used to manufacture some of the company's videotape.

Scully bought by Ampro
Ampro Broadcasting has purchased Scully Recording Instruments, formerly a division of Dictaphone, and has changed its name to Ampro/Scully to reflect the new association. Ampro/Scully has added facilities in Newtown, PA, for manufacturing and warehousing Scully recorders. Executive offices also have been relocated to 826 Newtown/Yardley Road, Newtown, PA 18940. (215) 968-9000.
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-2, the machine 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-2—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
OFFICIAL SUPPLIERS VIDEO RECORDERS AND MAGNETIC TAPE • XIII OLYMPIAD

Circle (29) on Reply Card
Rockwell International to produce and ship nearly $1 million of Coastcom's Model 412 single channel per carrier (SCPC) modulators and demodulators during the remainder of 1979.

E-Systems

E-Systems TelSatCom Division, Garland, TX, has signed a contract with Empresa Nacional de Telecomunicaciones TELECOM Bogota, Colombia, to engineer, furnish and install a 13-meter non-standard Intelsat earth terminal on a turnkey basis. The terminal, to be located in Leticia, Amazonas State, will be linked to the Colombian domestic satellite network, utilizing leased satellite capacity of the Intelsat system.

Marconi Communication

Marconi Communication Systems is under contract to supply and install a 750kW broadcast transmitter to the Kuwait Broadcasting and Television Service. The contract, valued at nearly $4.4 million, also provides for any necessary updating of the three Marconi 750kW transmitters currently in use.

Marconi also has received a contract for VHF and UHF television transmitters to be used by Rai-Radiotelevisione Italiana. The nearly $2.2 million order calls for the VHF transmitters to replace existing equipment operating on the first TV channel while the UHF transmitters are a part of a major project which includes replacement of some transmitters of the second TV channel and the establishment of an additional color TV channel.

Another large order has been received by Marconi for five television cameras, two telecines, installation materials, spares and training of the personnel at the Radio and TV Organization of the Yemen Arab Republic. The order will re-equip two studios at the television center in the nation's capital.

Microdyne

Microdyne booked over $1.2 million in new orders for satellite TV receiving equipment at the National Cable Television Association convention in Las Vegas. A company spokesman indicated that this was the highest volume of business ever booked by the company at a single trade show.

Neve Electronics

Neve Electronics International has received orders for two consoles from Anglia TV's facilities in Norwich. The largest of the two was a custom-built 36-input channel mixing desk based on the S315/24-input channel model. The second was an S301 10-channel "Kelso" transportable console.

Neve also reports sales of a 44-input 32-track 8086 console to Queen Village Recording, and a 8068 recording console with a custom 48-channel Necam automation system to Sound Labs.

Quantel

Quantel Limited has received an order for 15 DP3 5000 NTSC Digital Production Effects systems and other digital video devices valued in excess of $2 million from the

AND MAINTAIN IT!! Measures frequency response on TVs, VTRs and other video equipment.

The Asaca Video Sweep Generator 205 contains a built-in standard color sync signal generator. The color burst can be switched on and off so the 205 is ideal for oscillator comparisons to measure frequency response of color equipment. There is a selection of output signals: video sweep (0.1 - 10 MHz), chroma sweep (sub carrier ± 2MHz), CW and multi-burst.

Also, the 205 features facilities for composite sync signal outputs and trigger pulse outputs (H. D/V. D. Selectable) and so it can be used for oscilloscope triggering. Digital read out for CW frequency and variable marking.

Contact your Asaca distributor for details or demonstration. Or write to:

ASACA

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(312) 298-4386

In the far east, contact Shibasoku, Ltd.
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Canon Amsterdam N.V., Industrial Products Division De Buiteelaan 8, Amsterdam, Netherlands

Circle (31) on Reply Card
Business news

National Broadcasting Company, besides the digital effects systems, the order includes four NTSC DFS 3300 digital framestore synchronizers, five DPE 5001S digital production effects systems, four DFS 3001S digital framestore synchronizers and a DSC 4002 digital standard converter for converting the Soviet Secam signals to NTSC.

RCA

RCA reports the following major sales and contracts since the first of June:

- 90 color TV cameras and associated equipment, valued at about $5.5 million, to Radiotelevisione Italiane (RAI);
- Cablevision Systems equipment and installation services, valued at about $4.5 million, to Fresno Cable TV;
- television program production equipment, valued at more than $1.5 million, to KCET, Los Angeles;
- transmitting and studio equipment, valued at more than $1.5 million, to Ziff Davis Broadcasting;
- a 2-way radio system, valued at more than $125,000, to ABC-TV for coverage of the Winter Olympics; and
- 15 portable color television cameras to Bulgarian Television, Bulgaria.

Sony Broadcast

Sony Broadcast has sold electronic news gathering equipment valued at more than $1 million to the five owned and operated television stations of Group W (Westinghouse Broadcasting Company). The order included 30 BVF-300 broadcast video cameras and 50 BVU-50 ¾-inch videotape recorders.

Thomson-CSF

Radiotelevisione Italiane (RAI) has ordered television and video equipment from Thomson-CSF. The first delivery will include UHF 2+2kW and 10+10kW transmitters. The company will supply nine still image analyzers for color slide projection.

FINANCIAL

Ampex

Ampex has declared its first dividend in its 35-year history. The dividend of 5 cents per quarter, payable August 28 to stock of record July 26, was declared less than two weeks after the company reported record net earnings and revenues.

Anixter Brothers

Third quarter net income rose 159% on a 46% sales gain at Anixter Brothers. Sales for the third quarter totaled $69.6 million over $47.8 million in the period the previous year. Net income rose to $2.3 million or 71 cents per share, from $888,000 or 28 cents per share last year.

Fight Inflation With Harris Criterion 90 Series

Unbeatable Price and Performance

For the discriminating broadcaster whose demand for quality is increasing, but whose budget isn't, Harris offers the inflation fighting Criterion 90 cartridge machine.

100% solid state construction and simplicity of design coupled with computerized testing and strict quality control guarantees the Criterion 90 a long life of superior audio performance—and the price is well within your budget.

Call Harris Corporation, Broadcast Products Division, Quincy, Ill. 62301, for more information on inflation fighter prices and a 30 day field trial.

See you at NRBA Oct. 7-10 Booths 3-7

HARRIS COMMUNICATION AND INFORMATION PROCESSING

Circle (32) on Reply Card

44 Broadcast Engineering September 1979
MARCONI has the proven answer to 'H' & 'V' Blanking Measurements

See How Easily Timing Measurements Can Now Be Made

- Fast accurate measurements at the touch of a button
- Results from samples taken throughout active field
- Blanking at set-up (+4 IRE) and picture (+20 IRE) measured independently to 10 nsec. resolution
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Marconi Television Interval Timer
Model 2920 measures the following parameters

VERTICAL BLANKING MEASUREMENTS
Total Vertical Blanking Interval
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Set Up Blanking (+4 IRE)
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Front Porch, (x)
Sync Width
Sync to Burst Start
Sync to Burst End
Sync to Set-Up, (y)
Burst Length in cycles
Sync Rise Time

REFERENCE MEASUREMENTS
Burst Amplitude in IRE
Sync Amplitude in IRE

marconi instruments
100 STONEBURST COURT, NORTHVALE, NEW JERSEY 07647
TELEPHONE: (201) 767-7520 • TWX: 710-991-9752
Circle (33) on Reply Card
Business news

Atlantic Research
Earnings at Atlantic Research for the first six months of 1979 increased by 17% over the same period last year. Net income was $734,000 on sales of $24.8 million, compared to $625,000 and $21.5 million for a like period in 1978. Earnings per share were 63 cents this year compared to 62 cents in 1978.

Cohu
Cohu reported net income of $475,035 or 28 cents per share for the first six months of 1979. Revenues were $10.6 million compared to income of $276,759 or 13 cents per share on revenues of $9.1 million in the like period of 1978. An eighth consecutive quarterly cash dividend of 4 cents per share has been declared by the directors.

Comcast
Comcast has declared a quarterly cash dividend of 3 cents per share on Class A and Class B common stock. The payment will be made September 27 to shareholders of record as of September 6.

COMSAT
Consolidated second quarter net income of $10.6 million or $1.32 per share, has been reported at COMSAT. This is an increase of 37% from $7.7 million or 96 cents per share for the second period of 1978. Compared with the first quarter of 1979, second quarter net income decreased by $1.3 million or 17 cents per share.

Datatron
Datatron reported a profit of $34,254 on sales of $1,249,477 for the third quarter ended March 31.

Farinon
Farinon has announced increased sales and earnings for its fiscal year ended March 31, 1979. Sales for the year were $82.8 million or 23% above last year’s sales of $75.4 million. Net income at $5.7 million was also 23% above the previous year’s income of $4.6 million. Net income per share for the year was $1.18 compared with last year’s $1.00.

RCA
Second quarter earnings at RCA rose 9% over the record profit in the same quarter of 1978 on a sales gain of 17%. Net profit for the three months ended June 30, 1979, was $85.6 million, compared with $78.3 million in the same period last year. Quarterly earnings per common share rose from $1.02 a year ago to $1.13. Sales for the quarter reached $1.89 billion, against $1.61 billion a year ago.

Scientific Atlanta
Scientific Atlanta reported sales of $86 million for the nine months ended March 31, 1979. That is 29% over the same period last year. Net earnings of $5 million were 37% higher than in the first nine months of last year. Net earnings were equal to $1.85 per share, compared with $1.50 per share in the first nine months of previous year.

Sennheiser Electronic
Sennheiser Electronic of West Germany has reported sales of $28.9 million in 1978, an increase of 10% over the previous year. Headphones now account for almost half of the manufacturer’s sales, compared with only 1% 10 years ago.
System-Cameras for all Applications

The universal camera range for studio productions, outside broadcasts, electronic news and field operation. Fully automatic production camera KCK with additional hand held version KCK-R.
New economic 2/3 inch option: KCP.
Self contained multipurpose camera system KCA with comprehensive base station features.
Ease of operation with a high degree of automation. The latest technology with the economy and flexibility of system design. A rational and progressive camera concept in all color standards.
From Bosch.

Your Video System Partner

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Television Systems Division


Circle (35) on Reply Card
improves antenna stability for AM directionals.

"In addition to dielectric integrity, PHILLYSTRAN tower guys offer several major advantages. These non-conducting guys combine high strength, light weight and inherent flexibility for installation ease. They also are essentially maintenance-free, even around salt-laden corrosive atmospheres."

"Since these non-metallic synthetic guys eliminate white-noise arcing, they should be considered where high water tables and common grounding, severe lightning storms, or frequently inclement weather tend to create transmission and reception problems."

"Several broadcasters improved antenna stability for AM directionals by replacing steel guys with PHILLYSTRAN."

Lerner elected chairman of NAB radio board

Arnold S. Lerner and Edward O. Fritts have been elected to 1-year terms as chairman and vice chairman, respectively, of the National Association of Broadcasters' radio board of directors. Lerner is chairman of WLH, Lowell, MA, and Fritts is president of Fritts Broadcasting, Indianapolis, IN. In the new positions, both will serve on the executive committee which advises Vincent T. Wasilewski, president, on the implementation of NAB policies.

FCC asked to rethink microwave frequency decision

The NAB has asked the FCC to reconsider its decision on microwave frequency use and not allow the expansion of Cable Television Relay Service (CARS) into the band set aside for broadcast auxiliary service which includes ENG operations. The petition stated that, "with an astounding lack of foresight and with little, if any, regard for the full record, the FCC has struck a critical blow to the future of ENG, creative public service programming and overall video responsiveness by the broadcast television medium."

Voluntary receiver performance program proposed

In two separate actions made recently, the NAB proposed a voluntary program of AM and FM receiver performance standards and an inclusion in the capability of television receivers to reject noncommercial FM interference to channel 6.

In the area of radio performance standards, the NAB is proposing that receiver manufacturers voluntarily submit tests to NAB or an independent laboratory. Under the plan, the NAB would authorize the manufacturer to attach a seal signifying compliance if the radio meets the standard. Three classes of performance are proposed: A, B, and C. The purpose is to encourage design improvements in receivers and to help buyers utilize electrical performance as part of their purchasing decision.

Regarding TV receiver performance, the NAB said that the action would be a long-term solution and urged the FCC to adopt their earlier plan which asked for FM station assignment policy modifications, FM power limitations, FM vertical polarization requirements and the creation of an FCC task force to consider the channel 6 interference problem and prepare a plan of action.

NAB asks FCC to regulate home satellite reception

The NAB has requested that the FCC make an inquiry and adopt policies governing home satellite reception before the proliferation of receive-only earth stations occurs. According to the association, "unregulated growth of such reception antennas could lead first to the serious impairment of the program supply market, through unlawful and uncompensated use of program product, and second, could threaten the conventional terrestrial television system and the principle of local video service responsive to local needs and interests." The NAB urged the commission to maintain a system of earth station licensing and

Circle (36) on Reply Card
Direct drive made Panasonic Series 9000 a great 3/4" editing system. Here's what makes the new 9000A an even better one.

The new Panasonic Series 9000A offers even more impressive performance, even more quality, and more professional features than the Series 9000 did last year. And we still have the lowest price tag in the business.

The new system consists of the NV-9500A editing recorder, the inexpensive NV-9200A player/recorder, and the NV-A950, the versatile editing controller that goes between them.

Together, they deliver the clearest Panasonic frame-to-frame edits ever. S/N ratios are our highest ever, 46 dB color and 50 dB black and white, thanks to new crystal-oriented HPF video heads. And in addition to those crisp, clean edits, you get reduced audio delay at the edit point. And substantially increased frequency response at the first generation.

That's not all: The newly increased frequency response works with a patented dubbing mode for even better dubbing quality. And still another of the many important improvements is a new tape guide path on the video head cylinder. It reduces tape edge movement for an even better RF envelope, and an even better signal—the best yet from Panasonic.

You get all these improvements, plus professional features you can count on in a Panasonic editing system: Like controls that are completely solenoid-operated. A separate RF output for use with an external DCC. Even subcarrier and external sync inputs for use with a time base corrector.

The Panasonic Series 9000A 3/4" editing system. The only thing that looks better than its performance is its price.


Exterior cabinetry is simulated woodgrain.

Panasonic.
just slightly ahead of our time.

Circle (37) on Reply Card
NAB

noted that any proliferation of earth stations or modification of current satellite uses would be in direct violation of domestic and international restrictions.

Advisory team requested

In a letter to the secretary of the FCC, Erwin Krasnow, senior vice president of the NAB, repeated a request that the commission establish a joint government-industry advisory committee on full-time radio services. Krasnow stated that the committee should be "established to make a comprehensive review of all proposals pertaining to aural allocations, including the proposed restructuring of some of the Class I-A clear channels." The NAB believes that an overall national radio allocations policy is necessary rather than a piecemeal approach.

Antitrust suit brought

The US Justice Department recently requested that the US district court of Washington, DC, rule that the NAB television code standards are in violation of the Sherman Antitrust Act and should prohibit their use. The code, in effect since 1952, places the following restraints on nonprogram time, including commercials:
- for network affiliates: in prime time, 9 1/2 minutes per hour, and 30 seconds per hour for promotional announcements when deemed necessary;
- in children's programming on Saturdays and Sundays, 9 1/2 minutes per hour;
- in children's programming on other days, 12 minutes per hour;
- all other time, 16 minutes per hour;
- time, seven minutes per half hour; and
- in all other times, eight minutes per half hour.

According to the government's suit, the codes place unreasonable restraints on trade and commerce, however, the NAB contends that the codes are in the public interest.

Minority fund grows

The Minority Investment Fund established last February by the NAB to assist minorities in purchasing broadcast facilities has received corporate guarantees and cash contributions of almost $9 million to date. The goal is to obtain $15 million in contributions from individuals and corporations which will be supplemented by matching funds from the Small Business Administration.

Dismissal of complaint against form requested

The dismissal of a Citizens Communications Center complaint against their request that the FCC modify and clarify its revised annual employment report has been requested by the National Association of Broadcasters (NAB). NAB says the complaint contains "seriously distorted characterizations of NABs petition and of the employment and employment reporting practices of the broadcast industry."

In its original filing the association had suggested that the commission add job titles erroneously omitted from the revised form, include particular titles in more than one job category and reinstate the provision allowing licensees to place employees in job categories where equivalent to similar positions are found.
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MONEY-BACK GUARANTEE IF YOU
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September 1979 Broadcast Engineering 51
NRBA proposes new radio deregulation measures

The NRBA has begun to press for a radio deregulation bill now that HR-3333 is dead. The association has submitted a summary of radio deregulation proposals to Representatives Lionel Van Deerlin and James Broyles. These congressmen will share the proposals with other members of the House Communications Subcommittee in the near future.

Highlights of the proposals include the following:
- Radio licenses extended to 7 years;
- Licensees will meet the public interest, convenience and necessity standard by broadcasting a certain percentage of non-entertainment programming—this percentage, to be determined by the FCC, shall not exceed 6% for AM stations or 6% for FM stations;
- License revocation only in cases of willful and intentional reporting of false information to the FCC, willful and repeated failure to operate as set forth in the license, violations of lottery, fraud and/or obscenity laws as outlined in the United States Criminal Code;
- The FCC shall be prohibited from evaluating program content, format, presentation or topics covered in non-entertainment programming in renewal proceedings;
- Section 317 of the Communications Act of 1934, sponsorship identification rules, will be repealed;
- In the event a renewal application is designated for hearing, competing applications will not be entertained;
- Ownership will be limited to 10 AM and 10 FM stations—no restrictions on cross-ownership of AM and FM stations;
- FCC required to set standards for petitions to deny or revoke, and to establish sanctions for abuse of these processes—parameters for standards and sanctions to be set by statute; and
- Establish fund to make moneys available to minority applicants qualified to own and operate a radio station. Fund to be administered by the FCC.

Benefit questions asked

The NRBA has distributed forms to its member stations in order to determine their interest in developing several employee benefit plans. This includes Group Life, Basic Hospitalization, Major Medical,
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.

If that isn't reason enough to make us your choice, maybe this is. We're the only one-inch supplier that winds your tape onto a special cushioned flange reel to protect against shipping and handling damage. And we pack and ship our tape in a flame-retardant case to give you even more protection.

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.
If you think a third audio channel and 10 extra lines of resolution are worth an extra $6000 in a 3½" video editing system, read no further.

But if you'd like to save $6000 compared to the nearest performing competition...yet perform advanced editing functions at tape speeds up to 10 times normal (a JVC exclusive)...and produce broadcast quality tapes even if you're not an expert...then the CR-8500LU system including RM-85U Editing Control Unit is for you. It has many features you won't find elsewhere except on that higher priced system. Plus some you won't find even there.

**Fast, no-glitch editing**

With pushbutton ease, you get distortion-free frame-to-frame editing, thanks to JVC's built-in rotary erase head, blanking switcher and advanced servo mechanism. First, you have a choice of 11 forward and rewind search speeds, from still-frame to an unequalled 10 times normal. After picking edit points, you also have a wide choice of automatic preroll times. (The more expensive system limits you to 2 or 5 seconds.) Then you can preview your edits and adjust edit points. Preroll again, and edits are made automatically, electronically, at exactly the selected points ±2 frames—an accuracy equal to the higher priced system. There's also a horizontal sync phase compensator to minimize timing error. A patented dubbing switch for maintaining stable color. And much more.

The RM-85U Editing Control Unit has independent LED displays for player and recorder. Each gives elapsed tape time in
For those who need funds, not frills.

Stand-alone versatility

Let's say you just want to assemble or insert edit live material onto a tape. All you need is one CR-8500LU Recorder/Editor... which still gives you the benefit of automatic preroll. By contrast, the higher priced brand makes you buy a control unit as well.

Let a JVC dealer show you how our editing system gives you much more for your money. For the name of your nearest dealer, call one of these numbers collect: East, 212-476-8300; Midwest, 312-364-9300; South, 713-741-3741; West, 213-537-6020. US JVC Corp., 58-75 Queens Midtown Expressway, Maspeth, NY 11378.

Mail to US JVC Corp.,
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Maspeth, NY 11378.
I'd like to know more about the CR-8500LU editing system including RM-85U Editing Control Unit.

Name ____________________________
Title ____________________________
Company _________________________
Address __________________________
City, State, ZIP ____________________
Phone ____________________________
Type of operation __________________

Circle (41) on Reply Card
NRBA

Dental Insurance, Long Term Disability and High Limit Accident. The form asks, for each plan, whether the station now has, would be interested in or might join if the NRBA comes up with a better plan than the station now has.

The form was due August 1.

Community service study

According to a recently completed NRBA survey, radio stations in one and two station markets will continue to serve their communities of license in the absence of government regulation.

The study was prompted by concerns expressed by the National Telecommunications & Information Agency and the White House Domestic Policy staff that one and two station radio markets might not be subject to the same types of competitive marketplace conditions that would foster larger radio markets to meet the needs of the listening public.

The survey found that 93% of single-station markets receive an average of 12 strong radio signals from other markets. More than 85% of these indicated that the outside radio stations also sell advertising in their markets.

The study also cited results from 1978 studies by Frank Magid Associates which showed that good local news coverage is a primary reason people choose one station over another.

Severeid receives award

Eric Severeid, semi-retired CBS news correspondent, will be awarded the NRBA Golden Radio Award October 8, during the Sixth Annual Conference and Exposition at the Washington Hilton in Washington, DC.

The Golden Radio Award is presented when merited for outstanding contributions to the radio industries. Previous recipients include Representative Lionel Van Deerlin, ex-FCC chairman Richard Wiley and Lowell Thomas.

5 new regional directors elected to NRBA board

The ballots have been tallied and five new NRBA regional directors have been elected. The following will serve 2-year terms: Bob Herpe, WFLR/WOMN, New Haven, CT, Region 1; Bernie Mann, WGLD/ WOKX-High Point, WKIX/WYDF-Raleigh, Region 3; Ron Kemptt, WHIO AM/FM, Dayton, OH, Region 5; Paul Lange, KDID, Devil's Lake, ND, Region 7; and Eric Hansen, KDKB AM/FM, Phoenix, AZ, Region 9.

Suspect petition misuse

The NRBA has filed with the FCC a request for an inquiry into the uses which have been made of petitions to deny over the last 10 years.

The association says that the basis for the request is that an "aura of misuse and abuse has grown up around petitions to deny." It added that it appears that petitioners frequently file frivolous and unsupported applications and burden the commission's staff. Further, questions have occasionally been raised about the propriety of the reimbursement aspects of some agreements under which petitioners withdraw their petitions (or agree not to file them in the first place) in return for reimbursement of expenses, among other things.
Control the complete audio spectrum. At the controls of the new ADM® broadcast consoles you command every aspect of audio broadcast production. At your fingertips is a unit far beyond the scope of ordinary expectation. It's designed to the most exacting standards; manufactured to the most rigid tolerances. Its functions appear limitless; its quality obvious. So confident is ADM of their consoles, that they're backed with an exclusive five year warranty. For a complete catalog and list of users contact Audio Designs and Manufacturing Inc., 16005 Sturgeon, Roseville, MI 48066. Phone: (313) 779-8400. TLX-23-1114. The Audio Company.
Take 1:
More feedback on jobs and training in TV

The current series of columns relating to jobs, training and pitfalls, as relating to the TV operations area, has set off an avalanche of incoming mail. Letters have been received from interested parties such as guidance counselors at the radio-TV universities, vocational institute representatives, employers and lastly, would-be employees.

This response is welcome as evidence that we are relating what seemingly is important and relevant to BE's readers. Also, that we may be able to be of some real assistance to these various parties that represent quite a comprehensive cross-section of the TV Family.

Without identifying individuals, here are some brief extracts of what is being received. An instructor at a midwestern technical institute writes: "...You addressed some common problems...many of which concern us as a broadcast training station. ...As we continue to send graduates into the broadcast field, we are encountering the importance and necessity for 1) a national broadcast organization that would promote professional standards within the industry; 2) a national job information clearinghouse; and 3) a resource information center that would provide the broadcast worker and trainee with seminars, newsletters, new equipment and happenings in the industry." Another letter from a graduate coordinator at a northern university's school of radio-TV says: "Please send information on how ASTVC can help our students prepare for careers in television. We have nearly 700 undergraduate majors in radio and television...arrange for a rep of ASTVC to visit our campus."

A systems division manager of a southwestern production house wrote: "Our company is involved in field production, post-production editing and duplication based here in Arizona...Your article in BE attracted my attention because we are having the same problems related in the article. ...I would be interested in receiving... information you can send me regarding qualified personnel as we will require very shortly one producer, one director, four camera-persons, script writers, etc...I would entertain the prospect of receiving resumes from those interested."

This next letter is representative of many expressing similar points of view, and quite possibly is the one most common criticism we hear. "...As a recent college graduate, the article was just what I was looking for in terms of job-seeking guidance. I do not consider myself (as yet) a cameraperson...although I did take the [required] TV/film courses...for my MassComm BA degree. Most of my years in college centered around the student-run station. My college courses failed to prepare me for a career in broadcasting because of a lack of state-of-the-art equipment, and although new facilities are being built, the department's staff has dwindled to one full-time professor, such is the case with many...schools."

We believe that the letters printed (in extract form) for your general information and guidance represent the thoughts and experiences of so many people in our industry. Still, this is just a superficial view of the many complicated and frustrating
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problems that present themselves to all those interested in the human resources factor of this industry. In future issues of this column, we will examine related areas of concern and, by telling it like it is, endeavor to answer those questions put to us by member and non-member alike. We are most grateful to the editors of Broadcast Engineering for providing us with the means to present this forum which we know to be of interest and value to so many of our readers.

Take 2: The Arabs are coming!

Our column in the June issue of BE related how the ASTVC was chosen by the US Department of Labor to coordinate the training program for several visitors representing Yemen Broadcast Authority. As stated then, we believe what we learn through our efforts to provide a comprehensive training program for these people will prove most useful to the ASTVC in aiding us in many of our own programs for members.

We would like to say how pleased we are for these offers to cooperation and assistance extended us by organizations such as NBC, WNET (PBS), USMA-TV and the pending commitments of several others. These guests of the Labor Department's Bureau of International Visitors will first undergo an extensive English language refresher course slated to begin at Georgetown University on or about August 6. At the conclusion of this course, present plans call for a period of intern or over-the-shoulder type training at one or more Washington-based outlets. From there, they will travel to NYC to undergo related training at still more broadcast and/or production houses. For one or two of them, there will be a period of indoctrination at one or more transmitter sites.

Additionally, there may be a period of residence instruction provided by one of the vocational/technical schools to be chosen if necessary. Once again, the ASTVC hopes to learn much that can be of future value to our membership and the readers of this column. We will analyze most carefully the training programs (and results) provided by this project and the various participating agencies.

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Standard Features
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Many optional features including DSK, & quad split, etc.

MODELS 154 & 156

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 features, differing only in the number of buses 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 1000x cable
   - 22" sub carrier phase control
   - changed inputs 100% to 80% APV
   - sync addition on non-composite signals if desired.

3. Tallys
   - isolated dry contact relay closure on all inputs (2 amp at 50 v.)

4. Mix/Effects Units (Includes Keying Functions)
   - One (1) used in Model B1-154.
   - Two (2) used in Model B1-156.
   - Mix/Effects key may be produced

5. Positioner Joysticks for each M/E positions

6. Pattern Modulation may be accomplished by an external waveform generator. Modulation sources may be either 75 line waveform, (2) square wave, (2) saw tooth, or (4) external customer generated source.

7. Mix Key and Wipe Key available

8. Soft wipe and Key available with adjustable variations.

9. Push to Preview obtained by depressing knob on clip potential meter (provided for Nu/E monitor output).

10. Wipe Mode—3 interlocked buttons select "NDR", "REV" or "N/R"

11. Hard Wipe, Soft Wipe or Border can be selected with degree of softness made by "Edge" control adjustment.

12. Border may be controlled by adjustment of "Hue" and "Luminance" controls.

13. Symmetry of Pattern may be adjusted by "Sym" knob.


15. Spotlight alternate action push button produces a 6 db. level difference between "A" and "B" input channels in the "Wipe" mode. (Operations are all pattern.)

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 Nu/E control panel.

Non-Synchronous Inputs: An "NS" indicator is provided. M/E is prevented from allowing a non-synchronous signal to be switched except at extreme position of 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" Pull may be either "A" video for self keying or a colorized matte

Mix/Key provided a flex 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)

Chrome Keyer (IC K.) $950.00
- "Hue"—selects hue of stying color
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- "Edge"—adjusts the edge level for keying
- Camera 14 x 15 input switcher—selects RGB output any of four cameras to feed C.K.

Down Stream Keyer (DSK) $1,125.00
- Keys in mixer, inserts, or fades to black with or without insert
- Color matte background
- Key sources: (1) M/E, (2) Camera Key, (3) External
- Push to Preview (Monitor)

Border $1,190.00
- Border—black edge around insert
- Shadow—black edge on right side and bottom of insert

Quad Split $850.00
- Provides four (4) views of one source with variable width borders.

Aux Bus 1-56 only $2,100.00
- Two remote outputs available — remote control panel and amp required.

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September 1979 Broadcast Engineering 51
State broadcasting organizations and other associations

Arkansas Broadcasters Association
The ABA has joined several organizations in a combined effort to inform the public about the Freedom of Information Act in Arkansas. June 1st was proclaimed as a special day to observe the operation and the openness of municipal courts in Arkansas.

Colorado Broadcasters Association
Due to changing the date of the 1980 Winter Convention, now January 24-26, there will be a change in dates for the submission of entries in the Colorado Broadcasters Association Annual Awards of Excellence.

It is anticipated that for 1979 only, entries must be broadcast on or before November 30, 1979, and submitted by December 5, 1979.

Georgia Association of Broadcasters
Fred Pierce of WGCJ, Radio/TV, Savannah, has been elected 1979-80 president of the GAB. In accepting the job, Pierce called on broadcasters throughout Georgia to get involved in the fight to influence legislation positive to the broadcast industry.

Kentucky Broadcasters Association
The Kentucky Broadcasters Association has announced that four new members of the board of radio district directors have been elected. All candidates were unopposed and will serve 2-year terms beginning November 1, 1979. They are Shelby McCallum, Radio WCBL-AM/FM; Charles M. Anderson, Radio WKVE; William J. Laney, Radio WNNL; and Roy A. Redmond, Radio WDFM-AM/FM.

Senator Barry Goldwater will speak at the October 24-26 convention at the Lexington Hyatt Regency.

Missouri Broadcasters Association
The MBA fall meeting will be held October 18-21. A big program area will be the elections of 1980: how to handle candidates, both news and

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Response like this has a number of benefits. First, your EQ is used only to touch up the sound, not to correct built-in errors of the microphone. Which leaves more leeway to control the overall sound.

And without unwanted peaks you have more usable headroom. That's vital when you're working near the dynamic limit of a preamp or line amp. Sound stays clean and sharp. Compressors or limiters sound less forced, because they are controlling peaks in the sound, not peaks in the mike!

But perhaps the biggest advantage is the versatility of these A-T condensers. Because they have just the right amount of presence for today's recordings, they're not limited to just one kind of instrument... just one type of voice. Put them anywhere in the mix: brass, reeds, percussion, chorus, or strings. Then listen. What you hear in the studio you'll hear at the console. Which is a great place to start in mixing any session.

At their highly affordable prices, these are two of the best bargains you'll find these days. Reliable, clean-sounding, and the most predictable microphones you can use. Make them a mainstay in your studio today. Write for spec sheets and dealer list.

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Other associations

sales; election return computation at national and state levels; and returns broadcasts in smaller markets.

Ohio Educational Television Network
WGTE-TV Toledo, and WGUG-FM, Cincinnati, were winners in the 1979 Ohio Educational Broadcasting Awards competition presented June 11 in Bowling Green. The Toledo station accepted one in both the Public Information and Development categories with its "Vibrations in Black" awareness campaign and Studio Club Membership drive respectively while WGUG-FM claimed honors in the same categories with its "Show Off '78" awareness campaign and fund raising marathon.

Rhode Island Broadcasters Association
The association has elected the following officers: Dave Russell, president; Sandy Davey, executive vice president; Bob Carson, treasurer; and Don Kane, secretary.

South Carolina Broadcasters Association
At the last meeting of the South Carolina Broadcasters Association, the board of directors announced that judging of the entries for the association's awards activities had begun. Also, a form has been sent to all member stations requesting information about their EBS status.

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National/International groups

ABES
An association of broadcasters dedicated to the establishment and maintenance of optimum technical standards in the regulation of radio broadcasting, the Association of Broadcast Engineering Standards, is now actively expanding its membership and addressing industry issues. According to William Potts, Jr., ABES secretary, a special committee of the board of directors has been formed to screen and select an executive director. The special committee is currently meeting with candidates and hopes to have an executive director, who will be based in Washington, selected early in September.

At a major meeting on March 25th the ABES elected the following officers for a 1-year period: Richard R. Miller, KBOY, Butte, MT—president; Jeffrey Hatch, Communications Investment, Salt Lake City, UT—vice president; Thomas K. McKnight, Combined Communications, Phoenix, AZ—vice president; Col. John Bowman, Washington, DC—treasurer; and William J. Potts, Jr., Haley, Bader & Potts, Washington, DC—secretary.

The ABES Technical Committee includes the following members: James Wallman, WTMJ, Milwaukee, WI; Russel Arnold, Wabash Valley Broadcasting, Terre Haute, IN; Col. John Bowman, Washington, DC; Ralph Green, CBS Radio, New York; Everett Lawson, WLAC, Nashville, TN; and George J. Capalbo, KKO Radio, Boston, MA. All have been elected to the committee for a one-year term.

Persons interested in joining the ABES, or in making their views clear on critical issues, may write William J. Potts, Jr., ABES Secretary, Suite 700, 1730 M Street NW, Washington, DC 20036.
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September 1979 Broadcast Engineering 65
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TYPE 642-21 Degaussers is similar to the 9205A except it is limited to erasure of 10% inch reels. This unit is recommended where size and cost are limiting factors.

TYPE 9005 Magnetic Erasing Pencils is an excellent tool for erasing limited, small areas of tape or film and for demagnetizing record/play heads. In program material words, complete sentences, and even syllables may be erased. This unit is equipped with a press-to-operate switch on the handle.

MODEL 22-323-1 Foot Switch is a companion accessory to the bulk degaussers that allows convenient, “hands free” operation and provides a positive means of turning the degaussers off immediately after use. This is a momentary acting switch and can help extend the life of the degaussers.

If you're looking for a degaussers with proven reliability that will save you time and money, call or write WRE today.

Other associations

SMPT

The record for the greatest number of booths taken at a SMPTE exhibit has been broken by the upcoming SMPTE exhibit that is scheduled for the Century Plaza Hotel in Los Angeles October 21-26. March hundred booths have been taken so far; the previous record was 220 booths at the Los Angeles Exhibit in 1977. There will be 140 companies from both the motion-picture and television industries participating in this exhibit. In addition to the exhibit the conference will feature a 5-day program of sessions on the subjects of television and motion-picture technology. More than 7000 people from the motion-picture and television industries are expected to attend. For more information, contact SMPTE, 862 Scarsdale Ave., Dept. BE, Scarsdale, NY 10583.

PMEPA

“The Visual Effect of Special Effects” symposium hosted by William A. Fraker, ASC will be presented by the PMEPA in conjunction with the 121st SMPTE October conference in Los Angeles. The association is now sponsoring its fifth annual seminar that has each year produced an informal hands-on atmosphere of hardware usage. Tickets will be on sale prior to the show at the Century Plaza Hotel during the SMPTE Sunday registration and Monday exhibit hours. Tickets are $6 per person. Mail requests and inquiries to PMEPA National Headquarters, Dept. BE, University Tower, Suite 806, 6440 N. Central Expressway, Dallas, TX 75206. (214) 696-1440.

AMTA

The Antenna Measurement Techniques Association was formed March 12-13 in Atlanta as a non-profit organization composed of individuals interested in advancing the art of antenna measurement. The meeting was attended by key personnel from government and commercial organizations representing the interest of the antenna test and measurement field and manufacturers of antenna test instrumentation. Plans for the organization include a software pool which would be available to all members to assist in the development of programming for automatic systems. For additional information, contact Joe Pape, Scientific-Atlanta, 3845 Pleasantdale Road, Atlanta, GA 30340, (404) 449-2354.

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**Z6/B options include . . .**

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people in the news

Radio/Television

Robert N. Ordoñez, vice president, Donrey Media Group's broadcast division, has resigned. Gene Spry, also general manager of Donrey's KORK-TV, Las Vegas, will assume the additional duties of vice president of the broadcast division.

Solaris Television Studios' new vice president/general manager is Jerry O'Brien. Formerly vice president/finance of the television production and post-production company, he will be responsible for all corporate financial management and studio supervision.

John A. Tagliatello has been appointed vice president-operations at the Hughes Television Network. Tagliatello has been vice president-communications services since 1977. In his new position he will be responsible for the division and technical and production capabilities at the Madison Square Garden facilities.

The New Jersey Public Broadcasting Authority board of commissioners has named Gordon A. MacInnes, Jr. as its executive director. MacInnes was selected from a field of 130 applicants. From 1970 to 1978 MacInnes served as the executive director of The Fund for New Jersey and assisted in the development of the New Jersey Coalition for Fair Broadcasting, the Center for Analysis of Public Issues, the Office of Newark Studies and Schoolwatch.

Outlet Company recently announced the appointment of Charles F. Kennedy as senior vice president of the television station group as a reorganization of the broadcast division. Kennedy was most recently the division's vice president of planning.

Recent elections at Cox Broadcasting have resulted in the following: Alan D. Chunka to vice president; John Boyette, John J. Rouse, Jr., and Robert E. Gartia to assistant treasurers; and Linda Stewart to assistant secretary. Elaine K. Boryk has been appointed controller.

Edward L. Corn has been appointed chief engineer, KORK-AM/FM, Las Vegas. He has spent the last three years in engineering positions with KIOA and KCBC, Des Moines, IA.

Reid Carpenter has been promoted from director of engineering to vice president and director of engineering at KUTV. Carpenter has been with the Salt Lake City station since it went on the air in 1952 as design construction engineer and studio supervisor.

Jonathan E. Fricke has been named operations manager of WSAI, Cincinnati with responsibility for the supervision and direction of all station departments except for sales. Fricke most recently served as program director.

The Christian Broadcasting Network has named Tom Smith to the position of general manager at WXRI-FM. Smith also will serve as general manager and general sales manager of the CBN operated WYAH-TV station. He will be responsible for sales management,
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Circle (54) on Reply Card
People in the news

administration and operation of the FM station.

At KCET-TV/Los Angeles, Steve deSatnick has been promoted to vice president of operations and engineering. Previously, deSatnick was the station's director of operations and engineering.

Steve Flyte has joined KABC-TV/Los Angeles as a mini-cam engineer for their news department. Flyte was formerly with KATU-TV/Portland, OR, in the same capacity.

Emmett H. Massie is now director of engineering for public television station WUFT, Gainesville, FL. Massie previously was chief of technical operations for the United States Army Intelligence School at Fort Devens, MA.

Recent staff appointments at KFVS-TV, Cape Girardeau, MO, include Warren Bottorf to chief engineer, and Jerrold Hollis to production manager. Bottorf was most recently at WRVY-TV, Dothan, AL; Hollis has been with KFVS-TV.

Don Kerouac has been promoted to chief engineer of WKAN, Kankakee, IL. Kerouac joined the station a year ago.

WGN Continental Broadcasting Company has announced the retirement of Ralph F. Batt, vice president and manager of engineering. Batt had been with WGN since 1940.

George Semyan, WILA-TV technician in Washington, DC, died May 17, 1979, of a heart attack. The 59-year-old television pioneer had been with the station for 31 years. He pioneered televising early presidential inaugurations, press conferences, medical TV experimentation, Redskins' football, parades and congressional hearings (Army-McCarthy hearings).

Agencies/Associations

Thomas E. Bolger was elected to a 1-year term as chairman of the 49-member National Association of Broadcasters' board of directors. Bolger is president, WMTV-TV, Madison, WI.

The National Association of Broadcasters' Television Board of Directors has elected Robert K. King as its chairman. King is senior vice president, Capital Cities Communications, Philadelphia.

Ragan Henry, owner of Broadcast Enterprises Network, has been elected president of the National Association of Black-Owned Broadcasters. Elliott E. Franks has become chairman. Other officers elected were Pierre Sutton of Inner City Broadcasting, and Eugene Jackson of the National Black Network.

The SMPTE's executive director, Denis A. Courtney,
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 • Beyer • PMI
 Support Equipment
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People in the news

has retired after 26 years with the organization. Donald F. Breidt has succeeded him. Breidt comes to SMPTE from Harcourt Brace Jovanovich.

Robert B. Mitchell will succeed Wayne C. Cornilis as vice president for membership for the National Association of Broadcasters it was recently announced. Mitchell, who joined the staff in January, has been in broadcasting since 1955, in various capacities. In another appointment, Peter A. Lund, vice president of the CBS owned AM stations in New York City, was named to the board of directors.

Richard J. Shibon has been named chief of the FCC Broadcast Bureau. Shibon has been with the commission since 1962, most recently as chief of the bureau’s renewal and transfer division.

The FCC has appointed Frank G. Washington deputy chief of the Broadcast Bureau. Washington, who has been serving as chief of the policy and rules division of the Broadcast Bureau since May 6, joined the FCC in November 1977.

The FCC has announced that Roy J. Stewart, chief of the Broadcast Bureau’s transfer branch, has been appointed chief of the bureau’s renewal and transfer division.

Henry L. [Jeff] Baumann has been named chief of the FCC policy and rules division. Formerly chief of the Broadcast Bureau’s renewal branch, he has been with the FCC since October 1969.

Officers for The Society of Cable Television Engineers for 1979-80 are: Harold R. Null, vice president of engineering for Storer Cable TV, president; William H. Ellis, engineering director for Evansville Cable TV, eastern vice president; Frank J. Bias, vice president of engineering for Viacom Communications, western vice president; Kenneth S. Gunter, executive vice president and director of UA-Columbia Cablevision, secretary; and Thomas A. Olson, president of Tomco Communications, treasurer.

Roger Allan, WRKO, Boston, has been elected to the board of director’s post for the Radio and Television News Directors Association. He has served on the board of directors for two terms in the past.

Animator Harry Klynn and programmer Stu Rosen have been added to the Academy of Television Arts & Sciences board of governors.

David Schmuelle, chief engineer at TPC Communications, has been named to a committee of the Audio Engineering Society, which will study the problem of transmission of audio signals in TV broadcast. Schmuelle worked with National Teleproductions and the University of Kentucky Television Center before joining TPC in 1974.

Manufacturers/Distributors

UMC Electronics has announced two appointments. James C. Leu is now president of the company. He was president of the US Electrical Motors division of the Emerson Electric Company. Philip Lohman is now vice president-marketing, UMC. He was previously assistant vice president-international for the US Elec-
If you think their character generator is easy to operate, just go ahead and exawkm.

Before you invest in a top of the line character generator, you should know more than just what it can do. That's why the versatile new 3M D-8800 character generator could be just the one for you. You see, all instructions are in English, not in code. And we've put them on a convenient L.E.D. panel above the keyboard for less wasted eye motion. So even a beginner can soon be composing in all kinds of fonts and colors. See your 3M representative right away for the character generator any of your people can run, or call 612-736-1032. For more information. Unless of course, you'd rather exawkm.
People in the news

Ampro/Scully has announced several management changes: Tom Creighton, formerly national sales manager, is now vice president of sales and marketing; Bill Hamilton, formerly eastern regional manager at Scully, has been appointed national sales manager; and Ed Zdobinski has been appointed customer service manager for Scully products.

Richard N. Lawrence has been promoted to general manager of Lenco Electronics Division. Previously, Lawrence was sales manager for the company.

Philips Test & Measuring Instruments has named Robert Hynes national sales manager. He was eastern regional sales manager for the company.

William C. Ebell has joined A.F. Associates as national sales manager. Ebell was senior sales engineer with Ampex, AVSP division.

Ken Kohda, TDK Electronics, adds the title of general manager to that of vice president of the quality audio and videotape marketer/manufacturer for the firm. Ann Boucher has been appointed advertising and publicity manager.

Sharp Electronics has promoted four executives: Mike Akamatsu has been promoted to a new executive level position with the company's international division in Japan. Charles Daigneault has been promoted to executive vice president. Ted Inoue has been named assistant executive vice president and Ted Nakano has been promoted to general manager, business administration, consumer electronics division. Also at Sharp, Ron Colgan will assist the company's West Coast dealer network for the professional products department. Two new regional salesmen also have been named: Jim Freeman to southeastern regional sales manager, and Robert McNeill to eastern regional sales manager.

RCA has announced several staff appointments: Stanley E. Basara, promoted to division vice president and general manager of RCA Broadcast Systems; Donald M. Cook, appointed division vice president and general manager of RCA Distributor and Special Products division; Dr. James Vollmer, elected RCA group vice president with responsibility for the Commercial Communications Systems division and the Government Systems division; and Paul R. Tatge, appointed manager of Satellite Communications Services for the RCA Service Company.

Hitachi has announced the appointment of Clyde W. Smith as vice president of research and development. Smith was director of audio/video engineering at Thompson-CSF and was responsible for the Microcom Program.

Microtime has announced the appointment of Robert J. Anderman as director of marketing. Anderman came to Microtime from McMartin Industries where he served as broadcast sales manager.

John F. Delissio returns to the broadcast products division of Harris as vice president of international sales. Delissio previously served as director of international sales and then as director of domestic sales until his appointment of vice president of...
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People in the news

Marketing at the satellite communications division in 1977.

Scientific-Atlanta has named Donald Begitschke manager of engineering for its Optima Division. Begitschke will have responsibility for the engineering and design functions for the enclosure manufacturer.

UMC Electronics has named David M. Kelly sales and marketing manager for their broadcast products division. Kelly most recently served as an associate with the Chapman Company, a nationwide radio and TV station broker.

Ampex has added three sales engineers to the marketing staff of the audio-video systems division: Bob Natwick, video sales engineer for the northeast; Tony Dean, audio sales engineer for the northeast; and Earl Higgins, video sales engineer for the southeast.

EEV has announced Robert E. Knowles as product sales manager for Arkansas, Kansas, Louisiana, Minnesota, Nebraska, North Dakota, Oklahoma, South Dakota and Texas. Harry Kozicki has been appointed product sales manager for Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia and Puerto Rico.

Sony Consumer Products has named Don LaDieu national accounts manager. Previously, LaDieu served as regional sales manager in Sony's New England Office.

Electro-Voice's new high fidelity products marketing manager is Tony Satariano. He comes to the company from the Koss Corporation where he was midwest regional sales manager.

Harvey Ray is Commercial Electronics Incorporated's new eastern regional sales manager. He was formerly vice president at ITT Glendale. Dave Lindsey is CEI's midwestern regional sales manager. He was formerly national product manager at GBC.

Herman Schloss has been named vice president of US JVC'S Pro Vid division. Prior to his appointment, Schloss directed the division's operations as national sales manager.

Telex Communications announced the appointment of two representative organizations for its broadcast and professional audio products group. On the East Coast LCA Sales was appointed for greater NYC, New Jersey, Delaware and Eastern Pennsylvania; Robert Milsk Company was named for Indiana and Kentucky.

McMartin Industries has appointed Don Denver to national sales administrator. Prior to joining the company, he held an administrative and engineering post at Keck in Lincoln, NE. Also at McMartin, Charles E. Goodrich has been named director of marketing. Formerly, he was director of engineering.

Richard F. Corrigan and Stanley Risetter have joined Fuji Photo Film USA as sales representatives in the Midwest and Southwest. Both will specialize in sales and support of broadcast products.
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SINCE 1968. We’ve been at it longer and better than most. Consequently, we know TV cameras. In 1977 we committed CEI to a new direction in broadcast color television cameras.

At last components were small. Needs were different. Flexibility was key. And portability was a must. So, we developed the 310 system and not just one more bulky contraption with unnecessary flaps, doors, handles, corners, louvers, wires, cables … and weight.

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**meetings, events & seminars**

**September 19-26**—The World Telecommunication Forum will be held in the Palais des Expositions of Geneva, Switzerland. The forum is organized by the International Telecommunication Union (ITU) and professional engineering societies from around the world.

Part 1 of the forum, “Telecommunication perspectives and economic implications,” takes place from September 19 to 21; Part 2, the “Integration of the world telecommunications network,” will take place from September 24 to 26.

For more information, contact Rita Glita, American Express Travel Service, 7, rue du Mont-Blanc, Boîte postale 859, 1211 GENEVE 1 (Switzerland), (022) 31 76 00.

**September 20-26**—The Third World Telecommunications Exhibition, TELECOM 79, will be held in the Palais des Expositions of Geneva, Switzerland. Specialists, delegates of the telecommunications administrations in some 140 countries, engineers and industry representatives will be on hand to assess the displays of nearly 600 exhibitors from about 40 countries.

The exposition will coincide with the opening in Geneva of the World Radio Conference.

For more information, contact Rita Glita, American Express Travel Service, 7, rue du Mont-Blanc, Boîte postale 859, 1211 GENEVE 1 (Switzerland), (022) 31 76 00.

**September 24-November 30**—The World Administrative Radio Conference (WARC) will open on September 24, 1979. Organized by the International Telecommunication Union, it will last 10 weeks and will be held at the Geneva International Conference Center and in the ITU headquarters building. The purpose of WARC-79 is to revise, harmonize and bring up to date the international regulations applicable to all radio communication services. As a governmental conference, the decisions made will have the force of a treaty. For more information contact Union Internationale Des Telecommunications, Place des Nations, 1211 Geneva 20, (022) 99 51 11.

**October 7-10**—The National Radio Broadcasters Association (NRBA) will hold their Sixth Annual Conference and Exposition at the Washington Hilton hotel in Washington, DC. For more information contact the National Radio Broadcasters Association, Suite 500, 1705 DeSales St., NW, Washington, DC 20036.

**October 9-13**—The Inter-American Association of Broadcasters will meet at the Mayflower Hotel in Washington, DC.

For more information, contact Hector Armengual, Inter-American Association of Broadcasters, Calle Yi, 1264-Montevideo, Uruguay, 90-4456.

**October 11-14**—The American Film Institute national conference on film and television is scheduled for the Sheraton Universal hotel, Universal City, CA.

For more information, contact the American Film Institute, Kennedy Center, Washington, DC 20566.

**October 16-18**—The 10th annual Video Expo/New...
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Meetings, events & seminars

York will be held in the Rotunda of Madison Square Garden. The world's largest non-broadcast television trade exposition, Video Expo, will feature exhibits, general sessions and seminars.


October 21-26—The 121st Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers (SMPTE) will be at the Century Plaza Hotel in Los Angeles, CA. The conference will feature five days of technical sessions on motion pictures and television. The SMPTE equipment exhibit, beginning Monday, is expected to have more than 250 booths of equipment with many of the major film and video equipment manufacturers participating. For additional information write SMPTE Conference, Dept. BE, 962 Scarsdale Ave., Scarsdale, NY 10583.

October 27-November 3—Telemark '79, the 2nd Exhibition of Installations and Equipment for radio/television stations and the 2nd Borsa Programmi for producers and distributors of programs for radio/television will take place at the Exhibition Park of Novegro, Airport Milan/Linate. For more information, contact COMIS Lombardia, Via Boccaccio, 7 - 20123 Milano, Italy. Telephone (02) 80 92 81.

October 29-31—Scientific Atlanta's 5th annual Satellite Earth Station Symposium will be held at the Marriott Hotel in downtown Atlanta. The meeting is offered to executives and technical managers of cable systems, broadcasters and other communications firms. The symposium will feature the experiences of communications firms now receiving satellite-relayed programs and signals by the use of satellite earth terminals. For additional information contact Kenneth F. Ledick, broadcast marketing manager, Scientific Atlanta, Dept. BE, 3845 Pleasantdale Road, Atlanta, GA 30340.

November 2-5—The 64th Technical Meeting and Exhibits fall conference of AES will be held at New York City's Waldorf-Astoria Hotel. Convention chairman is Eric Porterfield, Columbia Records, 51 West 52nd Street, New York, NY 10019, (212) 975-4461.

November 7-8—A fall engineering conference on emerging technologies will be hosted by the Society of Cable Television Engineers. The meeting will explore fiber optics and its impact on cable television/broadcast communications.

For more information, contact SCTE, 1100 17th Street NW, Washington, DC 20036, (202) 659-2131.

November 11-15—The National Association of Educational Broadcasters will hold their 55th Annual Convention at the Conrad Hilton in Chicago. Highlights include the 2nd Annual Video Fair, a preview of programs being distributed to public broadcasting.

For more information, contact: National Association of Educational Broadcasters, Dept. BE, 1346 Connecticut Avenue NW, Washington, DC 20036.

November 15-18—The First International Video Music Conference, sponsored by Billboard magazine, will be held at the Sheraton-Universal in Los Angeles.

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The test pattern is produced by circuitry that is completely digital in nature and which substitutes for a monoscope tube. The digital circuit is very dependable and stable. There is no distortion. No pattern deterioration. There is an excellent signal to noise ratio.

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As an option, color burst signals can be added to the patterns through the insertion of external color signals.

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For more information, contact Billboard International Video Music Conference, 9000 Sunset Blvd., Los Angeles, CA 90069, (213) 273-7040.

November 26-27—Video Rights '79 is being held at the Cafe Royal, London, under the chairmanship of John Johnson, program consultant, and professional broadcaster in sound and vision. It was designed to examine the solutions to the rights tangle. For more details, contact Agneta Moe, Nord Media Ltd., Dept. BE, 37 New Bond Street, London W1Y 9HB, England, 01-629 9361., telex 25567.

November 27-29—The National Telecommunications Conference will be held at the Shoreham-Americana Hotel in Washington DC. NTC '79 is co-sponsored by the Communications Society, Aerospace and Electronic Systems Society, and Geoscience Group. For more information contact Dr. Thomas P. Quinn, chairman, Technical Program NTC '79, Dept. BE, P.O. Box 31031, Temple Hills, MD 20031.

January 9-11, 1980—The Armed Forces Communications and Electronics Association will host the first Western Conference & Exposition (Western Expo '80) at the Disneyland Hotel in Anaheim, CA. The conference will feature the participation of key leaders in the military, industry and government community whose areas of interest are electronics,

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What's more, audio distortion is less than 0.1% and signal-to-noise ratio is better than 57 dB (both ±2.4 kHz deviation, at 1 kHz).

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The system also comes with a shoulder-strap antenna and a leather carrying case. Altogether, it's compact and efficient and offers outstanding sound.

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For more information, contact Judith H. Shreve, AFCEA National Headquarters, One Skyline Place, 5205 Leesburg Pike, Suite 300, Falls Church, VA 22041, (703) 820-5028.


For more information, contact Box 2254, Morris- town, NJ 07960, (201) 540-8500.

April 13-16, 1980—Las Vegas will be the site of the 1980 convention of the National Association of Broadcasters. For additional information contact NAB, Dept. BE, 1771 N St., NW, Washington, DC 20036.

April 26-30, 1980—ISCAS/80 will be held at the Shamrock Hilton Hotel, Houston, TX. Workshops will be conducted by various technical committees of the Circuits and Systems Society immediately preceding the symposium on April 27. The symposium, sponsored by the IEEE Circuits and Systems Society, will be the 13th annual international conference devoted to all aspects of the theory, design and application of circuits and systems. Authors may contribute either a full paper, summary or abstract for presentation at the symposium after July 1, 1979, to the technical program chairman, Professor T. A. Bickart. For additional information contact T. A. Bickart, Dept. of Electronic and Comp. Engineering, Dept. BE, Syracuse University, Syracuse, NY 13210.
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**CSP-300/R**
Full Matrix Control Panel. Permits audio and/or video switching on any selected bus. Encoded version can be restricted to switch only on specific pre-assigned busses. Rackmount or recessed.

**CSP-10**
Controls and statuses ten busses (20 with Program Select switch installed). Provides separate audio and video switching and statusing.

**CSP-20/CX-20**
Permits button-per-source input selection on assigned bus. Basic panel accommodates 20 inputs. Expansion in 20-button increments is provided by adding CX-20 slave panels. Permits fast single-stroke selection of any input. Button lamps provide both audio and video status from refresh memory while Only buttons permit selective audio or video switching.

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World Administrative Radio Conference: Ten decisive weeks for the future of broadcasting/telecommunications

International Telecommunications Union

The International Telecommunication Union (ITU) is the specialized agency of the United Nations for telecommunications. It regulates, plans, coordinates and standardizes telecommunications of every type. It was founded in 1865 and has 154 member countries. Its headquarters in Geneva comprises four permanent organs: the General Secretariat, the International Frequency Registration Board (IFRB), the International Radio Consultative Committee (CCIR) and the International Telephone and Telegraph Consultative Committee (CCITT).

The Plenipotentiary Conference is the supreme organ of the Union and is responsible for revising the International Telecommunication Convention and defining the general policies of the ITU. The first such conference was held in Paris in 1865.

World Telecommunication Day is celebrated on May 17 each year by 154 ITU member countries. This date marks the anniversary of the signing of the first International Telegraphic Convention in Paris in 1865.

TELECOM 79

Opening concurrently with WARC-79, the 3rd World Telecommunication Exhibition, TELECOM 79, will be held at the Palais des Expositions, Geneva, from September 20 to 26.

This exhibition, organized by the ITU in accordance with the wish expressed by its 154 member countries, is placed under the patronage of the Swiss government. With more than 500 exhibitors from some 40 countries occupying nearly 70,000 square meters, it will be the largest telecommunication exhibition ever held. In addition to the exhibition itself, the following events will be held in connection with TELECOM 79:

- the 3rd World Telecommunication Forum, attended by some 2000 participants: senior telecommunications officials, economists and engineers;
- the 3rd International Festival of Telecommunication and Electronics Films, The Golden Antenna;
- the 1st World Book Fair on telecommunications and electronics.

Among the tens of thousands of visitors expected will be many ministers and directors-general of telecommunications.

The World Administrative Radio Conference (WARC), the most important radiocommunications conference to be held for 20 years, will be opening September 24, 1979. Organized by the International Telecommunication Union (ITU), it will last 10 weeks and will be held at the Geneva International Conference Centre (CICG) and in the ITU headquarters building.

The purpose of WARC-79 is to revise, harmonize and bring up-to-date the international regulations applicable to all radiocommunications services. It is a governmental conference whose decisions have the force of a treaty. The international legislation governing telecommunications, established and approved by the 154 member countries of the ITU, comprises the International Telecommunication Convention, a treaty which defines the basic principles in telecommuni-

Canadians face WARC issues

According to Canada's communications minister, Jeanne Sauvé, the federal government has approved recommendations for Canada's participation in and proposals to the WARC.

"All users of the air waves, from ham radio operators to broadcasters, have a stake in the outcome of the conference," Mme. Sauvé said. "Since the spectrum is a valuable, but limited, natural resource, and since the demand for telecommunications services using the spectrum is growing, Canada and other nations must ensure that this resource is used in a manner that will ensure that frequencies are available for the development of services in the years ahead."

As Canadian radiocommunication requirements have grown, Canada's participation in WARC has increased in order to ensure adequate
General Electric professional large screen television projectors—displaying color or monochrome pictures up to 25 feet wide—bring new dimensions of presentation impact to a broad spectrum of applications.

A wide choice of new and improved color and monochrome models is available to meet specific requirements for television display applications, in standard or high brightness, for various scan standards.

The color projectors utilize General Electric's exclusive single optical path light valve. All color information is projected simultaneously in one light beam. This system eliminates time-consuming registration of three separate color images, which is required for all other television projectors.

These projectors can display any size television picture from two feet to 25 feet wide, with high resolution and contrast over their full range of light output.

**GE Professional Large Screen Television Projector Specifications**

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*Line Power. All Projectors: 117 or 240 v., ± 10%, 50/60 Hz

*Resolutions measured with wide-band video input.

**Video Input Key: (1) NTSC or RGB. (2) RGB. (3) NTSC or Wide-Band.

***For use at other scanning rates, contact General Electric (VIDEO) for special application/model information.

---

**IN BUSINESS**—General Electric projectors display real-time computer-generated data for Merrill Lynch Government Securities, New York.

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Call or write: General Electric Company, Video Display Equipment Operation, Electronics Park 6-B06, Syracuse, NY 13221. Phone: (315) 456-2562/2533/2179.
Canada position

provisions for the operation and
growth of Canadian radio commu-
nication systems. Canada is one of
about 20 countries that submit
proposals which are used as the
basis for revisions; the other mem-
ber countries of the ITU usually
participate in the conferences but
do not submit proposals.

For WARC-79, the Canadian
preparations began in late 1974
with the formation of the Canadian
Interdepartmental Committee (CIC)
made up of frequency management
experts representing all federal
government departments and agen-
cies with interests in radio commu-
nications (Communications, Trans-
port, Defense, External Affairs,
Energy, Mines and Resources, NRC,
CRTC, CBC, RCMP, Teleglobe and
Teleasat). After extensive technical
studies and public consultations
with the private sector and provin-
cial governments, including the
public distribution of two drafts, the
CIC has prepared two groups of
technical proposals for revising the
International Radio Regulations.

The Canadian proposals for this
WARC are contained in a 200-page
document. Among the main Canadi-
on proposals are the following:

- that additional spectrum be allo-
cated for mobile communications in
the UHF band;
- that the standard AM broad-
casting band be extended to provide
for additional channels to permit cover-
age of areas in Canada not at
present adequately served;
- that the amount of shortwave
spectrum employed for international
broadcasting be substantially in-
creased;
- that additional radio spectrum be
provided for Canadian and interna-
tional requirements for radio commu-
nications by satellites;
- that additional spectrum be pro-
vided for the amateur radio service.

As BE goes to press, 41 delegates
have been selected to represent the
Canadian interests at WARC.

As a result of the public consul-
tations and the interdepartmental
participation in the preparations, it
is considered that the proposals
fully reflect current and future
Canadian radio communication re-
quirements. Since the WARC will
establish new technical standards
for radio communication equipment,
particular care has been taken to
ensure that the Canadian proposals
are compatible with the current and
planned models of radio communi-
cation equipment manufactured in
Canada.

WARC-79

cations and which sets out the
structure and modus operandi of the
ITU.

This convention is supplemented
by administrative regulations which
govern the use of telecommunications
and are binding on all members of
the ITU:
- telegraph regulations;
- telephone regulations;
- Radio Regulations (RR) which deal
with the use of the frequency
spectrum, the use of the geostation-
ary orbit, conditions for the oper-
ation of radio stations and the
relevant administrative provisions;
and
- additional Radio Regulations,
which deal with questions relating
to traffic and charges in the
aeronautical mobile service and the
maritime mobile service.

It is the last two bodies of
regulations, the Radio Regulations
being the most voluminous (1473
pages including appendices, resolu-
tions and recommendations against
51 pages for the additional regula-
tions) which will be reviewed to a
large extent by the conference.

The last conference with a com-
parable mandate was held in
Geneva in 1959. Since that time,
specialized world conferences have

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Circle (76) on Reply Card
WAHC-79 met to take account of new technical developments and new frequency requirements for each particular radio service: the service using space techniques, the maritime mobile, aeronautical mobile, sound and television broadcasting and direct satellite broadcasting services.

The international regulations revised by WAHC-79 will, in all likelihood, remain in force until the year 2000 or longer. They will have a considerable influence on the development of all types of telecommunications in the 21st century.

Origin of WAHC-79

The tenth Plenipotentiary Conference of the ITU (Malaga-Torremolinos, 1972) adopted a resolution to convene WAHC-79, considering:
- that, since 1959, various world administrative radio conferences

Historical notes

The advent of radiotelegraphy at the end of the nineteenth century was due to the work of scientists such as Maxwell, Lodge, Hertz, Branly, Popov, Marconi and many others. Ships were the first to benefit from the new technique: unlike cables or wires, electromagnetic waves are not subject to artificial boundaries and the distances they cover generally depend on the transmission power.

From the very beginnings of radiotelegraphy it was acknowledged that radiocommunications are by their very nature international. In 1903, less than two years after news of the first transmission of a radiotelegraph signal across the Atlantic (December 12, 1901) had been received, the first intergovernmental radio telegraph conference was held to establish international regulations governing the use of radio waves.

Many intergovernmental radio conferences have been held to establish or revise radio regulations on a world or regional level. All of these conferences stem from the Radio Regulations drawn up in 1906 and have been organized either in response to an invitation by a member of the ITU or by the ITU itself. The objective of the ITU, when it was founded in 1885, was the establishment of international regulations for telegraphy; later it concerned itself with telephony and then finally with radio, in 1903.

US plans strong delegation to WARC

Under the leadership of Glen Robinson, formerly an FCC commissioner and now a law professor at the University of Virginia, the US delegation of around 64 specialists will descend on Geneva to represent US interests at WARC-79.

Robinson is now on leave and working for the state department to coordinate the US effort. Members of the delegation representing the broadcast interests will be Neal McNaughten and Charles Breig of the FCC Broadcast Bureau and George Bartlett of the National Association of Broadcasters.

The US proposals for WARC-79 are contained in a formal document already before the WARC. Work behind this document represents extensive efforts by people and organizations from every facet of broadcasting and telecommunications.

Technical inputs for the broadcasting proposals contained in the US document to the ITU were obtained chiefly through eight notices issued by the FCC. These resulted in working groups to allow industry and private sectors to participate in establishing the US position on

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"These Auditronics 501 modules are all that survived the fire..."

that totally destroyed our East 46th Street Superdupe and SDC Recording Studio complex last year," says Herb Gordon, studio owner. "Almost before the wreckage cooled and the insurance adjuster completed his work, I was already planning the equipment purchases we would need to get back into business."

"In all the years we had the Auditronics 501 consoles prior to the disaster, I don't remember anything going bad. Our purposes were well served by our old 501s, so I went back to Auditronics the week after the fire to order three more of the latest model 501s."

Herb Gordon and over 300 other satisfied users of Auditronics mixing consoles have learned much about Auditronics performance, quality and reliability since we delivered our first 501 back in 1971. If you would like to know what they know, call or write for complete product information and the name of your nearest Auditronics dealer.
significant issues, including television, AM and FM radio, international broadcasting, and satellites. These groups provided a wealth of inputs to the FCC, including requirements for the spectrum allocation tables.

In addition, the FCC considered inputs from private individuals, interested companies, station personnel, and the three major networks. The formal positions of the US contained in the document submitted to WARC is now public information. But, there are fallback positions on issues that remain confidential. The impact of some of the negotiated decisions to be made at WARC may not be felt for months or years to come.

In brief, some of the proposals contained in the US document include the following:
- Expansion of the AM band from 1605kHz to 2000kHz to be shared with the radio location service. Very little change is being reported for FM.
- For television, a sharing of the band is being proposed for fixed and mobile services.
- For satellite service, a new band of 500MHz is being proposed to extend the band from 12.2 to 12.7GHz. The fixed satellite services would retain the 11.7 to 12.2GHz band and the broadcast satellites would utilize the proposed extension.

The associated problem is to find an uplink to feed the broadcast satellite. The US is proposing a shared 17.1 to 17.6GHz band, but agreement on the sharing circumstances may be difficult to attain.

There will be extensive work required following WARC to put decisions made there into perspective. Plans are under way for a March 1980 meeting in South America on the MF broadcasting band throughout Region 2, in which the United States is located. This meeting presumably would resolve the 9kHz/10kHz spacing problem in Region 2. The FCC is still accepting fillings on this topic to pave the way for a US position at this meeting.

WARC-79

have amended the Radio Regulations and additional radio regulations on specific points without having been able to harmonize the decisions taken because of the limited nature of their agenda:
- that, as a result of technical advances, some of the provisions in these regulations should be reconsidered, particularly with regard to certain services which are developing rapidly;
- that, for these reasons, a general revision of the Radio Regulations and of the additional radio regulations should be undertaken in a world conference in 1979.

As directed by the Plenipotentiary Conference, the ITU Administrative Council at its annual sessions took adequate measures to ensure the administrative and technical preparation of the conference. On the technical level, the Administrative Council’s action was 2-fold: to structure the Radio Regulations so as to provide the conference with a framework for the revision of the regulations, and to provide technical standards to equip the conference with international standards on which to base its decisions.

Structure of the regulations. At its

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**FIRST WITH THE PROS.**
WARC-79

30th session in 1975, the Administrative Council convened a group of experts to prepare the draft of a possible rearrangement of the Radio Regulations.

This group, which comprised experts from telecommunication administrations of members of the ITU assisted by representatives of the permanent organs of the union, met in Geneva on January 19, 1976 and worked for four weeks. Its task consisted of separating in the existing regulations the administrative provisions from those relating to operation, and to classify the latter according to the various services concerned. The group's report was considered and approved by the World Administrative Broadcasting-Satellite Radio Conference (Geneva, 1977) and was subsequently distributed by the ITU to all member administrations so that it could be used as a framework for the preparation of their proposals to WARC.

Technical standards. At its 31st session the Administrative Council instructed the International Radio Consultative Committee (CCIR), one of the permanent organs of the ITU:

- to carry out the studies necessary to achieve timely provision of the technical information likely to be needed as a basis for the work of the conference; and
- to arrange for a special joint meeting of CCIR study groups at the end of 1976 to assemble this technical information.

Participation in the conference

The national delegations to ITU conferences are designated by the members of the union. A delegation is defined in the International Telecommunication Convention as "the totality of the delegates and, should the case arise, any representatives, advisers, attachés, or interpreters sent by the same country. Each member (country) shall be free to name its delegation as it wishes. Accreditation of delegations to administrative conferences shall be by means of instruments signed by the head of state, by the head of the government, by the minister for foreign affairs, or by the minister responsible for questions dealt with during the conference."

The following are also entitled to attend conferences: United Nations observers; observers from regional telecommunications organizations; observers from specialized agencies of the United Nations and from the International Atomic Energy Agency; observers from accredited international organizations which have submitted a request for admission; and representatives of recognized private operating agencies duly authorized by the member country to which they belong.

About 1500 delegates from some 140 member countries of the ITU are expected.

ITU member activities

Many member countries of the ITU have set up national governmental coordination committees grouping the various users of radio-communications to prepare proposals for submission to the conference. Numerous bilateral and multilateral discussions also have been held by member countries to coordinate their proposals as far as possible. Many of these proposals already have been received at ITU headquarters; they may only be submitted by members of the union. They are currently expected to amount to more than 3500 typed pages by the eve of the conference.

In addition, a number of national or international organizations concerned with radio communications have already held or will hold meetings to discuss preparations for WARC.

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Circle (82) on Reply Card

September 1979 Broadcast Engineering 95
Technical achievements in producing

Live from Lincoln Center

By Donald W. Redell, Broadcast Engineering correspondent

Since the advent of videotape about 20 years ago, there has been very little live television aired on the three major networks except for sports, news and Saturday Night Live. The fourth network, PBS, offers an alternative in live programming—Live from Lincoln Center.

On January 30, 1976, Live From Lincoln Center began providing live television events to the Public Broadcasting network and has broadcast 27 of them since. The latest was The American Ballet Theater's production of Sleeping Beauty in May. Nearly every form of the serious musical and performing arts events has been produced at Lincoln Center in this series: ballet, opera, symphony orchestras and virtuoso recitals—all live.

Live From Lincoln Center, however, is a new kind of networking. Before videotape, getting the program on Telco facilities, across the country on phone lines and to the viewer was all that was necessary. Video was the major problem; after all, networks had been doing radio since the 1920s, and audio was easy. In addition, the needs of the cameras and of the television production staff came first; the on-stage production and the audience had to adjust.

Live From Lincoln Center has changed all that. Audio now is at least as important as video; the Lincoln Center audience is never aware that there is a television pickup present, and the performers are never asked to vary their performances for the cameras. In fact, there is never a special camera rehearsal. All television planning is done around the live production and never interferes with it.

To accomplish this feat, experimentation began in 1971 with the first Lincoln Center for the Performing Arts program to be telecast. Le Coq D'Or, which originated at the New York State Theater, was seen by cable subscribers on TelePrompTer's Manhattan CATV system. Between November 1971 and May 16, 1975 there were nine experimental Live From Lincoln Center broadcasts of various kinds, each of which had at least one engineering or production first, and in the 27 succeeding broadcasts there were 18 more firsts. Out of all of these

This cable layout for the American Ballet Theater production is typical for a Live from Lincoln Center event.

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experiments and broadcasts evolved the following set of parameters.

**Lighting**—Light levels often fall below 1 fc and rarely exceed 25 fc; lighting ratios often exceed 1000:1; dimmed incandescent lights often are used in the same scene as xenon and carbon arcs; all lighting instruments may be gelied different colors; bare flames, bare bulbs, flashbulbs and flash powder must often appear in a scene.

**Contrast**—Within these lighting conditions characters may appear together wearing everything from black velvet to white satin with sequins.

**Camera positioning**—Cameras which may have to pick up a tight face shot may be located more than 100 ft from their subject; cameras used in ballet must be located at front row center for proper perspective and must have their lenses above stage level, yet must remain invisible to the audience; cameras used in outdoor shots may endure subzero blizzard conditions and then must be repositioned indoors, set up again, and ready to go within the space of a single scene; cameras often are located in virtually inaccessible positions, cramping operators and making maintenance difficult.

**Sound pickup**—Microphones must be invisible to the

---

**Lincoln Center media development “firsts”**

**November 9, 1971**—First performing arts program telecast on a CATV system: Rimsky-Korsakov's Lo Coq D’Or, by the New York City Opera, televised live by Teleprompter Manhattan Cable Television from the New York State Theater.

**December 3, 1973**—First use of an image intensified color TV camera in any television production, during the experimental taping of the Metropolitan Opera’s Tales of Hoffman.

**November 20, 1974**—First live anamorphic video projection experiment, in conjunction with Camera Mart, General Electric and Video Camera Services.

**January 28, 1975**—First transmission of ballet via satellite: The Colorado Concert Ballet via NASA’s ATS-6 satellite from Denver to New York. This was also the first time a television signal from a satellite had ever been received directly within the City of New York and the first interactive dance instruction by satellite.

**May 16, 1975**—First use of ultra long focal length lenses in televising a concert, during an experimental taping of the New York Philharmonic.

---

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Live from Lincoln Center

Audience; in operas, singers must be picked up as far as 150 ft from the edge of the stage or as much as three stories above the stage floor; intermission guests often refuse to wear a microphone, yet must be picked up in a noisy environment amidst stagehands changing scenery or musicians tuning up; in addition to the microphones picking up a performance, separate microphones must be used for each position of the host, each intermission guest (occasionally in different locations), and announcers, who may be located more than 500 ft from the audio mixing board.

Sound transmission—All shows, domestic or international, must be transmitted live with stereo sound, even though that may involve satellites, microwave, land lines, delay lines and as many as 14 different common carriers; international feeds may require different announcers or videotape audio than domestic feeds and may desire video without titles and subtitles as well; sound networks must be established and tested immediately before air time.

Overall—All shows are transmissions of live performances with paying audiences: neither the audience nor the performance (staging, lighting, etc.) may be interfered with. Given those constraints, the show must look as good as any network studio show (lest it be turned off) and must sound like a high-fidelity stereo recording. Foreign language operas must be subtitled live. Program synopses must be transmitted somehow both visually and orally.

Countdown to broadcast
To accomplish this and to broadcast on schedule,

Media “firsts”


February 3, 1976—First patent ever issued for an accessory to allow high fidelity stereo audio reception of television programs, Number 3,936,594.

April 21, 1976—First opera ever broadcast under existing performance conditions; first live stereo network ever to reach more than half of all US television households—both during Live From Lincoln Center—The Ballad of Baby Doe on PBS and in stereo in 48 cities.

June 30, 1976—First broadcast of a full-length ballet, Swan Lake, on PBS and in stereo in 50 cities.

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Here you have one switcher that covers the entire range. Except for the number of inputs (nine including color-izable black) nothing comes even close to matching the performance of the 6112—excellent balance in video levels because of the technique of double clamping on the back porch, very stable and linear patterns, inherent timing, stability with no internal adjustments since there is nothing to drift, silky smooth fader arms with zero backlash, a downstream keyer with preview, automatic and manual faders, borders, standardized plug-in boards which are interchangeable with all our other switchers, just to mention a few points.

Ask your dealer to show you his demo tape. Call or write for information on the 6112 or our other switchers and products.

Crosspoint Latch Corporation
316 Broad St., Summit, N.J. 07901
Tel. (201) 273-1093

Circle (84) on Reply Card

96 Broadcast Engineering September 1976
Now You Can Afford To Do A-B Rolls With Your HET VTR’S.

Introducing the Edutron ccd2h-1. Full Time Base Correction For Only $5,800.

The ccd2h-1, when used at your editing station or for post production, can solve many problems while it is correcting and enhancing your heterodyne VTR signal. You will be able to synchronize your VTR, allowing you to use it as a source to do mixing at your switcher. With two ccd2h-1’s, you can now do A-B rolls between two VTR’s.

By using the latest advancements in charge-coupled-device memory technology, we can give you superior performance at a realistic price. The ccd2h-1 has a signal-to-noise ratio of 58 db, ½° of differential phase, and 1% differential gain. This will give you the best possible reproduction of the video from your VTR.

If you have bad tapes you would like to clean up or good tapes you would like to make look even better, the ccd2h-1 is ready. By using a unique noise coring that gives up to 4 db of noise reduction, all generations of tapes will look better. A horizontal enhancement of up to 200% boost will sharpen your video. All of this is standard in the ccd2h-1 and available at no extra cost.

The two horizontal lines of window correction will handle typical distortions. The automatic steerable advanced sync will make the window appear much wider as it keeps your VTR centered in the window. This will give you maximum correction range and a zero time system delay.

For complete specifications and the name of your nearest Edutron dealer, please write or call us at: EDUTRON INC., 25 Oak Street, Suite I, Roswell, Georgia 30075. Phone (404) 992-1626.

Edutron
The Video Electronics Company

Circle (85) on Reply Card
### Live from Lincoln Center

design engineer Mark Shubin starts about a year in advance by booking the AT&T circuits with Telco representative Paul Dujardin, to whom Shubin attributes much of the success of the network. The fall show's master list carries 69 separate lines, including all the lines booked (locally and nationally) from the three Lincoln Center auditoriums to and among various points, such as NBC, WNET (New York), Western Union and NR (Telco's Network Radio). Telco's Dujardin works closely with Shubin on each show, from booking the lines through to sign-off, putting out all the fires as they occur and rerouting when necessary.

The next booking is with the facilities company which supplies the mobile unit and maintenance crew. Usually that's Reeves/Teletape, and with the unit comes John Ley, engineering consultant. About six months in advance a hold is put on the facilities and confirmed a month before the broadcast. Next, all the equipment is checked out at the facility's studios.

The audio equipment, dolly, monitors and cables arrive at Lincoln Center three days before the broadcast. The stage hands lay cable and the audio staff begins setting up the extensive audio equipment in Liet Hall, a small recital hall near Metropolitan Opera's backstage.

Two days before the camera unit arrives, cameras are set up, chipped and aligned. (Chipping is done live with a young man wearing a black T-shirt with a color chart on the front. Chip chart and skin tones in one!)

The Chyron is loaded with crawl copy and other graphic

### Media "firsts"

**August 18, 1976**—First live 3-D video projection experiment, in conjunction with General Electric, Camera Mart and Stephens & Associates.

**August 30, 1976**—First stereo simulcast tariff ever filed with the FCC goes into effect; filed by Western Union specifically for Lincoln Center.

**September 30, 1976**—First satellite/terrestrial network test to prove insignificant delay regarding lip-synchronization, utilizing NBC Television Network.

**November 3, 1976**—First television show ever transmitted under a stereo simulcast tariff.

**November 28, 1976**—First live full-length recital televised, André Watts.

**March 15, 1977**—First live telecast of an opera from the Metropolitan Opera at Lincoln Center, *La Bohème*.

**June 2, 1977**—First telecast of a ballet from the Metropolitan Opera, American Ballet Theatre's *Giselle*.

**September 24, 1977**—First use of unobtrusive cameras within the orchestra in a

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**TV Lenses for 1 1/4" Cameras**

<table>
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<tr>
<th>TV</th>
<th>11 x Studio/OB</th>
<th>13 x Studio</th>
<th>15 x Wide Angle</th>
<th>30 x Standard</th>
<th>30 x Wide Angle</th>
<th>30 x Tele/OB</th>
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<tr>
<td>TV 11 x</td>
<td>2.1/18-200</td>
<td>2.1/18-235</td>
<td>2.1/16-240</td>
<td>2.1/20-600</td>
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**TV Lenses for 1" Cameras**

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<th>30 x Standard</th>
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<th>30 x Tele/OB</th>
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<tr>
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<td>2 /17-170</td>
<td>1.7/14-150</td>
<td>1.7/14.5-190</td>
<td>1.7/12.5-190</td>
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**TV Lenses for ENG/EFP Cameras**

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<td>1.4/11-330</td>
<td>1.4/8.7-260</td>
<td>1.4/18.5-550</td>
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September 1979 Broadcast Engineering 101
Live from Lincoln Center

material. On the afternoon before air, director Kirk Browning and the camera crew view the single camera, wide-angle videotape that was shot at a dance rehearsal and camera shots are set. At 8 PM there is a performance which the television crew uses as a dress rehearsal and which is taped on ¼-inch tape for viewing the next day.

On air day, after the cameras are fired, there is a rehearsal of the intermission interviews, and at 2 PM the cameramen and Browning view the previous day's tapes to refine the shooting script. At 5 PM the opening is rehearsed—the roll-in reel cues, the Chyron, etc. From 6:05 to 7:05 PM Shubin tests the network—and until 8 PM if there are problems. 8 PM to 11 PM is AIR—LIVE.

To broadcast Live From Lincoln Center—ABT's Sleeping Beauty on May 2, it took, besides the production staff:

8 Cameramen
2 Video operators
2 Videotape men
3 Audio engineers
1 Audio designer
1 Technical consultant
1 Electronic graphics man
1 TO/switcher
1 Senior technician
3 Maintenance men
1 Technical designer

This technical crew operated eight cameras, the entire audio and network control room in List Hall, four mics for

Media “firsts”


October 18, 1977—First live opera transmitted with subtitles, New York City Opera's Manon.


February 12, 1978—First live solo recital telecast from the Metropolitan Opera, Luciano Pavarotti.

September 20, 1978—First live transatlantic stereo simulcast, Horowitz: Live!, fed simultaneously to the NBC, BBC, Antenne 2 (France), ZDF (Germany), and ORF (Austria) networks, tape delayed for Japan with the first international distribution of a television program on stereo SMPTE Type C 1-inch videotape.

December 10, 1978—First live telecast of chamber music from Alice Tully Hall.

March 12, 1979—First test of the PBS Digital Audio Transmission Equipment system from a broadcast site, utilizing common carrier facilities.
"We evaluated all carts and have standardized on the Audiopak AA-3"

— Bob Kaneer
Chief Engineer
KRTN, FM 101
KHL, AM 92
Los Angeles

"Our test results show that the Audiopak® AA-3 holds stereo phasing better than any other cart on the market."

"The excellent phase stability of the AA-3 will be of major importance as AM stations convert to stereo."

"The High Output, Low Noise (HOLN) tape in the AA-3 gives us excellent frequency response combined with 5db more headroom."

"The AA-3 maintains excellent tape motion with low wow and flutter."

"We had previous cart pressure pad problems with our multiple playback machines — these have been resolved by the durability of the AA-3 pressure pads."

"The AA-3 is the 'state of the art' in cartridges — it meets or exceeds the specifications of the current NAB standards."

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Broadcast Cartridge

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Look at our board. It gives you the flexibility to use more of the 1200's features—more of the time. Because it's simple and straightforward. No tricks or special combinations to remember.

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Circle (90) on Reply Card

104 Broadcast Engineering September 1979

Live from Lincoln Center

the performance, and two mics for the intermission interviews.

Support equipment

Much of the technical equipment is either special or specially operated.
• First, the cameras. Because the Metropolitan Opera House and Avery Fisher Hall are very large, and the parameters listed above must be observed, the cameras (TK 46s and TKP 45s) are not out of the ordinary, but the lenses and set-ups are. The TK 46s are fitted with Fujinon lenses, which were chosen because of their exceptional optical quality and coating. The TKP 45s have a developmental lens designed by Rank Taylor Hobson in England and custom fitted to the cameras. The lens and a bracket are mounted on the camera tripod, and the camera is attached to the lens (so that the lens supports the cameras rather than the reverse).

The cameras are set up to run with extended gain at the expense of some noise like a sports pick up. The tubes are hand picked for minimal problems in black, to lessen noise, and for minimum lag and microphonics since the two TKP 45s are in the front row next to the orchestra. In addition, the stage scenes are evaluated for lighting; hot spots and follow spots are brought down so that contrast is more nearly controlled. Generally the

Harold Dunn (left) and Bill Kidda, of Reeves Teletape, set up to broadcast Live from Lincoln Center. (Photograph by Susan S. Perry)

The audio technical crew prepares for broadcasting the New York City Opera. From front left are Mark Schupin, technical director; Gino Lombardo; Raymond Matthews; and Michael Shrookes, audio technicians. (Photograph by Susanne Faulkner Stevens)
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These stations, and many others, broadcast Dolby FM. Their engineers know the difference Dolby FM makes in sound quality, and their managers know how widely recognized the name Dolby is among today's sound-conscious listeners.

But not everyone has heard the difference Dolby FM can make. That's why at the NRBA convention Dolby Laboratories will be conducting brief demonstrations of the Dolby FM system.

Hear the difference for yourself. Discuss with us the possibility of your broadcasting Dolby FM experimentally, without obligation. In time you too may want to add your call letters to the growing list of Dolby FM broadcasters.

Hear the difference: Dolby at NRBA Washington D.C. October 7-10
The Dupont Suite, located on the Terrace Level, one floor above the Exhibit Hall.
Live from Lincoln Center

picture leaves Lincoln Center looking pretty good. On occasion a little noise is evident, but given the requirements of the broadcast, the video is excellent.

- **Next the audio** is fed to List Hall in stereo (incidentally, ¾-inch videocassettes are recorded there) where it goes through two identical boards. One feeds the whole audio portion of the program and one provides a clean feed, without announce and similar material, for foreign broadcasts.

**Audio emphasized**

Lincoln Center and producer John Goberman felt from the beginning that in order to succeed with *Live From Lincoln Center* a major development in the recording and transmitting of sound was needed. Since the inception of television broadcasting and up to the present, audio has been secondary to video. Microphones generally are visible or on booms outside the shot. In addition, the quality of audio has not been emphasized since television sets have 3-inch monaural speakers, and the attitude has been to "get the sound there, that's enough."

*Live From Lincoln Center* producers planned to broadcast serious music, and satisfying the serious

---

**The control booth** is the scene of tense action in broadcasting the New York Philharmonic, *Live from Lincoln Center*, Zubin Mehta conducting. Director Kirk Browning sits in the center. (Photograph by Susanne Faulkner Stevens)

**The cameraman** focuses on a scene from "An Evening of Ballet with the American Ballet Theater," *Live from Lincoln Center*.

---

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- New "series Y" improved headsets
- 50 station capability with up to 8 channels using S88 switchboard monitor
- External program feed with volume control
- Wide frequency response (200Hz to 12kHz) for exceptional intelligibility
- Designed for high noise environments
- Visual signalling uses bright amber lights
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- Mic on/off feature standard with headset and remote stations
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DELTA BROADCAST PRODUCTS

AMC-1

The Amplitude Modulation Controller is the only modulation controlling system that provides a completely closed loop around the transmitter. The sampling of actual modulation levels after the PA output network assures precise adjustment for optimum modulation levels. The AMC-1 also keeps a digital count of positive and negative overmodulation bursts for both present and previous one minute periods.

DAM-1

The Digital Antenna Monitor couples pushbutton ease of operation with digital accuracy. The DAM-1 will accept RF samples from up to 12 towers (with an auxiliary panel) and features ±1° phase and ±2% current ratio accuracies. Remote panels and other accessories are available.

AAM-1

The Analog Antenna Monitor gives stable phase and ratio readings even in high RF fields. Separate phase and ratio microreadout meters assure accurate meter indications.

TMCS

The TMCS Antenna/Transmitter Remote Control System offers complete transmitter and antenna parameter control for stations utilizing the DAM-1 Antenna Monitor. Alarm indications and fail-safe circuitry is also provided, giving complete transmitter system control.

APC-1

The Automatic Power Controller is your insurance against citations for over- and under-power operation. The APC-1 continuously monitors the transmitter output power, and makes automatic power adjustments with the transmitter loading control. This assures proper power adjustment at all times.

6730-E
6740-B

Designed to switch two transmitters from antenna to dummy load, the 6730E interfaces with 1/4 inch coaxial cable. For 3/16" lines, the 6740-B transfer switch is used. Either manually or remote controlled, the Transfer Switch is fully interlocked and can be wired to existing equipment to prevent "hot" switching.

TCA

State of the art antenna current metering has arrived in the TCA Ammeter Systems. Accurate, modulation-free, temperature stable current indications are found in the TCA. Models include single and dual scale meters.

TCT

Delta's Toroidal Current Transformers provide accurate sampling current and phase values without the problems associated with sampling loops. Three output voltage ranges are available, as well as high voltage models for high-power facilities.

DPM-1

Delta's Digital Panel Meter displays up to sixteen channels of information in a 3 1/2 digit LED display. Any combination of operating parameters can be selected, such as plate current and voltage, common point current, base currents, etc.

OIB-1

The Operating Impedance Bridge measures the impedances of networks, radiators, and the line while they operate under full power. VSWR as well as complex impedances of up to 400 ± 300 ohms can be measured.

OIB-3

The Operating Impedance Bridge provides extended resistance and reactance ranges, measuring up to 1000 ± 1000 ohms. The bridge has a built-in carrying case and RF ammeter for improved nulling.

RG-3

The Receiver/Generator combines a two-watt RF output and a correlation detector circuit that virtually eliminates interference problems. The RG-3 can be used in conjunction with any conventional impedance bridge including the OIB series.

CPB-1

The Common Point Impedance Bridge is designed for permanent installation; and allows continuous monitoring of the common point, thus facilitating network adjustment. This model can be provided with one of Delta's TCA ammeters mounted in the front panel.

DELTA ELECTRONICS

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P.O. Box 11286 • ALEXANDRIA, VIRGINIA 22312
TELEPHONE: 703-354-3350 TWX: 710-832-0273

Circle (93) on Reply Card

September 1979 Broadcast Engineering 107
Live from Lincoln Center

music audience requires the sound to do more than just get there.

The nearly three years of experimentation developed high quality mics, many designed by the Lincoln Center technical staff. Then the problem became delivery of that high fidelity sound. It was decided to simulcast in stereo via FM radio stations and to diplex and multiplex the signal.

A Van Cliburn recital with the New York Philharmonic on January 30, 1976 was the first network Live From Lincoln Center. Nine days before the show a test of diplexing equipment was initiated with Western Union, and the next day it worked. Five days before the show, Lincoln Center’s desire to use the equipment was presented to Western Union’s Board of Directors and four days before the Board approved it but required that specific West Coast equipment be used. On the day before it arrived, was unpacked and set up. It worked.

For the second show, The Ballad of Baby Doe, two and a half months later, new diplexing equipment had been specially designed and approved.

For the Van Cliburn concert the network consisted of 13 cities plus New York and Los Angeles, making the network national. The second show had 40 cities, using about 12 different network carriers, and the program was available to 50% of the US audience. Now the network reaches, via satellite and the audio network, 250 Public Television stations, and 60 to 70 FM stations.

Audio/video routing

The audio and video take two different network routes. The audio leaves the board, and goes to a Rack (called Rack, designed by Mark Shubin), which adds limiting necessary for reception by the satellite, and splits and isolates the various stereo feeds to the network. If there is a failure of one or two feeds, the others won’t go down either. Rack has two normal audiometers plus 28 idiot meters which indicate that the audio is going through, with no indication of quality or gain. Son of Rack is in design now for next year’s series.

From Rack, the audio goes to WNET via New York Telco where it’s put into a 250ms delay unit to compensate for the time lost when the video goes up to the satellite and back. From there it goes by land line to NR at AT&T. It is then microwaved to the stations by diplexing on the AT&T video network and by multiplexing into the multiplex message network (like the telephone system) occupying the space of 12 phone calls. At the local TDC (Television Operating Center) the diplex signal is decoded and the multiplex is pulled off onto a local loop and sent to the station.

The video signal leaves the mobile unit via coax to the microwave transmitter on the roof of Lincoln Center to the Telco building on 11th Avenue in New York. From there it’s sent to WNET which acts as master control. WNET sends the signal either to Washington, DC, to Hartford, CT, via Telco microwave. At the Hartford Eastern Educational Network uplink, or the one at McLean, VA. Goes to the Westar satellite PPS transponder and to the ground station at each receiving PSS station. Sleeping Beauty was the first Live From Lincoln Center to be received by every station via satellite.

After nine major experimental productions and 27 Live From Lincoln Center broadcasts, producer John Goberman says, “Each show becomes a little easier, but it’s basically about the same as in the beginning. The difference is that we have a few better lenses, better cameras, and more people can do it now."

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# Electronic Industries Inc.

**SERVICE FOR BROADCASTERS**

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September 1979 **Broadcast Engineering** 109
Introductory digital circuits

Part 2:
Logic circuits
and simplification

By Dr. Ron Jetton, Bradley University, Peoria, IL

This article covering the basics of digital circuitry is Part 2 of a series on digital technology for broadcasters. The continuing series will include applications to audio and video portions of broadcasting and will consider implementing digital into station operation.

| TABLE 1 |
|------------------|------------------|
|                | Basic laws:      |
|                | 0*A = 0         |
|                | 1 + A = 1       |
|                | 1*A = A         |
|                | 0 + A = A       |
|                | Manipulative laws: |
|                | A + B = B + A   |
|                | AB = BA         |
|                | A + (B + C) = C + (A + B) |
|                | A(BC) = C(AB)   |
|                | A(B + C) = AB + AC |
|                | A + (BC) = (A + B)(A + C) |
|                | deMorgan's theorem: |
|                | AB ---- N = $\overline{A} + \overline{B} + \overline{C}$ |
|                | A + B + C ---- N = AB $\overline{C}$ |
|                | Simplification theorems: |
|                | AB + AC = A(B + C) |
|                | (A + B)(A + C) = A + BC |
|                | AB + AB = A     |
|                | (A + B)(A + B) = A |
|                | A + AB = A      |
|                | A(A + B) = A    |
|                | A + AB = A + B  |
|                | A(A + B) = AB   |
|                | AB + $\overline{A}C + BC = AB + \overline{A}C$ |
|                | (A + B)(A + C)(B + C) = (A + B)(A + C) |

Part 1 of this series examined the mathematical language of digital circuits. A summary of the important theorems and laws of Boolean Algebra is given in Table 1. It is extremely helpful in gaining an understanding of logic circuits and their design and simplification if the basic concepts of Boolean Algebra are well understood.

Part 1 showed the relationship between logical, true/false statements and Boolean variables. The next step is to discuss the relationship existing between Boolean algebra and switching circuits.

A switching circuit can be considered in its elemental form to be simply a black box with input and output terminals as shown in Figure 1.

![Figure 1](input terminals -- Logic Block -- output terminals)

The input and output terminals of the logic block will be thought of in a more restricted sense than in ordinary analog circuits. Each input or output terminal must be in one of two possible states. Depending on the nature of the block, the states may be on or off, up or down, positive or negative, or high or low.

First consider circuits in which an output is determined only by the present states existing at the inputs. Such circuits are referred to as combinatorial while circuits in which outputs are a function of past states as well as present are termed sequential. An understanding of combinational
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circuits is necessary to proceed in a rational way to sequential circuits. Since the output of a logic circuit is a function of its inputs and a Boolean expression is a function of its variables, manipulations and simplification of a Boolean expression are related to network simplification.

Logic blocks

The five basic logic blocks needed to make up functional circuits are AND, OR, NOT, NOR, and NAND. The AND block output equals 1 only when all of the inputs are 1 and is 0 when one or more inputs are 0. Figure 2 illustrates a 3-input AND block with its corresponding truth table.

The OR function output equals 1 only when one or more of the inputs equal 1 and equals 0 only if all of the inputs are 0. Figure 3 illustrates a 2-input inclusive OR block and its corresponding truth table.

The NOT function equals 1 only when its input equals 0. Also, the function equals 0 when its input equals 1. This block, of course, has only one input. Figure 4 illustrates the NOT circuit and its truth table.

The NOR function is, of course, a

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complemented OR (NOT OR) function. The output of this functional block is 0 only when one or more of the input variables equals 1. The output will be 1 only when all of the input variables are equal to 0. The NOR circuit and its truth table are illustrated in Figure 5.

![Figure 5](image)

The last of the basic building blocks is the NAND function (NOT AND). This function has an output equal to 0 when all of its inputs equal 1 and an output of 1 when

![Figure 6](image)

use or more inputs are 0. Figure 6 illustrates a 2-input NAND circuit and its truth table.

These five logic functions use the Boolean values 0 and 1 to represent the values taken on by the various variables. Realizing that 1 or 0 may be replaced by any discreet pair of values such as “+” and “−”, or “on” and “off,” the truth tables containing the algebraic values 0 and 1 can be used to describe the conditions on actual logic blocks. Just pair off the Boolean values 0 and 1 with state values such as voltages, polarities or other physical quantities. For instance, a value 1 may be assigned to the higher of two voltage levels and 0 to the lower. All that is necessary is that there be two distinct values of voltages to consider.

**Positive and negative logic**

The discussion above assumes that the Boolean value 1 will correspond to a “higher” or “up” or “on” physical value. This is not always done, and it is sometimes convenient to employ the opposite assignment of values.

\[- = 1\]
\[+ = 0\]

This results in what is referred to

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Digital basics

As negative logic, and in terms of the logic blocks previously considered the following statements can be made:

- An OR circuit performs the AND function
- An AND circuit performs the OR function
- A NOR circuit performs the NAND function
- A NAND circuit performs the NOR function
- A NOT circuit is still a NOT function.

To avoid confusion it is helpful to label the block with the function it performs and use a notation that will indicate when negative logic is being used on an input or output. An example of this concept is the use of the so-called bubble notation. A small circle or bubble is drawn at the junction of an input or output line and the function block to indicate the assignment of negative logic to that line.

As an example, consider the block shown in Figure 7.

A voltage or physical state truth table for both circuits of Figure 7 would be as shown in Figure 8.

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(a)

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(b)

Figure 7

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>+</td>
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<td>-</td>
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<tr>
<td>-</td>
<td>+</td>
<td>+</td>
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Figure 8

The negative logic versions of the OR, NAND and NOR circuits are shown in Figures 9, 10 and 11.

Note that by making use of complementation (inverters) OR gates may be used to perform an AND function and AND gates may be used to perform an OR function. This reasoning leads to the following statements regarding realization of Boolean expressions:

- Any Boolean function can be realized with AND and NOT functions only.
- Any Boolean function can be realized with OR and NOT functions only.
- Any Boolean expression can be realized with NAND functions only.
- Any Boolean expression can be realized with NOR functions only.

In the latter two cases the NOT function can be obtained by using only one input of the NOR or NAND blocks.

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September 1979 Broadcast Engineering 117
Digital basics

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Figure 9 (OR circuit)

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A
B
A
B
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<tr>
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<td>0</td>
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</table>

Figure 10 [NAND circuit]

```
A
B
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Digital basics

very common forms for logic expression or Boolean equations. Either form may be used as the basis for a logic circuit. A special form of truth table (which is now obsolete) was the origin of the terms.

- The minterm form may also be thought of as a sum of products formulation. For example:

  \[ X = (A \overline{B} \overline{C}) + (\overline{A}BC) + (ABC) \]

- The maxterm form can be considered to be a product of sums formulation such as:

  \[ X = (A + \overline{B} + \overline{C})(A + \overline{B} + \overline{C}) \]

In terms of logic circuits, a particular expression may be implemented by either form as a result of deMorgan’s Theorem. For example, to implement the expression

\[ X = (\overline{A}B + AB), \]

a minterm formulation would be as shown in Figure 12.

A logic function may be implemented in maxterm form as shown in Figure 13.

\[ X = (A + B)(A + \overline{B}). \]

The sum of products, or minterm form of an expression, may be written directly from a truth table. That is, the truth table can be considered to be a minterm formulation. For example, the truth table in Figure 14 can be translated into the circuit as shown.
Consider a 0 in the A column to be A and a 1 in the A column to be \overline{A} with a similar interpretation for the B and C columns. Thus,

\[ X = \overline{A}BC + \overline{A} \overline{B}C \]

can be written for the X variable by forming terms for each combination that results in X having an entry of 1. The circuit shown can be drawn directly from the Boolean equation.

The minterm form is the most commonly used; however, the maxterm form may be used. It is formed by complementing a minterm truth table. For example, given the minterm table in Figure 15(a), complementation results in the maxterm table of Figure 15(b).

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ \text{Figure 15} \]

The minterm and maxterm forms perform identical logic functions and are interchangeable from the standpoint of logical function. One of the formulations may appear to be more complex than the other due to redundant terms. Inclusion of these redundant terms represents an unnecessary expense and needless complexity when designing a circuit. Therefore, it is desirable to denote some design effort to simplification of the algebraic expressions or networks.

The next part of this series will consider some of the methods of simplification. These methods are all based on the basic premise that input combination can be divided into three groups:

- combinations for which an output is desired, i.e. output equals 1;
- combinations for which no output is desired, i.e. output equals 0; and
- combinations which can’t occur (physically impossible) or where it doesn’t matter if the output is 1 or 0.

The inclusion of terms of the third type may either complicate an expression (increasing the complexity and cost of a circuit) or may actually simplify an expression (reducing the cost and complexity of a resulting circuit). Thus, the simplification methods discussed are crucial in optimizing a design.
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Those not attending NRBA '79 may use the following list to receive NRBA '79 exhibitor data. This listing is up-to-date as of press time, but a complete replay of NRBA '79 containing information gathered at the show will appear in the November issue of BE. For exhibitor information, circle the number following the equipment or service on BE's reader service card. The exhibitor(s) will mail the requested information.

(Where available, specific exhibitor products for NRBA have been listed; where this information is not yet available, "product line" indicates that NRBA-related information will be mailed.)

The italicized listings denote new products being introduced at NRBA '79.

Further information on the convention may be obtained by contacting the National Radio Broadcasters Association, 1705 De Sales Street N.W., Suite 300, Washington, DC 20036, (202) 293-3570.

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September 1979 Broadcast Engineering 127
WGBH engineers talk about the Ikegami HK-312

WGBH covers Boston Pops Orchestra concerts with Ikegami HK-312 cameras from Symphony Hall, Boston.
Eight Ikegami HK-312 studio color cameras are in service at WGBH, Boston, some dating back to October 1977 — long enough for intelligence on their performance. From recent interviews with key WGBH people, read these excerpts.

**Pops without noise**

*Tom Keller, Director of Engineering:*

"The HK-312s have such high sensitivity that we were able to reduce significantly our light levels at the Boston Pops and Symphony telecasts. Yet, despite the major light reduction, we experienced no visible noise with the HK-312s. With their remarkable reliability record, we can depend on 6 cameras for 6-camera coverage, and not 7 for 6 as in the past. After all, you can't stop a live orchestra performance for a retake if you've lost a camera."

**2 IRE, but a complaint**

*Ken Hori, Senior Engineer for Advanced Development:*

"We tested several camera makes for RFI within a quarter-mile of a 50 KW radio transmitter. The HK-312 measured 2 IRE, whereas most others were in the 5 to 7 IRE area, and some as high as 20 IRE. For symphony remotes we'd need 2 to 5 hours for warm-up, but nowadays we're set up in less than an hour... We like its straightforward design — example, its truly high signal-to-noise ratio as compared to other cameras that resort to reduced bandwidth to attain a comparable ratio but wind up delivering noise too...."

We did get one complaint from the maintenance crew. They said that because they rarely found the problem of a down HK-312, they would never get to know the HK-312 well enough to fix it.

**Washouts and dropouts**

*Bill Fairweather, Video Control Engineer:*

"During a lighting seminar staged here by Imero Fiorentino Associates, an actor in a normally lighted scene held up a sheet of white paper with printing on it to show loss of detail in the case of more than 60 percent tv white reflectance. The HK-312, however, was able to retain enough detail for the printing to be readable on the monitor.

Next came a demonstration of the dangers of too much or too little light on a chroma-key background. The HK-312 held the key to such a low light level on the blank background that the lecturer grinned and said, "I guess WGBH has pretty good cameras." and went on to the next subject."

The HK-312 is the camera that met WGBH criteria for performance, stability, and reliability. They also have HL-53s, high-performance portable cameras that interface with HK-312 CCUs and can operate portably with their own CCUs. Adapters for triax cable, using digital techniques, make their cameras remote-usable at nearly a mile from base stations, yet easily revertible to multicore cable whenever needed.

In daily use, their HK-312s and HL-53s are interfaced with microprocessor-computer control units that automatically cycle them through all set-up adjustments, including black-and-white balance, flare and gamma correction, video gain, and eight registration functions, then recheck all those adjustments — all within 45 seconds. The cameras can also operate independently of the set-up computers, a feature that is an Ikegami exclusive.

If all of this suggests that the HK-312 is probably the best studio/field color camera in the industry, consider this: camera, set-up computer, and triax adaptor are not only operational, they are deliverable. For details or a demonstration, contact **Ikegami Electronics (USA) Inc.,**

Circular polarization (CP) field tests

By Bill Loveless, chief engineer, Bonneville International

Circular Polarization (CP) does not provide better television reception than the traditional Horizontal Polarization (HP), based on a series of field tests conducted in the Salt Lake Valley. Both field tests and electromagnetic field theory demonstrate that horizontal signal polarization is generally superior to CP in poor reception areas.

The tests were implemented to evaluate the installation of a CP transmitter in Bonneville International Corporation's Seattle, WA, television station, KIRO TV Channel 7, because the company has two similar high-band VHF stations with transmitters located at the same site. Both are public television stations, and so broadcasts from the same source. However, one station uses a CP transmitter, and the other employs the traditional HP transmission mode. Thus, the tests were conducted under actual broadcast conditions and in a wide variety of receiver locations, including open areas, urban high-rise building areas, mountainside areas, and others.

Bonneville International Corporation recently purchased a double power TV transmitter for a new CP installation at the company's Seattle outlet, KIRO TV Channel 7, on the premise that CP is a good solution to correct TV reception defects such as multipath ghosts, as reported in various trade journal articles. However, two well-known TV consulting engineers independently expressed to us their concern about the degrading effects of CP under certain reception conditions. In order to help solve our dilemma and to get some factual information first hand, Bonneville Engineering decided to run some comparative field tests and document the results.

Being based in Salt Lake City, it was convenient to make comparative CP/HP tests, since the two VHF TV stations are located at the same transmitter on Mt. Vision, 20 miles southwest of Salt Lake City. KBYU, Channel 11, is CP with the new HP Directive. The transmitter, while KUED, Channel 7, is conventional HP. The field tests were designed to address the following questions:

- Does CP cancel multipath ghosts and reflections in the TV picture? If so, under what conditions and how much?
- Does CP provide a stronger, more snow-free TV picture than HP? If so, under what conditions?
- How much does CP cause multipath ghosts and reflections that degrade rather than improve TV reception? Under what conditions?

Test antennas - A specially built CP receiving antenna cut to Channel 11 was ordered from Simplicity Tool Company of Portland, OR. The antenna consists of a 5-element horizontal yagi mechanically phased 90° in front of a 5-element vertical yagi on the same boom. The boom is end mounted to the mast behind the vertical reflector for minimum mast interaction. A remotely switchable phasing system is used to switch the CP antenna feeds between vertical, horizontal, right-hand circular, left-hand circular, and a separate rabbit-ear antenna mounted atop the vertical mast. The rabbit-ear antenna length was adjusted halfway between maximum Channel 7 and 11 video carrier signal strength on the field meter with elements set 45° from vertical.

Additionally, two separate 5-element horizontal yagis (one cut to Channel 7 and the other cut to Channel 11) on separate masts were used to compare the HP component of the Channel 11 CP signal with the Channel 7 HP signal. A Rohde & Schwarz field meter, a 17-inch Sony color TV set, and a 35 mm SLR color film camera were used to document the picture.

Test procedure - Using a control site with near perfect TV reception conditions approaching free space, the video carrier signal strength readings along with color photographs of the TV set picture were taken using the various antenna and polarization combinations on the CP station, Channel 11, and the HP station, Channel 7. After obtaining predictable free space results at the control site, 11 other sites, each with various reception conditions, were selected and visited. The same group of measurements and photographs were taken at each site. In every case, the antennas were positioned for a uniform signal field at a fixed height of 15 ft and oriented for maximum signal.

Results of CP tests - In the good reception areas, the CP signal delivered the expected "double power" signal strength on the CP receiving antenna with excellent picture quality and no ghosts. However, to our great disappointment, at the poor reception sites where ghosts and multipath are visible, the Channel 11 CP signal on the CP receiving antenna did not reduce ghosts and multipath reflections. In fact, the conventional HP Channel 7 had the strongest signal with the least ghosting on all the antenna combinations, including rabbit ears. The performance of CP was disappointing, to say the least.

In trying to explain the poor CP results, the theory was studied again. Theory indicates that in order for a CP receiving antenna to cancel CP ghosts, condition 1, the

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Editor's note: In the wave of advances in CP antenna design and installation successes, this paper suggests some caution may be exercised in system selection. The data and its interpretation, along with the conclusions and recommendations, are those of the author. They are printed here as a service to the industry, but, such publication does not imply Broadcast Engineering endorsement as to test results, interpretation or recommendations.
vertical component of the CP ghost signal, must be phased 90 degrees leading and of equal amplitude to the horizontal component of the CP ghost.

Furthermore, to obtain double power from the CP receiving antenna, condition 2, the vertical component of the direct CP signal, must be phased 90 degrees lagging and of equal amplitude to the horizontal component of the CP signal. Both of these free space conditions seemed to be closely approximated in the good reception areas but not in the multipath ghost area.

CP theory also indicates that if the CP reflected ghost signal does not have the desired phase and equal amplitude relationship between its horizontal and vertical components, then the ghost is amplified and the direct signal is reduced. This is condition 3.

Realizing that there are two different types of ghosts, a study was made to determine what two reflection conditions will produce a condition 1 ghost, cancellable with a CP receiving antenna, and a condition 3 non-cancellable ghost. An important clue was found by comparing the TV set picture photos from the separate horizontal and vertical antenna signal components of the CP signal. In the multipath areas, the vertical component was consistently lower in amplitude and contained significantly more multipath ghosts, while the horizontal component was stronger and relatively free from ghosts. It became obvious that the defective vertical component of the CP signal was causing the condition 3 ghosts. With this clue, further study of Electromagnetic Field Theory confirmed and explained the CP test results so that predictions could be made.

General predictions regarding CP—Condition 1 ghosts can be produced by a CP signal reflecting from a highly conductive flat surface, such as the side of a metal skinned

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Tape recorder air-checks programming

By John Shepherd, chief engineer, WROK/WZOK, Rockford, IL

Many program directors and announcers air-check their shows by having a recorder running only when the studio microphone is on. The usual method involves wiring the motor circuit of a cassette machine through the microphone muting relay. Although this works, it is desirable to have a studio quality reel machine start and stop in conjunction with the microphone switch.

At WZOK there are two ITC 850 reel-to-reel recorders in the FM control room. An enclosed circuit starts the recorder when the microphone is on and stops it when the mic goes off. A switch (S1) determines whether the machine will run normally or in the air-check mode. When S1 is closed, the record and start circuits are energized through diodes D1 and D2. The stop circuit is controlled through diode D3 which is routed through a set of normally closed contacts on the microphone mute relay in the board (S2).

If the microphone is off, the mute contacts are closed and the stop circuit is energized. The stop circuit will take precedence over the other circuits and the machine will remain stopped. When the relay contacts open (microphone on) the stop circuit will be open and the machine will start in the recording mode.

The circuit is simple to construct using three rectifier diodes (type 1N4004 or equivalent). The recorder connections are made on the remote control plug (P1) which may also be used for its normal function. When the switch S1 is open, the recorder behaves just as though the air-check features were not connected. All normal remote control connections also remain the same.

Back in action with improvised horn feed

By Steve Flyte, ENG engineer, KATU, Portland, OR

KATU, the ABC affiliate in Portland, OR, has used live/tape ENG capabilities extensively and aggressively since January 1976. So, I figured December 27, 1978 was going to be more or less a routine day for me. I was driving our Mobile Two news van to Salem, 50
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September 1979 Broadcast Engineering 135
Station-to-station

miles south of Portland, to meet the Channel 2 and ABC Network news teams to transmit their videotapes back to Portland for their respective news broadcasts.

After meeting with the crews and discussing our operation plans for the day, I proceeded up the hill not far from the Marion County Courthouse to establish our microwave circuit. It was when I arrived up on the hill that I discovered our Nural circularly polarized feed section for our 4-ft dish on the roof was missing. Like most of the news vans around the country, Mobile Two stores its feed section inside the van when traveling, and when the dish is erected for transmitting, the center feed horn with its four arms is held to the dish with four small tabs.

Without that one component, our $275,000 news van was not worth a thing to anybody. The first idea that came to mind was to try to fabricate some sort of makeshift assembly to fit to the dish. A telephone call to the local TV station proved negative—no extra 2GHz dish components laying around the shop. Next, I tried the Microreflect Company. They install large microwave repeater sights all over the nation. After going through their junk box, all we could come up with was a feed horn for a 10-ft dish, instead of something for the 4-footer mounted on the van. Figuring that the focal length would be wrong, I decided to try it anyway.

The borrowed feed assembly was quite heavy and approximately 4-ft long. It required lots of rope and gaffer tape to hold it into place.

After installation, I contacted the studio—nothing. I really didn’t expect anything with the focal length being so far off.

Almost ready to bag it with the agony of defeat, I decided to try one more thing. There happened to be a short piece of RG-11/U coax in the van with an N connector on it. I called back to the station and asked the assistant chief engineer to look up in the Nural manual what the proper focal length was supposed to be. He called back and said approximately 22 inches.

At this point, I took some of my 15 years of experience with amateur radio antennas to mind (dipoles and yagis) and fanned the shield and center conductor on the end of the coax into a small dipole, each side being 34-inches long. I ran the coax through a small hole in the center of the dish, pulled it out to 22 inches

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from the center, and just held the little dipole out in midair with lots of gaffer tape supporting it. I oriented the dipole in the horizontal configuration, and called the station again to look for my signal.

I went up on the roof of the van and started tuning the dish. To everybody's surprise a trace of bars were starting to appear on the monitors and scopes at the station. We all felt like Marconi sending his first radio signals across the Atlantic. More tuning proceeded, and finally the studio told me we had a fine quality, fully broadcastable signal with this Rube Goldberg concoction. We were all amazed. (Have you ever opened up one of the Nurad horns and seen the complexity of plumbing, coaxes, etc.?)

Soon, Channel 2 News and ABC arrived, and they sent their tracks and everybody was happy. Later that night, I drove back to Portland, and we did a live basketball remote from Memorial Coliseum for Channel 2 News. What a day!
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Station-to-station

2-tone attention signal broadcasting system

By Patrick Bryant, studio/theater engineer, ABC, Hollywood, CA

In the past, the FCC has required participating broadcast stations to have equipment for broadcasting a warning signal in the form of a carrier-break followed by a 1000Hz tone. The FCC now requires two tones to be broadcast simultaneously at 853Hz and at 960Hz with a variation of less than ±0.5Hz for a period of time between 20s and 25s.

One class of such 2-tone broadcasting equipment includes a manual switch. That, when depressed, causes a switch to interrupt the audio signal from the broadcast studio and a generator to generate the 2-tone signals and a circuit that combines the two signals for amplification and modulation.

Conventional implementing of such a system suggests that (1) the time that the warning signals are broadcast is controlled by an analog circuit (such as an RC circuit); and (2) two sine-wave signals are generated in tank circuits for combination and application through the interrupt switch to the amplification and modulation equipment. Such circuitry is known in other types of tone transmitting systems. This type of system has the disadvantage of being relatively expensive and not as precise as desired. The expense occurs because timing equipment with the required accuracy and the equipment necessary to generate the sine waves is expensive.

Signaling systems are known which generate the two frequencies digitally, convert them to sine waves, and combine these sine waves for broadcasting. Such a system is disclosed in US Patent 3,676,780 to Niemann. However, this type of equipment has relatively high distortion and low accuracy in the timing of the signals. One cause of the distortion is that the digital signals are applied directly without differentiation to resonant tank circuits for conversion to sine waves. This distortion, coupled with any distortion from the application of the signals through telephone wires from the interrupt switch, is a disadvantage which would impede the direct use of such equipment in a 2-tone attention signal generator.

A new circuit (US Patent 4,103,235) provides a novel 2-tone attention signal broadcasting system. The circuit was designed to provide (1) a 2-tone attention signal broadcasting system which is relatively inexpensive; (2) a system with a relatively simple and inexpensive timing system that provides precise timing of the duration of the signals; (3) a low distortion 2-tone system;
(4) a sine-wave generator which provides a low distortion sine-wave output signal from a square-wave input signal; (5) a system for generating two frequencies from a single clock frequency and combining them into a 2-tone sine-wave audio signal; and (6) an interrupt system for terminating the audio signal from a broadcasting station and transmitting instead a 2-tone attention signal to the amplification, modulation and transmitting equipment.

Accordingly, the 2-tone attention signal broadcasting system described here includes an encoder and an interrupt switch. The switch interrupts the audio signal which is being transmitted from the studio to the modulation, amplification and broadcasting equipment upon the depressing of a manual switch and transmits instead a 2-tone signal developed by the encoder for a fixed period of time between 20s and 25s. The 2-tone signal is received by receivers forming part of the 2-tone attention signal broadcasting system and decoded to provide an alarm and to demote certain radio receivers for a reception of further information.

Complete details of the entire system may be obtained by purchasing referenced patent from the US Patent and Trademark Office, Washington, DC 20231.

---

**Building a digital lock**

By John Linebarger, WREG-TV, Memphis, TN

We have constructed a digital lock to eliminate a large number of keys that would be necessary if a majority of station employees were to have access to the building entrance or any door for that matter. Additionally, eliminating the need for even having a key would eliminate lost or stolen keys.

The lock can be constructed using TTL logic devices available from the shelf of any electronics retailer. A power supply of 150 mA should be plenty for power with the exception of the external door controls or alarm.

The circuit is very straightforward. In order to gain access, one presses four buttons or flips four switches to enable the device to function. After this is done, a TTL logic level is sent to a transistor driver for door release. If the wrong

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September 1979 Broadcast Engineering 139
Station-to-station

code is pressed and then enable is pressed, an alarm TTL level is sent. Again this signal can drive a
transistor stage to sound an attempt
to open the door.
The device was installed on an
interior door that only certain
employees have access to. It has
worked very well but a series of
set-reset flip flops for the code
buttons would have simplified things.
It is a little awkward pressing five
buttons at once. Of course, the
more devices in the lock the less
likely someone is going to want to
build it.

![Diagram](image1)

**Figure 1**

**Figure 2**
An improved digital logic probe

By Edward P. Alciatore, III, weekend supervisor, WCKT-TV, Miami

There was an article in November, 1977, BE on how to build an inexpensive digital logic probe. Since everything is becoming more digital, I immediately started looking for the parts for this useful device. Several days later, after spending even less than the $3.50 claimed by the original author, I had my probe ready for testing. The high and low lamps worked perfectly, but the pulse lamp would not function.

I determined that the circuit would work if the 1/μF capacitor had a large amount of leakage. This struck me as a rather undesirable situation, so I revised the pulse detector section as shown in Figure 1. I also raised the input impedance by using voltage divider R1 (600 K), R2 (300 K) to bias the probe at 1.5 V when no input is present and I selected resistors R3 (2800), R4 (1000) and R5 (500) to provide a low threshold of 0.5 V and high threshold of 2.4 V. This combination of probe bias and threshold voltages provides a better match to TTL characteristic and turns all the lamps off when the probe is not being used or if the circuit being probed is in a high impedance state. This precludes getting false low readings.

I used this version for some time but found that, useful as it was, it did not show the fast, low duty cycle pulses often found in digital circuits. These pulses are one of the prime reasons for using a logic probe. You always miss them on the scope due to limited bandwidth, improper triggering or a brightness control that stops 1/4 turns before the necessary intensity level is reached.

Looking at the circuit again, I quickly determined that the limited bandwidth of the LM339 was the problem. However, since we are trying to detect logic pulses, logic ICs should provide a good means of catching them. In Figure 2, the 74123 is a dual, edge triggered, mono stable multivibrator. By using the normal input on one section and the inverting input on the other section, one of the outputs will be present for either positive going or negative going.

Otari’s new MX-5050-B continues the proud heritage of the MX-5050 Series, a recorder now extensively used by television and radio broadcasters worldwide. The new version has all the proven features of the earlier pace setter, including front adjustable bias and record EQ, built-in test oscillator, edit and cue, splicing block, motion sensing, selective reproduce, and adds many new features all its own: ultra reliable TTL switching, noise free inserts, three speeds in field-selectable pairs of 15/7½, 7½/3¾ ips, 24 dBm headroom with 28 dBm output into 600 ohms, dc capstan servo with ±7% speed control (to match program length to a time slot), peak reading LED plus standard full sized VU meters, return to zero memory, and LED function indicators, among others.

Add these features to a 66 dB S/N ratio and a frequency response from 30 to 22,000 Hz ± 2 dB at 10 ips and you have a machine that competes with those costing thousands of dollars more.

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negative going transitions, R11-C1
and R12-C2 determine the length of
the output pulses and therefore how
long the pulse lamp is lit. The
values shown should provide about
0.1 s.

The inverted outputs from U2 are
combined in U3 which acts as a
NOR gate. This output will be high
for 0.1 s after each positive or
negative transition in the probe. The
third section of U1 compares this
with a 1.5 V reference and drives
the pulse lamp, D3. The other
section of U3 is used as a buffer
between the probe and U2; it
accounts for most of the input
loading of 1.2 unit TTL loads.

The high and low detectors are
simple voltage comparators as in
the original circuit, F1 and D4 form
a protection circuit which I haven't
tested so you may use them or not
as you wish.

I packaged the circuit with a
double sided PC board in a 1"x2"x
3" (nominal) plastic box with a
metal cover. The circuit board is
mounted on four 4-40X 1/4-in screws
used as standoffs and the LEDs are
mounted with long leads to allow
them to fit through holes in the
cover. I kept the probe and power
leads to a reasonable length to
avoid stray capacitance and pickup.
A single sided board with jumpers,
perforation or even the IC bricklaying
techniques could also be used.

The main disadvantage of this
approach is that the probe is now
limited to the various forms of TTL
and a 5 V supply voltage. On the
positive side, the 74123 is guaran-
teed to detect 40 ns pulses and in
tests, my probe detected the short-
est pulses I could breadboard,
about 8 ns. This, plus the other
improvements, should make it a
very good TTL probe.

My cost was well under $10
although you could exceed this
amount if you pay top price for too
many of the parts. I have found this
probe to be an excellent TTL
troubleshooting aid and it fits well
in my policy of acquiring minimum
cost test equipment with the maxi-
mum possible utility.

Figure 2
A second generation recorder incorporating all the field-proven Otari features plus several new items of special interest to broadcasters. These include: modular transport and electronics for convenient console, rack or portable mounting, plug-in cards for ease of maintenance, splicing block, complete accessibility to all electronics adjustments for fast bias and record/reproduce alignment, variable speed (±7%) dc capstan servo to precisely match program length to a specific time slot, and interface jack for dbx or Dolby noise reduction switching. Standard Otari features include true professional quality and reliability, motion sensing, selective reproduce on all channels; 19 dBm headroom, XLR connectors, edit and cue, and built-in test oscillator. Available in two-channel ¼-inch or four-channel ½-inch models.

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Station-to-station

The 150 Hz/8kHz tone detector for cartridge machines

By Tom M. Cupp, broadcast operations engineer, WCET-TV, Cookeville, TN

I have designed and built a 150 Hz/8 kHz tone detector for cartridge machines. A description of the circuit and components follows.

The power supply for the tone detector is a dual voltage supply that supplies the +30 Vdc (relay pull-in voltage) and the regulated +5 Vdc (detector circuit voltage). C1, C2 and C3 are filter capacitors. R1 is a 2 W dropping resistor. Five detector circuits can easily be powered by this circuit.

The preamp may or may not be needed, depending upon the cart machine used. I found it necessary with the ITC-3D and the Harris Criterion machines. This circuit amplifies the tone to a level that provides a good sample at the detector IC input. The amplifier is common to both the 150 Hz and the 8 kHz tones.

The 150 Hz detector IC is a LM 567 tone decoder phase locked loop with a 0 to 14% controllable bandwidth determined by R6 and R5 and adjusted by R9. These resistors provide an approximate bandwidth of 140 Hz to 160 Hz.

When the determined tone is detected IC 1 provides a saturated transistor switch to ground which, after passing through a 7404 inverter, is fed to the relay pull-in circuit.

To best adjust the detector circuit:

• Hook a frequency counter to pin 5 of the IC. Adjust R9 until 150 Hz is obtained. You are adjusting the current controlled internal oscillator.

• From a reliable audio oscillator, feed 150 Hz into the IC on pin 3. (1 V or less)

• Place a dc voltmeter on pin 8 of the IC. If the circuit is working properly, you will read zero V when the tone is present.

• Remove the tone from pin 3. You should now read +5 V on pin 8.

• A slight adjustment of R9 may be necessary to compensate for characteristics of tape and cartridge machine.

Basic operation of the 8 kHz detector is the same as the 150 Hz
detector but the frequency determining components are different. Also C11 is a paper 0.047 μF used for stability. Frequency adjustments are made with R13. Frequency range or bandwidth is from 7500 Hz to 8500 Hz.

After passing through the 7404 inverter, the signal passes through a special delay circuit. This circuit may or may not be desirable for your operation. Some cart machines run through 150 Hz oscillator being started up. This action causes the 150 Hz detector (if used as an end of message detector) light to momentarily flash. The delay circuit is of 1 to 2 s delay and will prevent this. When saturated with several bursts of 150 Hz, the delay will in effect become invisible to the signal. Again, this action may not be undesirable to your operation. The delay circuit consists of C9 and R11.

The basic operation with the 8 kHz relay pull in circuit is the same as the 150 Hz circuit, but the delay circuit should not be used.

Practically all parts used in the circuit were bought at a local Radio Shack. Each deck or cart machine requires a 150 Hz and 8 kHz detector costing about $30 each. The power supply costs about $15.

Widely used in leading automation systems. Specifically designed to meet their stringent requirements for highest audio performance, long term reliability and around-the-clock operation. Basically, the ARS-1000 is a work horse two-channel stereo reprodor with two tape speeds (7½ and 3½ ips) and the following features: heavy duty 19-inch top plate, head mounted pre-amp to minimize hum, RFI and yield superior S/N, special long-life polyurethane pinch roller tire, friction reducing ball bearings, heavy duty motor and brake assemblies, and gold plated PCB connectors. It's easy to maintain with its plug-in PCB's and mother board configuration, easy-access flip-up head cover, and front adjustable output level and head azimuth (to minimize stereo phasing errors). Its operating features include removable Play and Stop, a ready light to indicate proper tape threading, head lifters for fast modes, a cue control for audible monitoring, and optional 25 Hz cue tone sensor. All connections are brought out to a single 25 pin Cinch connector.

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Station-to-station

Transmission line pulser

By Victor Castens, KOAM-TV, Pittsburg, KS

We developed a simple circuit (Figure 1) to enable us to locate noisy bullets or bad joints present in a transmission line. The test circuit is a 555 square-wave oscillator driving a one transistor output line driver.

Figures 2 and 3 show the results that were obtained when we checked each of the two feed lines to an RCA TF-12BH antenna. In Figure 2, T1 is located at the matching section near the base of the antenna, 573 ft from the test location. Figure 3 shows the results of a test made of the second feed line to the same antenna. This oscilloscope photo shows the effects of a noisy bullet at 9.5 μs, point T, 465 ft. Notice the thickened line to the right of T. This bounce is due to the varying resistance of the bullet near that level.

Figure 4 is a graphic diagram of the results of the pulse generator output with no line attached, an open cable and a shorted cable. A listing of velocity factors also is included for use in computing the distances involved to a line problem.

![Diagram](image)

Figure 1

Figure 2

Figure 3

(a) PULSE GENERATOR

(b) OPEN CABLE

(c) SHORTED CABLE

D = ROUND TRIP, MICROSECONDS

V = VELOCITY FACTOR: 3" = 100%

RG9 etc. = 66%. Foam = 80%.

490xVxD = Length, feet.
Electret condenser mics

By Ian M. Evans, news director, KRCR-TV, Redding, CA

KRCR-TV uses five miniature electret condenser microphones on the news set each night. Several more are used with the mini-cams by our commercial production department. We're satisfied with them, and while the $30 to $75 price each isn't hurting the station's finances, $2.49 is more attractive.

You can readily see why the electret condenser microphone elements advertised for $2.49 in a Radio Shack flyer (Catalog 270-092) caught my attention. Fidelity seemed fine, comparing favorably with the Sony ECM-50s we've been using. My response check was a little on the informal side, amounting to plugging one Radio Shack and one Sony into separate channels of a mixer and then listening to the mixer output on a good pair of headphones. If anything, the Radio Shack unit had a better bass response. A small response chart printed on the back of the blister pack that the microphone element came in showed a slight peak in output at 6 kHz, but, if it was there, I couldn't hear it.

Your $2.49 investment brings only the actual microphone element, you'll have to think up a package and cabling for it. I developed the idea of sticking the element and a necessary capacitor inside the plastic barrel of a 1/4-inch phone plug. The element makes a snug fit and no glue is necessary to hold it in place. Like most broadcast stations, the 3-wire Cannon-type plug is our standard and one was readily available from the engineering department's junkbox.

That little contactor in with the mic element allows you to superimpose the audio output signal on the wire carrying the power. That's necessary if you're unable to come up with miniature 2-conductor shielded cable. The capacitors I used were 5 µF at 15 V, electrolytic. You can substitute on capacitance value here, anything reasonably close should work. Supply voltages from about 3 V through 10 V should work, I chose 9 V because of the easy accessibility of the NEDA 1604-type battery.

So far, the units I've put together have been running more than six months with no battery failure. If so, then 12 of these batteries amount to a 6-year supply. Naturally, a more expensive alkaline type battery should last substantially longer, probably well over a year.

Fastening the microphone to the talent's tie or lapel can be done with an alligator clip or an old tie clasp. I fastened the mic to the clasp with a couple of drops of cyanoacrylate glue. This dries in a few minutes, with a strong bond.

The experiment also gave me a chance to improve on what I've considered a weak spot in the physical design of miniature micro-

---

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Circle (144) on Reply Card

September 1979 Broadcast Engineering 147
phones. My station always has at least one of these units in the shop for repairs, usually broken leads or at the output connector. I mounted the battery, battery connector and coupling capacitor in a small plastic utility box that fastens at the waist. An unexpected tug pulls off an easy-to-repair solder joint rather than those microscopically tiny connections. The banker's clip used to hold the utility box to the wearer's belt is available at office supply stores.

You may have noticed the output of this microphone is unbalanced. Our microphones are 60 ft of cable away from the control room, but we notice no problem. It will be necessary to ground the unused contact in the microphone output plug. This allows the microphone's output voltage to appear across the mixer's input transformer or transistor, while still keeping the cable shield at ground potential.

---

**Announcing the New PW-200 Pulse Width Measuring Set**

The PW-200 generates precision markers which are locked to either station sync or to incoming video. These markers are inserted into incoming video for viewing on a standard B&W picture monitor or television waveform monitor.

VERTICAL or HORIZONTAL mode is selected via front panel switching and front panel controls are used to adjust the position of the markers to the start and finish of the pulse to be measured. The time between markers is computed by the internal 10 MHz clock and is numerically displayed on the LED readout.

**STANDARD PW-200 FEATURES INCLUDE:**
- Internally generated pulse-cross-allows measurements to be made on any standard B&W monitor.
- Separate, non-interacting controls for vertical and horizontal rate measurements.
- Two isolated outputs—one for pulse-cross monitor display and one to feed a waveform monitor with markers inserted into the video signal.

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Tech note:
The solution to 3/4-inch tape edge damage

Most tape edge damage in 3/4-inch cassettes occurs when the pack rides at the wrong height inside the cassette, having been positioned at that height by a misaligned spindle. In some cases, the tape will continue to play in the defective drive without any sign of damage, since the tape in the cassette has adjusted to the particular height of the misalignment. But as soon as the cassette is moved to a correctly adjusted drive, or a drive that is adjusted to a height different from the first, the tape edge rubs against the guides as it travels around the scanner to the take-up reel, or against the edge or reel of the cassette as it enters the cassette housing. In some cases, tape edge

Editor's note: Hardware Report contains notes and short articles about manufacturer's broadcast products and technology advances. Broadcast Engineering has not tested the products to confirm the manufacturer's specifications. The sources cited should be contacted for complete data.

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COLOR or B & W Television Signals with Audio

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Circle (146) on Reply Card

September 1979 Broadcast Engineering 149
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Hardware report

Damage may occur immediately; at other times, the tape may be packed so high on the supply reel that it slips off the transport in the threading operation and wraps around the scanner, necessitating disassembly of the machine. This spindle height misalignment frequently causes the take-up pack to jam against the housing as it rotates inside the cassette. The resulting friction may become so serious that take-up is slowed; the capstan continues to pull tape off the supply reel without take-up tension and the tape rides loosely around the transport. When the hindered take-up reel intermittently moves, it yanks the loose tape into the cassette, resulting in stretched tape in addition to edge damage.

Tape edge damage is often unnoticeable by the naked eye when inspecting the tape, but the slightest damage along the edge of helical scan tape can have serious adverse effects on tape performance.

Symptoms of edge damage

The results of tape damage are visible long before the most obvious stage of malfunction—loss of vertical lock. When tape is pulled away from the traveling heads, even for only a moment, loss of sync causes tearing and skewing of the picture in the RF portion of the screen and can travel up into the viewing area of the picture if damage is severe. Control track pulses recorded along the tape edge are crucial in maintaining proper head drum and capstan synchronization. When there is edge damage, the tape loses contact with the heads, which results in a rolling picture that continues to roll until the moving head can lock up with the next available sync pulse. Tape damage of this sort is usually permanent,
rendering that portion of the tape useless.

All of these problems can be solved by the proper alignment of reel tables. If the tape travels at a centered height, it will wind into the cassette without rubbing against the plastic reel, cassette housing or machine guides. The reels inside the cassette are able to rotate freely and smoothly with the motor speed. In addition, if reel tables are adjusted to the correct height above the drive registration planes, cassettes can be played on any correctly-adjusted drive without the resulting edge damage. Cassette life will be dramatically increased once the machine spindles are properly aligned.

Because previous manual means of measuring alignment were inadequate to measure and solve the problem, Memorex, 1200 Memorex Dr., Santa Clara, CA 94050, developed a cassette-like gauge called SHAG (Spindle Height Alignment Gauge). SHAG has dial indicators which, when placed into the drive, quickly register the difference between the machine registration post and the machine registration surfaces of the drive spindles. A mini-cassette version was also developed and tested, again with good results. The final version of the gauge can be used on all brands of standard or portapack VCRs.

With SHAG it is possible to check the registration planes to reel table height in less than a minute. The SHAG is placed on a set-up block which is designed for the standard heights of ¼-inch cassette reel tables. Two dial indicators, one for the supply spindle and one for the take-up spindle, are zeroed using thumb screws on the side of the gauge. SHAG is then lifted off the block and placed into the videocassette drive, and the reading of the indicators gives the height deviation from the standard spindle height (i.e. supply reel: 0.150-in; take-up reel: 0.197-in). Proper spindle height specifications within .0006-in are indicated on SHAG, with no disassembly of the machine necessary for the reading. This reading indicates the exact amount of shimming necessary to achieve proper spindle height alignment, and upon completion of adjustment and reassembly, SHAG will confirm that proper alignment has been achieved. Richard Engebretson, Engineering Services Manager, Memorex.

RTS Systems introduces an innovative new intercom system for teleproduction communications in studio and field. With Super System Phase III, we've incorporated a number of advances which mark a significant increase in product versatility.

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With increased flexibility, improved circuitry, and greater reliability, our Super System represents a new development in meeting the demands of modern teleproduction. For additional information, contact RTS Systems, Inc.

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Circle (153) on Reply Card
September 1979 Broadcast Engineering 151
new
literature

Electro-optics design
AMP—Designer Digest 11 covers new electro-optics packaging, plating in the electronics industry, crimping conductive inks and easier connection termination. The 14-page brochure also covers basic fiber optic terminology and includes a table on contact plating materials.

Circle (475) on Reply Card

Replacement batteries
Alexander Manufacturing—Batteries for pagers, hand-held 2-way radios, portable videotape recorders, cameras and emergency medical equipment are included in a 12-page catalog. Nickel-cadmium, alkaline, mercury and single-cell batteries, as well as automatic battery chargers, are all described.

Circle (476) on Reply Card

Tools & safety equipment
Anixter Pruzan—More than 6000 tool and safety equipment items are illustrated and described in a 150-page pocket size catalog. The items are designed for those who build and maintain CATV, telephone and power lines.

Circle (477) on Reply Card

Microphone selectors
Audio-Technica—Three slide-rule microphone selectors to help recordists, sound installers and professional musicians choose and position the right mics for sound reinforcement and recording situations are available. Information covered includes the sound frequency range of 26 instruments, male and female voices, plus complete band and orchestra.

Circle (478) on Reply Card

TV signal distribution
Blonder-Tongue—The company's complete line of television signal distribution products for MATV, CATV, audio-video and home use are described and illustrated in a catalog. Individual product specifications, application drawings and product features are highlighted.

Circle (479) on Reply Card

TV furniture
Bretford Manufacturing—Two TV brochures are available. A 4-page booklet displays the company's TV/VTR cabinets, centers and stands. The second is a 2-page brochure featuring mobile tables with TV and AV applications.

Circle (480) on Reply Card

Slide presentations
Ruhl Video—A free booklet describes how to produce slide presentations and how to transmit their programming to video using the Mobile Multiplexer filmchain. "Care and Feeding of the Mobile Multiplexer" offers information on techniques for making slides, a sample story board, and choices and recommendations for dissolve controls.

Circle (481) on Reply Card
Perfect Timing

MASTER CLOCK SYSTEMS

If seeing the same time on all your clocks is important, select ES 192 - Line Frequency timebase, for only $300.

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Or National Bureau of Standards accuracy! ES 190 is synchronized to Radio Station WWV to provide a Master with unquestioned accuracy. $1134 with receiver and antenna.

For a Time! Temperature Master, ask for ES 196 - $709.

ESE Master Clock Systems are simple to install. All Masters have a Serial Time Code output, able to drive twenty slave displays without buffering. Slaves range in size from 3" LED to 3" gas discharge displays, priced from $146 to $415.

IF YOU ALREADY HAVE A SYSTEM AND WANT TO EXPAND IT, get the ES 167 Serial Time Code Generator ($136), then add any number of our low cost slaves.

Many, many options and accessories are available. Ask us about them. Our brochure tells the whole story, but not for long. We keep adding new products.

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Digital & linear ICs
Cherry Semiconductor—A 12-page guide to designing custom digital and linear bipolar ICs is available. Included is a discussion of the three phases: design and breadboard, layout and prototype, and circuit review and production release.
Circle (482) on Reply Card

Monochrome TV monitors
Cohu—The DM Series monochrome monitors is the subject of a product data sheet. The illustrated brochure includes features and specifications of the modularly constructed series.
Circle (483) on Reply Card

TV equipment
Cohu—A new edition of Short Form Catalog Number 6-945 describing the company's current line of broadcast television products is available. Included are descriptions and photographs of all equipment.
Circle (484) on Reply Card

Remote camera system
Cohu—A product data sheet describes the DTMF series remote camera control system which can remotely control up to 100 camera locations. Product description, features, specifications and photographs are included.
Circle (485) on Reply Card

Power supply
Computer Products—The Power Products division is offering an updated 20-page catalog with functional descriptions, photographs, electrical/mechanical specifications, prices and ordering information for four series of power supplies. The series consist of high-efficiency switchers, encapsulated high-efficiency switchers, dc-dc converters, and linear encapsulated power supplies with single, dual, triple and logic outputs.
Circle (486) on Reply Card

Test & measuring
Continental Specialties—A 32-page catalog features frequency counters, logic troubleshooting tools, an ultraviolet pulse generator, a sweepable function generator and solderless breadboarding. Each section includes photographs, specifications and descriptions.
Circle (487) on Reply Card

Editing systems
Convergence—A 15-page catalog describes the company's line of ECS-100 Superstock Editing Systems. Besides illustrating the basic series, the catalog includes interface packages, VCR upgrade packages, interface modules and general specifications.
Circle (488) on Reply Card

Mast & tower data
Decca Austin Instruments—Product data sheets de-
New literature

scribe the firm’s line of mast and tower equipment: guy strain insulators, base insulators, lighting transformers, and static drain resistors.

Circle (489) on Reply Card

Multi-image production

Eastman Kodak—A book of programmed multi-image production, "Images, Images, Images," examines the justification for as well as the planning, production, and presentation of multi-image programs. The 244-page book covers various topics, including setting objectives, selecting the media and visual format, writing the project proposal, choosing the right equipment, producing the visuals, creating the script, editing the visuals and programming the equipment.

Circle (490) on Reply Card

Resistive pads

Electric Sound of Minnesota—A 28-page "Resistive Pads Manual" is offered in the Audio Reference Series. Contents include adjustable pads, center-tapped pads, choosing pads, measuring attenuation, VU meter pads, bridging pads, lattice splitting pad and specifications. A resistive pad calculator also is offered.

Circle (491) on Reply Card

FCC proceedings update

FCC—The Annual Report of Major Matters, which reflects the status of major proceedings as of December 31, 1978, is available. Written in a "plain English" style, the document is designed to keep Congress, the public and the commission's staff apprised of pending proceedings.

Circle (492) on Reply Card

CATV equipment

GTE Sylvania—A catalog describes the company's line of CATV equipment and accessories. The 71-page booklet includes technical specifications, charts and block diagrams covering the family of mainline and distribution amplification stations and accessories.

Circle (493) on Reply Card

Oscilloscope bulletin

Gould—The OS3900 oscilloscope and optional DM3010 digital measuring unit are described in a 2-page illustrated bulletin. The portable scope features a bandwidth from dc to 60MHz (-3dB); and 8cm x 10cm CRT operating at 12kV; and maximum vertical sensitivity of 2 mV/cm.

Circle (494) on Reply Card

Oscillographic recorders

Gulton—Full details on 2, 4, 6 and 8 channel oscillographic chart recorders using plug-in signal conditioners and 1 and 2 channel multiple sensitivity oscillographic recorders are featured in a catalog. It includes photos of all recorders, electrical and mechanical specifications, plug in signal conditioner specifications, and options.

Circle (495) on Reply Card

Microwave handbook

Hewlett-Packard—More than 350 microwave compo-
ments used in coaxial and waveguide measurements are featured in the 1979-80 edition of the Coaxial and Waveguide Catalog. Sections include a microwave measurement handbook, attenuators, detectors, couplers, filters, power sensors, slotted lines and 75 Ω items.

Circle (496) on Reply Card

Fiber optics
Information Gatekeepers—Volumes I and II of the company's Fiber Optic Manual and Handbook series has been published. The manuals are written for communications engineers and specialists with little or no experience in fiber optics technology and include such areas as typical equipment parameter design methods and specifying waveguide digital connector systems.

Circle (497) on Reply Card

Mosfet transistors
International Rectifier—SPA 913 is an 8-page application note which describes power Mosfet transistors and compares them with conventional bipolar devices. The brochure describes basic applications including switching power supplies, audio amplifiers, motor speed controllers and RF amplifiers.

Circle (498) on Reply Card

ITTA source directory
International Tape Association—A 56-page directory which lists products, service and activities of ITTA member companies is available free. It encompasses all areas of the audio/video tape and disc industry.

Circle (499) on Reply Card

Video glossary
JVC—Harry Elias, Vidstar division vice president, has assembled a glossary of the most commonly used video terms. It was compiled to aid the informed selection of a VCR system.

Circle (500) on Reply Card

Equipment rental
Leosametric—Rental catalog contains model numbers, descriptions and rental rates for more than 4000 separate pieces of equipment. Listed in the free catalog are 1, 3, 6 and 12-month rental rates for I/O terminals, general-purpose test instruments and microprocessor development systems.

Circle (501) on Reply Card

Film guidebook
The Means Ltd.—A Colorado film guidebook is designed as a personnel and services directory for on-location shooting of television programs, motion pictures, documentaries and commercials within the state. The listings include location scouts, light personnel, grips, set designers, wardrobe and costume houses, stylists, hotels, motels, restaurants and catering services.

Circle (502) on Reply Card

Film catalog
Modern Talking Picture Service—A 41-page catalog of more than 400 films available on free loan to television stations is available. The films are sponsored by business firms, trade associations, government agen-

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made especially for the broadcaster and recording engineer

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There are a number of Audio Level Indicators using L.E.D. bar graphs on the market today. Their acceptance is becoming widespread due to obvious advantages. However, the ES 214 gives you more: Transformer Isolated Input others consider too costly; A Power Supply Regulator on the circuit board, so you can use any unregulated D.C. voltage from +15 to +35 while others require dual supplies; The Standard Scale so you don't have to adapt to new numbers; and, the ability to select Peak Responding Mode or a special Fast Averaging Mode to approximate Apparent Loudness.

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Circle (159) on Reply Card

September 1979 Broadcast Engineering 155
New literature

- Oscilloscope how-to book
  Parker Publishing Company—The Practical Oscilloscope Handbook by John Douglas-Young covers servicing, operation, maintenance and repair of the oscilloscope, as well as giving detailed analyses of all principal waveshapes. More than 100 drawings, photographs and fault-finding tables are included.
  Circle (504) on Reply Card

- Tower guys
  Philadelphia Resins—Ten advantages of nonmetallic non-conducting tower guys for radio and TV and for CATV applications are explained in a brochure. The Philmystran tower guys are said to be essentially maintenance-free, even around salt-laden, corrosive atmospheres.
  Circle (505) on Reply Card

- Testing & measuring
  Philips Test & Measuring Instruments—A catalog contains informational, technical specifications and illustrations of all the company's current products. The free catalog groups products by category, including oscilloscopes, counters and counter/timers, recorders, signal generators, and radio and TV service equipment.
  Circle (506) on Reply Card

- Telecommunications' future
  Prentice-Hall—Future Developments in Telecommunications is a guide to digital transmission, storage and manipulations which forecasts future trends. Written by James Martin, the book encompasses topics from video telephones to satellite antennas on rooftops. A table of events for probable growing trends up to the year 2000 is included.
  Circle (507) on Reply Card

- Flat cable system
  Robinson-Nugent—A short form catalog features information on the IDC flat cable system as well as material specs, dimensional drawings and ordering information on the R-N line of IDC socket connectors, headers, cable plugs and transition connectors.
  Circle (508) on Reply Card

- Frequency and time equipment
  Rohde & Schwarz—A 24-page brochure entitled Frequency and Time describes applications of standard frequency and time equipment and a history of standard time and standard frequency. A table lists frequency and time emissions.
  Circle (509) on Reply Card

- TV monitors
  Rohde & Schwarz Sales—A 24-page brochure features the full line of Berco professional color TV monitors. Included in the brochure are technical specifications, display performance, detailed descriptions of all controls, illustrations and ordering information.
  Circle (510) on Reply Card

Write or phone for fast delivery. Write for free catalog and detailed information on the new calibrator.

Write or phone for fast delivery. Write for free catalog and detailed information on the new calibrator.

Write or phone for fast delivery. Write for free catalog and detailed information on the new calibrator.
Signal source
Scientific-Atlanta—A brochure contains applications information, specifications and ordering instructions for the Series 2190B signal source, designed for antenna range applications. The signal source and RF plug-in oscillators may be located at the transmit site and may be remotely tuned up to 2500 ft. away. Locating the signal source at the transmit site provides maximum RF power to the transmit antenna.
Circle (511) on Reply Card

Enclosures
Scientific-Atlanta—A brochure describes the Optima line of enclosures, including small cases, vertical cabinets, desks and consoles. New products and accessories illustrated include modular desks and Plexiglas doors for cabinets.
Circle (512) on Reply Card

Satcom cameras
Sharp Electronics—A brochure is available which describes the company’s line of 3-tube, 1/4-inch Satcon bias-lighted color cameras. The publication features the XC-450 self-contained professional portable ENG/EFP color camera and a XC-500 multi-function professional studio color camera. Features, specification charts and a list of available accessories for each camera are included.
Circle (513) on Reply Card

Corporate brochure
TPC Communications—A full color brochure provides information about the firm including major areas of performance and a review of the capabilities of the subsidiary companies. A description of the company’s StarTruck mobile video unit also is featured.
Circle (514) on Reply Card

Product selector
UMC Electronics—A 6-page Quick Reference Product Selector provides capsule information on all products in the firm’s line. A photograph, short description, and price are given for each product, including cart machine rack adaptor kits, accessories and options.
Circle (515) on Reply Card

UL video standards
Underwriters Laboratories—The first edition of the Standard for Safety, Low Voltage Video Products Without Cathode-Ray-Tube Displays, UL-1469, has been published and becomes effective April 1, 1980. Products covered include videotape recorders; video-receiving, -processing, -producing, and -amplification equipment; television cameras without CRT viewfinders; television-antenna amplifiers, cable television converters; picture tube degaussers; and similar video equipment.
Circle (516) on Reply Card

Character generators
Unitel—Literature is available describing the Scriptel range of microprocessor-controlled character generators. Two units are detailed: The Scriptel P features color, proportional spacing, many composition and animation facilities, and several options; the Scriptel V is designed for OB vans or small TV studios and

STOP GROUND-LOOP HUM!

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Will ELIMINATE HUM and other INTERFERENCE in Video Lines caused by differences in Ground Potential.

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Circle (241) on Reply Card

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Circle (232) on Reply Card

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Circle (518) on Reply Card

September 1979 Broadcast Engineering 157
New literature

- features internal time counter and 16 page memory.

Circle (518) on Reply Card

Film & video rental

Victor Duncan—A catalog lists and describes the full line of video and film cameras plus accessories available from the company. Rental terms and conditions are included in the back of the catalog.

Circle (519) on Reply Card

Breadboarding

Wainwright Instruments—A catalog describes the company’s Breadboarding System. Included are photographs and descriptions. A price list also is available with detailed information on kit contents.

Circle (520) on Reply Card

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**TV blanking analyzer**

A.F. Associates' HV-100 Television Blanking Analyzer allows horizontal or vertical blanking measurements to be taken using only a waveform monitor or pulse-cross picture monitor.

Measurements include picture blanking; set up blanking; front porch; sync width; burst length; sync to burst-end, burst-start or set-up; and vertical blanking. The unit, in its rackmount or table-top version, is designed to be inserted into a video monitor feed. It provides a video input and output, operating on 115V, 60Hz.

Circle (521) on Reply Card

**Reverberation unit**

AKC Acoustics has begun shipping the EZ version of the BX-10 portable reverberation unit. The torsional transmission line system has been redesigned and equalization has been added to the TTL system electronics. For speech applications there is a special short-decay time version available, the BX-10E2-Short.

Circle (522) on Reply Card

**Blumicon camera tube**

A 5-inch Blumicon camera tube, type 744X, has been introduced by Amperex Electronics. The unit is a diode gun tube with very high resolution, typically 55% response at 400 TVL. A high beam reserve can provide 4 f stops for highlight protection when used with the dynamic beam control. The tube is suited for studio use as well as ENG and EFP applications.

Circle (525) on Reply Card

**Boom box**

The Boom Box from Allied Broadcast Equipment, was created for the disco market but lends itself to constructive use with pop and AOR formats. The unit creates subharmonics of existing program material. Because the unit operates on the principle of synthesis there is some audible fuzzing of the human voice as the unit attempts to provide bass for the person speaking. Various methods are being employed to minimize or eliminate this effect.

Circle (524) on Reply Card

**Make up controller**

An automation make up controller

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Circle (166) on Reply Card

September 1979 Broadcast Engineering 159
New products

Two packaging styles are also provided. The standard Tyvek-coated shelf box features built-in hub support and a moisture and soil repellent exterior. The tape is also available in a flame retardant stackable shipping container.

Circle (526) on Reply Card

Telephone Interface
Ampro/Scully's PhoneCon is an interface device allowing Ampro cartridge tape equipment to be used for telephone answering and message recording. The unit incorporates a built-in FCC-approved telephone line coupler to avoid continuous monthly charges for a phone company supplied coupler. Also, a separate Ampro cartridge tape recorder can be controlled by the PhoneCon to record the caller's reply.

Circle (527) on Reply Card

Weather radar accessor
Arvin CATV is offering a system, Tel-Weather TW-2, which accesses and displays NOAA weather radar data. The system can be connected to virtually any of the US National Weather Services' 111 weather radars. The system is independent of the Weather Bureau's Remote Radar transmitters which provide the weather data via an analog signal by phone line.

The TW-2 provides direct access of radar direction, range and intensity information, and converts these data into digital form for transmission over a 1200 baud dedicated communications line to a receiver where it is reassembled into a line-by-line television signal.

Circle (528) on Reply Card
Recording mics
Audio-Technica's AT-816 unidirectional dynamic microphone also is supplied in stereo matched pairs as the AT-816/2. The microphones are said to be ideal for tape recording.
Circle (529) on Reply Card

Audio step generator
Bald Mountain Lab's model 1760 FM audio step generator offers nine precise crystal controlled frequencies which are available instantly.
Frequencies are pushbutton selectable and can be sequentially stepped one time or repeatedly. Output impedance is 600 or 150 Ohms. A precision output attenuator and front panel output jack are featured.
Circle (530) on Reply Card

Spotlight
Berkey Colortron offers a 4.5-inch 500 W ellipsoidal reflector spotlight designed for use in theatrical, photographic and television studio applications. The lens barrel design permits a 50, 40 or 30 degree field of angle to be achieved by the movement of one lens within the lens barrel. The unit accepts 250, 400 and 500 W 120 V mini-can screw base lamps.
Circle (531) on Reply Card

Production camera
The KCP 60 from Bosch Fernseh is a studio and outside broadcast camera utilizing three 3/4-inch pickup tubes and dynamic beam control circuitry, which can handle up to 16 times overload when used with diode gun tubes. The camera includes a weatherproof head with shock resistant optics and an adjustable viewfinder.
Circle (532) on Reply Card

Mobile multiplexer
Buhl Optical is offering a video-cassette tape entitled Ready One! Take One!, which demonstrates their mobile multiplexer filmchain. The system is a filmchain without a dedicated camera which allows switching a video camera with a standard TV zoom lens from filmchain to studio use. The tape also shows how the unit interfaces audiovisual and video operations.
Circle (533) on Reply Card

Broadcast cartridge
The Audiopak AA-3 stereo phase broadcast cartridge from Capitol Magnetic Products features a ramp and cone tape guidance which is said to provide optimum geometry for movement of the tape from the center of the spool to the proper operating plane. Capitol's high output, low noise (HOLN) lubricated tape designed for studio mastering is used in the cartridge. The low friction binder on the backcoating and oxide sides reduces wear and extends the life of the tape.
Circle (534) on Reply Card

Camera stabilizer
A second version of the steadicam film/video camera stabilizing system (universal model II) is available from Cinema Products. Several modifications in the unit permit
New products

- Greater maneuverability and safety in operation. A breakaway-style operator's vest features an emergency release cord which allows the operator to get out of the system quickly in an emergency. The raised video monitor is positioned between the camera-mounting platform and the sled-like lower portion, which allows tilting and rotating.

For further information, write to Cinema Products, 2037 Granville Avenue, Los Angeles, CA 90025.

Remote station

The RS-250 remote station by Clear-Com enables camera men, floormen and crew operators to separately and simultaneously monitor two channels of intercom and one program feed on binaural headphones with individual volume controls. Standard features include binaural output, microphone on/off switch, talk channel select and balanced transformer isolated program input.

Remote camera system

The DTMF remote camera control system by Cohn features dual tone multi-frequency encoding and digital techniques to remotely control up to 100 television cameras.

The basic system consists of a transmitter at the control station and a receiver at each camera location. Available options include a
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893AR 6423 7805
1089 6424 8461
5667 6425 8550
5671 6426 8795
5681 6427 23165
5682 6686 23431
5770 6697 23454

Circle (234) on Reply Card

computer interface with remote
control interlock, remote status
feedback and switcher control.
Circle (536) on Reply Card

Transceiver
Model 260 transceiver from Colorado Video allows video teleconferencing over normal, dial-up telephone lines. Three functions are combined in the unit: freezing of a

single frame of video, conversion of the frozen picture to a slow scan television signal for transmission over audio channels, and reception and reconversion of slow scan TV signals to conventional TV standards. Standard features include solid state design, operation in moving environments, remote control, real-time monitoring of A/D operation and gen-lock to other video sources for systems operation.
Circle (537) on Reply Card

Edit code reader
Datametrics SMPTE edit code reader SP-733 features time or user bit operation, eight digit hexadecimal
display/output, range of 1/5 to 40
times recorded speed, and automatic
forward/reverse sensing. Displays include code present indicator, forward direction indicator, drop frame format indicator, time operation indicator, user bit operation
indicator, and display hold indicator.
Circle (538) on Reply Card

Lightning/surge arrester
Delta Lightning Arresters offers a protector which prevents damage to electrical equipment caused by
lightning or surge. The unit presents
a low resistance path to ground, while blocking the power current. When in the conduction mode, the arrester’s internal resistance is comparable to a 1 ft bus of number
four aluminum. When shut off, the
resistance goes to a billion ohms.
Circle (539) on Reply Card

Videodisc recorder/electronic slide
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Circle (175) on Reply Card

Circle (176) on Reply Card

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Circle (178) on Reply Card
New products

access control of 600 electronic slides with full instant replay slow motion. A keyboard control addresses any location within the 600-capacity disc chassis. Once located, a sequence can be played as single steps, animation crawl or at speeds up to full motion, in either direction.

The single images can be displayed as either fields or frames. Sources for slides are live camera, film chain or ENG tapes. The model 16 includes high-band signal system, j-control and digital time base corrector/dropout compensator.

Circle (640) on Reply Card

Omnidirectional mic

Electro-Voice has introduced a shock-mounted omnidirectional microphone, the D056. Primarily intended for hand-held broadcast and sound reinforcement, the main acoustic cavity and the diaphragm/voice coil assembly are isolated as an integral unit from the case. Frequency response extends to 18,000Hz. There is a slight emphasis in the 2000-12,000Hz range, with a slow rolloff below 200Hz to reduce low frequency noise interference.

Circle (641) on Reply Card

Bulk eraser

Fidelipac has introduced a hand-held bulk eraser called Blank-IT. The unit includes a high torque motor capable of erasing magnetic tape of all formats, including audiotape of up to 1-inch, computer tape and both VHS and Beta videocassettes.
Duty cycle for the unit is five minutes on, 15 minutes off (the unit shuts off when its duty cycle has been exceeded).

Circle (642) on Reply Card

User-bit encoder

Gray Engineering Labs' User-Bit Encoder, UBE-118, features the use of multiplexing 320 separate user bits in the SMPTE edit code, every 10 frames. This allows the operator to transmit many more kinds of information, such as calendar date, video machine number, titles, reel number, operator identification, company code, customer code, etc. These data can be encoded in memory and can be transmitted, changed or recalled at will.

The unit is designed to be used with the company's Edit Code Generators DT-104, DT-113, or the User Bit Modifier-Display MD-111.

Circle (543) on Reply Card

Color monitor

Hitachi's CM-182 16-inch color monitor features resolution in excess of 370 lines. Signal-to-noise ratio is more than 46dB, and deflection linearity is less than 2% (within the central zone of diameter equal to picture height).

The NTSC monitor is recommended for broadcast and medical TV applications which demand accurate colorimetry.

Circle (544) on Reply Card

Production switcher

The PAL and PAL-M versions of ISJ's model 902 video production switcher is now available. The unit features two mix effects systems utilizing a shared pattern generator with rotate and module enabling hundreds of possible wipes. Standard features include electronic spotlight, border generator, preset pattern limit, key invert, matte key and joystick positioner.

Circle (545) on Reply Card

Automation preamp

Inovonics has introduced a dual-channel tape playback preamp. The model 377 interfaces with a wide variety of tape heads and transports and is pin-compatible with Ampex and Schafer equipment. The preamp is RFI-proofed and offers balanced outputs capable of 24 dBm. Panel features include multiturn gain and equalization adjustments.

Circle (546) on Reply Card

RGB-to-NTSC encoder

Lenco has introduced an RGB-to-NTSC color encoding system that enables computer graphics or alphanumeric information to be displayed on standard commercial color television monitors.

The CCE-850 is designed to encode high-resolution RGB color graphic computer displays, regardless of scan rate.

The encoder may be used with any computer graphics system when NTSC video is required for videotaping and distribution. An additional feature includes a color reference test pattern to allow for proper NTSC color monitor alignment.

Circle (547) on Reply Card

Circle (642) on Reply Card

Circle (545) on Reply Card

Circle (546) on Reply Card

Circle (547) on Reply Card
New products

TV interval timer
Marconi has introduced the television interval timer model 2920. The timer provides digital readout of 15 different parameters. Changes in measurements can be monitored directly by front panel selection of the particular parameter of interest. All functions may be controlled remotely.

Circle (548) on Reply Card

Audio control center
The "S" system by Micro-Trak is a packaged 6-channel broadcast system, which provides turntables, turntable preamplifiers, interconnecting wiring and the model 6618 6-channel audio control console. The 30"x30" operating desk provides space for desk top equipment such as cart machines as well as accessory space in the pedestal.

Circle (549) on Reply Card

Amplifiers
Modular Audio Products (MAP) has introduced models 7821 and 7822 rack mounting audio distribution amplifiers. Both feature low distortion and noise through the use of MAP audio op-amps in a transformerless bridging input, differential amplifier configuration. Both units also feature self-contained power supplies.

Model 7821 provides eight balanced outputs from one input, while model 7822 provides 16 balanced outputs from two separate inputs. All outputs are 600 ohm at up to +20dBm level per output, with a minimum of 80dB of isolation between outputs, and from output to input. Alternatively, model 7821 can provide 16 unbalanced outputs and model 7822 can provide 32 unbalanced outputs. Inputs can be strapped for a single source feed. The amplifiers are internally protected against short circuit and input overload.

Circle (650) on Reply Card

TV transmitters
NEC offers the PCN-1200 series VHF and the PCU-700 series UHF TV transmitters. The PCN-1200 series transmitters employ IF modulation and feature a minimum of vacuum tubes. Other features include a broad-band matching system allowing full spectrum coverage of Band III (170-230 MHz) without adjustment, integrated circuit technique to minimize the number of electrical and mechanical parts and integrated CIN Diplexer for size reduction and ease of installation and maintenance. The series is available in 1, 2, 5, 10 and 25 kW models.

The PCU-700 series uses all solid-state IF modulator and exciter high-efficiency Klystrons for both visual and aural power amplifiers. Features include 30% reduction in parts by use of IC and other current circuit techniques high-performance non-linear distortion compensation circuit for both DG and DP adopted at IF frequency and new vestigial side-band SAW type filter for steep sideband response. The series is available in 10, 30, 40, 55, 60 and 110 kW models.

Circle (651) on Reply Card

Equalizer accessory
Orban Associates has announced the availability of a transmitter equalizer accessory for their Opti-mod-AM compressor/limiter/equalizer system. The equalizer is designed to compensate for low frequency tilt inherent in many transmitters and also to compensate for transmitter-antenna system overshoot and ringing.

Two separate equalizer sections (remotely switchable) permit independent adjustment of day/night transmitters or day/night power levels. Each section has three controls: one for low-frequency tilt and
two for high-frequency compensa-
tion. When desired, the entire
transmitter equalizer can be
switched out. A front panel jack
permits convenient insertion of
square wave test signals for initial
setup. LEDs indicate the day/night
status of the circuit.

It is available as an accessory kit
for retrofit into existing units and is
being included on all current pro-
duction units.

Circle (552) on Reply Card

24-track recorder

The MTR-80 Mastercorder from
Otari is available in 16 or 24 track
versions or in a 16 track prewired
for 24 tracks. The unit features
symmetrical pinch-roller-free direct
drive, 30 and 15 ips tape speeds,
fulltime servo system for capstan
and reel motors, digital tape timer,
automatic monitor switching and
variable-speed cue control. Auto
locator with full shuttle search-to-
cue capabilities and 10 memory
capacity and a 16/24 track con-
version kit are optional.

Circle (553) on Reply Card

Camera tubes

Philips has announced the 74XQ
series of ½-inch Plumbicon tele-
vision camera tubes for ENG appli-
cations. Resolution for these tubes
is typically 55% at 400 TV lines
(uncorrected for the lens). The
74XQ has a high beam reserve and
when used with dynamic beam con-

The ½-inch camera tube also is
suitable for studio use, such as
continuity, interviews and news
reading, as well as for electronic
field production (EFP).

Special features of the 74XQ
series are the use of a photosensi-
tive layer for increased resolution,
and the use of a diode electron gun
dynamic beam control to mini-
mize comet-tailing and blooming.

Circle (554) on Reply Card

16mm telecine

RCA has introduced a 16mm film
handling system with advanced cap-
babilities for specialized broadcast
and teleproduction telecine applica-
tions. The FR-16 projector system
features an incremental 16mm film
handling system designed for
presenting an illuminated film frame
to a telecine camera. A servo con-
trolled film drive mechanism func-
tions as a film drive station using a
low-inertia dc servomotor with a
large diameter sprocket.

Start, from cine to cine speed (24
or 25 frames per second), occurs in
less than five film frames. Stop
occurs in less than one film frame.
A smooth stop-reverse-start se-
quence, as a special effect, occurs
in less than one-half second.

In the freeze frame (still) mode,
the application of light remains the
same as when the projector is
operating, with no degradation of
the picture.

Circle (555) on Reply Card

Microphone mixer

The model HPM041 microphone
mixer by RTS Systems is designed
for professional applications ranging
from location film and tape to major
recording console input augmenta-
tion.

Input features include four Lo-Z
mic inputs, a 3-position attenuator
switch, a 3-position high pass
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with on/off switch on front panel
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switch for +8dB or +4dB for zero
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New products

headphone amplifier with front panel volume control and headphone jack.
Circle (556) on Reply Card

Monitor
The model MAS-1 monitor amplifier/speaker from Ramko Research is an all purpose utility amplifier with speaker and headphone jack. Standard features include a 200 balanced bridge input, 1 W RMS audio amplifier, 12 position input select switch and level control.
Circle (557) on Reply Card

Wireless microphones
The Schaffer B&T wireless instrument and microphone by the Ken Schoffer Group is said to have the same performance capabilities as its more expensive counterpart, the Schaffer-Vega Diversity System, with one exception: Musicians must allow a few minutes for a sound check to ensure the absence of dead spots by selecting optimum antenna placement. Signal-to-noise ratio of better than 90dB, crystal controlled stability, interference proof performance and no tuning are common to both systems.
Circle (558) on Reply Card

Distribution amplifiers
The Masterline series of UHF/VHF distribution amplifiers designed for small TV signal distribution systems is available from Singer Products. The system is a medium
gain, low noise, broadband amplifier with both VHF and UHF amplifiers.

Lavalier microphone
The ECM-50PS lavalier microphone by Sony is suited to binaural recording because of its compact size, S/N ratio of 66 dB and sensitivity of 56 dB. The mic uses the standard cannon output connector and is equipped with a 2-way power system (battery or studio power supply).

Circle (561) on Reply Card

FM transmitter
Sintronic has introduced the model S1-F-25 FM broadcast transmitter, 27.5kW, designed for long-term performance in the 87.5-108MHz FM broadcast band.

The transmitter is housed in a dual section, single cabinet. The left section consists of the driver and the right section houses a complete RF power amplifier with separate power supply. A combination of meters, illuminated pushbuttons and LEDs provide full visual monitoring of transmitter status and primary operational parameters at a glance. Major control panel and facilities are included in the transmitter for remote control and metering.

The company's S1-10E exciter is the heart of the transmitter. It uses six ICs and four transistors in its front-panel visual monitoring system. Operating status is monitored continuously by five LED indicators which normally are illuminated through electronic sensing circuitry.

Circle (560) on Reply Card

Audio cassette tape
TDK Electronics has developed a metal tape, designated MA-R, which is loaded into a Reference Standard cassette mechanism made of die-cast metal.

The 60-minute metal cassette tape utilizes particles which have greater magnetic energy than oxide particles. Coercivity of the new tape is 1050 oersteds, while remanence has been fixed at 3000 gauss. In a suitably biased cassette deck, an increase of high-frequency maximum output level [MOL] of as much as 7dB can be expected.

The die-cast metal shell is said to be less sensitive to warp than conventional plastic molded shells, and is not subject to deformation caused by changes in ambient temperature or humidity.

Circle (562) on Reply Card

Sportscaster headset
A professional boom-mic headset for live sports broadcasting has been introduced by Telex. Designed for use in moderately noisy conditions, the Sportscaster II is effective for broadcasts from a press box, interview on the side lines, or reporting from the playing field or track.

The headset, model CS-91, features an omnidirectional dynamic microphone and an in-line push-to-talk switch which lets the announcer mute the microphone when needed.

Circle (190) on Reply Card

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needed. The circumaural cushions of the binaural headphone receivers attenuate noise to let the announcer monitor the program in one ear while receiving cues in the other. Extra comfort socks for the ear cushions are included, and a snap-on foam filled headband cushion provides ventilation during prolonged periods of use.

Circle (563) on Reply Card

Spindle height gauge

The Tentel U-omatic Spindle Height gauge (TUSH) is designed for 1/4-inch video recorders. It has two indicators which read in thousandths of an inch, mounted on a 1/4-inch thick aluminum die plate.

The TUSH not only measures the heights of both the supply and take-up spindles, but can measure out of flatness of the four cassette locating pins. The gauge includes a master checking block, instructions and carrying case.

Circle (564) on Reply Card

Videocassette storage

A videocassette storage system designed for 1/4-inch and mini-1/4-inch cassettes has been designed by the magnetic audio/video products division of 3M.

A shipper/storage case, a metal bar that can be cut to any length and mounted on a studio or storage room wall and a portable 6-pack
cart is capable of holding and transporting more than 100 boxed or unboxed videocassettes.

Circle (565) on Reply Card

Digital monitoring
A digital remote control and status monitoring system (model 7815) is available from Time & Frequency Technology. The system features fully duplexed digital data with parity check, control and status functions for 15 channels (expandable to 45). Double scan compare logic for full data integrity, built-in crystal controlled FSK data modems and interconnection adaptability for phone line or radio.

With the Micro-Loc option, the system is dead-lock accurate and offers a numeric display in either SMPTE format or pulse count readout. The editing system incorporates a complete data readout with all editing parameters displayed and continually updated as the editing session progresses. Error messages prompt the operator through each sequence, calling attention to illegal or illogical commands.

Circle (567) on Reply Card

Dummy load
Wilkinson has introduced the DLU 80-800 kW self-contained calorimeter dummy load. Using a closed loop system and film type resistor, the unit permits accurate power measurement up to 80 kW. It features nonmeasurable VSWR, frequency range of dc to 1.8 GHz, easy power readout, and mobility for multiple uses. The unit exceeds FCC specifications.

Circle (568) on Reply Card

Editing system
A single event, frame accurate editing system is available from Videomedia. Mini Z features bidirectional shuttle arms, auto search, cruise control, auto tag and edit—rehearse, perform and review.

Circle (569) on Reply Card

Dubbing console
Winsted Corporation's 990 dubbing console features rugged steel construction and caster-mounted

Circle (197) on Reply Card

September 1979 Broadcast Engineering 171
New products

mobility and will hold all sizes of VTR equipment. Four all-steel VTR drawers and monitor shelves which adjust on 1-inch increments are featured.

Circle (568) on Reply Card

Color generator

The B&K-Precision model 1250 NTSC generator is a cost-effective unit intended for broadcast, CATV and industrial television applications. It generates the standard NTSC bar pattern with a -1WQ signal occupying the lower quarter of the pattern as well as the full-screen color bar pattern. Another feature is the 5-step staircase pattern with selectable chroma levels. Other patterns include dot, crosshatch, center cross and color raster for convergence checks and adjustments.

Circle (570) on Reply Card

Analog TBC

 Consolidated Video Systems has introduced an analog TBC for non-broadcast, heterodyne VTR users. The CVS 506 reduces or eliminates skew, jitter, flagging and other picture distortions. It uses charge coupled device (CCD) circuitry and works with any heterodyne VTR format, including ¾-inch, Beta and VHS.

Standard features of the CVS 506 include a built-in proc amp and automatic color/mono selection.

Circle (571) on Reply Card
Lamps

Custom Audio Electronics has announced the availability of goose-neck lamps for illumination of control panels and work spaces in dimly lit areas.

The lamps come equipped with a bayonet type bulb and 360-degree swivel base. A kit including lamp, base, dimmer, power supply, cable and mounting hardware is offered.

Circle (572) on Reply Card

Microphone system

Edcor has introduced the E-COM 150-210 MHz band wireless microphone system, complimentary to the 30-50 MHz wireless mic systems.

Transmitter includes the E-COM 1 pocket transmitter and the E-COM 2 handheld microphone transmitter. Receiver includes the single channel crystal controlled E-COM 3, the E-COM 5 true diversity receiver for using two antennas and the E-COM 7 mini-receiver.

Circle (573) on Reply Card

Mono/stereo matrix

Eventide's Monostemat model RD770 mono/stereo matrix converts the stereo signal into left-plus-right and left-minus-right, putting the L+R mono signal on one cart track. The second track carries the difference, L - R, signal. Full stereo is restored on playback and dematrixing. Using the dbx noise reduction system, the unit is available in two formats: record/play, which provides encoding and decoding for one cart machine; or play/play, which can handle two cart machines in the play mode.

Circle (574) on Reply Card

Marking beacon

Flash Technology Corporation of America has introduced a flashing white aviation obstruction marking beacon. The FTB-319 ElectroFlash Beacon meets the new FAA night/twilight marking requirements.

Flashinq 40 times per minute, it features self-contained solid state timing and photoelectric controls and has an expected flash tube life exceeding two years. There is a 75 W, AC-powered, flashing light that needs less than 10% of the power consumed by conventional 300 mm incandescent beacons.

Circle (575) on Reply Card

dBs system

The Swintek dBs system, available on Alan Gordon Enterprises'

September 1979 Broadcast Engineering 173
New products

Mark 21-dB S transmitter and Mark 50A-dB S receiver, offers virtual elimination of buzz noises and high-fidelity audio recordings. The signal-to-noise ratio is increased by at least 15 dB. Another advantage is the increased dynamic range utilizing the compander method rather than the compression method.

Circle (576) on Reply Card

Computer terminal

Hazeltine has introduced the 1420 low-cost computer terminal designed for support of small business systems using data and word processing software. The unit features a typewriter-style keyboard and high intensity, blank or non-display modes. A program function key mode as well as column and field tabs are standard.

Circle (577) on Reply Card

Micro mixer

Holland Electronics offers the 401 micro mixer for ENG applications. The mixer is fully-portable and operates from internal rechargeable batteries. Standard features include transformer coupled mic inputs, transformer coupled outputs, built in switchable AGC and built in 1 kHz tone oscillator.

Circle (578) on Reply Card

Automated console

The JH-600, MCI's console, is an in-line audio console with each I/O module containing one complete mic channel and one complete remix channel. On the JH-600 the VCA fader assemblies have been mechanically separated from the rest of the module. It comes in two...
frame sizes, the JH-618 (18 inputs) or JH-636 (36 inputs).
Features for the automated console include differential line inputs and optional differential mic preamps.

Circle (679) on Reply Card

Microwave leak detector
Metretest's hand-held microwave leak detector monitors unsafe radiation levels in microwave equipment which might occur through equipment damage, misuse or wear. A light-emitting diode in the center of the arrow-shaped device glows red when in contact with radiation levels above the prescribed US minimum of 5mW/cm² at a distance of 2 inches.

Circle (679) on Reply Card

THE MEAN LITTLE KIT

New compact 24-piece kit of electronic tools for engineers, scientists, technicians, students, executives. Includes 7 sizes screwdrivers, adjustable wrench, 2 pair pliers, wire stripper, knife, alignment tool, stainless rule, hex-key set, scissors, 2 flexible files, burnisher, miniature soldering iron, solder aid, coil of solder and desoldering braid. Highest quality padded zipper case, 6 x 9 x 1 3/4 inside. Satisfaction guaranteed. Send check, company purchase order or charge Visa, BankAmericard or Mastercharge. We pay the shipping charges.
JTK-6 Tool Kit .......................... $75.00
FREE CATALOG 128 pages of hard-to-find precision tools. Also contains 3 pages of useful "Tool Tips" to aid in tool selection. Send for your free copy today!
JENSEN TOOLS INC.
1290 S. PRIEST DR. TEMPE, AZ 85281

Circle (195) on Reply Card

SINTRONIC
AM & FM TRANSMITTERS

A 27.5 kW Fm transmitter with a solid design, terrific performance, and at a price that makes our cost-performance ratio hard to match. Call or write for all the details.

Sintronic
212 Welsh Pool Road.
Lionville, PA. 19353 (215) 363-0444.

Circle (205) on Reply Card

REPLACEMENT TRANSFORMERS
FOR GATES, COLLINS, RCA, ETC.

GATES PLATE TRANSFORMERS
FM 250 .......................... $175
FM 150 .......................... $100
BC14F .......................... $200
BC14 .......................... $250
BC11 .......................... $300
BC3P .......................... $1050
GATES MODULATION TRANSFORMERS
BCI SERIES .......................... $400
BCS SERIES .......................... $1000
GATES MODULATION REACTORS
BCI SERIES .......................... $400
BCS SERIES .......................... $600
DC FILTER CHOKES
5.0 HY @ 1.0 ADC .......................... $175
5.0 HY @ 2.0 ADC .......................... $225
8.0 HY @ 3.3 ADC .......................... $300
10.0 HY @ 2.0 ADC .......................... $200
MISCELLANEOUS
RCA BTA 11US TRANSFORMER .......................... $400
Vanguard Plate Transformer .......................... $450
Collins 20v2 Plate Transformer .......................... $350
MANY OTHER TRANSFORMERS ALSO AVAILABLE. CALL US FOR FREE QUOTATIONS. LARGE STOCK AND FAST DELIVERY.
24 MONTH GUARANTEE ON ALL ITEMS

Peter W. Dahl Co.
4007 Fort Blvd. • El Paso, Texas 79932
Telephone (915) 566-5005

Circle (208) on Reply Card

Contact sleeve
Neutrik's Halcon contact sleeve is said to provide high-reliability contacts with low contact resistance on a long-term basis. High-quality phos-
New products

Phosphor bronze is formed into a tube with a front guiding sleeve followed by two helical spring-like fingers with contact dimples.

Recording/mixdown console

Neve Electronics International has introduced the 8038 48 track recording and mixdown console which features reverb return inputs and multi-frequency line-up oscillator.

Standard features include 56 input channels, master mic/line changeover facilities, four reverb/echo outputs and muting positional solo facilities on all channels.

Circle (593) on Reply Card

Oscilloscope

A portable 15 MHz oscilloscope offered by Philips Test and Measuring Instruments features an 8x10 cm screen, a choice of display modes and automatic triggering. The PM

ENERGY.
We can't afford to waste it.

EVERY YEAR
MILLIONS OF UNIFIED WAY
VOLUNTEERS WORK
TIME AND A HALF
SO YOU'RE NOT
BOtherED
TIME AND
AGAIN.
3207 provides a separate manual trigger control. Both internal and external triggering are possible with internal trigger sensitivity 0.75 div at 100 kHz.

Circle (584) on Reply Card

Shipping cases
Plastic Reel Corporation is offering the Video Vault series of overlapping construction to keep out dirt and moisture; integral carrying handle and labeling.

Circle (585) on Reply Card

**DC turntable**
The Galaxy by QAK Electronic Products is a dc turntable which features an electronic speed control for plus or minus 10% speed variation on both 33 1/3 and 45 RPM.

The turntable features instant starting without speed loss and back cueing with no motor drag.

Circle (586) on Reply Card

**Coax transmission line**
SWR claims that technological improvements in their coaxial trans-
New products

mission lines result in a 2-fold improvement in heat dissipation for some line sizes. The firm’s Cool “K”

transmission lines use TE copper connectors with a thermal coupling design.

Circle (587) on Reply Card

Signal analyzer

Model WR-515B color bar Signal-
yest from VIZ Test Instruments incorporates solid-state electronics, rugged construction and compact size for bench and field servicing applications.

Circle (590) on Reply Card

VHF HI-BAND WIRELESS MICROPHONE SYSTEM

The HME System 22EF combines the convenience of a field pack portable receiver with a broadcast quality wireless microphone. Special Dynamic Expansion processing increases the dynamic range up to 95 dB.

The transmitter, compatible with any electret or dynamic microphone, is powered by a 9V alkaline battery. The lightweight receiver is powered by either alkaline or NiCad batteries, as or do power, (quality is reversible), and is a perfect mate for your recorder or microphone. PRICE: $1,890.00.

Circle (215) on Reply Card

AUDIO DISTRIBUTION AMPLIFIER PACKAGE

The SA-200 DA is available in two basic packages. Shown is the wiring side of the 12 circuit frame which contains a Dual Regulated Power Supply and rear mounted Terminal Boards for ease of installation. Provides 16 Inputs and 72 Outputs at a cost of $2,495.00. Other products include: Custom Audio Compens, Studio Intercom Systems, Studio Monitor Systems, SCIENTIFIC SYSTEMS, INC. 92 Westwood Dr., Toms River, New Jersey, 08753, (201) 255-2230. Sales Office: 191 West Field Ave., Clark, New Jersey, 07066, (201) 381-1088.

Circle (217) on Reply Card

FILTERS

1,000.00 Standard Types

BANDPASS • BANDBSTOP
Select any frequency from 3Hz to 500MHz such as • CUE TONE 2SHERTZ NOTCH • LOW NOISE 50HERTZ HIGHPASS • STEREO GENERATOR 19KHz LOWPASS 15.75KHz CATV Bandpass, 300 Hz Telephone Simulation Lowpass, 21Hz Bandpass, 18KHz Lowpass, 1kHz notch, 4MHz Lowpass, 7.65MHz Lowpass.

TT Electronics, Inc. 2214 Barry Ave Los Angeles, 90064, (213) 478-8224

Circle (235) on Reply Card

Electronic slides / slow-motion combination

Random access 600 stills, and have slow-motion capability for sports and editing. Combination controller, high-band color. Digital TBC/QC @ $27,000.

EIGEN VIDEO P.O. Box 1027
Grass Valley, CA 95945 916-273-1341

Circle (216) on Reply Card

Tamper-proof 24 hour monitoring system

SoundScriber Model S-124-T keeps a mistake-proof, permanent record of all programming—around the clock, every day of the year. Every broadcast minute of every program is recorded with indisputable accuracy on a time-calibrated tape—invaluable for verification or legal documentation. New Easi-Readable design allows direct rack mounting. The unit uses tape 2" in width, perfect for discarded videotape. Contact factory for direct pricing. SoundScriber, 85 Willow Street, New Haven, Conn. 06511.

Circle (218) on Reply Card

WE'RE FIGHTING FOR YOUR LIFE

Have Your Blood Pressure Checked

The American Heart Association

Circle (209) on Reply Card

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WHEN YOU THINK OF THE LEGENDARY AMPEX VR-12000'S AND VR-20000'S THINK OF AFA...

We're keeping the legend alive!

AMPEX VR-2000's and VR-12000's are the stuff legends are made of... they're the best. So if you can't afford a new VTR... consider owning a "pre-owned" legendary AMPEX VTR instead.

Our customers, including TV Stations, Manufacturers, Institutions, TV and Film Production Facilities have purchased $8 million in AMPEX VR-2000's, VR-12000's, AVR-1's, HS-200's and paid only half that price. They know they're still getting the best in VTR's.

AFA VTR's are fully rebuilt and good as new... even better! These "legends" are in a class of their own... and at prices that are becoming legendary in their own rights.

And when the New AMPEX VTR's become legend... AFA will be there to keep them "alive" too.

Who knows... some day someone will have to keep our legend alive.

AFA... the largest rebuilders of the best VTR's in the world.

A.F. ASSOCIATES, INC.
100 Stonehurst Court, Northvale, NJ 07647
2465 E. Bayshore, Suite 301, Palo Alto, CA 94303

201-767-1000
415-856-1060
• Product directory section begins on page 182.
• Manufacturers' addresses section begins on page 228.
• Dealer/distributor section begins on page 242.
• Edges of each section are color coded so that they can be found easily.

Since our first edition of the Buyers' Guide 11 years ago, the broadcasting industry has grown tremendously in complexity of equipment and completeness of broadcast services. Just as the industry has responded to the use of new technologies—most notably the microprocessor in all phases of automation—the Buyers' Guide has responded by providing the most complete directory possible for engineers, managers, and purchasing agents requiring broadcasting equipment or services. Reflecting the current healthy state of our industry, this year's Buyers' Guide has nearly 800 product categories, lists more than 700 manufacturers, and contains more than 200 advertisers. It's the result of a dedicated staff effort to make it our finest tool for purchasing the industry's hardware, software and services.

Each year, Broadcast Engineering mails extensive questionnaire forms to suppliers around the world. They are asked to identify, by special code number, every product they currently market. In the process, scores of new products and companies are added, while lines that have been phased out—and firms that have left the field—are deleted. Once amassed and assembled, these new data are processed through a unique computer operation, programmed to "read" the code numbers and assign company names and Red Listings to appropriate product headings.

Advertisers in this issue are listed in red under each appropriate product heading. These Red Listings include the ad page location to serve as a direct reference to the product information you are seeking.

Broadcast Product Dealer/Distributors are listed separately in the section beginning on page 242, followed by the states they serve and the products/services they provide. If they are advertisers, their ad appears either on the page of their listing or on the facing page. A full explanation of this section appears on page 242.

Broadcast Product Manufacturers' Addresses begins on page 228. There, you will find a complete, alphabetized index of mailing addresses for all of the companies listed in the Product Directory. Additional information appears under the index listing for advertisers in this issue: the name and telephone number of the home office sales manager, followed by, in many cases, a roster of regional sales contacts for that firm.

Reader Service Cards are bound into this edition for your convenience. Each card is valid for a full year. By circling the appropriate numbers on the card, you can secure additional information directly from the advertiser through August 1980.
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  - Dermak Communications Industries, Inc.
  - The Finney Co.
  - Harris Corp. Broadcast Products Div. LPB Inc.
- McMartin industries, Inc.
- Microwave Power Devices, Inc.
- Moseley Associates, Inc.
- PMG Electronics Laboratory, Inc.
- Singer Products Co., Inc.
- Verter Count Engineering
- Wilkinson Electronics, Inc.

**Amplifiers, Headphone**
- Edcor

**Amplifiers, Keying**
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- Broadcast Video Systems, Ltd.
- Central Dynamics Corp.
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- Roger Mayer Electronics, Inc.
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- Dyma Engineering, Inc.
- The Finney Co.
- Harris Corp. Broadcast Products Div.
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- International Nuclear Corp.
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- Marti Electronics
- Roger Mayer Electronics, Inc.
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- Merit Cable Equipment Corp.
- Micro-T-Track Corp.
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- Monroe Electronics, Inc.
- Omp Labs, Inc.
- Pacific Recorders and Engg. Corp.
- Protex Audio Corp.
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- Quad-Eight Electronics
- RGH Corporation
- Ramko Research Inc.
- Richmond Sound Design, Ltd.
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- Cezar International
- Crosspoint Latch Corp.
- Dyma Engineering, Inc.
- Ender Electronics, Inc.
- Harris Corp. Broadcast Products Div.

**Holland Electronics**
- Industrial Sciences, Inc. (ISI)

**Integrated Solid State Systems Inc.**
- GLI Brand

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- Panasonic Company
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- QSC Audio Products

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- ROH Corporation

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Maury Microwave Corp.
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Moseley Associates, Inc.
PWH Electronics
Potomac Instruments, Inc.
QEI Corp.
Sharepoint Systems Inc.

Delta Electronics Inc.

Automation, Data Processing

Automation Electronics, Inc.
Autotron Systems, Div.
Bic Computers
Boston Sound & Power Systems
Central Dynamics Corp.
Columbine Systems, Inc.
Computer Business Systems, Inc.
Computer Management Systems, Inc.
Cov Data Services Suite 100/Prado North
Groton Computer Inc.
Doubletek Corp.
Kaman Sciences Corp.
Marconi Communication Systems Ltd.
Moseley Associates, Inc.
PWH Electronics
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Automated Broadcast Controls
The BXT Corp.
Boston Sound & Power Systems
Broadcast Electronics, Inc.
DYMA Engineering, Inc.
Harris Corp. Broadcast Products Div.
Lyon Metal Products, Inc.
Micro-Track Corp.
Wallace & Associates Inc.
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Ampli Engineering Co.
Amplifier Cases, Inc.
Automated Broadcast Controls
Bally Engineering Ltd. Member of AEG-Telefunken Group
Broadcast Electronics, Inc.
Used Industries, Inc.
Cases Inc.
Cinetber Broadcast Group
DYMA Engineering, Inc.
Emoor Products D/F Business Equipment, Inc.
Enclosure Corp.
Equipo Storage Systems
Harris Corp. Broadcast Products Div.
Javelin Electronics
Labo Telemedica Inc.
MacKenzie Laboratories, Inc.
McCurdy Radio Ind. Inc.
Micro-Track Corp.
Nordau, Inc.
Paso Sound Products Inc.
Plastic Reel Corp. of America
Quad-Eight Electronics
Research Technology, Inc.
Rustiang Corp.
Scientific-Atlantic, Inc.
Shintron Co. Inc.
Stanton Div. Wyo Metal Products
Storeel Corp.
Tektronix Inc.
Vector Electronic Co., Inc.
Winsted Corp.

Cabinets, Equipment, Custom
Advance Products Co.
Amplifier Cases, Inc.
Audicon, Inc.
Bretford Mfg. Co.
C. S. P. Inc.
Centro Corp.
DYMA Engineering, Inc.
Emoor Products GP Business Equipment, Inc.
Kreonite, Inc.
Leedgal, Inc.
Micro-Track Corp.
Parsons Mfg. Corp.
Rusia Corp.
Sound Dynamics, Inc.

Cable, Camera
Belden Corp.
Bosch-Fernseng Corp.
Boston Insulated Wire & Cable Co. Brand-Rex Div.
Comprehensive Video Supply Corp.
GBP Closed Circuit TV Corp.
Harris Corp. Broadcast Products Div.
Ikegami Electronics (USA) Inc.
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AVA Electronics
Aldorf Mfg. Co.
Andrew Corp.
Audicon, Inc.
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Boston Insulated Wire & Cable Co.
Brand-Rex Co.
C.C.A. Electronics Corp.
C.C.S. Hattel Communications Products
COMPAC
C. S. P. Inc.
Cablevision Systems Inc.
Cinetber Broadcast Group
CommScope Co.
Comprehensive Video Supply Corp.
EMT Franz & Wienert
The Finney Co.
GBP Closed Circuit TV Corp.
G E Electronics Div. Wallace Murray
Gabriel Electronics, Inc.
General Cable Corp.
Javelin Electronics
Marshall Electronics
Maury Microwave Corp.
Media Concepts, Inc.
Micro Communications, Inc.
Micro Control Associates, Inc.
Nagra Magnetic Recorders, Inc.
Neutrik, Inc.
Philips Dodge Communications Co.
Prodelin Inc.
S.W.R. Inc.
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Rank Precision Industries, Inc. (N.Y.)
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Times Wire and Cable

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Ditch Witch Div. of Charles Machine Works Inc.
Roll-A-Reel
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Bird Electronic Corp.
Commercial Radio Monitoring Co., Inc.
National Electro Lab.
Photo Research Div. of Kolmorgen Corp.
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Gruber Products, Ltd.
Harris Corp. Broadcast Products Div.
Javelin Electronics
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Gruber Products Co.
Harris Corp. Broadcast Products Div.
Innovative Television Equipment, Inc.
Javelin Electronics
K & H Products, Ltd.
Lee-Ray Industries, Inc.
Miller Professional Equipment, Inc.
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Harris Corp. Broadcast Products Div.
Ikegami Electronics (USA) Inc.
Innovative Television Equipment, Inc.
Javelin Electronics
Miller Professional Equipment, Inc.
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Quick-Set Inc.
Shigekawa Div. Of Spectrum Video
Tel-Cine Inc.
Telemation, A Div. of Bell & Howell
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Marconi Communication Systems Ltd.
Philips Broadcast Equip Corp.
RCA Broadcast Systems
Sharp Electronics Corp.
Telemation, A Div. of Bell & Howell

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Optics Div.
Cinema Products Corp.
Eastman Kodak Co.
Frezzolini Electronics, Inc.
Alan Gordon Enterprises Inc.
Harris Corp. Broadcast Products Div.
Super 8 Sound, Inc.

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Shure Brothers Inc.
Sono-Mag Corp.
Stanton Magnetics Inc.
Telex Communications, Inc.
UMC Electronics Co. Broadcast Products Div.

Cartridges, Videotape

Ampex Corp.
Audio Ltd.
Cinema Products Corp.
Fuji Photo Film USA, Inc., Magnetic Tape Div.
Maxell Corp. of America
Memorex Corp. Professional Products Group
Panasonic Co. Video Systems Div.
RCA Broadcast Systems
Rocertec Inc.
Sony Corp. of America

Cases, Film and Tape, Carrying and Shipping

Amaray Intl. Corp.
Anvil Cases, Inc.
Cases Inc.
Lowenthal Mfg.
Maxell Corp. of America
Neumann Products Corp.
Parsons Mfg. Corp.
Plastic Rigid Corp. of America
Reliance Plastics & Packaging Div.
Research Technology, Inc.
Schneissler Case Co., Inc.
Star Case Mfg. Co., Inc.
Thermodyne International LTD
Univex International
Vulcan Binder & Cover
WID Video

Cases, Video Equipment Transit

Anvil Cases, Inc.
Casco, Inc.
Comprehensive Video Supply Corp.
Kuhlemeyer-Rent, Inc., Fiberbuilt Photo Products
Multiplier Industries Corp.
Panasonic Co. Video Systems Div.
Parsons Mfg. Co.
Reliance Plastics & Packaging Div.
Star Case Mfg. Co., Inc.
Thermodyne International LTD

Cassette Duplication Machines

Audio Ltd.
International Audio, Inc.
Ray Jacobs Audio, Inc.
Magnatek, Inc.
Panasonic Company
Pentagon Industries, Inc.
Simpson Products Co., Inc.
Sony Corp. of America
Telex Systems Corp.
Telex Communications, Inc.

Cassette Machines, Dual Deck

Automation Techniques, Inc.
Celtec Audio
Edco Products, Inc.
Telex Systems Corp.

Cassette Machines, Multiple Deck

Automation Techniques, Inc.
Edco Products, Inc.

Telectro Systems Corp.

Cassette Machines, Random Access

Amlion Corp.
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Harris Corp. Broadcast Products Div.
Interland Corp.
Teletrolator Div.
International Communications & Control Corp.
Kalftronics
Knox Video Products
Laird Telemedia Inc.
MBP Technologies Inc.
MSI Televison
Motorola Semiconductor Products Inc.
Panasonic Company
Portec Inc.
QSI Systems, Inc.
S ITT Matrix Instruments Div.
Shinton Co.
System Concepts Inc.
Tektronix Inc.
Tele Commun, A Div. of Bell & Howell
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MSI Televison
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NEC America, Inc., Broadcast Equip.
Power Optics Inc.

Chroma Key-Decoder

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Central Dynamics Corp.
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Grass Valley, Inc.
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Sieg Electronics
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RCA Broadcast Systems
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Telemet A Geoteil Co.
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3M Co.
Micronav Corp.

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G C Electronics Div. Wallace Murray
Memorex Corp. Professional Products Group
Miller-Stephenson Chemical Co., Inc.
Nortronics Co., Inc.
Rondo Video Systems Div.
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Singer Products Co., Inc.
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Teleco Systems Corp.
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Automated Broadcast Controls Beaveronics, Inc.
Boston Sound & Power Systems
Broadcast Aids, Inc.
Broadcast Electronics, Inc.
Celtic Broadcast Group
Channelmatic, Inc.
Datametrics Inc.
Datatrons, Inc.
EECO Inc.
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Harris Corp. Broadcast Products Div.
Health Co.
Kalftronics
Leitch Video Ltd.
Logilek Electronic Systems, Inc.
Motorola Semiconductor Products Inc.
OPCODA
P/Wi Electronics
Pacific Recorders and Engrg. Corp.
QRK Electronic Products
QSI Systems, Inc.
Ramko Research Inc.
Sealer Products Co., Inc.
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Leitch Video Ltd.
Nationwide Electronic Systems, Inc.
P/Wi Electronics
QSI Systems, Inc.
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Cetac Broadcast Group  
Channelmatic, Inc.  
IGM Div. of Northwestern Tech.  
Kaitronics Corp.

Converters, A/D and D/A  
Computer Labs Div. of Analog Devices, Inc.  
Digital Video Systems  
Micro Consultants  
Motorola Semiconductor Products Inc.  
Tektronix Inc.

Converters, Frequency  
AILTECH Div. - Cutler-Hammer Los Angeles Operation  
California Instruments  
California Microwave  
Celeb Div. United Scientific Corp.  
The Finney Co.  
Marconi Electronics Inc. Broadcast & Communication Div.  
Motorola Semiconductor Products Inc.  
Mo-Del Electronics, Inc.  
North Hills Electronics, Inc.  
Oak Industries, Inc.  
Phillips Test & Measuring Instruments, Inc.  
RNG Electronics Laboratory, Inc.  
Telecom A G Coontz, Inc.  
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ESE  
Logitek Electronic Systems, Inc.

Audio, Ltd.  
Broadcast Aids, Inc.  
Broadcast Electronics, Inc.  
Data Precision Corp.  
EIP Microwave  
ESE  
John Fluke Mfg., Co. Inc.  
Glentronix Ltd.  
Gotham Audio Corp.  
Harris Corp. Broadcast Products Div.  
Katronics Corp.  
Laird Telemedia Inc.  
Logitek Electronic Systems, Inc.  
Motorola Semiconductor Products Inc.  
Nationwide Electronic Systems, Inc.  
PWH Electronics  
Pacific Recorders and Engrg. Corp.  
Phillips Test & Measuring Instruments, Inc.  
QRK Electronic Products  
QSI Systems, Inc.  
Ramko Research Inc.  
Sharepoint Systems Inc.  
Systrom-Doner  
Tektronix Inc.  
Track Audio, Inc. (TA)  
United Systems Corp.  
Vanco Engineering

Counters, Frequency  
B & K Precision Dynascan Corp.  
Continental Specialties Corp.  
Data Precision Corp.  
EIP Microwave  
Eicom Engineering Co.  
John Fluke Mfg., Co. Inc.  
Harris Corp. Broadcast Products Div.  
Health Co.  
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Phillips Test & Measuring Instruments, Inc.  
Scientific-Atlanta, Inc.  
Sencore Inc.  
Solar Electronics  
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Barry Engineering Ltd. Member of AEG-Telefunken Group  
De Blyton Enterprises  
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PWH Electronics  
Protect Audio Corp.  
Quad Eight Electronics  
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Bayly Engineering Ltd. Member of AEG-Telefunken Group  
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<td><strong>CMX Systems &amp; Videomax Div's. of Orrox Corp.</strong></td>
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<td><strong>Datamatics Inc.</strong></td>
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<td><strong>Datatron, Inc.</strong></td>
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<td><strong>Dynacines Div. Whittaker Corp.</strong></td>
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<td><strong>ECCO Inc.</strong></td>
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<td><strong>EEC Inc.</strong></td>
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<td><strong>E.M.S. Inc.</strong></td>
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<td><strong>Electro &amp; Optical Systems Ltd.</strong></td>
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<td><strong>Kee平衡 Int'l.</strong></td>
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<td><strong>Motorola Semiconductor Products Inc.</strong></td>
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Shively Laboratories, Inc.
TT Electronics, Inc.
Tektronix Inc.
Teletc Co.
Television Equipment Associates
Texscan Corp.
Varian Associates, Inc.; Elecrzde Device Group
Varian/Beverly Micro-Link Products
Wide Band Engineering Co., Inc.

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Audio & Design Recording Inc.
Automated Processes, Inc.
Kappa Networks, Inc.
Roger Mayer Electronics, Inc.
Rupen Neve, Inc.
Orange County Electronics Inc.
Panasonic Company
Pulse Techniques Inc.
Quad-Eight Electronics
Richmond Sound Design Ltd.
Spectrum Instruments, Inc.
TT Electronics, Inc.
URSA Major, Inc.

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Amber Electro Design, Ltd.
Andersen Labs, Inc.; Advanced Systems Div.
Audio, Ltd.
Audio & Design Recording Inc.
Automated Processes, Inc.
Calex Industries Ltd.
The Finney Co.
Frequency Devices Inc.
Gotham Audio Corp.
Kappa Networks, Inc.
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Multronics, Inc.
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Orange County Electronics Inc.
Panasonic Company
Pulse Techniques Inc.
Quad-Eight Electronics
Salus Systems, Inc.
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Allen Avionics
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Datatek Corp.
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Arvin/Echo Science Corp.
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Saki Magnetics, Inc.

Saki Magnetics, Inc.

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Saki Magnetics, Inc.

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B & K Precision Dynasonics Corp.
Ballantine Labs, Inc.
California Instruments
Gold Inc. Instruments Div.
Harris Corp.
Leader Instruments Corp.
Lencos Electronics Div.
Philips Test & Measuring Instruments, Inc.
Tektronix Inc.

Oscilloscopes, Triggered Sweep

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Ballantine Labs, Inc.
Gold Inc. Instruments Div.
Harris Corp.
Leader Instruments Corp.
Lencos Electronics Div.
Philips Test & Measuring Instruments, Inc.
Tektronix Inc.
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Singer Products Co., Inc.
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Sontec Electronics
Spectra Sonics
Sphere Electronics
Stanton Magnetics Inc.
Studer Revox America
Superex Electronics Corp.
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Roger Mayer Electronics, Inc.
Modular Audio Products Unit of
Multiviewer Devices Inc.
Orange County Electronics Int'l., Inc.
Protech Audio Corp.
Quad Eight Electronics
Ramko Research Inc.
Richmond Sound Design, Ltd.
Sescom, Inc.
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Edcor
Gregg Laboratories
Harris Corp. Broadcast Products Div.
Holland Electronics
ITI Electronics, Inc.
International Communications & Control Corp.
Logitek Electronic Systems, Inc.
Roger Mayer Electronics, Inc.
Micro-Trak Corp.
Modular Audio Products Unit of
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Nagra Magnetic Recorders, Inc.
Oplab Labs, Inc.
Protech Audio Corp.
QRK Electronic Products
Quad Eight Electronics
RDI Corporation
RTS Systems, Inc.
Ramko Research Inc.
Richmond Sound Design, Ltd.
Sescom Electronics
Sonotec Electronics
Spectra Sonics
Stanton Magnetics Inc.
Track Audio, Inc. (TA)
United Recording Electronics Industries
Wilkinson Electronics, Inc.

Preampifiers, Video

Blender-Tongue Labs.
Gardiner Communications Corp.

Preampifiers, Microwave

Antek, Inc.

Preampifiers, Stereo

Audio Interface, Inc.
Automated Processes, Inc.
Cetec Broadcast Group
DYMA Engineering, Inc.
Eumig USA, Inc.
Harris Corp. Broadcast Products Div.
Integrated Solid Systems Inc. GLI
International Communications & Control Corp.
Logitek Electronic Systems, Inc. Micro-Trak Corp.
Modular Audio Products Unit of
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Panasonic Company
Protech Audio Corp.
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Gardiner Communications Corp.

International Nuclear Corp.
Kaitronics Corp.
Lenco Inc. Electronics Div.
Radiation Devices Co., Inc.

Pressurization Equipment, Transmission Line

Andrew Corp.
CCA Electronics Corp.
Cablewave Systems Inc.
Cetec Broadcast Group
Diellectric Communications A Unit of
General Signal
General Cable Corp.
Harris Corp. Broadcast Products Div.
Micro Communications, Inc.

Probes, Oscilloscope

B & K Precision Dynacomp Corp.
Health Co.
Leader Instruments Corp.
Lectrotech Inc.
Philips Test & Measuring Instruments, Inc.
SCHMITT Metric Instruments Div.
Tektronix Inc.

Processors, Electronic Still

ADDA Corp.
Echo Science Corp.

Processors, Film Color

Allen Products Co.
Houston Fearless 76
Houston Photo Products Inc.
Jenimes Production, Inc.
Kodak, Inc.
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Laired Telemedia Inc.
Optical Radiation Corp.
Radmar, Inc.
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Scott Corp. of America
3M Co. Magnetic Audio/Video Prod.

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Fort Worth Tower Co., Inc.
Sutla Seikakusho Co., Ltd.
Uniclo-Rohn Div. of Uniclo Ind., Inc.
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Regulators, Voltage
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California Instruments
Harris Corp. Broadcast Products Div.
Hitron Corp.
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IGM Div. of Northwestern Tech.
Monroe Electronics Inc.
TM Systems, Inc.

Set-up Trucks

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Street Corp.

Cinema Products Corp.
Harris Corp. Broadcast Products Div.
Street Corp.

Winsted Corp.

Shifters, Phase Microwave
Comark Industries Inc.
Dielectric Communications A Unit of General Signal
Maury Microwave Corp.
Micro Communications, Inc.
The Narda Microwave Corporation
Singer Products Co., Inc.
Systron-Donner

Slide Storage Systems
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Cetec Audio
DYMA Engineering, Inc.
Eventide Clock Works Inc.
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Orange County Electronics Int’l., Inc.
Richardson Sound Design, Ltd.
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Singer Products Co., Inc.
Varian Instruments Inc.

Sound Systems, Automatic Level Control
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ITT Jennings
Javelin Electronics
Magnachip Electric Co.
Marshall Electronics
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SII Inc.
Sisyphus-Donner
Texascan

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Wide Band Engineering Co., Inc.

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Cherry Electrical Products
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Electro & Optical Systems Ltd.

Electro-Voice, Inc.

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B & K Precision Dynacorp
Bellantine Labs. Inc.
Baylor Engineering Ltd. Member of AEG-Telefunken Group
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California Instruments
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ADDA Corp., 1671 Dell Ave., Campbell, Calif. 95008
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A. F. Associates, Inc., 100 Stonestreet Court, Northvale, N. J. 07647
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AK Acoustics Div., Philips Audio Video Systems, 91 McKee Dr., Marl-

nwh, NJ 07430
AMP Special Industries, Valley Forge, PA 19482
ATV Research, 13th and Broadway, Da- kota City, Neb. 68731
AV Electronic, 4000 Bridge St., Drexel Hill, PA 19026
AVAB America Inc., 1714 Stockton St, San Francisco, CA 94133
Acrodyne Industries Inc., 21 Commerce Drive, Montgomeryville, PA, 18936
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Al Leon (212) 265-1760
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Advant Products Co., Box 2178, Worthington, KS 67561
Agfa-Gevaert Inc., 275 N. Street, Teterboro, N.J. 07608
Alklemann Inc., 214 Harris- ton St., Tipton, Cal. 93262
Kenneth Aitken, Pres. (805) 765-5430

Alco Electronic Products Inc., 1551 Osage St., North Andover, Mass. 01845
Alexander Mfg. Co., Box 1645, Mosaic City., Iowa 50401
Richard Alexander (515) 423-6955

Alford Mfg. Co., 15 Sixth Rd., Woburn, Mass. 01801
Alvin Allan, 224 E. 2nd St., Mineola, N. Y. 11501
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Alumna Tower Co., 1639 Old Dixie Hwy., Box 2096, Veri Beach, FL 32960

Amanay Int’l Corp., 1901 Old Middle- field Way #11, Mountain View, CA 94033
Amber Electro Design, Ltd., 4810 Jean Talon West, Montreal, Que., Canada H4P 2K6
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Scientific Contact, Inc., 800 Black Hawk, SD 57718
Andrew Corp., 10500 W. 153rd St., Orland Park, Ill. 60481
Angenieux Div. of Angenic, America, 1500 Ocear Ave., Bohemia, N. Y. 11716
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R. B. Annis, Co., 1101 N. Delaware St., Indianapolis, Ind. 46202
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Applied Video Electronics Inc., Box 26, Brunswick, Ohio 44212
Aqua-Tronics, Inc., 1700 Southwest Shaw, Beaverton, OR 97005
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Arnet Div., Western Broadcasting, Ltd., 505 Burrard St., Vancouver, B.C., Canada V7X 1M6
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Seach Equipment, 16 York Rd. Maidenhead, Berkshire S2J 1TF
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Ar Inco, 470 S. Fifth St., St. Paul, Minn. 55101

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T. Shigekizaki (312) 298-4360

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Broadcast Product Dealer/Distributors

For your added convenience, Broadcast Engineering has designed this NEW Broadcast Product Dealer/Distributors section to provide close-to-home purchasing assistance. Use it, in conjunction with other sections in the 1979 Buyers’ Guide, to plan new facilities, and equipment expansion or upgrading. For broadcast product dealer/distributors, this directory identifies: address and telephone, products handled and territory served.

Listings are arranged alphabetically by location. Firms listed do not include all dealer/distributors serving an area, but only those who returned BE’s listing form.

Both a typical dealer/distributor listing, and the geographical area and product classification code keys are included on this page to assist you. We think you will find this new section, in addition to the updated Product Directory and Broadcast Product Manufacturers’ Addresses section, makes this issue the most useful and comprehensive purchasing aid for the broadcast industry.

Typical listing

1. Jones Broadcast Sales, 2912 W. 10 St.,

2. Kansas City, Mo. 64105

(816-842-1234)

3. IA, KS, MO, OK, 1, 2, 5, 7, 9

(1) firm name, street address
(2) city, state, zip code, telephone
(3) geographical area served and products handled (see code keys)

This firm covers Iowa, Kansas, Missouri and Oklahoma, and sells audio equipment, video equipment, tape, film equipment, and service and repair.

Key to geographical area code

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(Abbreviations for Canadian provinces)

ALTA Alberta
BC British Columbia
MAN Manitoba
NB New Brunswick
NF Newfoundland
NS Nova Scotia
ONT Ontario
PEI Prince Edward Island
QUE Quebec
SASK Saskatchewan
YUK Yukon Territory

Key to product numerical code

1 AUDIO EQUIPMENT (including recorders, microphones, mixers, consoles, cart machines, turntables, processing devices, etc.)

2 VIDEO EQUIPMENT (including cameras, videotape recorders, production switchers, monitors, lights, etc.)

3 TEST AND MEASUREMENT EQUIPMENT (audio and video)

4 TRANSMITTERS, ANTENNAS AND TRANSMISSION SYSTEMS (including towers, ATS, STL, MDS, etc.)

5 TAPE (including video and audio recording tape, etc.)

6 VACUUM TUBES (including video camera, transmitter, TWI, etc.)

7 FILM EQUIPMENT (including cine cameras, processing equipment, film projectors, etc.)

8 VANS AND ACCESSORIES

9 SERVICE AND REPAIR

10 SYSTEM DESIGN (including studio installation, etc.)

11 USED EQUIPMENT (including leasing, rent, etc.)
NEW JERSEY

Landy Associates, 1890 E. Marlton Pike, Cherry Hill, NJ 08003 (609) 424-4660 CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT, 1, 2, 3, 5, 7, 10, 11

Tele-Measurements Inc., 145 Main Ave., Clifton, NJ 07014 (201) 473-2822; 212-581-9020 CT, DE, MD, NJ, NY, PA 1, 2, 3, 4, 8, 9, 10, 11

Auscom Associates, 30-16 Broadway, Rte. 4, Fairlawn, NJ 07472 (201-796-0600) CT, NJ, NY, PA 1, 2, 3, 5, 6, 9, 10, 11

Thor Electronics Corp., 321 Pennsylvania Ave., Linden, NJ 07036 (201-486-3300) Worldwide 6

Cinectra Int'l Inc., Export Agents, 22 Caesar Place, Moonachie, NJ 07074 (201-939-0876) Worldwide 1, 7, 9, 11

Dimension 3 Recording Co., Box 326, New Milford, NJ 07646 (201-265-5599) USA and Canada 5

Comprehensive Video Supply Corp., 148 Veterans Dr., Northvale, NJ 07647 (800-526-0242; NJ only 201-767-7990) Worldwide 1, 2, 3, 5, 7, 9

L&M Associates, 511 Victor St., Saddle Brook, NJ 07662 (201-843-8700) CT, NJ, NY, PA 3

H. M. Holzberg Associates, Inc., Box 322, Totowa, NJ 07511 (201-256-0455) CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT 1, 2, 3, 4, 5, 7, 8, 10

See advertisement on this page

NEW MEXICO

DYMA Engineering, Inc., Box 1697, Taos, NM 87571 (505-758-2686 or 8686) AZ, CA, CO, KS, NV, NM, OK, TX, UT 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

Bovillco Studio Inc., Melody Pines Farm, Morris, NJ 07960 U.S.A.; in Canada: BC, MAN, MB, NS, ONT, PEI, QLE, SASK 1, 5, 8, 11


Adcom Communications Inc., 555 West 57th St., New York, NY 10019 CT, NJ, NY 1, 2, 9, 10, 11

Adwar Video Corp., 100 Fifth Ave., New York, NY 10011 (212-691-0976) Worldwide 1, 2, 3, 5, 6, 9, 10, 11

Barbizon Electric Co., Inc., 426 West 55th St., New York, NY 10019 (212-586-1620) AL, CT, DE, DC, FL, GA, IL, IN, KY, ME, MD, MA, MI, MS, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VT, WA, WV, WI 2


The Camera Mart, Inc., 456 West 55th St., New York, NY 10019 (212-757-6977) CT, ME, MA, MI, NH, NJ, NY, OH, PA, VT 2, 7

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The Ken Schaffer Group, Inc., 10 East 49th St., New York, NY 10017 (212-371-2335) Worldwide 1, 3

E. Smalling III, Consulting Engineer, 1675 York Ave., New York, NY 10029 (212-722-2478) U.S.A. 10

Sonocraft Corp., 29 West 36th St., New York, NY 10018 (212-769-9300) NJ, NY 1, 2, 5, 7, 9, 10

Studio Film & Tape Inc., 630 9th Ave., New York, NY 10036 (212-977-9330) U.S.A. and Canada 3, 5

Tape City, Inc. 404 Park Ave. S., New York, NY 10016 (212-675-1606) CT, NJ, NY, Mail Order in U.S.A. 1, 2, 5, 9, 11

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H. M. Holzberg Associates, Inc.
P.O. Box 322, Totowa, N.J. 07511, (201) 256-0455

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You Ask For It—You Will Get It

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1 set of ½-in. plumbicons (new) $1,425.00. RCA TMM-1 microwave transmitter and receiver $500.00 ea.

Write or telex for other models that you need.

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15 Main St., East Rockaway N.Y. 11518 Tel.: (516) 599-6400 (800) 645-2300 Telex 125237

September 1979 Broadcast Engineering 245
R F Gain, Ltd., 100 Merrick Rd., Rockville Centre, NY 11570
(516-536-8868; 800-645-2322) Worldwide 6
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Hammond Industries Inc., 155 Michael Dr., Gyost, NY 11791
(516-364-1900) U.S.A. and Canada 1, 3

MINIERE OFFICE ELECTRONICS, INC., 946 Downing Rd., Valley Stream, NY 11580
(516-925-4703) U.S.A.

NORTH CAROLINA
Technical Video Systems, 245 Executive Park Blvd., Winston-Salem, NC 27103 (919-768-9536) GA, NC, SC, TN, VA, WV 2, 3, 5, 8, 9, 10, 11

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OHIO
Applied Video Electronics, Inc., Box 25, Brewsterick, OH 44212
(216-225-4443) U.S.A. 2, 3

Doug Cook & Associates, 2184 Trem Rd., Columbus, OH 43229
(614-471-4114) OH, W. PA, WV 1, 2, 3, 4, 10

OKLAHOMA
Walter S. Brewer Co., Inc., 5242 S. Zunis Pl., Tulsa, OK 74105
(918-749-9894) Worldwide 2

OREGON
United Radio Supply Inc., Box 1040, Portland, OR 97214 OR, WA 3, 6

Pennsylvania
Communication Media, Tideman at Jefferson Sts., Allentown, PA 18102 (215-437-0607) North America 1, 3, 4, 5, 6, 7, 8, 9, 10, 11
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TENNESSEE
Broadcast Equipment & Supply Co., Box 3141, Bristol, TN 37620
(615-878-2931) U.S.A. 1, 4, 5
See advertisement on page 40

Audio Consultants, Inc., 1200 Beechwood Ave., Nashville, TN 37212
(615-256-6900) AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, MO, NC, SC, TN, TX, VA, WV 1, 3, 5, 9, 10, 11
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Distributors for Sony - Panasonic Video parts and accessories

Sony magnetic tape products — Audio & Video
Sony microphones and accessories
Vidicon - Newvicon and broadcast tubes
Electro Voice - Shure microphones-mixers etc.
Belden cable and connectors

Steinberg Electronics Inc., 2520-22 N. Broad St., Philadelphia, PA 19132, Phone (215) 223-9400

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The Gene Sudduth Co., Inc.
Representatives & Distributors of Professional Electronic Equipment.

845 39th St., S.E.
Paris, TX 75460
(214) 785-5784

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Advertising rates in Classified Section are 50 cents per word, each insertion, and must be accompanied by cash to insure publication.
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ment number, processing of replies, and mailing costs.
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facturers unless used and no longer owned by the manufacturer or a distributor.

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WANTED

WANTED: 5kw or 10kw AM transmitter to use as a standby. Prefer something no older than 1952 years. Call John Gober, WVOK Radio, (205) 785-5111.

WANTED: Pre-1926 radio equipment and tubes. August J. Link, Suncom Associates, 305 Wilson-
son Ave., Oceanside, Ca., 92054, (714) 722-6162.

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tion (In Georgia call 404-324-1271).

WANTED: Base insulation for fit Rohr 25 tower. Chester, Route 1, Box 281, Woodlawn, Tenn.

MICROPHONES needed for historical archive; early RCA and Western Electric models. Jamieson Steele, National Association of Broadcasters, 477 Madison Avenue, New York, NY 10022, (212) 759-7920.

WANTED: Four used cameras TK-45 or TK-76. Those interested send information to: P.O. Box 31568, Bogota, Colombia.

SITUATION WANTED

AUDIO ENGINEER AVAILABLE: Education/Expe-
rience in recording, radio, reinforcement, theatre, music. Write for resume, D. L., 3077
Cuhar Rd., Rochester, N. Y. 14622.

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F.T. Brewer Company, P.O. Box 8897, Oakland, Calif. 94623. Telephone (415) 832-1527.

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VIDICOM TO NEWTIVITON—We'll update your Panasonic WV-2100P to WV-2150 quality with new Newtivitron tubes. LIVE-VIDEO, Parcel B, Suite 3A, Farmington, CT 06085, (203) 673-4611.


EQUIPMENT FOR SALE

USED TK-448 CAMERA

Orb Roberts University has used RCA TK-448 camera for sale. New tubes, Schneider 11X1 TV7 zoom lens, ITE cam head, 100 ft. TV 8 cable, remote control, Houston Fearless P8 pedestal. 40K. Write ORU Director of Engineering, P.O. Box 250, Tulsa, OK 74101 or phone 918-462-5535.

TK-456 W/MINI PACK CCU, Canon 10:1 zoom lens, carrying cases, & all accessories. Low hours. Excellent shape. Ross Bagwell, Sr., Cinetel Productions, 2 Forest Court, Knoxville, TN 37919, (615) 584-2232/584-0171.

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$500.00. 1-206-746-2256.

FOR SALE: ONE RCA FIELD INTENSITY METER, type WX20, frequency 540 to 1650, Cal 1961-233-

2713 or write to P.O. Box 1650, Alhambra, CA 91801.

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September 1979 Broadcast Engineering 249
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FOR SALE: Class C FM with 100,000 watts serving a major southwestern market. $1,000,000.- with 15,000 listeners. 700-760 AM. Box 12901, Overland Park, KS 66212. (913) 299-9871

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HELP WANTED

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TECHNICAL MANAGER (PART-TIME): Television Equipment Test Center at Northern Arizona University needs a part-time Technical Manager to maintain and modify test equipment. Must have experience in television engineering, test equipment maintenance, and technical training. Must have a technical degree and experience in the field. Write to: Phone: (602) 524-8471

PRODUCER/DIRECTOR—Immediate opening for qualified individual with B.A. in Communications, 2 years TV, and 3-5 years of "hands-on" production experience directing production crews. The setting is the KSAV Special Events Centre in Riyadh, the capital of Saudi Arabia. The hospital is a 250-bed referral medical center with over 300 employees from around the world. A 24-month married-status contract, salary and housing allowance, plus housing, utilities, entertainment, etc. Interested, qualified candidates should submit a resume with current salary to: Perishing hospital, PO Box 34, Eugene, OR 97404. Phone: (503) 342-1388

MAINTENANCE ENGINEER—Wanted immediately for prominent public station. Minimum two years television training. 1 year TV broadcasting equipment maintenance experience plus 13 years technical experience. Send resume to: P.O. Box 20, Rochester, NY 14601. Phone: (503) 342-1388

CHIEF ENGINEER: TV/Radio unit of Illinois Information Service. Immediate opening. Requires Associate Degree in Electronics with at least 3 years experience. Two years experience in technical management or associated field required. Excellent benefits. Phone: (312) 339-8500

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TELEVISION BROADCAST ENGINEER—More television station has an opening. Must have FCC class 1 license and technical school education. Must include medical and life insurance plans. Must be ready to work and travel. Send resumes to: Phone: (202) 342-1212

250 Broadcast Engineering September 1979
HELP WANTED (CONT.)

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This career position offers you an opportunity to design custom systems for a variety of GVG customers. The individual will have a solid technical background in television systems with good basic circuit design knowledge.

Field Service Engineer, East Coast
We need an individual to provide after-sales support for our wide variety of complex systems. The position provides travel opportunities within the U.S., plus marketing and engineering career opportunities. An individual with experience designing and/or maintaining television broadcast systems is needed.

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An excellent career opportunity for an individual to assume responsibility for challenging research and development projects. This position requires video project experience plus a BSEE or equivalent.

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Interested and qualified individuals are invited to send a resume in confidence to Val R. Marchus, The Grass Valley Group, Inc., P.O. Box 1114, Grass Valley, California 95945. An Equal Opportunity Employer M/F/H.

The Grass Valley Group
A Tektronix Company

OPERATING TECHNICIAN for Washington, D.C. area production company. Must be familiar with audio pickup and recording techniques and have a good working knowledge of television audio systems. Reply Dept. 465, Broadcast Engineering, P.O. Box 12001, Overland Park, KS 66212.

TV BROADCAST TECHNICIANS. Established public television station moving to new color facility. West Virginia University and WVU-TV has vacancies for persons experienced in master control, operations, production and maintenance including all phases of transmitter and/or microwave transmitting/receiving maintenance. Send resume of qualifications and salary history to: Jack Podeszwa, Personnel Officer, West Virginia University, Morgantown, WV 26506. An Equal Opportunity/Affirmative Action Employer M/F.

HELP WANTED (CONT.)

CHIEF ENGINEER NEEDED FOR NEW 100,000 WATT PUBLIC STATION. Will be responsible for all technical aspects of operation including, maintenance on transmitter, microwave, studio equipment and automation system. Will assure compliance with all F.C.C. requirements. 1st phone, B.A. in electronics and two years full-time experience required. Additional experience may substitute for degree. Experience in remote recording technique involving high quality music performance very helpful. One month vacation. Send resume to David M. Horning, General Manager, KDHQ-FM, 1300 North Plum, Hutchinson, Kansas 67501.

INDUSTRIAL VIDEO ENGINEER: Large Dallas based insurance company with in-house color TV studio, post production facilities, national ¾” video network. In fully equipped multi-media learning center needs chief engineer with 3 to 5 years experience in industrial or broadcasting TV. Must have thorough knowledge of 3-tube color cameras & ¾” editing systems. A be willing to become part of 4/3 & studio production team. Company has excellent benefits including flexible work hours. Send resume with salary requirements to P.O. Box 2899, Dallas, TX 75221, attention: Staffing Director. Equal Opportunity Employer M/F.

HELP WANTED (CONT.)

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American Totalisator Has Exciting Positions In It's Newest OTB Production

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With the scheduled opening rapidly approaching, we are currently seeking the following professionals to staff this new concept in sports centers.

Our current needs are:

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Requirements include experience with broadcast quality professional/video tape recorders. Individual will be responsible for the production of acceptable audio/visual programs and will direct a crew of technicians engaged in video control, audio and related technical state-of-the-art equipment.

AUDIO-VIDEO MAINTENANCE ENGINEERS (2)
Candidate must have experience with the maintenance and calibration of switchers, professional video recorders, monitors and test equipment.

AUDIO-VIDEO OPERATIONS TECHNICIANS (4)
Individual must have experience in operating broadcasting quality videotape recorder and other related equipment.

AUDIO-VIDEO PROJECTION ENGINEERS (3)
Candidate must have experience in operating and maintaining sequential Eidophor projectors.

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Jack Monahan
(301) 666-8700

AMERICAN TOTALISATOR SYSTEMS
GENERAL INSTRUMENT CORPORATION
1126 McCORMICK ROAD • HUNT VALLEY • MD 21031

September 1979 Broadcast Engineering 251
ENGINEERING MANAGEMENT

☆ Network Studio Operations
The Technical Manager is involved in the production of video taped shows from pre-production meetings through final taping. Responsibilities include selecting engineering crews, setting schedules, satisfying the creative needs of the production company, and maintaining control over engineering costs.

☆ Local Station Operations
The Technical Manager is responsible for the operations and maintenance of all equipment in the news technical operations center for the local station.

☆ Audio/Video Systems Engineer
Position involves designing, creating and planning engineering installations for television and associated technical equipment, and facilities for use in network and local production studios, and stations. Requires BSEE or equivalent experience, knowledge of state-of-the-art broadcasting techniques and equipment, plus background in engineering supervision preferred in the position.

If you are interested in any of the above positions, please send resume in confidence to:

Mike Sweet

O.K., who put the used prices on the new equipment?
It's no mistake, here's your chance to buy brand new 3M video gear at prices you may never see again. And each of these superb pieces comes with full manufacturer's warranty.

Production video recorder MODEL 1000, 3/4-in., 8-channel, 1.2TRP/8 LP, $980.00
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MODEL 730
$400.00
RGB image Enhancer
MODEL 610
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MODEL T11
$750.00

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MAINTENANCE SUPERVISOR for large Washington, D.C. area production company. Technical school plus minimum 5 years experience. Must be familiar with all types of studio broadcast equipment. Reply Dept. 464, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

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