1977 Buyers' Guide
Will The NAEB Survive?
Live Via Satellite
We are innovators, designers and craftsmen who have a thorough knowledge of our marketplace and the desire to build the best possible products for it.

We are inspired by perfection, not by compromise.

We are dedicated to the achievement of excellence in quality, performance and dependability.

We are the creators of totally balanced systems designs, in highly flexible configurations.

We are Ward-Beck!
ONE GOOD DEED LEADS TO ANOTHER

Nearly every quad head refurbished at Videomax come from referrals or existing clients. Since 1970, Videomax has been able to satisfy more customer quad requirements than any other firm in the field. Service and dependability are guaranteed components of the Videomax refurbished head assembly. Write or call Videomax for price warranty comparisons.

"Max, they do a super job on Mark XV's!"

"And on every head being made today, Maxine!"

Videomax, An Orrox Company
3303 Scott Boulevard, Santa Clara, CA 95050
Phone: (408) 988-2000 Telex: 910-338-0554

SALES AND SERVICE – New York: (212) 947-8031, Los Angeles: (213) 980-7927, Atlanta: (404) 992-4490
Munich Office: (089) 967-622

For More Details Circle (16) on Reply Card

42 ENG: It Pays To Be Committed. Phil Dean.

56 Profanity Is No Problem For WTIC. Michael Russell.


84 A Systems Concept For Audio Interface. Peter Burk.


166 WTAR-TV/AM Combines Operation For Better News Coverage. Dave Busch.

231 Manufacturers Address Section.

About the cover
Our cover depicts the theme of our largest-ever verified broadcast product directory, which begins on page 107. Graphic design by Mary Christoph.

Departments
Direct Current .................. 4
Industry News .................. 8
Radio Workshop ................ 84
SBE Journal .................... 94
People in the News ............ 178
News Briefs .................... 194
Blue Bananas ................... 202
Technical Data .................. 204
New Products .................... 220
Ad Index ......................... 272
Classified Ads ................... 277

BROADCAST ENGINEERING is published monthly by Intertec Publishing Corp., 9221 Quivira Road, Overland Park, KS 66212. BROADCAST ENGINEERING is edited for corporate management, technicians/engineers, and other station management personnel at Commercial and Educational radio and TV stations, Teleproduction studios, recording studios, CATV and CCTV facilities, and government agencies. Qualified persons also include consulting engineers, dealer/distributors of broadcast equipment.

SUBSCRIPTIONS: BROADCAST ENGINEERING is mailed free to qualified persons in occupation described above. Non-qualified subscriptions in the U.S. are $6.00 per year, $10.00 two years, $13.00 three years. Outside the USA add $1.00 per year for foreign postage. Single copy rate 75 cents. Back issues rate $1.00. Adjustments necessitated by subscription termination at single copy rate.

Allow 2-3 weeks for new subscriptions.

Allow 6-8 weeks delivery for change of address.

Controlled circulation postage paid at Kansas City, Missouri.
NOW AVAILABLE WITH DVE

THE GRASS VALLEY GROUP, INC.
A TETRONIX COMPANY

Station Plaza East
GREAT NECK, NY 11021
(516) 487-1311

4419 Van Nuys Blvd, Ste 307
SHERMAN OAKS, CA 91403
(213) 996-6172

1644 Tullie Cir, NE
ATLANTA, GA 30329
(404) 321-4318

P.O. Box 482
MABANK, TX 75147
(214) 887-1181

810 W Bristol Street
ELKHART, IN 46514
(219) 264-0931
Changes Proposed in Operator Licensing

The Commission has proposed sweeping changes in the present system of radio operator licensing. The proposals arose from a Commission Inquiry initiated last year.

The new proposals make a clear distinction between licenses issued certifying competence for technical duties and those intended merely to authorize routine operation. The technical licenses would designate the holders as technicians while those dealing with routine operation would be identified as operators. The proposed technician series would consist of: radiotelephone technician license; radio broadcast technician license; and television broadcast technician license. The routine operator series of permits would consist of limited radiotelephone operator permit and restricted radiotelephone operator permit.

Holders of current licenses would be permitted to renew existing licenses at the expiration of the present license term.

Most of the comments filed in response to the Commission's Notice of Inquiry overwhelmingly favored the retention of a licensing system to demonstrate the competence where the installation, servicing and maintenance of radio transmitting equipment is involved. On the other hand, there was a preponderance of feeling that licensing of an operator served little purpose where routine operation is involved due to the reliability of existing equipment.

The Commission has invited comments on these proposals (Docket #20817) by October 3, 1977.

Rules Adopted to Control Interference from Cable System Radiation

The Commission has made final its proposal (May, 1977) to protect air communications and navigation systems from any interference which might be caused by radiation leakage from cable television systems. This interference potential was brought to attention by an incident last year which affected aircraft communications in the vicinity of Harrisburg, Pennsylvania.

continued on page 6
CETEC Sparta’s
new SS1000A
is really
worth listening to.

For starters, our new AM transmitter produces less than 1% harmonic distortion. Near perfect. Advanced circuitry easily provides 125% modulation. So exclusive we’ve applied for patents.

☑ One factor we haven’t provided is “dead air.” Our SS1000A behaves much like a tube type — it simply ignores load variations.

☑ High overall efficiency? In spades. RF systems 90% or better. Remarkably low power consumption. ☑ Another plus. We use two accurate digital meters. Each assures an automatic “spare” for the other. ☑ Extras: no-load, no-tuning broadband combining system. “Tally light” fault locator system and individually replaceable PA and modulation Transistors. ☑ Interesting fact: CETEC Sparta is the only manufacturer of both AM and FM solid state transmitters. Enough said? Not quite. ☑ Wouldn’t you as a professional broadcaster, prefer to talk to a broadcast professional? ... about the good group of products from Sparta, Schafer and Jampro.

☑ We’re worth listening to. And—we’re delivering.
The new rules prohibit the use of carriers in the vicinity of the emergency frequencies 121.5 MHz, 156.8 MHz, and 243.0 MHz. In addition, cable systems employing the bands 108-136 MHz and 225-400 MHz must maintain information on signals carried and file the data with the Commission. Regular monitoring of systems employing these frequency bands must be performed throughout the entire system to detect any evidence of signal leakage in the cable. Details are not spelled out, but the method must be sufficiently effective to detect any instances of leakage which might be a significant source of interference.

Problems In Land Mobile Sharing of UHF TV Channels

The Commission has announced the results of negotiations with Canada intended to enable the sharing of UHF TV Channels 14 and 15 with land mobile operations in the Cleveland, Ohio area and similar sharing of Channels 15 and 16 in the Detroit, Michigan area. It was necessary to coordinate this sharing, which was authorized by the Commission in 1970 in Docket #18261, because of the closeness of both of these cities to the Canadian border.

The Commission's announcement met with prompt objections from various television broadcast interests, chief among which was the Council for UHF Broadcasting (CUB), a coalition of various educational and commercial broadcast organizations. These objections pointed out that the original authorization for the sharing of UHF Channels 14-21, inclusive, by land mobile operations had been temporary in nature intended to bridge the gap with the development of equipment suitable for operation in the frequency region near 900 MHz, which was opened up at the same time the sharing of the lower channels was authorized.

In the meantime, considerable controversy over land mobile sharing of UHF TV channels throughout the entire UHF television broadcast band continues, with particular emphasis on the development of a U.S. position for the 1979 World Administrative Radio Conference (WARC).

Short Circuits

The proposed prototype television "Receiver of Tomorrow" was delivered by the contractor to the Commission for testing on August 15... Field tests of the various AM stereo systems have been completed with a report to the Commission due on October 1...The Commission has declined to prohibit the construction of a high power shortwave broadcast station in California on radiation hazard grounds, pointing out, among other things, the RF energy concentrations near C.B. transmitting antennas...The Commission has approved systems for wideband swept RF anti-pilferage devices in frequency bands at 2, 4.5, and 8 MHz.
ASACA is Known By Its Credentials

TV stations have opted for ASACA after comparing all brands. That says it all with respect to quality and value. This broadcast camera is also used in schools, hospitals, institutions, etc.


Broadcast quality picture from features seldom found in cameras priced below $30,000.00. 2 line contour compensator, 3 Plumbicon® (Saticon®) tubes and I and Q encoder, pre-heat circuit—low power consumption of approximately 30 watts AC. Easily adapts to battery. Optional adaptor for use with 12V car or truck batteries. No wonder top TV news crews use.

Great indoors, too! Optional 5" view finder readily adapts camera to studio. Add remote control unit with painting, iris and pedestal control that also accommodates many cameras and VTR.

ASACA ACC-2000 color mini-cam has overscan and underscan switching, a wobble circuit for quick, accurate line adjustment and a sawtooth signal (100%-200%) for gamma correction, knee level, white clip, etc.

Write for a free demonstration.

ASACA CORPORATION OF AMERICA
1289 Rand Road
Des Plaines, Illinois 60016
(312) 298-4380

ASACA welcomes its metropolitan New York dealer: KVC, Inc.,
770 Lexington Ave., New York, N.Y. 10021. Phone for free demo (212) 752-3690.
FCC announces availability of revised broadcast forms

Noting that forms for broadcast applications and reports are revised frequently, the FCC has issued a revised listing of acceptable editions of such forms.

The Commission said revision of a form usually makes the previous edition obsolete. In turn, it added that use of obsolete forms can result in unnecessary delays in processing applications, requests for more information, or the preparation and submission of data no longer required.

The following recently revised forms are now available for use:

- Form 302. Application for New Broadcast Station License (March 1977);
- Form 308. Application for Permit to Deliver Programs to Foreign Broadcast Stations (March 1977);
- Form 309. Application for Authority to Construct or Make Changes in an International Experimental Television, Experimental Facsimile, or Developmental Broadcast Station (March 1977);
- Form 315. Application for Consent to Transfer of Control of Corporation Holding Radio Broadcast Station Construction Permit or License (March 1977);
- Form 330-L. Application for Instructional Television Fixed Station License (March 1977);
- Form 348. Application for Renewal of TV or FM Broadcast Translator Station License (April 1977);
- Form 349-L. Application for an FM Booster Station License (April 1977).

SMPTE preparing for record crowd

To meet the overwhelming demand for booth space at its upcoming Technical Conference, the SMPTE has increased the exhibit area to accommodate companies in both the motion picture and television industries. The Conference is set for the Century Plaza Hotel in Los Angeles, October 16-21.

According to SMPTE Conference vice president, Harry Teitelbaum, Hollywood Film Co., the 168 booths the SMPTE had available were all reserved by June 20. SMPTE's largest previous exhibit was in 1976 in New York, where they had a 166-booth sellout exhibit.

The Century Plaza is building another exhibit area adjacent to the area the SMPTE is now scheduled to occupy. This new area will have space for an additional 72 booths, giving the SMPTE a capacity of 240 booths.

At Last, a Cart Machine that Keeps its Cool

Telex/Magnecord broadcast cart machines run cool and steady. So cool no ventilation is required, so steady no ventilation or frequency fluctuations will alter their speed. Thanks to our dc servo flutter-filter drive.

The MC series offers broadcasters a host of options, including field convertability from mono to stereo or play to record and, of course, end of message, secondary/tertiary cue tones. Designed for type A or B carts, the MC series meets all NAB specifications, offers full immunity to EMI and RFI, is remote controllable and automation compatible with CMOS digital logic. Audio muting, air damped low voltage dc solenoid and fast forward are standard features on every MC unit.

Four broadcast cart machines to choose from in the Telex/Magnecord MC series. Running cool and steady. With a pleasant surprise—they're affordable.

For detailed information please write:

**TELEX COMMUNICATIONS, INC.**
9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.
Europe: 22 rue da la Legion-d'honneur. 93200 St. Denis, France
Canada: Teiak Electronics, Ltd., Scarborough, Ontario

For More Details Circle (19) on Reply Card
WHAT IS A CMX?

CMX is the best computer assisted video tape editing system in the world.

From the System 600 (at about $350,000) until today (at less than $20,000) CMX has been the recognized leader in the field.

A CMX is a whole system. It’s a keyboard, a computer...

a switcher, a minimum of one record playback machine, and one interfaces with most machines)...

and an Intelligent Interface (F)™ between each and every sound and picture source and the computer, and most importantly, the creative editor.

This is the simplest configuration possible. The creative editor and the keyboard. By merely touching the keys, he determines what happens to the video tapes under his control. From the keyboard, he is able to effect all decisions.

He can select individual frames; cut action and dialogue; reedit and rearrange scenes at will.

The editor’s genius is matched by our software’s genius. Incredibly complex technical operations are performed with sublime ease.

CMX calls its genius software the “Supervisor,” and the Supervisor resides in the computer.

The editor talks to the Supervisor through the keyboard.

He can select individual frames; cut action and dialogue; reedit and rearrange scenes at will.

The editor’s genius is matched by our software’s genius. Incredibly complex technical operations are performed with sublime ease.

CMX calls its genius software the “Supervisor,” and the Supervisor resides in the computer.

The editor talks to the Supervisor through the keyboard.

The Supervisor relays the information to the respective machine or switch through the Intelligent Interface.

The edit decision list is kept in the computer to be read out as you need it — on punched paper tape or in human language. Auto assembly is great.

The results are a good work print (off-line) or a Master recording (on-line).

There now. You know! For more details, write CMX Systems, 3303 Scott Boulevard, Santa Clara, CA 95050, USA or 27 Taketstr. 8045 Ismaning/ Munchen, West Germany.

September, 1977

For More Details Circle (20) on Reply Card
The Very Best FM Exciter
Wilkinson Model FME10

- 253 TRANSMITTERS USE IT!
- POSITIVE PROOF!
  - Frequency response ± 1/2 DB 15 HZ-350 KHz
  - FM Noise Level - 70 DB below 100% Mod.
  - Distortion - 0.3%
  - Power Output - Adjustable to 18 watts
  - Stability 1 part in 100,000
  - Requires no oven and is not susceptible to rumble and microphonics.

FCC Type Accepted
- POWER SUPPLY INCLUDED.
- COMPLETELY METERED.
- REQUIRES 7" VERT. SPACE.
- ADJUSTMENT FREE.

The Very Best Stereo Generator
Wilkinson Model SG1E

- 196 TRANSMITTERS USE IT!
- POSITIVE PROOF!
  - 60 db separation 50 Hz-7500 Hz
  - 55 db separation 7500 Hz-10000 Hz
  - 50 db separation 10 KHz 15 KHz
  - FM Noise - 75 db Cross Talk - 60 db

COMES COMPLETE WITH POWER SUPPLY
REQUIRES ONLY 3½" RACK SPACE
ONLY ONE FRONT PANEL ADJUSTMENT
REMOTE STEREO ON/OFF FUNCTION

NO ONE CAN MATCH THIS COMBINATION

FCC opens TV inquiry on use of subcarrier frequencies

The Federal Communications Commission has instituted an inquiry into the use of subcarrier frequencies in the aural baseband of television transmitters.

The action was in response to a petition by Boston Broadcasters, Inc. (BBI), licensee of WCVB-TV, Channel 5, Boston. BBI asked the FCC to amend Part 73 of the rules to permit television stations to use subcarriers on their aural transmitters to cue and coordinate electronic news gathering (ENG) crews in the field.

For more than a year, WCVB-TV, under special authority from the FCC, has been testing the use of a 67 kHz subcarrier on its aural transmitter for those purposes. This has been done with the simultaneous use of a 39 kHz telemetry subcarrier.

Test reports submitted by BBI with its petition indicated that the subcarriers do not interfere with each other nor cause interference to the aural or visual portions of the television broadcast. The National Broadcasting Company, American Broadcasting Companies, Inc., and National Association of Broadcasters supported BBI's position.

The Commission said since the type of subcarriers proposed by BBI might have additional applications and since there might be other uses for the aural baseband that could be affected by standards developed, an inquiry to investigate such applications and uses was appropriate.

The Commission noted that several proposals have been developed through the years for multi-channel TV audio transmission, and invited comments on some possible uses, including: stereophonic television sound broadcasting; foreign language translation; and augmented audio for the blind.

Technical considerations

The implementation of any of those applications of television aural transmitter subcarriers would involve making technical evaluations and decisions on the feasibility of each application and the most practical method for its implementation.

Some of these considerations include:
- degradation of service;
- subsidiary communications authorization (SCA) specifications;
- stereo interest;
- foreign language and augmented audio interest;
- other uses;
- equipment considerations.

The FCC said it must be determined whether the use of a subcarrier for any purpose would cause degradation of audio or visual transmissions or cause interference to adjacent television channels or radio services.

The restrictions on use of subcarriers also must be determined, including: what part of the baseband should be used; what modulation levels should be authorized; how many subcarriers could be authorized without causing degradation of normal television signals.

continued on page 14
Still manually monitoring VITS?

mi has the AUTOMATIC answer whether your system is NTSC, PAL or SECAM

Adaptable to all national VIT waveforms including NTC #7 and FCC, the mi 2914A Insertion Signal Analyzer has proven performance with broadcasters and common carriers throughout the world. For unattended operations the Analyzer interfaces directly with telemetry control systems. Combine the mi 2914A with the optional Limits Comparator, mi 2915, and the mi 2917 Data Selector for a complete monitoring, measuring and alarm system. You can control or print out at a local or remote terminal, and, our print-out is now available in English, French or American. As a stand alone unit, the mi automatic VITS Analyzer replaces Waveform Monitors, Vectorscopes, Color Gain and Delay test sets and Random Noise Measuring sets. Even the most complex VITS measurement is performed at the push of a button and the result displayed with digital accuracy on the front panel meter. So if you are still manually monitoring VITS... we have the immediate solution... contact mi today for the new mi 2914A specifications.
The BVH-1000. Consider the advantages.

Last year, Sony Broadcast introduced the prototype of a new 1" high band video recorder. The BVH-1000.

The BVH-1000 produced picture quality difficult to believe. In fact, broadcasters didn’t believe it. They had to see it for themselves. And they snapped up every prototype we could deliver.

Since then, we’ve made some changes. Added more features. Expanded the BVH concept to include a portable model, the BVH-500, for professional 1" production in the field.

And we’ve sold a lot of machines.

If you’re considering the move to 1", consider the advantages of the BVH-1000.

1. The Advantage of Shared Sector Scanning. The Sony Broadcast BVH-1000 and BVH-500 both use an exclusive system of scanning that records video and sync (lines 1-17) with separate heads. Which means the entire vertical interval is captured and available for encoding any signal required in the future by the FCC.

Color banding is eliminated. And generation after generation, the BVH-1000 picture retains incredible clarity and precision.

2. The Advantage of BIDIREX. Film editing techniques, with a professional video recorder?

That’s what you get with the BVH-1000. Not one, but two control modes are provided to give editors a true “film” feeling. In shuttle mode, the tape can be moved in either direction, from stop to 30 times normal speed. With a recognizable picture, so you can make fast editing decisions.

In jog mode, the BVH-1000 lets you move the tape as though you were positioning the reels by hand—while you monitor a fully locked picture.

3. The Advantage of Interchangeability. 1 dB down is the specification. Need we say more?

Sony’s interchange is guaranteed by a gimmick-free devotion to precision mechanics and supported by the experience of building several hundred thousand video recorders.

4. The Advantage of Color Framing. Some high end production recorders don’t offer color framing. Others make it available as an expensive option.

But both the BVH-1000 and BVH-500 provide color framing capability as standard equipment. Add that to a logic system ideally suited for computer assisted editing, and the Sony BVH-1000 is your best bet to produce that “word from our sponsor.”

5. The Advantage of High Fidelity Audio. Not one, not two, but three isolated audio tracks with frequency response from 50 Hz to 15 kHz. With over 50 dB isolation between tracks.

Never before has any production recorder offered the level of audio quality found in these two new Sony Broadcast machines.

And a special wide band amplifier is automatically switched onto the cue track in search mode, to accommodate SMPTE code playback in high speed.

But it is impossible to describe all the advantages of the Sony BVH-1000 and BVH-500 high band recorders. You must see them to believe them.

Contact Sony Broadcast today, and ask for a demonstration. You’ll see why networks and production companies alike are buying this remarkable new recorder.

Sony Broadcast
Sony Corporation of America, 9 West 57 Street, New York, New York 10019
New York: (212) 371-5800 Chicago: (312) 792-3600 Los Angeles: (213) 537-4300 Canada: (416) 252-3581
Outstanding VIDEO PRODUCTS
from DYNASCIENTES

Video Processing Amplifier Series 6000
Superior performance in restoring signal levels. Compatible with any VTR, monochrome or color, quad or helical scan.

Image Enhancers
The most complete line available. Improve picture detail without color distortion or noise addition.

Production Switcher & Special Effects Generator Model 7400
Big board capability at a small board price. A 4-bus, 12-input switcher with 24 wipes, 6 other effects.

Model 7400/A
Puts the same capability in 8-3/4 x 7 inches of panel space.

Routing Switcher Series 8500
Add modules up to 12 x 12 without additional amplifiers. Available with audio-follow switching, audio amplifiers, sync addition, and clamped outputs.

Most equipment is available in NTSC, PAL, and PAL-M models.

Other high-reliability Dynasciences products include video, pulse and subcarrier Distribution Amplifiers, Downstream Chroma Keyer, and Automatic Programmer for unattended sequencing of video cassettes. Video test equipment includes compact convergence, multiburst, and sine² generators, and an economical color bar and sync generator.

DYNASCIENTES | video products
A SUBSIDIARY OF Whittaker
Township Line Road Blue Bell, PA 19422
Tel: (215) 643-0250 Telex 64-83538

For More Details Circle (25) on Reply Card

industry news
continued from page 10

service; and should interim standards for the use of subcarriers be authorized for use as proposed by BBI while considering other uses.

The Commission said it also must be determined whether the public is interested in stereo TV and is willing to bear the additional costs involved: are broadcasters interested in such transmissions and would they make the necessary expenditures to make them a reality: what system proposals are feasible for implementing stereo TV: what studio-transmitter transmission techniques are available for local and network programming: should systems lend themselves to quadraphonic sound to increase the realism of programs, and if there is a desire for TV stereo, can stereo as well as subcarriers for other uses be accommodated.

Foreign language audio
With respect to foreign language and augmented audio, the FCC said it must be determined if there is a need and interest for such services: what is the best way of accomplishing them: and is there a multi-channel sound scheme that would lend itself to these types of services in a way compatible with stereo TV transmissions.

The FCC has asked for comments on whether there are other uses for aural baseband or subcarriers that have not been addressed here.

Comments also were requested on the difficulties that might be encountered in designing and manufacturing receivers for reception of stereo television: whether manufacturers, in the interim, would produce receivers or special television aural receivers that have output jacks for connection to external stereophonic or quadraphonic equipment, and could similar outputs be provided for subcarriers used in foreign language transmissions and augmented sound for the blind.

NAB wants NCCB to stay out of FCC fee refund controversy
The National Association of Broadcasters (NAB) is opposing the National Citizens Committee for Broadcasting (NCCB) in its request to delay the refund of fees due broadcast licensees by the FCC.

NAB's Erwin G. Krasnow wrote to Vincent J. Mullins, FCC secretary, citing the NCCB's lack of standing "to inject itself into the final stages of years of litigation." He added that it had no involvement in any of the proceedings or orders that were the subject of Supreme Court review.

He also asked that the portion of the NCCB's accompanying rulemaking petition dealing with refunds be dismissed.

Krasnow stated that full refund at this point is the most equitable solution because:
- of the amount of time that has passed since 1970 when refunds were first requested;
- of the significant portion of fees paid that would be refundable under even a partial refund formula.

continued on page 16

BROADCAST ENGINEERING
# Good Reasons Why Philips is Setting The Standard in TV Test Equipment

<table>
<thead>
<tr>
<th></th>
<th>PM 5580 Modulator</th>
<th>PM 5560 Demodulator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Used extensively by transmitter manufacturers.</td>
<td>Instantly tunable to all VHF and UHF channels.</td>
</tr>
<tr>
<td></td>
<td>Synthesized carriers derived from internal 10 MHz oscillator.</td>
<td>Automatic and manual level control.</td>
</tr>
<tr>
<td></td>
<td>Instantly tunable to all VHF and UHF channels.</td>
<td>Eliminates quadrature distortion.</td>
</tr>
<tr>
<td></td>
<td>AFC corrects for transmitter off-set.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>PM 5560 Demodulator</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>PM 5570 NTSC Test Set</td>
<td>PM 5578 VITS Analyzer</td>
</tr>
<tr>
<td></td>
<td>Generates all signals for aligning and checking TV studios, video paths and transmitters.</td>
<td>Automatically measures 21 TV and 3 “house-keeping” signals plus alarm indications.</td>
</tr>
<tr>
<td></td>
<td>All levels adjustable plus preset positions.</td>
<td>2 sets of VITS lines can be selected.</td>
</tr>
<tr>
<td></td>
<td>Sweep signal with markers: 100KHz to 10 MHz.</td>
<td>5 input channels selected manually, remotely, or for automatic sequential scanning.</td>
</tr>
<tr>
<td></td>
<td>Remote controllable.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>PM 5578 VITS Analyzer</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>TV Oscilloscopes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 to 50 MHz, TV triggering, odd/even frame selection.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>PM 5529 Monitor Color Analyzer</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>PM 5576 VITS Generator/Inserter</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>The Philips Commitment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Innovation, Technical Excellence, Reliability, Accuracy... and Service.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Our engineers staff our toll-free Hotline for application information and service.</td>
<td>800-631-7172</td>
</tr>
<tr>
<td></td>
<td>(From New Jersey call collect)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Philips Test &amp; Measuring Instruments, Inc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U.S.A.: 85 McKee Drive, Mahwah, NJ 07430</td>
<td></td>
</tr>
<tr>
<td></td>
<td>201-529-3800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Canada: 6 Leswyn Road, Toronto, Ont. M6A 1K2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>416-769-7188</td>
<td></td>
</tr>
</tbody>
</table>

**Circle 123 on Reader Service Card**

**Circle 124 on Reader Service Card**

**Circle 125 on Reader Service Card**

**Circle 126 on Reader Service Card**

**Circle 127 on Reader Service Card**

**Circle 128 on Reader Service Card**

**Circle 129 on Reader Service Card**

**www.americanradiohistory.com**
In the market for FM broadcast antennas?

There are over 300 reasons to buy ours.

We have over 300 circularly and horizontally polarized FM broadcast antennas radiating signals daily in the U.S. alone. And, they're operating without difficulty or downtime. Still, you actually pay less for these remarkable antennas. Choose from 24 different types. Use an element as a single bay antenna. Use multi-element arrays. Your antenna ships complete, ready for installation with a tunable input transformer to match the antenna to the location.

Our new 20-page catalog has the complete story. Write for your copy today. Phelps Dodge Communications Company, Route 79, Marlboro, New Jersey 07746, 201 462-1880.

industry news continued from page 14

- the government has had these funds during the intervening period without paying interest;
- cable television operators have already received full fee refunds; and
- of the uncompensated effort and expense to which broadcasters have been put in more than three years since the Supreme Court decision.

First Bahaman TV station will start with color

The first national television broadcast system in the Bahamas will be established later this year by the Broadcasting Corporation of The Bahamas, known as RADIO BAHAMAS.

The $2.5 million equipment order calls for studio and portable color cameras, television film and videotape systems, remote production and newsgathering equipment, and transmitting systems, according to J. E. Hill, division vice president and general manager, RCA Broadcast Systems.

The new Channel 13 outlet will bring the first local programming to Nassau, the Bahamas' capital, and to New Providence Island and several Family Islands.

Studio facilities in Nassau will include three TK-46 television cameras, two complete TK-28 film originating systems, two TR-600 quadruplex videotape recorders and two HR-1060 videocassette editing recording-reproducers, Hill said.

An RCA-equipped compact television van will be used for on-the-scene program and commercial production. The van will be equipped with two TKP-45 portable color cameras, TR-600 videotape recorder, video switcher, and audio and intercom equipment.

RADIO BAHAMAS also will operate a complete electronic newsgathering department. Hill said. Three TK-76 lightweight portable cameras and four HR-1020 portable videocassette recorders will provide for fast-response, on-site recording of events. Two additional HR-1060 recorders will be used for editing and airing of the news material.

The transmitting system will use two 2.5-kilowatt units, operating in parallel to produce 5 kw visual power output. Combined with the antenna, the transmitting system will produce approximately 40 kw effective radiated power, the minimum required for coverage of the New Providence area and environs.

INTELSAT now includes 96 member countries

The Republic of Chad has acceded to the Agreement of the International Telecommunications Satellite Organization (INTELSAT), thus bringing that organization's membership to 96. The INTELSAT Operating Agreement, concluded among telecommunications entities designated by the member countries, was signed by the Société de Télécommunications Internationales du Tchad. Chad becomes the twenty-third African nation to join INTELSAT.

continued on page 18
Studer B67

It's got competitors ... but no competition!

When you buy the Studer B67 tape recorder/reproducer, you get more than just one of the world's finest tape recorders.

You are buying an engineering philosophy where performance is first and there isn't any second or third. You are buying a dedication to quality seldom seen in today's world of "make 'em faster and cheaper."

At Studer, one person in every seven is a quality assurance inspector.

You are buying performance that stays within spec long after lesser equipment has given up. If performance is an important part of your tape recorder buying decision, test drive the Studer B67 before you decide. You'll find the B67 is the recorder without competition.

To learn more, circle reader service number or contact:

Studer Revox America, Inc., 1819 Broadway, Nashville, Tenn. 37203 / (615) 329-9576 • In Canada: Studer Revox Canada, Ltd. / (416) 423-2831

www.americanradiohistory.com
RUSSCO engineers design the broadcast equipment that works for you—Solid state stereo and mono 5-channel audio mixers, amplifiers and preamps, the finest turntables and precision tone arms. Using modern, trouble-free technology and RUSSCO/RUGGED construction, we bring you products you can really depend on. There’s just no other name to consider for Top Quality and Economy!

RUSSCO ELECTRONICS INCORPORATED
1070 BROOKHAVEN, CLOVIS, CALIF. 93612 Ph. (209) 299-2167

Write us for our brochures

your
BEST BUY

For More Details Circle (23) on Reply Card

**industry news continued from page 16**

INTELSAT. created in 1964, now provides through its global satellite system more than half of the world’s transoceanic international telecommunications services, as well as satellite capacity for domestic communications systems in nine countries. Services on a full-time basis are provided through 174 antennas at 140 earth stations in 82 countries.

CMX Systems and Marconi reach agreement

CMX Systems, a division of Orrox Corporation, and Marconi Communications Systems of Chelmsford, England have reached an agreement giving Marconi exclusive marketing rights in the United Kingdom and a non-exclusive arrangement in other areas of the world.

Al Behr, general manager of CMX Systems, indicated that Marconi would market and provide full support for the CMX product line of computer-assisted editing systems such as the 340X and the peripheral devices like its time code generators and readers.

Marconi’s recent entry into the VTR business required the company to offer its clients the most modern and sophisticated editing systems, and it chose the CMX Systems product line to fulfill that need, according to Cyril Teed, Marconi’s marketing director.

Marconi Communications Systems manufactures a wide range of television equipment for broadcast applications.

PMPEA seminar will feature Academy-award winners

Several 1977 Academy-award winners are scheduled to lead the opening event of the upcoming SMPTE conference in Los Angeles, planned and organized by the Professional Motion Picture Association (PMPEA).

The program, called the Motion Picture Production and Hands-On Equipment Seminar, is scheduled for Sunday, October 16. Academy-award winners Haskell Wexler, ASC. (Bound for Glory) and John Alonzo, ASC. (Black Sunday) each will demonstrate and discuss studio cinematography techniques. Verna Field, production executive for Universal Studios and winner of an Academy award for best editing (Jaws), is tentatively scheduled to lead a discussion on post-production techniques. Jim Webb, co-winner of the 1977 Academy award for sound (All the President’s Men) will demonstrate production recording.

"This seminar," says Roy Isaia, vice president of the PMPEA, "is a unique opportunity for filmmakers to see top professionals demonstrate their craft, with the latest equipment, on a Hollywood soundstage.

The seminar will be held on the 20th Century Fox lot from 10 am to 2 pm.

continued on page 20
LENCO'S 300 SYSTEM

THE SYSTEM ENGINEERS DREAM COME TRUE!

Our PFM-300 Frame is more than just a "holder" of certain pre-selected plug-in units. It does not require "add-on" connector assemblies. It is a unique system concept, engineered to allow YOU to select ANY nine modules, place them in ANY frame position, in almost ANY system configuration, at ANY time, WITHOUT modification. LENCO'S 300 SYSTEM is the most versatile and flexible system concept ever devised for television.

**TAKE YOUR CHOICE OF THESE 300 SYSTEM MODULES**

- PSG-310 Sync Generator with RS-170 Genlock
- PSG-311 Sync Generator with Helical Genlock
- PGS-315 Sync Generator Substitute
- PCO-317 Automatic Sync Generator Changeover
- PCB-320 NTSC Color Bar Generator
- PBB-321 Black Burst and Color Background Generator
- PBD-322 Bar Dot and Visual Reference Generator
- PMB-323 Multiburst and 12 MHz Sweep Generator
- PSS-324 Stairstep and Ramp Generator
- PPD-325 Sin², 20T Pulse and Window Generator
- PSD-340 System Delay Module
- PPA-346 Pulse Distribution Amplifier
- PSA-346 Subcarrier Distribution Amplifier
- PVA-350 Video Distribution Amplifier
- PVD-354 Video Delay Amplifier
- PRC-360 Processing Amplifier
- PRC-361 Processing Amplifier with Sync Generator
- PCD-363 NTSC Chroma Decoder
- PFO-364 Universal Amplifier
- PSW-366 8 x 1 V.I. Switcher

"QUALITY WITH RELIABILITY AT A REASONABLE PRICE"

LENCO, INC., ELECTRONICS DIVISION
319 WEST MAIN ST., JACKSON, MO. 63755
314-243-3147

September, 1977

For More Details Circle (29) on Reply Card

www.americanradiohistory.com
Telecommunications featured at Southeast Asia Conference

Telecommunications representatives from more than 30 Southeast Asia countries are expected to attend the first US/Southeast Asia Telecommunications Seminars Program and Exhibit.

Designed as an overview of telecommunications hardware and technology, the program and exhibits are scheduled for January 19-21, 1978 at the Hyatt Singapore Hotel. The seminar will be sponsored by the Electronic Industries Association, communications division.

The exhibitors will display a wide range of hardware representing top U.S. manufacturers, said John Sodolski, staff vice president of EIA, communications division.

The conference will cover a variety of state-of-the-art advances in U.S. telecommunications hardware and technology. Such subjects as telephone equipment and systems, transmission equipment and systems, and mobile communications will be covered.

Broadcast and cable TV ownership limit affirmed

A federal appellate court has affirmed the FCC's June 10, 1976, order setting a 5% limit on institutional ownership of broadcast and cable television companies for the purposes of applying the Commission's multiple ownership rules.

The limit was appealed by the National Citizens Committee for Broadcasting, a Washington-based public interest group, in the U.S. Court of Appeals for the District of Columbia.

The 1976 action raised the ownership benchmark for investment companies from 3% and for insurance companies from 1% to the 5% standard in force for bank trust departments. The standard applied only to widely-held broadcast and cable entities having more than 50 voting stockholders.

For revised benchmark to be applicable these institutional investors must exercise no control over the management of policies of these concerns.

Banks, investment firms and insurance companies may hold up to 5% in broadcast and cable companies, provided they exercise no control over the management or policies of the concerns.

The rules change had been requested by the Aetna Life and Casualty Co., The Teachers Insurance and Annuity Association of America and College Retirement Equities Fund, The Prudential Insurance Company of America, the American Life Insurance Association, the National Association of Independent Insurers and the Investment Company Institute.

The FCC said its adoption of the 5% rule was in the public interest because it would be likely to increase investments in broadcast and cable companies and thus strengthen the economic foundation of these industries without creating undue concentration of control.

continued from page 18

continued on page 184
Just add four walls and you're on the air.

Presenting Collins' full line of broadcast equipment.

Whether you have 10 watts or 100,000 watts behind your signal, Collins has everything you need. From towers and transmission line to transmitters and test gear to turntables and tone arms ... and all the other items in between.

Including the modular, flexible AutoPro program automation line. And featuring the Generation 4th series of transmitters — with the exciter that has set new standards for FM broadcasting. Plus AM transmitters that our customers say sound like FM ... and consoles with plug-in flexibility to meet your changing format requirements.

But there's much more to Collins than just breadth of line. Every item we make is the result of an uncompromising dedication to technical superiority. The result is a difference that some customers say they can "feel". They call this difference "the Collins presence". Your listeners will notice the difference, too.

And Collins believes in after-sale support to keep you on the air. Our Product Support Staff is at your service 24 hours a day, 365 days a year. And our Service Parts Department is just a phone call away, even on weekends and holidays at 214/690-5000. Support is not just lip service at Collins, either. Our transmitters are backed up with a full two-year warranty, twice as long as the other majors.

Our quality line of broadcast products and prompt service add up to still another benefit to Collins customers — longer operating life and lower cost of ownership. We're ready to demonstrate this with action, too.

For those four walls, see a general contractor.

For everything else, see Collins, the radio specialists. Contact your local Collins salesman, or Broadcast Marketing, M.S. 406-240, Collins Commercial Telecommunications Group, Rockwell International, Dallas, Texas 75207. Phone 214/690-5574 or -5424.

For More Details Circle (31) on Reply Card
The small machine for big stations. The big machine for small stations. AVR-2.

Tell us what it has to do. There’s an Ampex AVR-2 for every videotape assignment in your station. If you already have a complete production/editing setup, you probably don’t need a lot of accessories for your AVR-2. Order it with basic manual controls, and it’s ready to go to work.

You might want Super High Band Pilot. It comes with optional switch selection to augment the standard High Band Color circuits, and it adds valuable depth to your multi-generation production work.

If you’re just now growing into more advanced production work, then you’re going to want the EC-2 Edit Controller. This complete, sophisticated stand-up time code editing accessory can put you in command of as many as seven additional (similarly equipped) machines working in any combination of master/slave for production or multiple dubbing service.

Modular construction means an easy fit for your AVR-2, no matter where you want to use it—at a remote location, in your tape room, or out in the mobile van.

AVR-2 is the quad recorder that grows. Every accessory for this machine is available upon initial purchase or at any time in the future when you’re ready. Tell us what it has to do, and we’ll recommend the model that suits your needs.
Feed your Sony Scotch.
No matter what brand of VTR you own—Sony, JVC, or Panasonic—you'll extend your recorder's head life five times longer by feeding it only "Scotch" Brand videocassettes.

Even though we're made of iron, we're gentle.

"Scotch" videocassettes are coated with a patented, cobalt-doped, high energy ferric oxide. In simple language, magnetic rust.

We've found a way to control the size and shape of these oxide particles to create an extremely smooth recording surface. And it's so easy on your recorder's heads. Under lab conditions, we've run a set of heads for over 4,000 hours without any picture degradation or head clogging.

With "Scotch" videocassettes, you save money and reduce equipment downtime.

"Scotch" videocassettes outperform competitors on the screen, too.

"Scotch" videocassettes deliver the same high quality sharpness and color from the master down to the last dub. You get superior signal-to-noise, RF output, and stop motion performance that beats typical chromium dioxide tape hands down.

We haven't neglected strength, either. Our new Mastering Broadcast U-Matic (MBU) videocassettes are made specifically for the roughest field use and editing.

Let's look at the backside... something no one else will ask you to do.

Our exclusive back treatment creates a conductive surface that all but eliminates static buildup and the resultant dropouts and scratching.

The backing itself is specially stabilized so that it won't shrink with temperature changes or during shipping and storage.

We design our cassettes as carefully as our tape.

Only "Scotch" videocassettes are made from tough, high impact ABS plastic.

It wouldn't be such a big deal if all videocassettes were so durable. But they aren't. And if you've ever accidentally dropped and cracked a cassette, you can appreciate why we've made ours extra strong.

Give us an order and you'll also receive some extra cassettes that are a class by themselves.

With every order of $800 or more, we'll give you one program from our 10-course workshop series on video production. These informative videocassettes show you everything from lighting and propping to field production camera techniques.

Just circle our reader service card number and we'll tell you more.

Nobody, but nobody, knows tape like 3M.

We've been in the video tape business for as long as there has been video recording.

So show your Sony that you care. Buy it a case of "Scotch" videocassettes soon.

Try your hand in our videocassette reloading competition. 3M Booth, Video Expo Show Oct. 11, 12 & 13.
James A. Fellows, NAEB president, discusses the upcoming convention and NAEB's new efforts to serve non-commercial broadcasting.

There was a time, not very long ago, when the National Association of Educational Broadcasters national convention was referred to as the "little NAB." But over the last five years the NAEB's national meeting has taken such a steep attendance slide that some have openly wondered if a 1977 convention would even be held.

First off, there will be a 1977 convention. It will be held in Washington, D.C. November 13 through 16, with the Sheraton Park designated as the exhibit hotel.

Whether or not the NAEB will be able to put together a convention with the earmarks of a major broadcast meeting will depend upon how many nagging problems have been solved. To get a handle on how the NAEB plans to come back, I talked to the NAEB's president, James A. Fellows, and asked many of the hard questions that will have to be fielded before a comeback is possible.

The following are questions from Broadcast Engineering and the official NAEB response.

BE: Whom does the NAEB represent? And, how are their needs being met?

Fellows: NAEB is the most comprehensive organization in public and educational communications. Its constituency includes individuals as well as institutions and organizations. Public radio and television stations, colleges, schools, universities, ITFS operations, and industrial closed-circuit organizations are part of the NAEB family. Our individual constituency includes trustees, managers and other executives, producers, programmers, graphic specialists, engineers, business officers and instruction personnel.

To meet the specialized needs of these individual groups, the membership of the NAEB is organized into professional councils which provide a means through which many of the programs and activities of the association are carried out.

Through the councils, NAEB maintains close touch with each professional discipline represented in its membership, enabling the association to tailor its services to meet existing and emerging needs.

BE: In what areas are these councils presently involved?

Fellows: At the present time, professional councils have been established in the following areas: broadcast education; business officers; directors of volunteers; engineers; graphics and design; membership; producers; production managers; radio; research; state administrators; television station managers; and television programming.

BE: Concerning the 1977 national convention, will the selection of Washington, D.C. represent any problems?

Fellows: Not only will it not represent any problems, it presents an opportunity for suppliers that cannot be duplicated as easily in any other city. Much of the support for technical and equipment purchases by education and public broadcasting comes from programs of the federal government. There is no better opportunity for suppliers to show the federal planners and legislators of advances in equipment and to dramatize the need for support to encourage the necessary updating and improvement in all technical aspects of the system.

There couldn't be a more natural place for a major technical exhibition than Washington: as for logistics, the NAEB will be contained in the Sheraton Park-Shoreham-American complex. "No bus, no fuss, no bother."

BE: What plan do you have for increasing general attendance?

Fellows: Several activities will result in increased attendance, including:

- The involvement of the professional councils in the program planning has resulted in more participation, earlier and more extensively than ever before. For the first time a full-day meeting was recently held for all elements within the professional councils.
- Special mailings in the Washington area to organizations and individuals whose interests are in some way related to public broadcasting will invite them to the convention and to the exhibits.
- A liberal policy for exhibitors to provide exhibit guest passes will be observed.
- The registration fees will be kept low with only modest adjustment from last year.

BE: How can you convince prospective exhibitors and trade press that the numbers and quality of the continued on page 28
Some suppliers want you to serve them. You know the type. All they're interested in is getting the order. Don't bother them with any problems. We know because this kind of supplier calls on us, too.

But we don't operate that way. We get involved. We'll work with you to solve your most vexing audio problems. If one of our standard systems won't do the job, we'll custom-engineer one that will.

We've been providing service like this for a long list of customers worldwide for more than 10 years. Now we're ready to do it for you.

AUDIO DESIGNS AND MANUFACTURING, INC.
16005 Sturgeon, Roseville, Michigan 48068
Phone: (313) 778-8400, Cable: AUDEX TLX-23-1114

DISTRIBUTED OUTSIDE U.S.A.
BY AMPLEX INTERNATIONAL OPERATIONS, INC.
NAEB continued from page 26

Exhibit area attendees will improve?

Fellows: We have had the cooperation and support this year from an exhibitors committee that has made very constructive and helpful suggestions that will make the show much more appealing and useful for suppliers. Among the recommendations that have been established as policies are the following:

- Exhibitors will have opportunities this year for technical and other presentations in the professional programs of the convention, both in the meetings and on the exhibit floor.
- There will be several times when there are no program conflicts with the exhibit hours. Eight and one-half hours have been allotted during which the exhibit will be open and no sessions have been scheduled.
- A general session on technology and the future will include exhibitors as major participants.
- The engineering and technical program has been designed to attract a large number of personnel who will find attendance at the convention a professional necessity.

BE: Are there any signs that these changes are helping?

Fellows: One early sign that the suggestions are working: six exhibitors who were not in the 1976 show were among the first to sign in for the 1977 show.

"Satellite developments and ENG developments will receive extensive attention in the program components of the convention and there are obvious benefits to suppliers who are involved in these areas."

BE: How will you increase attendance of those people who make equipment purchase recommendations or decisions?

Fellows: The key people involve chief executives, senior technical and senior production personnel. The NAEB is the only national meeting where these people are together. The television managers council, the engineering council, the radio council and others are planning extensive programs that will require participation.

Specifically, the television managers council, the radio group and the engineering group are planning station- and institution-based tours of the exhibit areas so that the key people from each organization will receive a guided tour of the exhibit from their engineering director.

The technical program and the production program will both be key factors. Satellite developments and ENG developments will receive extensive attention in the program components of the convention and there are obvious benefits to suppliers who are involved in these areas.

In addition, the PBS Engineering Committee will be meeting at the convention and the vice president for technical and engineering affairs at PBS, Daniel Wells, will be co-chairing the engineering program with our engineering council director, Noyes Willett. Thomas Keller of

Committed to serving the broadcaster.

Beaucart and Beau.

Our introduction of Beaucart audio cartridge tape machines in 1976 was one indication of our dedication to solving problems and simplifying operations for the broadcaster. But we don't want you to forget our Beau hysteresis synchronous drive motors, Beaucart splice finders, or Beau audio tape heads, either. Our product line is expanding and we know you'll be excited by the new products we'll be adding shortly.

UMC

BEAUCART DIVISION
UMC ELECTRONICS CO.
460 Sackett Point Rd. North Haven, CT 06473

"Satellite developments and ENG developments will receive extensive attention in the program components of the convention and there are obvious benefits to suppliers who are involved in these areas."

BE: How will you increase attendance of those people who make equipment purchase recommendations or decisions?

Fellows: The key people involve chief executives, senior technical and senior production personnel. The NAEB is the only national meeting where these people are together. The television managers council, the engineering council, the radio council and others are planning extensive programs that will require participation.

Specifically, the television managers council, the radio group and the engineering group are planning station- and institution-based tours of the exhibit areas so that the key people from each organization will receive a guided tour of the exhibit from their engineering director.

The technical program and the production program will both be key factors. Satellite developments and ENG developments will receive extensive attention in the program components of the convention and there are obvious benefits to suppliers who are involved in these areas.

In addition, the PBS Engineering Committee will be meeting at the convention and the vice president for technical and engineering affairs at PBS, Daniel Wells, will be co-chairing the engineering program with our engineering council director, Noyes Willett. Thomas Keller of

continued on page 32
Arvin/Echo's
EFS-1 Discassette Recorder
Never Forgets a Face
or a Name
or a Number

Arvin/Echo's frame-stor™ recorder has been remembering faces all over the globe, from the 1976 World Olympics to the Hollywood glitter of the Merv Griffin Show. It remembered faces at the Presidential Inauguration, The Kentucky Derby, The Indianapolis 500, The Barbara Walters/Harry Reasoner Show, and on and on and on. The EFS-1 is a regular on major networks in the United States and Canada... an accepted member of the broadcast elite.

Perhaps part of the reason for such rapid rise to fame is its versatile remote random access controller... our ticket to the world of automation!

Another reason may be its low price... under $15,000. And talk about dollars and sense... the real cost-saving factor of the EFS-1 unit is its DISCASSETTE Record, which electronically stores 400 slides—200 on-line—at only $75, less than 20¢ a slide.

Service, product reliability, compact size and light weight—fact is, the reasons for owning an EFS-1 are as long as its memory!
Why Panasonic’s Series 9000

We started with an annealed aluminum die-cast chassis.

Up to now selecting the right VCR deck or system left you with one major problem: To get the features you wanted, you had to pay a small fortune. Now there's Panasonic’s new generation VCR, Series 9000. Two standard-performance decks. Two high-performance decks. And a high-performance, direct-drive editing system. Each with the kind of features and performance you may not find even in the most expensive ½" decks.

Like an annealed aluminum die-cast chassis. For better stability of alignment, greater strength and long-term durability. Like individually removable cabinet panels on the outside. And low-density circuit boards on the inside. There's also a new jam-proof gear tape loading system. Less jitter. A high S/N ratio of 45 dB. And more.

For those who want a meaningful alternative in standard VCR performance, Panasonic offers the NV-9100 player. And the NV-9300 player/recorder with VHF and UHF tuners. Both decks include high resolution: 330 lines mono and 240 lines color. A VTR/TV antenna switch. An optional RF modulator. And just about everything else you need for the kind of picture you want.

There are also two high-performance, direct-drive decks. The NV-9200 player/recorder and the NV-9500 editing recorder. The NV-9200 gives you outstanding performance at a very affordable price. Because it gives you a direct-drive video head cylinder. Patented HPF video heads. Chroma level adjustments. As well as the capstan servo system. The results: Highly stable color and black and white pictures with less jitter. High resolution: 330 lines mono and 250 lines color. And dubs that look more like masters than copies. But whether you use it as a high-quality master recorder, a CCTV studio deck or a dubbing deck, the NV-9200 will give you the performance you expect at a price you don’t.
should be your next 3/4" VCR.

We finished with a direct-drive editing system for under $10,000.

With the NV-9500 editing recorder, you also get frame-by-frame insert and assembly edits that are crisp and clear. Without tear, roll or loss of chroma information. And with its two independently selectable audio channels, you can also edit audio without affecting video.

But perhaps the best part about the NV-9200 and the NV-9500 is what goes between them—the NV-A950 editing controller. With its five-minute memory for entry and exit points of video and audio inserts, the NV-A950 will let you perform insert and assembly edits automatically. What's more, at a complete system price of under $10,000 you can also achieve considerable savings over comparable editing systems.

And for complete 3/4" mobility, Panasonic also offers the NV-9400 portable VCR, as well as the WV-2210 portable color camera. Both are compact, lightweight and operate on rechargeable Panaloid™ batteries.

But the best way to be convinced about our new VCR's is to see them in action. Ask your Panasonic dealer for a demonstration. He'll show you how to get the 3/4" VCR system you want at a price you can afford. Series 9000 by Panasonic.

For more information write: Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094.

In Canada, contact Panasonic Video Systems Department, 40 Ronson Drive, Rexdale, Ontario M9W 1B5.

*Optional remote control for all Series 9000 decks shown below.

All cabinetry is simulated wood.

Panasonic

just slightly ahead of our time.

For More Details Circle (37) on Reply Card
AFA says:

**BUZZ OFF!**

to the 960Hz. tone in your video only edits

If you've got it... you know it... and AFA's unique Gated Video Circuit Module will get rid of it.

Buzz tone during video only edits on a VR 2000 or VR 1200 can be stopped cold with this all-digital, CMOS module.

Simple installation, RF turn-on, turn-off.

Used by major networks and post production operations.

For information, call or write:

**AFA**

A.F. ASSOCIATES, INC.

100 Stonehurst Court, Northvale, NJ 07647 (201) 767-1000
2465 E. Bayshore, Suite 301, Palo Alto, CA 94303 (415) 321-4823
Europe: Keeble Productions, 1 Spring Villas, Broomfield Place, London, W13 9LH, England (01-579 3447)

For More Details Circle (38) on Reply Card

---

**NAEB**

continued from page 28

WGBH. Robert Klein of Kentucky Educational Television, Frederick Remley of the University of Michigan, and Evart Anderson of KCET are also invited in the program planning.

“The new policies are designed to accommodate the needs of the exhibitor and therefore the needs of our constituency to benefit from an effective exhibit program.”

**BE:** Will the convention attendee have adequate time to visit the exhibit area? And will there be any added incentive to visit the exhibits?

**Fellows:** The new policies are designed to accommodate the needs of the exhibitor and therefore the needs of our constituency to benefit from an effective exhibit program. The governing principle is that the exhibit policy should enhance the exhibitors' opportunity to meet customers in an environment conducive to marketing their products and services. This is the main reason for an exhibition and our policies are supportive of that practical business goal.

In particular, the new policy establishes 81/2 hours during the convention when no scheduled program will conflict with the exhibits, as previously mentioned. We are also setting up a food service within the exhibit area; a Monday afternoon reception will be held within the exhibit area; and follow-up sessions from the technical sessions will be held in the exhibit section.

**BE:** Will the 1977 convention sessions cover topics of interest to attendees representing CCTV, instructional TV, campus-limited radio and educational AM-FM?

**Fellows:** The preliminary program planning schedule shows the following topics:

Radio: Fifteen sessions covering community ascertainment, program planning, broadcasting, communication services, and technology.

Continued on page 34
About the only thing our new 3M D-8800 Titling System can't do is spell.

If you can spell, you can create video excitement never before possible with the new dual-channel 3M Datavision D-8800 Titling System. That's because we've combined two fast, programmable microprocessors with some innovative video engineering to produce a flexible video graphics system that'll make you look great on the tube, whatever the job.

At the 8800's control console, you can make titles and credits using up to four complete type fonts at a time, chosen from our varied and extensive library. You can change from one font program to another letter by letter, generate letters and words in 8 different colors, and in several sizes at the touch of a button. You can even control the letter spacing!

On the 8800, not only will your words be gorgeous, you can present them just the way you want 'em, too.

You can initiate roll and crawl at several speeds and adjust both the roll and crawl masking to achieve just the 'right' look. And you can also select crawl position and roll and crawl direction. An inter-active panel display 'walks' the operator through every move, so complicated effects are easy to make and error free.

All graphic font and title information is stored on floppy discs for quick, easy program changes and retrieval. And the 8800 features numerous custom fonts and other options, to help you create those very special images you want for your station.

If you want great video graphics, put your best font forward. Take a good look at the new 3M Datavision Model D-8800.
NAEB
continued from page 32
The Newark school radio project, CPB and PBS education activities, regional instructional television campaigns, instructional television programming update, the Essential Skills Learning project, technological advances in instructional television delivery systems, television in higher education, instructional radio/television in school emergencies, faculty involvement in school television course utilization, improving reading skills by television, and student involvement in television production.

The sessions are being developed on the basis of input we receive from our professional councils, which continually monitor the needs of their respective groups in broadcast and non-broadcast facilities throughout the country.

BE: Will the sessions be aimed at "blue sky" projections, innovative and/or practical solutions to everyday problems, descriptions of new hardware by manufacturers, or a combination of these?

Fellows: We are aiming for a healthy and realistic balance. Manufacturers will participate specifically in a general session of the technological "future" that they are forecasting and it is altogether likely that they will participate in other sessions within various convention programs.

Public broadcasting is unquestionably the innovator in the use of satellites for interconnection. Considerable attention during the convention will be devoted to the "here and now" in satellite transmission, as well as plans for nationwide interconnection by satellite for the public system.

BE: Looking past the 1977 convention, is the general direction of the NAEB shifting? If so, why?

Fellows: It would be fair to say that the NAEB is shifting its direction with changes in the field itself. The lines between the exclusive broadcast outlet and the non-broadcaster are becoming less necessary to distinguish. Many major broadcasting stations are developing other means of distribution and many non-broadcast systems are becoming larger and more diversified. NAEB reflects and encourages this kind of growth and development.

Looking past the convention:

Will the NAEB survive?

There are grumblings from many quarters that there are too many conventions, some going so far as to suggest the NAB convention should be held every two years instead of annually. Yet despite the complaints, conventions with equipment
continued on page 38

Performance-proven towers by Stainless ... the Leader!

Stainless has a proven record for building towers that withstand all types of weather and stresses—reliably!

- For TV, microwave, AM/FM, radar or whatever the requirement, towers are our only business and we've been building them for a long time—successfully!
- We build worldwide for commercial, military and government customers, putting the same quality in every structure, whether a 200 ft. radio tower, a 2000 ft. TV tower or an 8-tower array.
- Using the latest computerized engineering and automated fabrication helps us keep quality high, costs low and jobs on schedule.
- Choose Stainless—for proven performance!

Stainless, inc.

North Wales, Pa. 19454 U.S.A. • Phone 215/699-4871 • TWX: 510-661-8097

For More Details Circle (40) on Reply Card
From the World’s largest producer of custom video controllers...

**NEW STANDARDS of excellence.**

**SL VIDEO CONTROLLER SERIES**

Models are available for single or dual audio editing applications, plus master control mobile or studio production/post production and on-air applications.

**Features** include the addition of dual audio to editing models, Rho-Tery wipes, a dual fader arm DSK (with internal color gen and key PVW), **integrated image compression**, independent chroma key buffer amplifiers and controls, up to five levels of keying, torque adjustable fader arms, and for the larger production switchers, quad split with input selector.

**Other significant features** of the SL Series include up to 85 wipe patterns each with adjustable borders (softness, width, color), 10-18-26 inputs including color black and background, provisions for up to 12 external key sources, hybrid format that maximizes the performance to cost ratio, and packaging with front loaded PC boards for ease of access.

Also new in the series this year is the SL1000, “stand alone” downstream mixer/keyer. This device will offer broadcasters the capability to upgrade existing switching systems to include such features as full pattern effects with soft edge and color borders, Rho-Tery wipes, linear chroma keyer, external keying with border/dropshadow effects, program fade to black, etc.

The SL1000 DVIK is compatible with up to two (2) standard NTSC color signals (1 volt p-p composite) and up to four (4) key sources (0.7 volt p-p non-composite or 1 volt p-p composite).

---

**CUSTOM AUDIO/VIDEO CONTROLLERS**

The Computer Image Custom Video Controller line provides 30 different basic configurations varying from a simple 16 input 2 bus model to the top of the line 26 input 7 bus model. Each basic system can be equipped from a list of 45 defined options offering a wide choice of effects and system “expanders”. These can be supplemented further by special user defined options and configurations, e.g., the addition of custom machine controls or other ancillary monitors and controls. The custom design approach allows the discriminating buyer to design to his own exacting requirements.

---

**TECHNICAL AUTOMATION**

The AJM 440 Series automation system is a sophisticated broadcast operation controller offering significant advancements in reliability and simplicity. Because of its modular design, should failure occur, a self diagnostic feature expedites servicing. Other advantages include better system throughput and performance capabilities, such as an optionally available terminal to support production automation. The AJM 440 Series can be interfaced with a business computer system.

---

**DK8000/VIDEO CONTROLLER**

This new system offers features and value unique among video switchers. The DK8000 incorporates a number of advancements including multiplexing, L.E.D. indicators and readouts and keyboard M/E programming for efficient operations. The DK Series has been pre-designed to incorporate a small memory, thus allowing storage and re-call of complex production set-ups. Keyboard M/E programming offers remote operation in which all M/E functions (such as transition mode, line selection, pattern selection and key selections) may be quickly and efficiently entered via the key board. The DK8000 combines aesthetic appearance with optimum control panel operation to produce a powerful video production tool.

---

**DYTEK INDUSTRIES INC.**

2475 West Second Ave.
Denver, Colorado 80223
(303) 934-5804
The fire, earthquake, election and touchdown company now brings you love scenes in Studio Two.

The new HK-312 studio camera from Ikegami, the ENG experts.

Wherever there's been news, from natural disasters to national elections to sport events, Ikegami ENG cameras have been there with the news teams. Now Ikegami makes news of its own: the introduction of our new state-of-the-art HK-312 studio and field camera.

We've built ENG cameras so good in the rough-and-tumble of news-gathering that more Ikegami ENG cameras are in use than all others combined. So imagine how good an Ikegami camera can be in the stable environment of a studio.

Very good indeed.

Ikegami's new HK-312 color-TV camera is like no other. It has a built-in minicomputer that helps trim the daily camera checkout from a one-hour ritual to an automatic run-through that's shorter than a 20-second commercial. With its auxiliary computer, you'll be able to cycle your Ikegami HK-312 (and up to four other Ikegami HK-312 cameras linked to it) through every adjustment parameter in under two minutes: white balance, black balance, flare correction, gamma correction, video gain, beam alignment, and eight registration functions.

All this before you start shooting. The HK-312 gives you three 30-mm Plumbicon tubes for highest picture quality. You frame your shot on a high-intensity, high-resolution, seven-inch tiltable viewfinder. Signal-to-noise ratio is better than 54 dB.

We've combined the zoom lens and camera tube into a single rigid assembly for highest accuracy of the optical axis. Class-A deflection amplifiers assure maximum linearity and best picture quality. Black level balance correction is automatic. Picture quality and brightness are maintained in spite of flare.

A complete two-line image enhancer provides horizontal and vertical detail correction. A special comb filter keeps background noise to a minimum. All this and a lot more.

If your budget or production requirements are smaller, use our tried-and-tested TK-355 studio camera. Five were used for network feed at the 1976 Democratic National Convention where camera failure would blow a lot more than a few fuses.

The TK-355 uses three 25-mm Plumbicon tubes which are biashlighted for reduced lag at low lighting levels. This reduces studio lighting and air conditioning power consumption. And the camera is more compact and lighter, a little easier to maneuver. The unique half-rack CCU facilitates multi-camera studio installations.

Both broadcast cameras use TV-81 minicable for ease of handling.

If you need a small, fixed-position camera for announcer booth and news-casting, check out the Ikegami HK-809. It can be operated remotely or simply turned on and left in fixed position.

For movies, the Ikegami TK-950 is a large-image film-chain broadcast camera system for 16-mm or 35-mm film or slides with highest quality color reproduction. Much of its operation is automatic, requiring a minimum of engineering support. Its unique optical system is dust-shielded and unusually compact.

Ikegami has been famous for its ENG cameras for a long time. Now take a look at what we can do with studio cameras. For specs or a demonstration, get in touch with us. We have nation-wide distribution.

Ikegami Electronics (USA) Inc., 29-19 39th Ave., Long Island City, N.Y. 11101 • (212) 932-2577

Plumbicon is a registered trademark of N.V. Philips.
It's in the cards

and Integra 3 offers you a full deck

Mike preamps
Line preamps
Line amplifiers
Booster amplifiers
Bridging amplifiers
Stereo amplifiers
Stereo preamps
Four-channel booster amplifiers
Distribution amplifiers
Mixing amplifiers
Preamp/compressor
Mike preamp/compressors
Stereo mike preamp compressors
Stereo preamp/compressors
Preamp/limiter

Mike preamp/limiters
Stereo preamp/limiter
Stereo mike preamp/limiters
Stereo line preamps
Stereo bridging preamps
Stereo booster preamps
Monitor power amplifiers
Stereo equalized phono preamps
Stereo equalized tape preamps
Switchers
Line-level transformers
Stereo line-level transformers
Tone oscillators
Stereo mixing preamps
Tape automation oscillators
Tape automation notch filters
Mono and stereo remote controls.

We have more cards and they're less expensive.

Whether you are in broadcasting, recording, sound reinforcement, communications, engineered sound or theater sound—we have the cards for you.

Integra 3 is a complete system of audio processing components and accessories in modular form built around a large number of the highest quality, standardized PC boards which use the latest IC technology. The boards are compact in size (only 2½ by 7½ in.), use epoxy-glass 2-ounce clad material with precious-metal-plated contacts. The circuits are the latest IC op amps and other similar components which feature widest frequency range, lowest distortion, highest signal-to-noise ratios, best overall performance, maximum economy and reliability. Servicing is simplified by the slide-in/slide-out modular design.


SEE US AT NRBA—BOOTH 115

---

NAEB continued from page 34

exhibitions are necessary. Whether or not equipment exhibitions are necessary at every national convention, however, is another matter.

It's no secret that a well-run convention and equipment exhibition can be a great revenue-producing venture. But it's the exhibitor who usually pays the freight. And knowing this, the exhibitors are at the point of demanding better convention treatment and services.

For the attendee, choosing the most appropriate convention is a problem. There are so many these days that narrowing it down to a few must conventions is no easy task. In the last few years, we've seen the growth in popularity of the National Radio Broadcasters Association (NRBA), the Society of Broadcast Engineers (SBE), and the Industrial Television Association (ITVA).

For the educational broadcaster, there are many possibilities. ITVA covers the closed circuit field. NAB, SBE, SMPTE and NRBA hit the AM, FM and over-the-air side. But there is a gap, and that's where strictly public broadcasting, instructional TV and educationally-oriented AM and FM come in. While the equipment doesn't know where it's operating, these special interest groups do have unique problems, as well as problems common to most communications operations. And that's why there is a need for an organization with a name like the National Association of Educational Broadcasters.

Many other associations place so much emphasis on the commercial broadcaster that such acronyms as NPR, ITFS, PBS, ITV and CCTV serve to identify real minorities that, when lumped together, can be referred to as the non-commercial broadcasters. Better yet, they could be called non-commercial communicators.

Out of the same mold?

There has always been something different about this group of communicators. Maybe it's because they aren't faced with dollar returns on investments. It could be that they, for the most part, operate on or near the grounds of a college or university. Whatever the reasons, they need a clearing house for educational/non-commercial information.

And strangely enough, it has been these same types who have been a

continued on page 40
Editing Videotape Means AUDIO as Well as Video

Most videotape editing systems ignore audio. They solve only half your editing problems. The Convergence ECS-1B Joystick Editing System with Liplock™ solves both your audio and video editing problems and sets a new world standard for speed and precision.

Now that you’ve selected your edit points in world record time, set another speed record for getting that edit on tape with our new switchable Half-Time edit cycle.

Half-Time reduces cue pre-roll, post-roll and recue times by 50% and saves crucial time when you need it the most.

Liplock™ and Half-Time are deliverable now and available only on Convergence ECS-1B Joystick Editing Systems. As a matter of fact, we even have the patent* on Joystick Editing Systems. Call us for a demo—There’s a lot more you need to see—and hear—for yourself.

Editing Means Convergence

CONVERGENCE CORPORATION
17935 Skypark Circle
Irvine, CA 92714
714/549-3146
For More Details Circle (44) on Reply Card

*U.S. PAT #4040098
The eyes of the world are upon us.

Around the world, more people now look to Electrohome for excellence in video equipment than ever before.

We manufacture solid state video monitors in monochrome and color to NTSC and PAL standards for broadcast, educational, industrial, commercial, medical, security and data applications.

The reason for such wide-spread acceptance is two-fold: a standard of quality and a record of service to our customers that have earned our products top rating around the world.

For complete information, contact Electrohome Limited at one of these offices:

Electro-Visual Corporation of America
3617 West Macarthur Blvd., Suite 508, Santa Ana, Calif. 92704
(714) 545-6991

Electrohome (U.S.A.) Limited
182 Wales Ave., Tonawanda, N.Y. 14150
(716) 694-3332

Electrohome Limited
809 Wellington St. N., Kitchener, Ontario N2G 4J6
(519) 744-7111

ELECTROHOME
...an extra degree of excellence in video equipment for every application.

Distributed in:

Austria France Netherlands Sweden
Australia Greece New Zealand Switzerland
Belgium Hong Kong Norway Taiwan
Canada Israel Philippines Thailand
Denmark Italy Portugal United States
Egypt Japan Saudi Arabia United Kingdom
Eire Malaysia South Africa Venezuela
Finland Mexico Spain West Germany

For More Details Circle (45) on Reply Card

NAEB
continued from page 38

vital part of the broadcast industry, sometimes even leading the way into fresh viewpoints or technological innovations. (The origins of several well-known radio stations can be traced to the engineering department of various state universities.)

"The eyes of the broadcast industry will once more focus on our educational stations. And, once more the challenge of the times will be forced upon the National Association of Educational Broadcasters."

And now we see the movement of satellite program relay being set up for what could be the largest radio network. And it's coming through educational stations. The eyes of the broadcast industry will once more focus on our educational stations. And, once more the challenge of the times will be forced upon the National Association of Educational Broadcasters.

If attention will be given to the individual needs of this presently almost homeless group, as the NAEB promises, there will be little need in the future to beat the drums for upcoming conventions. For aside from the fact that their needs must be met by some professional association, it is a fact that technological developments are coming along so fast in the 1970s that not even the most professional of them all can satisfy the tremendous need for more and more information.

Convention theme choice will become of greater importance. Any professional association today offering seminars, sessions and literature on digital basics and digital troubleshooting would have long, wonderful lines waiting at the registration desk. Equally important, the successful convention of the future depends upon satisfying the needs of the attendee and the exhibitor.

So what happens next?
It's up to the NAEB now. Their hopes and aspirations might not be fulfilled in Washington this November, but there is every indication that the NAEB is finally headed in the right direction. We'll take a flyer on the 1977 convention, biased mostly on interest and need. If the promises are not fulfilled, there will be little hope for future years, and other associations will be forced to pick up the load.
The Marconi MARK VIIIB is the largest selling, fully automatic color camera in the world today. With all the features shown as STANDARD and NOT OPTIONS, it offers outstanding value without compromise. You may think we're expensive with all this luxury. Call us — you'll be pleasantly surprised at how competitive we are!

- Fully automatic registration
- Continuous auto centering from live scene
- Automatic color balance from live scene
- Electronic color temperature control
- Automatic self-diagnostic check out
- Choice of pick-up tubes
- Tilting view finder
- Standard or mini cable
- Portable MARK VIIIP uses same CCU

Let us show you the Marconi MARK VIIIB and prove that YOU DON'T HAVE TO SETTLE FOR LESS.

Marconi Electronics, Inc.
100 Stonehurst Court • Northvale, New Jersey 07647 • (201) 767-7250
For More Details Circle (46) on Reply Card

www.americanradiohistory.com
ENG: It pays to be committed

By Phil Dean

The news tradition of KSTP started in 1925, when the station established the first local radio news department of any station in the country. Back in those days the call sign was WAMB. And as you’d suspect, in the ’70s KSTP-TV’s news emphasis rides on ENG, a move that began two years ago.

Unlike many TV stations which use their ENG equipment solely for ENG, KSTP-TV encourages experimentation with the mini-cameras for creative programming.

KSTP-TV is the flagship station for Hubbard Broadcasting, Minneapolis-St. Paul. And that news tradition was started by Stanley E. Hubbard, chairman of the board. News emphasis in the future is assured with his son, Stanley S. Hubbard, working as president of the company and general manager of KSTP-TV/AM/FM. Their goal is to keep the emphasis on news by supplying their news staff with “an environment, equipment and talent” to insure that the commitment to news is maintained.

Consequently, KSTP-TV has established a news approach in the Twin City market that has gained national recognition not only for its news excellence, but also for its creative use of the ENG gear for unique programming. These efforts continued on page 44

Consistent use of ENG is the key to an effective approach to the news. It’s also an expensive investment if it’s not in regular use.

KSTP’s ENG action-cam team is shown here before a pro soccer game at Metropolitan Stadium.
No matter what size your station, or how fast you're growing, TFT has a digital remote control system that can fit your budget and grow right along with you.

It's called the TFT 7600 System.

It's Expandable. The root of 7600 is the Model 7610, 10-channel Raise/Lower System. Add Model 7615 Direct Control and Status Monitoring System and you have 15 more digital controls and 15 more status indicators. Now add Model 7620 or 7630 Channel Expander at the remote point and you increase the Raise/Lower control capability up to 3 fold. Several Expanders may be added to provide up to 110 channels of digital remote control and status indication. Finally, the Model 7640 Multiple Channel Data Display adds the digital display capability for simultaneous meter readings plus Limit Alarms and Automatic Logging.

It Saves Operating Costs. Your weekly calibration can be performed by one person. Also, several different remote sites can be operated by one person from a single control point.

It's Reliable. Proprietary TFT double-scan-compare digital data filtering plus parity check ensures highest possible data integrity throughout the system.

It's A.T.S. Compatible. Full provisions for A.T.S. (Automatic Transmission Systems) are built into the TFT 7600 System. An A.T.S. Override is also provided.

It's Wire or Wireless. TFT 7600 is designed to operate on either a voice grade phone line or STL and TSL transmission links.

It's Economical. Now you can have a full digital remote control system at competitive prices to analog, and at about half the cost of other digital systems.

As with all TFT broadcast products, engineering excellence is the key to acceptance. That's why, in the 9 months since TFT 7600 was introduced, over 60 systems have been delivered and are now handling the remote control needs of every size radio and TV station throughout the country.

Plan for your growth potential now, with the flexible TFT Model 7600 Digital Remote Control System. For full information, call or write TFT. In Canada, call C.C.A. Caldwell (800-261-4088)

See the 7600 at NRBA
Inside the van, Jim Biagi checks one of the cameras, while Al Kaplan makes last minute adjustments.

The specially designed master control console is the core of the communication system. More than 40 channels are covered, including communications with two-way equipped radio cars.

When Hubbard's son decided that the news staff needed more space to become a more effective department, he spared no expense and completely renovated the station at a cost of about $2 million. The core of the renovation was a wing that connected the original KSTP-TV building with an adjacent building.

The entire first floor, over 10,000 sq. ft., was assigned to the news department. It's beautifully decorated with wall-to-wall carpeting and is scientifically lit. All of the continued on page 46

**Datametrics Model SP-722**
Generates/Translates SMPTE Code and Displays Time on Video Monitor along with Subject Matter.

**Generate**
- Time Code/User Bits
- Video Synchronization
- Jam Synchronization

**Translate**
- 0.25 to 10 Volt Sensitivity
- ¼ to 40 Times Speed
- BCD Outputs

**Time Display**
- Infinitely Positionable
- Size and Style Selectable
- Intensity Variable

Gould Inc., Control and Systems Division
340 Fordham Road, Wilmington, Massachusetts 01887  
Telephone (617) 658-5410  TWX 710-347-7672

For More Details Circle (48) on Reply Card
The finest multi-core studio and field camera system ever produced by Philips.

Which means the finest multi-core studio and field camera system ever produced.

In the decade since Philips re-invented color with the Plumbicon* tube, its PC-60 and PC-70 have successively stood as the reference standard for broadcast performance. Behind Philips leadership, that standard has steadily improved to today's ultimate—the LDK-25.

That Philips has again leapfrogged the competition can surprise no one who knows broadcast cameras...since we created Plumbicon technology. After a decade of refinement and improvement Philips is still the only company that manufactures all of the critical picture determining components—computer-matched yokes, beam splitting prism, deflection circuitry and Plumbicon tubes. The only company that can design each component for optimum performance of the entire camera system. These advantages, of superior Philips design and in-house component availability, offer you unsurpassed stability, picture quality and value.

Further, at Philips, we offer you options that are options. The LDK-25 you buy is a custom unit, equipped with the automatic features you select...not a 'loaded' factory package.

But you can't just read about the LDK-25...you've got to experience it.

Only a demonstration can show you how our anti-comet-tail Plumbicon tubes handle highlights up to 32x normal peak-white level without blooming or streaking—and without loss of our famous color rendition and resolution. 'Live' is the only way to learn what our Color Line-Up Equipment (CLUE) can do for ease of balance...what electronic color temperature control, auto white balance, flexible auto iris and contrast compression mean in use.

Only after you've seen it all—after you've actually handled this remarkable camera—will you understand why the Philips name is a guarantee of incomparable stability...why no one else can match our 1000-hour performance.

To get your hands on an LDK-25 or to get more information, call us today at (201) 529-3800, or write: Philips Broadcast Equipment Corp., 91 McKee Drive, Mahwah, N.J. 07430.

For Demonstration Only Circle (49) on Reply Card
For Literature Only Circle (50) on Reply Card
This is one of KSTP's four editing rooms located along the perimeter of the newsroom.

Film is still a factor in covering the news. Here Gary Hill works on a triple reel convergence system developed for KSTP's setup.

ENG continued from page 44

equipment, most of which was specifically designed for the station, is positioned for the most efficient and maximum access by the staff.

Although the KSTP-TV newsroom has the openness associated with the city room image of major newspapers, the clutter and clatter is missing. Electric typewriters now occupy reporters desks. the teletype machines are of the latest silent "X-Tel" variety. and the AP's new laser-style photo copier is within reach of the photo editor.

The Dispatch Center

The functional core of the news center, from a communications standpoint, is the "Dispatch Center" featuring a specially designed Motorola console which operates on four separate channel frequencies. Three units operate on 160 MHz and one on 450 MHz for instant communication with the ENG crews in the field.

The Dispatch Center controls all the taping of news. From the Center, stories are distributed to the news editor, and a teleprinter machine sends them to the ENG crews in the field. Stories as well as key words and phrases are sent to the ENG crews on the field through the four-channel system. This system is then relayed to the newsroom through the dispatch center.

Should you play the same Old Numbers Game?

...or the now generation numbers?

ATHENA® 4000 * ATHENA® 5000

The Athenas give you six more features than the RCA TP-66 or the EK CT-500:

AT LOWER COST!

1. Freeze-frame, instant start/stop, animation, slo-mo — all direct from film to tape by TV film chain.
2. Digital control CMOS circuitry for complete low-voltage remote control and/or computer control.
3. 115V 60 Hz or 220V 50 Hz
4. Modular digital design for easy service.
5. Extended 2-3 year warranty.
6. Insured against obsolescence—retrofittable to new design improvements and options.

Call or write Pat Smith, Dave Stern or Bob Lawrence for additional information and/or name of nearest dealer.

L-W INTERNATIONAL
6416 Variel Avenue
Woodland Hills, CA 91367 U.S.A.
Telephone: 213/348-8614 • TWX 910/495-1714

For More Details Circle (51) on Reply Card
Here's how useful a distortion analyzer can be

Monitor voltage, power, distortion or dB ratio.

No manual nulling controls required (the 1710A is always in auto-null, reaches a null in less than 5 seconds).

Intermodulation Distortion Analyzer optionally available.

Oscillator distortion is typically 0.01%.

±1 dB Vernier adds fine level control.

Internal oscillator adjustable from 26 dBm to -89.5 dBm in 0.1 dB steps.

Turn off oscillator for quick S/N measurement.

Tuning indicators help measure distortion of an external source.

Simultaneously select oscillator and analyzer frequency with fast-to-use pushbuttons. 10 Hz to 110 kHz.

Balanced and floating 150Ω or 600Ω Generator output.

Measure distortion down to 0.002%, voltage or S/N ratios with 100 dB dynamic range.

View distortion products on a scope.

Automatic Set Level is optionally available.

View input signal on a scope.

Two of the above features are so outstandingly valuable that we especially invite your attention to them.

One is the fast, easy measuring you get with pushbutton-selected distortion-measuring circuits (signal source and measuring circuits are simultaneously selected with the same pushbuttons). Pushbuttons make it so simple to measure quickly and to repeat measurements.

Secondly, you can drive virtually any type of circuit from the signal source output — whether balanced, unbalanced, off-ground or whatever. That's because the signal source output circuit is fully isolated and balanced. **There is no output transformer** to introduce noise or distortion.

Besides these outstanding conveniences, you can have the Sound Tech 1710A with an option that enables you to measure intermodulation distortion.

Call Mike Hogue/Larry Maguire to get full information on an instrument recognized everywhere as the standard of the audio field.

SOUND TECHNOLOGY
1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540

For More Details Circle (52) on Reply Card
Learn electronics easier... with HEATHKIT®

MONEY-BACK GUARANTEE

We're so confident you will enjoy and benefit from these five courses, that if for any reason you are dissatisfied, we will refund the full purchase price of the course text material.

Unique Heathkit Electronics Courses are designed to provide you with a complete overview of basic and advanced electronics. You learn at your own pace, without pressure or deadlines, and all material is presented in a clear, logical, step-by-step fashion. It's the ideal, effective way to learn about electronics if you're a beginner, or to "brush up" on the latest techniques and theory.

Courses start as low as $39.95 (less trainer)

Thousands of people just like you have already learned electronics the easy Heathkit way — and you can, too. The secret is our efficient approach to self-learning with easy, step-by-step "programmed" instructions; audio records to introduce and reinforce key concepts; self-evaluation quizzes to test your understanding; and interesting experiments that let you learn the easy "hands-on" way. All you need is a record player, small tools and a VOM. The optional Heathkit experimenter/trainer is specifically designed to help you do the experiments in each course, and when you finish the course, you can use it to design and breadboard your own circuits. After completing each course, you can take the optional final exam (passing grade 70%) and receive both a Certificate of Achievement and Continuing Education Units, a nationally recognized way of acknowledging participation in non-credit adult education.

ORDER NOW — GET THESE BONUS SAVINGS!

GET THIS WELLER SOLDERING IRON worth $7.95 FREE! with your order A 40 watt iron for easy kitbuilding

Buy Any Single Course with Trainer and — Save $9.95

Buy Courses 1 thru 4 with Trainer and — Save $24.95

Heath Company, Dept. 558-331 Benton Harbor, Michigan 49022
faster...at lower cost...
Learn-at-home Courses!

COURSE 1: DC Electronics
An ideal introduction to electronics. Covers current, voltage, resistance, magnetism, Ohm's law, electrical measurements, DC circuits, inductance and capacitance. Discusses matter, atoms, current, flow, voltage rises and drops, series and parallel connections, magnetic fields, voltage dividers, network theorems, more. Includes text, records and 56 parts for 20 different experiments. Average completion time, 20 hours. 2.0 Continuing Education Units and certificate for passing optional final exam.
Course EE-3101 .......................... 39.95

COURSE 2: AC Electronics
Provides an understanding of most commonly used circuits. Covers alternating current, AC measurements, capacitive and inductive circuits, transformers and tuned circuits. Discusses waveforms, period and frequency, meters, scopes, series and parallel circuits, RF filters, dividers, phase shifts, reactance, vectors, transformer theory and characteristics, series and parallel resonance, more. Includes text, records and 16 parts for 8 different experiments. Average completion time, 15 hours. 1.5 Continuing Education Units and certificate for passing optional final exam.
Course EE-3102 .......................... 39.95

COURSE 3: Semiconductor Devices
Essential for understanding latest solid-state equipment. Covers fundamentals, diodes, zener diodes, special diodes, Schottky, transistor operation and characteristics, FET's, thyristors, integrated circuits and optoelectronics. Discusses holes, current flow, N and P types, biasing, tunnels and varactors, PIN, IMPATT, gain, cutoff and leakage current, SCR's, Bi-directional diodes, light sensitive and light emitting devices, more. Includes text, records and 27 parts for 11 different experiments. Average completion time, 30 hours. 3.0 Continuing Education Units and certificate for passing optional final exam.
Course EE-3103 .......................... 39.95

COURSE 4: Electronic Circuits
Outstanding explanations of basic circuits. Covers basic amplifiers, operational amplifiers, power supplies, oscillators, pulse circuits, modulation and demodulation. Discusses amplifier functions and configurations, class of operation, audio characteristics, video amplifiers, buffers, IF's, rectifiers, voltage multipliers, voltage regulation, basic oscillators, RC waveshaping, clipping, AM, FM and SSB, modulation fundamentals and more. Assumes knowledge of courses 1 through 3 or equivalent and requires an oscilloscope for some experiments. Includes text, records and over 110 parts for 18 different experiments. Average completion time, 30 hours. 3.0 Continuing Education Units and certificate for passing optional final exam.
Course EE-3104 .......................... 49.95

LEARN DIGITAL TECHNIQUES
Our most advanced self-learning course prepares you for the world of computers and microprocessors, with particular emphasis on circuit design. Covers digital fundamentals, semiconductor devices for digital circuits, digital integrated circuits, Boolean algebra, flip-flops and registers, sequential logic circuits, combinational logic circuits, digital design and digital applications. Discusses TTL, ECL, CMOS, PMOS, NMOS, integrated circuits; \$51, MSI and LS1; ROM's, PLA's, microprocessors, computers and more. Assumes completion of Heathkit courses 1 through 4 above, or equivalent knowledge. The special digital techniques experimenter/trainer helps you perform all the experiments in this course, and when you complete the course, build and design your own circuits. Course includes text, records and 44 parts for 24 different experiments. Average completion time, 40 hours. 4.0 Continuing Education Units and certificate for passing optional final exam.
ORDER DIGITAL TECHNIQUES PROGRAM AND TRAINER .................. $109.95

HEATH IM-17 VOLT-OHM METER
All Electronic Learning Programs require a VOM to make electrical measurements. We suggest the Heath IM-17 as the ideal "all-purpose" unit. All solid state with TTL output for better accuracy. Portable battery operation, zero and ohms adjust, accessory probe jack. Comes with DC polarity switch, three test leads, batteries not included. Easy 3 hour assembly.
ORDER KIT IM-17 .................... $32.95

HEALTHKIT EXPERIMENTER/TRAINER
For use with Heathkit Electronics Courses 1 through 4 — helps you perform all the experiments quickly and easily. Has solderless breadboarding sockets, dual variable power supply for positive and negative voltages, sine and square wave signal source, centered tapped line transformer. After you complete the course, the trainer is ideal for experimenting and breadboarding with your own circuit designs.
Kit ET-3100 ......................... $59.95

Order Form/Agreement
Heath Company, Dept. 556-331
Benton Harbor, Michigan 49022

Please send me items checked below and include FREE 7.95-
value Weller Soldering Iron (GP-1105).
☐ Send one course (checked below) with the Experimenter/Trainer (ET-3100) at the special price of only $99.95 plus $3.00 shipping and handling.
☐ DC (EE-3101) ☐ AC (EE-3102) ☐ Semiconductors (EE-3103)
Send me the Electronic Circuits Course (EE-3104) with the Experimenter/Trainer (ET-3101) at the special price of only $99.95 plus $3.00 shipping and handling.
☐ Send all four of the courses above (EE-3101, 3102, 3103, 3104) with the Experimenter/Trainer at the special price of just $199.95 plus $4.50 shipping and handling.
In addition, please send the following courses (less trainer):
☐ DC (EE-3101) ☐ AC (EE-3102) ☐ Semiconductors (EE-3103) for just $49.95 plus $1.50 shipping and handling each.
☐ Electronics Circuits (EE-3104) for just $49.95 plus $1.50 shipping and handling.
Send me the Digital Techniques Course (EE-3201) with its Experimenter/Trainer (ET-3300) for only $199.95 plus $3.00 shipping and handling.
Also send me that IM-17 VOM kit for just $32.95 plus $1.50 shipping and handling.
Michigan residents add 4% sales tax.
I enclose ☐ cash ☐ money order for $_________ or Charge to my:
☐ BankAmericard Accn. No. Exp. Date
☐ Master Charge Acct. No. Exp. Date
☐ If Master Charge, Include Code No.
Signature: _______________________
Name (please print) _______________________
CITY ___________________ STATE ___ ZIP __________
ADDRESS ____________________________________________

Broadcast Engineering ED-105A
www.americanradiohistory.com
ONE THING ABOUT THE NEWS BUSINESS: YOU NEVER GET A SECOND TAKE.

Here's a videocassette made for the people who make the news.
It's the new "Scotch"* Brand Master Broadcast U-Matic videocassette. MBU for short. The first ¾" videocassette designed specifically for tough ENG recording and the repetitive stress of editing.

We took the same high energy oxide videotape you've used for years and fused it to an incredibly strong backing. The result is a videotape that won't twist, tear or jam in the field. An unyielding videotape that won't stretch under the strain of tape editing's shuttling modes or degrade in extended stop motion.

And to protect it even under the worst conditions, "Scotch" MBU videotape comes packed inside a high impact cartridge.

Of course, "Scotch" MBU videocassettes have the same high signal-to-noise ratio and low headwear and dropout rates of our superb quad tapes.

So if you've ever worried about a good story and a videocassette breaking at the same time, record on "Scotch" Master Broadcast U-Matic videocassettes. They'll always back you up.

"Scotch" MBU Videocassettes.

"Scotch" is a registered trademark of 3M Company, St. Paul, Mn. 55101. © 1977, 3M Co.
one of four editing rooms, located along the side of the city room, for processing and story selection. The editing rooms are equipped with two 2850 Sony 10-line tape systems that are much faster than normal editing systems. Each of the areas has an announce booth with audio that is tied to the overall communications system. The booth is also used for adding on audio portions to the tape.

The Center also monitors over 40 separate channels: police, fire, public service and others, and is equipped with a scrambler for private communications with the 40 separate two-way systems in news staff and management cars.

KSTP-TV news staffers also have at their disposal two aircraft. An F-27 is used for stories outside the Metropolitan area and their helicopter can be summoned for instant use for coverage of fast-breaking stories.

**Mercedes Mobile Units?**

The cars utilized by the news staff are probably the most unique ENG equipped mobile units in the country. In addition to the remote mobile van, which is completely equipped to originate live remotes via microwave, the station boasts three Mercedes-Benz limousines. Each of them carries a two-man ENG crew equipped with a minicam ENG camera and a tape recorder for instant editing.

The Mercedes-Benz were bought by the elder Hubbard for several reasons. Being diesel driven they consume less fuel, they’re easier to maintain in cold weather (a major factor in Minnesota), and they can be driven over rougher terrain than American cars with a far smoother ride. And, as Hubbard puts it, “They’re great public relations assets for our news staff. What other news staff drives around in a Mercedes-Benz?”

In addition, the trade-in value and life expectancy of the Mercedes-Benz far exceeds that of American cars.

KSTP-TV’s advocacy of the superiority of ENG cameras as overall news and general production equipment has been strong. Since the time they were first unveiled, the station has acquired several more portable cameras. All the other television stations in the Hubbard Broadcasting Company are now equipped with the latest in ENG gear.

Hubbard’s dedication to the further use of the ENG cameras for news and feature programming was emphasized recently when Chief Engineer George Merril ordered 10 new cameras, totalling over $500,000 for the new equipment.

With the innumerable advances in signal processing and editing equipment, Merril is continually searching for technical equipment which can be used to carry on the process of upgrading the signal that goes out over the air.

Where news is concerned, whether it’s the collection, communication, distribution, programming or presentation, the policy of the Hubbards has always been, “Spare no Expense” and over the years the reputation of KSTP-TV has grown in its excellence in news programming and has gained national recognition.

---

**Editor’s Note:**

Effective use of ENG implies a commitment. If stations look upon ENG equipment as effective only for coverage of hot, late-breaking news stories, the image of local news will suffer. Most stations are still running their news right off the news set. This approach boxes-in the news, cutting off the extra dimension film and ENG offer.

And it doesn’t change the image to get out occasionally. That only tells the viewer that you can do it. Then he wonders why you don’t do it more often. Doing it more often makes you different, creating an image of real interest in the local news.

The tough part of a commitment to ENG is that its use must be consistent.

---

Ron Merril
Microtime, the leader in video signal processing, offers a complete family of video correction systems. Time Base Correction, Image Correction, and Automated VTR Programming, All with Microtime's proven reliability.
PROFANITY is no problem for WTIC

By Michael Russell, Engineering Supervisor, WTIC-AM-FM, Hartford, Conn.

When the decision was made at WTIC to change over our 6:20 p.m. to 6 a.m. programming to a telephone talk show format, we were faced with the need to purchase or develop the most efficient equipment to do the job. We knew that we would be using one studio for most of the on-air work and that we'd have to solve the problem of getting in and out of delay without any loss of air time.

Our first task was to look at other telephone talk shows. We considered every aspect of the show, including engineering, production, and talent. We also drew heavily on our own experience of doing a telephone talk show. After all, we had been running one ourselves for 20 years.

From our observations, several criteria arose:

1. We would have to develop, along with our local telephone company, an entirely new telephone assembly capable of conferencing several lines together.

2. We would have to delay the programming with a delay cartridge machine, instead of our present system of two reel-to-reel machines.

3. A cartridge system would have to be developed that would not leave dead air as we went in and out of delay.

4. A system would have to be developed that would automatically start and sequence all these machines with one-button operation.

5. A system of profanity editing would have to be developed that would be foolproof.

Telephone system

The concept of our telephone system is based on one developed at WCAU-Philadelphia by Chief Engi-
PORTABLE BROADCAST REMOTE PICKUP TRANSMITTER

Model RPT-1 Series

FEATURES:
- Portable operation on internal rechargeable nickel-cadmium battery. Total weight only 5½ lbs.
- All Solid-State Built-In battery charger
- Dual frequency operation (One crystal included) Meter indicates battery condition and modulation
- Whip antenna mounted directly on unit
- Broadcast-quality Compressor/Limiter handles toughest remote pickup conditions
- Two microphone inputs (one push-to-talk) and one Hi-Level input each with individual mixing gain control

MOBILE RELAY RECEIVERS

Models RR-30/150
RR-50/450

Transforms a mobile RPU transmitter into an automatic relay station

REMOTE PICKUP

150 - 450 MHZ

RPT-40 (150 MHZ)
RPT-25 (450 MHZ)

FEATURES:
- All Solid-State
- Direct FM Modulator
- Modular Construction
- Test Meter Built in
- Proven Reliability in hundreds of installations
- Unsurpassed for Dual Channel Stereo STL, Single Channel AM STL or Inter City Relay

SPECIFICATIONS - STEREO

Stereo Cross Talk — 65 DB
Noise — 65 DB or less
Response ±0.5 DB 30-15000 Hz.
Distortion Less than 0.5%

PRICES

Dual Channel Stereo $4,160.00
Single Channel $2,290.00
Cost of Antenna Systems not included.

STL-8 ACCESSORIES

RMC-20 Digital Remote Control
ST-10/ST-10 Digital Status/Alarm
RMC-2AX Analog Remote Control
SCG-8 SubCarrier Generator
SCR-8 SubCarrier Receiver
ASO-8A Automatic Transmitter Switcher
ASO-200A Automatic Receiver Switcher
CLA-40A Compressor/Limiter
HRC-8A Transmitter Combiner
Complete Antenna Systems

Also...

- Automatic Repeaters
- Base Stations
- Complete System Packages Including Antennas

Who builds a simple, effective, reliable, versatile, reasonably priced compressor/limiter with thousands of satisfied users in the AM-FM-TV and Recording industries?

MARTI

For More Details Circle (56) on Reply Card

P.O. BOX 661 • 1501 N. MAIN
CLEBURNE, TEXAS 76031
817/645-9163

September, 1977
WHICH ONE
IS THE BGW?

Theirs and ours. Brand C and the BGW. We thought it was about time to give the whole story—in one glance. Here are twelve good reasons why you should demand a BGW for your next amp. It's obvious, isn't it?

1. A massive heat sink assembly—330 square inches.—modular.
2. L.E.D. front-panel clipping indicators (driven by a sophisticated one-shot circuit, they are turned on to full brilliance if the amplifier is clipped).
4. Unlimited output stage design; no form of output limiting is required.
5. Extremely stable output which delivers 30 watts minimum average continuous power per channel, with I.M. distortion less than 0.01% to rated output.
6. Instantly convertible normal dual channel operation to bridged mono mode (80 watts. I.M. distortion less than 0.01%)
7. Fully shielded power supply for noise improvement. Hum and noise level—better than 106db below rated output into 8 ohms.
8. Teflon insulated harness wiring, modular epoxy glass circuit board for ease of servicing, hermetically sealed metal can transistors in all signal handling circuitry, and 5% tolerance precision resistors.
9. 16 gauge welded steel packaging.
10. Individual channel gain controls.
11. Both chassis and circuit grounding available at rear panel barrier strip—eliminates troublesome ground-loop problems.
12. Professional Cannon-type input connectors and provisions for plug-in input matching transformers available (order option Model 100-01).

Take a close look. And don’t be surprised if you never again see the inside of the above amp. It’s the Model 100 from BGW—just one in a full line of proven amplifiers built for the professional.

THE PROFESSIONAL'S CHOICE
neer Jack Miller, with help from Bell Telephone of Pennsylvania. They designed a system that would conference up to five lines at one time. Working with our Southern New England Telephone Company, we adapted this system to our needs.

The conferencing operation takes place in the studio without the assistance of an outside operator. An important feature of the system is the use of a telephone speaker phone system, but not in the conventional manner. Through a telephone repeat coil, we feed the studio microphones into the speaker phone transmitter. This assures that everyone in the studio who is on mic also will be heard by the telephone caller. This direct feed also eliminates the hollow "harney sound" that is commonly associated with speaker phones.

The great advantage of the speaker phone is its AGC action and sidetone nulling. Our audio for on-the-air use comes through a telephone repeat coil from the speaker phone. This assures good, clean audio with AGC, with sidetone nulling, and also assures that the audio heard by the audience is the same that is heard by the announcer.

We further improved the telephone audio quality by processing it through a graphic equalizer. This allows us to shape the audio response of the call and make it more intelligible. We greatly attenuate frequencies above 3 kHz, since there is little available voice information in this range. We add 3 to 5 dB gain to frequencies from 300 Hz to about 2 kHz. By switching the equalizer in and out, you can readily appreciate its value as an audio processing tool.

The next step is to take the equalized audio and process it through a limiter. This gives us an additional level control before the audio reaches the console. We limit the average call from 5 to 7 dB. This gives us some additional gain on weak calls. On a strong local call, we can limit up to 20 dB. When the speaker phone AGC reaches the end of its effective range, the limiter takes over. With this arrangement, the engineer has to make very few gain adjustments throughout the course of the show and has more time to concentrate on other matters, such as commercial breaks.

**Delay system**

We have been doing a telephone talk show for 20 years and we have been delaying the programming by four seconds with two Ampex 351s. This system worked fine. However, when we decided to do this show continuously for almost 12 hours a day, the system became a little impractical. The choice was clear: We would use a delay cartridge system.

We chose a delay machine built by UMC's Beaucart Division. We worked closely with Beaucart and developed a new delay machine using a Beaucart Type 20 machine. With on-air quality paramount, we decided upon full track record/playback and erase. This system gives maximum signal-to-noise ratio and maximum erasure.

**Profanity fill system**

What makes our delay system unique is the use of secondary and

---

**Micro-Perfect Film Cleaner/Conditioner**

LIPSNER-SMITH CF200

- Smaller in size
- Smaller in price
- Same capacity as larger units

**NEW!**

Nothing touches your film except filtered air and cleaning/conditioning liquid

WORLD'S SAFEST SYSTEM

This is the same CF2 micro-perfect cleaning/conditioning method used by leading television stations, motion picture studios and labs in 60 countries. Now offered in a new, slightly smaller model at 40% less cost. From ultrasonic bath to the patented non-evaporative drying system, nothing but air and liquid touch your film. Lipsner-Smith cleaning improves sound as well as picture quality.

*Send for free full-color specification brochure today.*

LIPSNER-SMITH CORPORATION
4700 Chase, Lincolnwood, Illinois 60646
312/675-8473; 800/323-7520 (Toll-Free)

---

**TV 120**

The First Film Care Machine Specially Designed For Television's Demanding Uses

Now there's a proven way to help eliminate make-goods and improve on-air film quality. The model TV 120 Film Inspection/Cleaning Machine with Previewing and Editing Capabilities gives you all this and more!

High speed inspection (up to 1600 FPM) lets you find film defects easily before air time! Find edgecuts, bad perforations, poor splices and cue tabs. Cleans away surface dirt for top quality image and audio when film is aired. Easy film editing with large 40-sq. inch PREVIEWER screen for sharp picture quality, clear sound; choose sound speed or variable edit 0-400 FPM. Digital, sprocketless film counter for accurate film timing and editing, preset function allows automatic stopping.

4700 CHASE/LINCOLNWOOD/IL/60646
312/677-3000; 800/323-7520 (TOLL-FREE)

For More Details Circle (58) on Reply Card

---

For More Details Circle (59) on Reply Card

BROADCAST ENGINEERING
Now there's a JBL monitor specially designed for broadcast studios.

Fits on EIA Standard Rack shelf.

Does your monitor tell you about turntable rumble and ambient noise (like your air conditioning) and tape hiss and cue tone leakage? The JBL 4301 will.

Our call letters. If you're tuned into the professional recording studio business, you know about JBL's studio monitors.

If you're the station engineer or the jock on duty, why should you be the last to know what sound you're putting out?
Listen to the JBL 4301. It's a compact that delivers wide band sound reproduction accuracy—the kind of accuracy your station is going to need to keep up with the new broadcast standards.

Among other good things, the 4301 has exceptional clarity, solid bass, open high frequency reproduction and a nice honest face.

If you'll fill out the coupon, we'll send you a lot more specs and the name of your nearest JBL Professional Products Dealer who would be very glad to set up a test listening at your convenience.

September, 1977

For More Details Circle (60) on Reply Card
**Cart machines**

continued from page 60

tertiary cues in the fill cartridge machine. In other words, the "fill cartridge" machine is used to present prerecorded audio on the air when the studio is going into the delay mode. This eliminates dead air and gives smooth transitions from real-time audio to delayed audio.

The first function of the "fill cart machine" for each hour is promo fill. This consists of a prerecorded announcement telling listeners to stay tuned for a certain show. This cartridge is encoded with two additional cues. A tertiary cue is used to achieve a cue light and sound a "Sonolert." This lasts about 1/2 second, signaling the engineer to start the show. There is no guesswork as to how much to "lead" the promo fill as the promo fill tells you when to go. The tertiary cue is always eight seconds before the end of the audio. The secondary cue is always placed at the end of the fill promo audio. This tone is used to switch the studio output line from the fill machine to the output of the delay machine.

The fill cartridge machine also serves as the proficiency fill machine. As soon as the opening promo fill cartridge has recycled, the producer changes cartridges in the fill cartridge machine. This "profanity fill" cartridge will remain in the machine on a stand-by basis until the end of each hour.

We use two systems for proficiency editing. The first system consists of lifting the audio output of the studio for as long as the "Spot edit" button is depressed. This is ideal for deleting a person's name, commercial mention, or an occasional mild profanity that might be uttered by a guest. The other system consists of dumping out of the delay mode as soon as the "profanity dump" button is depressed. This assures complete certainty of catching a profanity, since the audio is dumped as soon as the button is pressed. This can be activated by the producer, engineer, or announcer.

As soon as the profanity dump button is activated, a warbling Sonolert goes off. This allows activation of the system even though someone may not catch the word.

Again, the tertiary and secondary tones come into play. The tertiary cue tone sounds eight seconds before the end of the profanity fill, allowing the announcer time to get rid of the call and compose himself.

The secondary cue tone is again used to switch the audio relays from the fill machine back to the delay machine. By using the cue tones, we can use any length of profanity fill.

On the more serious shows, the profanity fill audio consists of the telephone call-in numbers repeated several times. Other fills consist of short comic routines, lasting about 15 seconds.

**Simplified controls**

In our quest for a telephone talk show system, we were faced with the task of building a complicated system that would be operated by nontechnical personnel. So, we built several automatic functions with automatic sequencing which are activated by a simple control. The producer in charge of the show has very few technical responsibilities. Once the delay machine has a tape inserted and the promo fill machine is loaded, the producer, engineer, or announcer need only to depress "delay start." Automatic devices take over from there.

By depressing the delay start button, the following takes place:

1. The studio output lines are put into the delay mode.
2. The delay machine record is "set."
3. The delay machine starts recording.
4. The fill cartridge is started with the audio output going to the studio output lines.
5. The tertiary tone on the fill cart tells when to start the program.
6. The secondary cue tone transfers the audio from the fill cart to the output of the delay machine. Now you are in delay with no loss of air time and a smooth program.

All of our machines are stereo units. These machines are used only in that mode on WTAG-FM. We feel that AM stereo will be here in four or five years: therefore, we are gearing towards the future. When we built new studios two years ago, we installed four new Harris Stereo 80 consoles in the three AM studios. We added four additional mixing positions, remote control, and other functions as well as mono mixdown. In the coming year, we will be putting approximately 3,000 records on cartridge on the AM side. These will obviously be recorded in stereo.
DIGITAL CLOCK
ES 112/124 ($139)

ES 112 (12 hr.) and ES 124 (24 hr.) are solid state, six digit clocks. Three simple controls make setting to the precise second easy. Fast Advance, Slow Advance, Hold. Can drive Jumbo Slaves.

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Case: Electrical: 117V AC 60 Hz 10W max.
Options: B CD JK LP RS W

Do you need a contact closure one or more times during the hour? Many ESE clocks can be tailored to generate a time pulse. Contact factory for pricing.

DIGITAL CLOCK THERMOMETER
ES 142/144 ($241)

ES 142 (12 hr.) and ES 144 (24 hr.) are MOS, solid state digital clock-thermometers. Displays 6 digits of time (hours, minutes, seconds) and 3 digits of temperature (0°F to 122°F or -20°C to +50°C) in planar, gas discharge displays. 55 high. Temperature sensor on 25 ft. cable included. Attach to rear-mounted connector.

ES 240 Digital thermometer is available as separate unit.

Dimensions: 2½ High x 10 Wide x 6 Deep

Electrical: 12V max. 117V AC 80 Hz.
Options: B CD JK LP RS W

CONSOLE MOUNT CLOCKS AND TIMERS, 70 SERIES

JUMBO CLOCKS AND TIMERS, 80 SERIES

All units have access to control inputs on rear-mounted connector. Displays are 3 led led's.

ES 172 Six Digit. 12 Hour Clock ($134.00) Three setting controls—Fast Advance, Slow Advance and Hold. Four time multipliers. Will run continuously until stopped. Reset will return all displays to zero. Unit will run if reset while running or will start at zero if reset while stopped. Options are B, C, D, J, M and V.

ES 174 Six Digit. 24 Hour Clock ($144.00) Otherwise identical to the ES 172.

ES 370 Four-Digit, One Hundred Minute Up/Down Time ($171.00) Six controls—Count Up, Count Down, Stop, Minutes Advance, Seconds Advance, Reset. Options are B, C, D, J, M, N, P, S, T, W, Y, Z.

ES 381 Up/Down Time ($353.00) Similar to ES 380 except that with finger push switches. Option D is supplied as part of this unit. Options are B, C, J, N, P, S, T, W, Y, Z.

Displays are 1 planar gas discharge.

ES 182 Six Digit. 12 Hour Clock ($220.00) Three rear-mounted setting controls—Fast Advance, Slow Advance and Hold. Options are B, C, D, J, M, N, P, S, T, W, Y, Z. When option Q panel mount is specified, digits will be separated by colors.

ES 184 Six Digit. 24 Hour Clock ($250.00) Otherwise identical to the ES 182.

ES 280 Four Digit. 100 Minute Up/Down Timer ($267.00) Displays minutes and seconds, with rear-mounted connector to allow remote wiring of six momentary SPST controls—Count Up, Count Down, Stop, Minutes Advance, Seconds Advance and Reset. Other features specified. Options are B, C, D, J, M, N, P, S, T, W, Y, Z.

ES 281 Up/Down Time ($353.00) Similar to ES 380 except that the leverwheel preset capability for setting the desired time. Option D is supplied as part of this unit. Options are B, C, J, N, P, S, T, W, Y, Z.

ES 512/524 FOUR DIGIT CLOCK TIMER WITH MEMORY ($200)

Combination four digit 12 or 24 hour clock and 60 minute timer with memory. Allow the user to set the exact time of day. Switch to timer mode then switch back to time of day by pressing a single button. Time of day will be correctly displayed in hours and minutes.

The ES 400 has three controls—Start, Stop, Reset. Runs continuously unless stopped. Reset returns display to all zero's. Can be reset while running or stopped. If reset while running, timer will continue to run. Can drive Jumbo Slaves.

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Case: Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P R S T W

ES 300 is a four digit, one hundred minute timer ($99 59) with six controls. Count Up, Count Down, Stop, Minutes Advance, Seconds Advance, Reset. Controls are single pole, momentary, push button switches. When Stop control is pressed the four digit display is neat. Counting direction (up or down) can be changed or time can be reset for zero without stopping the count. It will continue to register elapsed time before the zero setting unless unselect. The ES XX can drive Jumbo Slaves.

ES 301 ($198)

Dimensions: 2½ High x 8 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 15W max.
Options: B D J K P R S T Y Z

The ES 301 is a four digit, plus or minus timer ($198.00) with Start, Stop and Reset controls. Runs continuously unless stopped. Reset returns display to all zero's. Can be reset while running or stopped. Can drive Jumbo Slaves.

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Case: Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P R S T W

ES 500 ($800)

ES 500 is a 12 hour clock or timer with 5 rear-mounted controls: Start, Stop, Reset, Fast Advance, Slow Advance. Will run continuously to 12:59.59. Advances to 0:00:00. Can drive Jumbo Slaves.

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P R S T W

www.americanradiohistory.com

September, 1977

For More Details Circle (62) on Reply Card

ES 510 ($134)

Dimensions: 2½ High x 8 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 15W max.
Options: B D J K P R S T W

ES 302 ($254)

Dimensions: 2½ High x 8 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P R S T W

ES 301 ($198)

Dimensions: 2½ High x 8 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 15W max.
Options: B D J K P R S T W

ES 300 ($180)

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Electrical: 117V AC 60 Hz 15W max.
Options: B D J K P R S T Y Z

ES 300 is a four digit, one hundred minute timer ($99 59) with six controls. Count Up, Count Down, Stop, Minutes Advance, Seconds Advance, Reset. Controls are single pole, momentary, push button switches. When Stop control is pressed the four digit display is neat. Counting direction (up or down) can be changed or time can be reset for zero without stopping the count. It will continue to register elapsed time before the zero setting unless unselect. The ES XX can drive Jumbo Slaves.

September, 1977

For More Details Circle (62) on Reply Card

ES 510 is a four digit, sixty minute timer ($198.00) with Start, Stop and Reset controls. Runs continuously unless stopped. Reset returns display to all zero's. Can be reset while running or stopped. Can drive Jumbo Slaves.

Dimensions: 2½ High x 6 Wide x 5 5/8 Deep

Case: Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P R S T W

ES 301 is a four digit, sixty minute timer ($198.00) with Start, Stop and Reset controls. Runs continuously unless stopped. Reset returns display to all zero's. Can be reset while running or stopped. Can drive Jumbo Slaves.

Dimensions: 2½ High x 8 Wide x 5 5/8 Deep

Case: Electrical: 117V AC 60 Hz 15W max.
Options: B D J K P R S T W

ES 300 is a four digit, one hundred minute timer ($99 59) with six controls. Count Up, Count Down, Stop, Minutes Advance, Seconds Advance, Reset. Controls are single pole, momentary, push button switches. When Stop control is pressed the four digit display is neat. Counting direction (up or down) can be changed or time can be reset for zero without stopping the count. It will continue to register elapsed time before the zero setting unless unselect. The ES XX can drive Jumbo Slaves.

September, 1977

For More Details Circle (62) on Reply Card
At Camera Mart, we feature the entire line of Ikegami quality products. And we service what we sell—with our own in-house, factory-trained technicians and factory-approved facilities. The ENG package below is just one of the many we offer, so why not talk to us about your needs... or come in for a demonstration.

CAMERA MART CUSTOM IKEGAMI PACKAGE
The camera: Ikegami's HL-77,* completely self-contained. High-sensitivity color in a compact, lightweight three-Plumbicon*** package. All in a single low-profile 16mm-size camera with eye-level CRT monitoring on take and playback, plus many more features you'll appreciate.

The lens: The Canon f/1.6 10-100mm zoom, for wider-wide angles and tighter tele's.

The recorder: Sony's easy-to-operate VO-3800—a 30-lb. package that gives you up to 20 minutes of NTSC color on a single U-Matic cassette which can be edited on the 2850.

*Also available with HL-35.
**Plumbicon is a trademark of N.V. Philips.

OPTIONAL ACCESSORY:
VIDEO CRASH CART
Custom-designed to make production safer and smoother, with reduced setup and strike time, easier transport and fatigue-free shooting. Sturdy, weilded construction with 2-position handle lets you transport or operate in upright handtruck or horizontal 'dolly' position. So it can go virtually anywhere your crew can go.

Holds camera backpack recorder, AC adapter, cables—even extra cassettes.

RENTAL-LEASE-PURCHASE:
Pick the terms that suit your budget (and tax situation) best.

STEREO PHASING
Is everything
One of the prime requirements in FM is stereo phasing. Because there are so many mono sets out there, the mono listeners frequently get shortchanged when cassettes are slightly out of phase. We bought our new FM cart machines to replace the units which were 10 or 12 years old. Cartridge movement is a problem in good stereo phasing, and systems using a center hold-down can cause a bow in the cart, detrimentally affecting phasing.

All in all, we're very satisfied with the operation of this equipment and the reception to our talk show programming.
SOP

Perfect Ttminqj

PROGRAMMER/
COMPARATORS 750 SERIES

required control function involves a count
other than timing, these products can be
adapted to your needs.

Systems:
6 Digit Program
6 Digit Program
6 Digit Program
4 Digit Programs
4 Digit Programs
4 Digit Programs
4 Digit Program
ES 757- ES 300 and one 4 Digit Program
ES 758 -ES 510 and two 4 Digit Programs
ES 759 -ES 300 and two 4 Digit Programs

Thunlbwheel Comparator
ES 750 -ES 112 and one
ES 751 -ES 124 and one
ES 752 -ES 500 and one
ES 753 -ES 112 and two
ES 754 -ES 124 and two
ES 755 -ES 500 and two
ES 756 -ES 510 and one

ES 1296 ($150)
For Off -Air taping. or operating tape recorders when nobody is there. ESE has created
ES 1296.

ES 1296 is a six

digit, twelve hour clock with

LED displays and a programmable. 300 watt.
117V AC outlet on the rear
Once the rear outlet is activated, it will
remain on for 66 minutes. unless manually
terminated. or an optional Record Duration
switch is set to a different time interval. This
Record Duration Option allows the user to
select one of four time intervals for recording. These four time intervals are either 16.
33, 66 and 138 minutes. or 33. 66. 138 and
250 minutes. Price $25.00.

Turn -on.
for those machines that require Power. Play.
Record in sequence. for proper operation
This Option costs S25Á0.
An additional option is Sequential

ES -251 ($250)
ES 251 SMPTE Time Coda Reader ES 251 is a

six digit SMPTE Time Code Reader displaying
Hours. Minutes and Seconds Receives the
standard SMPTE Time Code through rear

mounted BNC connector, converts it into six
digits of clock time. Source of the code is
normally a SMPTE time code generator but
the unit will read the time code directly from
a tape machine running at playback speed.
This unit produces an extremely accurate
time of day display when driven from a time
code generator which is locked to a color
sub-carrier frequency. The momentary hold
switch allows holding of time on display.
Releasing hold switch updates display to
correct lime.
The input code is AC Coupled to two stages
of amplification and level shifting to Obtain a

ground reference. The input circuit requires
between and 20 volts peak to peak of input
signal and presents an input impedance of 50
Kbhm. ES 251 is a CMOS design which
operates from a single power supply.
Dimensions: Aluminum Case 23" High s 8'
Wide x 5-5/8" Deep.
Electrical: 117V AC 50/60 Hz 6W Max.
Options: BJPOW
1

252 SMPTE Time Coda Reeder: Exactly
like ES 251, but displays Minutes. Seconds
and Frames.
ES

September. 1977

1111111111/1111

.

-__

-

11111111-_

RAM TIME PROGRAMMERS
780 SERIES

For flexibility and economy with up to ten
events ESE has designed the 750 Series of
Programmer /Comparators. Rugged thumbwheel programmers coupled with an ESE
clock or timer to provide single pole form A
contact closure (1 Amp contact rating) for the
length of time program matches display. All
this on a 31/2" high 19" relay rack mounting
panel. Power required: 117V AC 60 Hz: 220V
AC 50 Hz may be specified.
If

-

The ES 780 Series Programmers provide 32
events (expandable to 96) in 51/4 inches of
rack space Ten minutes is all that is required
to install, set the clock and program 32

Bright .3" LED displays and all
controls are on the front panel. outputs and
events.

MASTER CLOCKS
Mounted in a 51/4" relay rack panel 4nd chassis. displays six digits of
time information on large. easy to read .3" LED displays, in 12 or 24 hour format, as
specified. ES 160 has its own internal timebase, with three second per month accuracy. Its
standard output is serial BCD. CMOS compatible, and can drive 20 ES 161, 166, 168 or 171
Remote Displays without buffering. All inputs and outputs are through rear -mounted
connectors
Dimensions: 5%" High x 19" Wide s 15" Deep
117V AC 50/60 Hz.
Electrical:
Options: B (CMOS Compatible). J. One PPS Output, Relay Closure on hour and half hour,
Battery/Charger (ES 163) Impulse Driver (ES 162), External Timebase-l. 5 or 10 MHz.
ES 160/1 (9900.001: One second per month version of ES 180
ES 190 ($900.00): The ultimate in accuracy! A digital clock. similar to ES 160. with special
circuits for receiving and decoding a 1000 Hz tone at the start of each minute. The decoder
Output resets the seconds' Counters in the clock each minute except the first minute Of
every hour. when a 1500 Hz tone occurs. These Inner are transmitted by Radio Station
VJVYV, with an oscillator accuracy of ,.1 part in 1011 ES 190 has an antenna and internal
VVWV receiver with audio -output. Its crystal timebase is accurate to 1.7 seconds per day.
used when WWV is not received. A battery and charger (ES 163) is available to protect
against power interruptions. Displays are .3" red LED's. Serial output drives ES 161, 186.
168 or 171 Slaves.
Dimensions: 51/4" High s 19" Wide s 15" Deep
Electrical: 117V AC 50 /80 Hz
Battery/Charger (ES 163)
ES192/194 1$275.00) The most economical Masters. ES 192 (12 Hr) and ES 194 124 Hr( are
constructed using ES 112 or ES 124 digital clocks and adding the ES 167 Serial Time Code
Generator to provide the output needed to drive Remote Serial Displays ES 181, ES 166. ES
168 and ES 171. 60 Hz timebase is derived from the power line. Displays are 6"
incandescent type.
Dimensions: 21/2" High s B" Wide s 5 -5/8" Deer,
Electrical: 117V AC 80 Hz
Options: BCDJLPOR, Time Pulse Outputs. Battery and Charger, Impulse Driver. Unit
mounted on a 31/2" High panel when certain options are specified.
ES 196 3650.00): Time and Temperature Master- Basically the same as ES 192. with gas
discharge displays, panel mounting and separate serial BCD outputs for time and
temperature. Displays either 12 or 24 hours and 'F or 'C. as specified.
Dimensions: 31/z" High x 19" Wide s B" Deep
Electrical: 117V AC 60 Hz
Options: BCOJR, Time Pulse Outputs, Battery/Charger.
ES 160 ($750.00):

battery lest are on the rear ES 167 Serial
Time Code Outputs can be specified as an
option. Line frequency time base with backup
crystal time base. 72 hour battery/battery
charger are standard. External time base can
be used. 60 Hz is preferred others may
require additional internal circuitry.

Eight Digits of Programming Capability:
ES

780 -10

Days. 10 Outputs.
Minutes. Seconds

Hours,

ES 781 -100 Days. Hours, Minutes.
Outputs, Hours, Minutes.
ES 782

Seconds
Seconds
-16
Capability:
Programming
Six Digits of
ES 783 -Hours. Minutes, Seconds
ES 784 -100 Days. Hours. Minutes
ES 785 -100 Days, Minutes. Seconds
ES 786 -16 Outputs. Hours, Minutes
ES 767 -16 Outputs. Minutes. Seconds
Four Digits of Programming Capability:
ES 788 -Hours, Minutes
ES 789 -Minutes, Seconds

isolated Outcan be programmed to activate any of the 16 outputs.
ES 780 has 10 outputs. The other units have
a single output.
ES 784. 786. and 788 have a one minute
contact closure. The others have a one
second contact closure.
Displays:
REAL TIME. An eight digit display when day
selection is required as on the ES 781. 784.
785. seven digits for ES 780. and six digits
for the others.
NEXT EVENT: A two digit display of next
event number.
NEXT EVENT TIME: An eight digit display
when ES 780. 781. or 782 is specified. a six
digit display when ES 783. 784. 785. 786. or
787 is specified, and a four digit display
ES 782. 786. and 787 have 16
puts Any of the 32 events
.

when ES 788 or 789 is specified.

Dimensions: 51/4" high

x

9"

wide

x

10"

deep.

ACCESSORIES
Designed to function with any ESE Master Clock,
decodes serial time data and displays six digits of clock time on large .55" Gas Discharge
formal
as specified.
Displays. in either 12 or 24 hour
Dimensions: 8" Wide x 21/2" High x 6" Deep.
Electrical: 117V AC 50/60 Hz.
Options: JPOW.
ES 162 Impulse Driver 3170.00): Plugs into the ES 160 chassis, can drive 20 Impulse
Clocks. Designed so that, if power fails, impulse always comes on with the same polarity
when power is restored. Drives minute or second clocks as specified.
ES 163 Battery and Charger (5140.00): Plugs into the ES 160 or ES 190 chassis. Fast
charge. 12 hours continuous use. When operating on battery, displays are automatically
blanked and may be viewed by actuating Display button on the front panel.
ES 164 Remote Digital Impulse Display ($170.00): Similar to the ES 161 except that the ES
164 derives its count command from the ES 162 Impulse Driver. or any impulse clock drive
circuits already installed. Choice Of 12 or 24 hour display and available either as desk top
unit or panel mounted.
Dimensions: 8" Wide s 21/2" High s 6" Deep.
Electrical: 117V AC 50 /80 Hz.
Options: BJPOW.
ES 166 Jumbo 1" Clock Display ($215.00 Features six digits of one inch high planar gas
discharge displays in 12 Or 24 hour formal as specified. Receives serial time code input
from any ESE Master Clock or serial time code generator.
Dimensions: 1019" Wide s 41/2" High x 61/2" Deep.
Electrical: 117V AC 50 /60 Hz.
Options: JPOW. If O is ordered digits are separated by colons.
ES 167 Serial Time Code Generator 3125.00): Offers a low cost answer to a master timing
system. An.inlegral part of ES 160, 190, 192/194 and 196 Master Clocks, this unit can be
added Io many other ESE products. including ES 112. 124, 182, 184, 500, 582. 750, 751.
752, 753. 754, 7S5. and all 780 Series Time Programmers. The ES 167 fits inside the case so
than no extra space is needed. Drives 20 ES 161, 166, 166 or 171 Remote Displays. ES 167
provides CMOS compatible serial BCD output and operates from the logic supply voltage.
ES 168 Remote Electromagnetic Display (5388.00): 4" HEIGHT! Used wherever large size at
low cost is essential. Receives the serial time code from any ESE Master Clock. displays
the time on four bright. yellow -green digits in 12 or 24 hour format as specified. Designed
to mount on wall or ceiling. When time changes. audible "click" is heard.
Dimensions: 6" High x 161/2" Wide x 6" Deep.
Electrical: 117V AC 50 /60 Hz.
ES 161 Remote Digital Display ($140.001

Options: JW
ES 169 Temperature Slaw ($125.00): Receives serial BCD temperature code from ES 196.
displays it on 55" Gas Discharge Displays
Dimensions: 8' Wide x 21/2" High s 6" Deep
Electrical: 117V AC 50/60 Hz.
Options: JPOW
ES 171 Console Mount Display ($134.00). Newest of the 70 series console mount clocks
and timers. ES 171 receives the serial time code generated by any ESE Master Clock, or
any ESE product containing the ES 167 serial time code generator, and displays it on bright
red .3" LED's.
Dimensions: 21/4" High x 41/2" Wide x 4" Deep
Case: High Impact Black Plastic.
Electrical: 117V AC 50/60 Hz.
Options: JW.
For More Details Circle (64) on Reply Card

Weight: Approx. 20 IDs. varying with model
number
Front Panel: Brushed, etched. anodized
aluminum

OPTIONS
Please Note: Some combinations of options
are not compatible. Consult factory If In

doubt.
BCD Output
Crystal Timebase: A ,..002% crystal is
employed in an oscillator for those applications requiring independence from the power
line frequency. Trimmer included for greater
accuracy.
D Remote Connector, 6' Cable and Control
Switch Set: This option consists of a rear B
C

mounted connector wired for all control
functions. a mating connector. wired to six
of cable. the other end of which is
connected to control switches which are
mounted On a 1/8" anodized satin finish
aluminum plate suitable for mounting on
most surfaces.
L .55" Planar Gas Discharge Display
M Front -mounted pushbutton controls: available on 70 Series except for ES 371.
380, 381.
N Avallable on ES 301. 302,
Provides a change in count direction from
down to up at zero when t'e unit has been
counting down from a preset time
p 19" Front Panel. 31'2" high.
O 9" Front Penal. 31/2" high.
R Remote Connector
S Slaw /Remote Display: User must specify
option B ¡BCD Output) on master when
ordering a slave
T Tenths of Seconds
V DC Operation (Includes crystal timebase)
W Three Wire Cord
Y Relay Closure at Zero: Available on ES 300.
301. 302. 380 and 381 only
Z Relay Contad Closure and Stop at Zero:
Available on ES 300. 301. 302. 380 and 381
only
feet

5051/2

Centinela Ave.

Inglewood, CA 90302

;213) 6743021

65


This caption superimposed on the lower half of a color television screen is so commonplace an occurrence in 1977 that it is hard to realize how young this technology really is.

A little over 30 years ago, in January of 1946, the U.S. Army Signal Corps using a modified SCR 271 radar succeeded in making radar contact with our moon. They not only achieved a precise earth to lunar distance (384,402 ± 1.5 km), but also the distinction of generating the first useful round trip space signals.

It took the intermittent bleep of the Soviet Union's first orbital space vehicle, Sputnik I, launched just twenty years ago (October 4, 1957), continued on page 68
First Hitachi developed the revolutionary Saticon tube. Then Hitachi designed the perfect camera for it...

The remarkable new SK-80 has three superior 2 3/4" Saticons at its heart, for unexcelled image and color fidelity. Hitachi's sophisticated electronics coupled with the high resolution capability of the Saticon set a new high level of performance for a portable EFP camera under the most demanding conditions.

Moreover, the SK-80 feels and handles like a true portable should. And its 2-hour battery belt with 1-hour charge time assures you of adequate power for continuous long-term shooting when you're on location. The standard C-mount and optional Arrif adapters give you the added versatility of selecting the exact lens that fits your shooting requirements.

But performance is only half the SK-80 story. A special training tape on videocassette is available with complete camera set-up and maintenance instructions, to help you keep your SK-80 making its excellent pictures. Beyond this, our six Hitachi regional offices are all staffed with qualified engineers and fully stocked with parts. They stand ready to back up our vast national network of servicing dealers.

We urge you to check out the performance features of the SK-80, as well as its low price, before specifying any other camera. Arrange a demonstration with your local Hitachi dealer or call the Hitachi regional office nearest you.
“Live via satellite”
continued from page 66

to accelerate experimental work in the United States and elsewhere on long-range transmission of radio signals via passive or active devices in space.

By 1960 transcontinental signals were relayed by huge reflective balloons 100 and 135 feet in diameter. Made of an aluminum-coated thin plastic and launched into orbits above 600 miles up, the balloons were appropriately named Echo I and II.

Although the two Echoes proved they could reflect radio and television signals between stations thousands of miles apart, the attenuation was too great and they confirmed the need for active satellites in practical space communications. These were not long in coming.

Less than two years later (July 10, 1962), the first active repeater satellite with a transponder aboard was launched into an elliptical orbit between 600 and 3500 miles. This was Telstar I; solar-cell powered, spin stabilized and with a 157-minute orbital time, it provided a 15-20 minute transmission window between continents as it came into view of the stations on Earth.

Telstar I proved that both the Atlantic and Pacific Oceans could be spanned by color TV signals, and its successors brought the opening ceremonies of the Tokyo Olympics (1964) to North America in full color.

Not willing to give up completely on passive reflectors, NASA launched project Westford in 1963. This far-out idea, which actually did provide a space communication capability, consisted of 400 million individual copper wire dipoles that formed a signal reflecting grid in the stratosphere. However, passive systems were giving way to more sophisticated active repeaters.

It was evident by now that short of launching a series of Telstars every few degrees along the orbital path, no continuous TV programming could be carried. The answer to this dilemma was to place the communication satellite in an orbit that matches the rotational period of our planet, thus creating a geostationary position in relation to any spot on the Earth. The physics of our space mechanics dictated that this location must be on an equatorial plane, 22,300 miles above the surface of our own satellite, Earth.

In June 1965 the first such geosynchronous satellite, Intelsat I (Early Bird), was launched and placed above the Atlantic for U.S.-to-Europe TV relay services. It carried a lot of the early programs between continents including a “Town Meeting of the World” when President Eisenhower and Field Marshall Montgomery reminisced across a split screen.

But Early Bird was a baby by modern satellite standards. It was barely two feet tall with a girth of 28.4 inches and an operational weight of 85 pounds. It carried 240 sound circuits or one TV channel; TV transmission required the relinquishing of the voice traffic. It did, however, exceed its designed life expectancy of 18 months by staying operational for more than 3½ years—not an insignificant factor since the spacecraft contractors (Hughes) collected substantial longevity bonuses during the active life of any satellite they build.

Early Bird and many of its Intelsat successors are now officially listed as “no longer in service.” They have joined the growing list of space “junk” (including the Echoes) that float around the nether regions

continued on page 70

Ten heads are not better than one
When the one is Duracore™

New From Nortronics

Whenever a magnetic head needs replacing, you're faced with recorder downtime, electronic adjustments and costly service calls. Now Nortronics introduces a way to reduce these profit-slicing problems... Duracore direct replacement heads.

Developed after several years of extensive research, Duracore is a mu-metal type material with ten times the lifespan of conventional mu-metal heads. Duracore heads replace conventional heads without requiring mechanical or electrical adjustments in your equipment, and their performance along the entire frequency range is identical to mu-metal.

To find out more about Duracore heads, contact your local Nortronics distributor. Available for all equipment formats, Duracore is the state of the art in magnetic tape heads.

Recorder Care Division

NORTRONICS

Nortronics Company Inc.
807 Tenth Ave North Minneapolis, Minn. 55427
Telephone (612) 545-0401, Telex 290324

For More Details Circle (66) on Reply Card
All silicon solid-state circuitry and utilizing direct FM, Moseley aural studio-transmitter links offer uncompromised, dependable performance—a Moseley tradition. Micro-stripline techniques and true modular construction are but a few of the features typical of the advanced technology used in the PCL-505 and PCL-101 series STL systems.

For AM
PCL-101 or PCL-505  PCL-101 or PCL-505
For FM
DUAL STL—Two monaural links conveying left and right audio.
COMPOSITE STL—Stereo on a single RF carrier—the PCL-505/C—a system pioneered by Moseley!

Loudness and clarity without compromise, ... the Moseley Associates TFL-280 Audio Limiter precisely controls the modulation levels of FM and TV aural transmitters. FM monaural, stereo, quadraphonic, FM SCA, TV aural are all expertly processed. This frequency-conscious limiter cleanly solves the problems associated with the transmission of pre-emphasized audio, including the ringing (over-modulation) produced by low-pass audio filters.

Audio Limiter

From MOSELEY ASSOCIATES, INC.

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK

September, 1977

www.americanradiohistory.com
They chose AMPRO.

A lot of people depend on emergency weather broadcasts for their livelihood, and their lives. So when the National Weather Service looked for cartridge equipment for their over 300 weather and emergency broadcasting stations, they needed top performance and proven reliability. In other words, they chose Ampro.

Ampro Cartridge Equipment. Our engineering expertise gives you top performance, proven dependability. We can custom-design the system you need.

AMPRO BROADCASTING INC.
850 PENNSYLVANIA BLVD., FEASTERVILLE, PA 19047 • (215) 322-5100
Professional Equipment for Broadcasting Professionals

VISIT US AT BOOTHS 8-8-10; NRBA SHOW, NEW ORLEANS
For More Details Circle (82) on Reply Card

continued from page 68

over the Atlantic, Pacific and Indian Oceans. Canada has its own satellites (Anik I, II, III) all positioned over the Pacific Ocean. In addition, there are now private satellites launched for RCA (Satcom I, II) and Western Union (Westar) that provide commercial services.

Intelsat IV A is a good example of the current status of reliable satellite construction and operation. It is over ten times as tall as Early Bird (275 inches) and weighted 22 times more at launch (3,340 pounds). It took an Atlas Centaur vehicle 133 feet tall and having a gross weight of 163 tons to get Intelsat IV A into synchronous orbit. Where this satellite really shines is in its signal handling capacity. It can relay 12,500 voice circuits plus two TV channels. There are 20 transponders on board, each with a 36 MHz bandwidth. Mounted above the 111-inch height of solar panels are three dish antennas. Two of them are 53 inches in diameter and are used for transmission. The reception dish feeds two sets of horns and the internal circuit design is such that simultaneous reuse of the same frequencies is possible.

The Intelsat IV series is expected to provide seven years of continuous service and the first one, activated on March 26, 1971, is still operational, although in reserve. Signals transmitted up to the satellite are in the 5.9-6.4 GHz range and the down link is between 3.7 and 4.2 GHz.

Current Satellites

Most TV communication services are presently supplied by the Intelsat IV and IV A series of satellites beyond our atmosphere. However, for all of its lack of sophistication. Early Bird laid the foundations for the global system of satellites and earth stations that now provide instant television contact among more than 90 countries around the world.

The Earth Stations

Current earth stations that connect the Intelsat countries with the communications satellites are in their fifth generation of antenna and associated circuitry design. The dish-shaped parabolic reflector concentrates the signals from space onto the antenna at the focal point. The whole structure, which is as tall as a twelve-story building, can be rotated on a 50-foot-diameter truck. It is also served so that precision tracking down to one-hundredths (2/100) of a degree is possible. The diameter of the dish is 105 feet and the movable portion weighs 300 tons.

As satellite transmitters have increased in power and directivity, the need for such huge antenna structures is reduced. Many ground stations now use 36-foot (11-meter) parabolic dishes for reception from present day 4/6 GHz transponders on commercial satellites. The increase in signal strength at the antenna has also simplified the input amplifier. Present systems use gallium arsenide field effect transistor (GaAsFET) in a redundant configuration to assure reliable reception.

The new Communications Technology Satellite (CTS), Hermes, launched in 1976 as a joint venture between Canada and the U.S., has a 200-watt transponder and makes possible the use of earth stations having a 15-foot dish (4.57 meters). Operating in the new band of 12-14 GHz, these dishes (Farnon STL) are steered about ±6 degrees and are served to follow the figure-8 pattern the satellite forms in the
Our tradition of excellence your decision for today

M15A

Today's ever increasing quantity and complexity of Control Room equipment makes the concept of solid engineering and trouble-free performance more important than ever before. AEG-TELEFUNKEN, the developer of the world's first professional tape recorder, has been the leader for well over 35 years — longer than any other manufacturer in the field. Their engineers apply this experience and the excellent rapport they enjoy with their many demanding clients worldwide to make sure that today's magnetophon always reflects an optimum balance between objective quality, serviceability, human engineering and price.

Today we present the latest result of AEG-TELEFUNKEN's efforts: The new magnetophon 15A — based on the M 15 deck, proven in years of service throughout the world. The M 15A — the master recorder for today and for tomorrow.

— new and more compact electronic assembly built into the deck itself features all-electronic timed switching, which permits electronic editing without modulation overlap on RECORD activation or the «hole» usually experienced after STOP.

— electronic digital timer as standard equipment; a highly sophisticated «auto-locator» provides heretofore unheard of operating ease and time economy.

— improved performance-to-price ratio makes AEG-TELEFUNKEN quality more affordable than ever before.

— our virtual zero-defect experience is unmatched in the master recorder field. In the highly unlikely case of a service need, you will find knowledgeable engineers and field service people, fully equipped with spare parts, as close as your telephone, no matter where you are located.

We'll be happy to send you our 16-page full-color English/German detailed brochure if you will mail the coupon below to the appropriate address.

**Coupon**
Please send me the brochure on «magnetophon 15A»

Name ____________________________
Address __________________________
Telephone _________________________

Gotham Audio Corporation
741 Washington St.
New York, N.Y. 10014

Hayden Laboratories Ltd.
Churchfield Road
Chalfont St. Peter, Bucks. SL9 9EW; England

AEG-TELEFUNKEN
Energie- und Industrietechnik
 Magnetbandgeräte
P. O. Box 2154
D-7750 Konstanz

**September, 1977**
Switchcraft® introduces an entirely new line of professional audio connectors. Starting with clean, modern styling, precision die-cast housings and a special "Vel-Tone" non-reflective finish, the professionalism of these outstanding audio connectors continues every step of the way with Switchcraft innovative, pace setting quick-ground provision. Each Quick-Ground Professional (QGP) audio connector shares much of the uncommon features of the "Q-G" audio connector. Until now, the standard of the audio industry...
The mobile studio tape recorder

Any supplier who attaches as great an importance to the practical solution of problems as AEG-TELEFUNKEN does, is not likely to abandon its studio customers when it comes to solving the problems of remote recording. On the contrary, it will offer them sturdy and efficient “all-purpose” devices able to hold their own in stationary studio operation, remote recording assignments, and mobile installations (OB vans).

AEG-TELEFUNKEN produces just such a universal device, the M 12 ¼” Studio Magnetic Recorder. It is small, compact, easily transportable and, of course, remote controllable. Whether in mono (with or without pilot sync), stereo or two-track recording and whether for 9.5/19 cm/s (3¾/7½ ips) or 19/38 cm/s (7½/15 ips), it fulfills all the professional demands in the ¼ inch field, and more. In its integrated mic/line mixer version, complete with vu meters, it even serves as a fully self-contained system for every recording purpose. Due to its technological perfection, it guarantees optimum specifications, audible quality, and an exceptionally long life expectancy with a minimum of maintenance. There you have it—a self-contained unit. Practical. Reliable. At a reasonable price.

- The mechanical and electronic components fulfill all studio requirements for quality and reliability.
- The large, well decoupled capstan flywheel provides for the lowest flutter even when used on poorly stabilized power lines.
- The sensitive, though uncomplicated, tension control maintains constant tension with 7 to 27 cm (3” to 10¾”) diameter reels without the need for switching.
- Vertical or horizontal mounting with perfect performance.
- The amplifiers are easily aligned to every kind of tape made.
- All deck mechanical assemblies are easily accessible and all amplifiers are plug-in.
- Its construction on a robust, die-cast aluminium frame allows the magnetophon 12 to stand up to even the roughest duty without impairment to the quality of the recording.

Should your unit ever require service, you can rest assured that your M 12 is in good hands with our servicing experts world wide.

Coupon:
For more information on the M 12, please send us the attached coupon:

Name
Address
Telephone

Gotham Audio Corporation
741 Washington St.
New York, N.Y. 10014

Hayden Laboratories Ltd.
Churchfield Road
Chalfont St. Peter. Bucks. SL9 9EW, England

AEG-TELEFUNKEN
Energie- und Industrietechnik
Magnetbandgeräte
P.O. Box 2114
D-7750 Konstanz

professional tape recorders by AEG-TELEFUNKEN
For More Details Circle (67) on Reply Card
"Live via satellite"

continued from page 72

watts with the mean figure over its life span expected to be at least 1000 watts.

The SHF antenna on board has a beam width of 2.5° and can be boresighted over a 15° range. Since Earth sensors maintain the platform accuracy to within 0.1° there is no problem with accurate coverage of the intended area.

GTS is the first, but the late 1970s will see a whole series of new satellites for individual country coverage like Japan's ETS II and CS that will start in 1977 and their experimental broadcast satellite (HSE) scheduled for February 1978.

In Intelsat V is also under construction and will be ready to replace current satellites starting in 1979. This series will follow the GTS solar array principle and operate on both frequency spectra (4-6 and 12-14 GHz) in addition to having steerable spot antennas to service high-traffic regions. Beam isolation between antennas is achieved through careful beam shaping and linear orthogonal polarization. Polarization techniques are making possible the doubling of transponder channels on existing satellites like Satcom and Westar.

The Organizations

Satellite communications has grown into a huge enterprise in less than a decade. In 1966 there were 172 hours of satellite time on the only available circuit over the Atlantic. By 1976 the Pacific circuits alone carried 2418 hours and the total for the three regions (Atlantic, Pacific, Indian) was just under 18,000 hours. As cost of such communications comes down, various segments of society begin to see a potential for their own communicative needs.

COMSAT was formed in 1963 to carry out the Congress Communications Satellite Act, designed to set up a global network in cooperation with other countries. COMSAT also has a 30% share of INTELSAT, a legal international entity with a $400 million-plus equity in which 92 countries hold shares. According to their own publication, they make a 14% return on investment.

Two years ago (March 1975) the Public Service Satellite Consortium (PSSC) was set up to take advantage of the new emerging technological capabilities of more powerful satellites like NASA's ATS-6. More than 45 non-profit organizations concerned with public interest projects in health, education, religion etc. see this as a way to affordable domestic networks through the use of small diameter earth stations that fit their pocketbooks. Even the ethnic groups with language or cultural communicative needs or remote groups like the citizens of Alaska have put in bids to participate in these new satellite services.

On the commercial side, the economic advantages for CATV operators, pay television distributors, and industrial or corporate communicators provided by these satellites over terrestrial signal-delivery systems will no doubt lead to a clamor for expanded capacities and FCC ratification of use. It may be cheaper to broadcast instructional tapes over satellites for re-recording in each school district than duplicating and sending those cassettes by mail. The PSSC and a lot of other groups are investigating the answers to these questions right now.

Summary

The technology for satellite-to-home broadcasting is not very far away. In fact, if it were not for rain attenuation of SIF signals the GTS satellite could feed an easily affordable 3-foot (1 meter) dish on a roof top with a usable color television signal.

Jim Murray of Farinon Electric, who make satellite and microwave equipment, says that a one-meter antenna is marginal on signal-to-noise ratio if the safety factors for climatic variations are cranked. Dr. Bruce Lusignan of Stanford University's Communication Satellite Planning Center is a little more cautious. He feels that a communal antenna of 9-10 foot (3 meter) diameter with a down converter could be jointly purchased for $2,000 and the signal then distributed with an RF modulator on a UHF or VHF channel to a group of users at very little individual cost.

Of course the overall question of governmental attitudes both for national and international broadcasts is still to be settled. In today's world it's unlikely that citizens of most countries would be given access to foreign broadcasts direct from satellites even if the available technology made it economically feasible.

The author would like to acknowledge the invaluable help provided for this article by Jim Murray, vice president, Farinon Electric; Dr. Bruce Lusignan, director of the Communication Satellite Planning Center at Stanford University; Dr. Joseph Felton of Intelsat; B. Bell of Aeronutronic Ford; and Steve Rupp, staff engineer, Farinon Electric.

For More Details Circle (58) on Reply Card

For More Details Circle (58) on Reply Card
I thought you may be interested in learning of some of the benefits this company has derived since we changed to MCI JH-110 tape recorders.

As you know, both stations are heavily automated. Several times during the day and night we are required to record spots from the NBC Network. One of the first "tricks" our production staff learned was to record the network on two recorders. At the beginning of spot No. 1, they punch the reset button of recorder No. 1; at the beginning of spot No. 2, they punch the reset button of recorder No. 2. Then, at their leisure, they punch the RTZ button on both recorders, and there are the two spots already cued.

The cue facility allows us tighter "drop-ins" on beginning and end tags, and in compiling programs generally.

The calibrate/variable play and record level controls, and variable speed, are useful in that we have to process tapes received and from many different sources. The 3-speed capability also allows us to high-speed these dubs—saving valuable time.

Apart from the tremendous improvement in recorded quality (we were able to align the recorders to better than factory specifications) since installing the recorders we have not had one case of stretched or broken tape.

We have been able to design and build relatively simple units to interface with the control logic to enable us to—for example—pre-time record start and multi-recorder start and stop.

In closing, might I just say that original alignment and installation was very quick and simple, and maintenance has been virtually negligible.

Yours sincerely,

H. Graeme Goodall,
WVCG-WYOR, Coral Gables, Florida

It's been nearly a year since I purchased an MCI JH-110, and it's been a year of pleasure! I am (at least I consider myself to be) one of the best production persons in the country, and your machine puts all the others to shame!!!

I must tell you that I bought my machine by chance. I was not satisfied with our Ampex and ITC's, and Scully just couldn't handle it. I read a tiny ad in the trades and called your chief engineer for details on performance. Never having seen nor heard of your machine before, I was impressed with his recommendations and therefore purchased one.

I have found several uses which were not listed in the Manual, and it seems we discover new ways to use the machine every week—and we do some pretty complicated production!

I assure you that when the money and the opportunity (and in that order) arises, I will purchase a 4-track and perhaps another 2-track and, hopefully, have you add a few more production aids which I feel could be of great value to our production load.

Again, I am totally satisfied with my MCI JH-110. It's a shame everyone has not had the good fortune to work with one.

Very truly yours,

Larry Ryan, General Manager,
KBCL, Shreveport, Louisiana

After using the MCI for a couple of weeks I'm greatly impressed by its improvements over traditional tape machines and its innovative features.

The machine is incredibly quiet—one reason being its motor does not idle but engages only during the play mode. Undoubtedly this feature will give the machine far greater mechanical life than its counterparts.

The machine's constant-tension transport feature is a plus in news situations where a mixture of small and large reels are used.

One of the more remarkable features is the machine's ability to time tape. At present, completed 60-minute shows are timed by running them through a conventional recorder, at 15 IPS and the elapsed time doubled for an accurate reading of 75 IPS programming. This MCI machine actually times the programming while in the fast-forward mode— reducing a 30-minute job to a 3- or 4-minute job and greatly reducing machine tie-up time.

Though the advantages of 2-deck electronic editing are obvious and ultimately the best state-of-the-art engineering for news producers, the MCI "tape return" feature by itself is quite helpful. I reset the mechanism while dubbing cassette material to reel-to-reel for quick and accurate recall of key segments.

The time saved in hunting material is invaluable, but perhaps more importantly this is the first tape machine I have ever encountered that actually "assists" the operator. All other machines are neutral in their attitude to the job—they'll go when the right button is pressed, stop when another is pressed... but THIS machine actually is positive. It's a great device—too many engineers ignore the human engineering factor. These people have explored it and created a machine with a valuable accessory.

Other benefits: the machine is extremely easy to thread—and the proximity of the reels to the actual operating deck is an advantage over the Electro Sound transport system which is raised and creates the possibility of tape fall.

The machine is incredibly quick-starting, even at 15 IPS, which is the speed I most often use. I often started the transport in mid-sentence on the air, where on other machines I have had to edit leader into the tape to account for slow-start wow.

The manual velocity control is another device which gives quick access to material on tape. I can audition material at variable speeds from a slow crawl to the speed of fast forward—slip into reverse direction with a minimum of mechanical effort—and locate key segments at three to five times the speed of conventional decks.

I intend to chain this demonstrator model to the wall when its test period is over. Congratulations to its manufacturer and designer for creating a machine with the human factor in mind.

Mike Linder,
WNEW Radio, New York
STL Operating Techniques

Part 2 of a 2-part series

By John E. Leonard, Jr.*

Part I of this article explored some of the reasons for selecting an aural studio-transmitter link for relaying aural program material to remotely-located AM and FM transmitter plants. These reasons included:

- lack of available leased telephone circuits;
- better quality;
- higher reliability;
- operations under station control;
- flexibility/versatility;
- savings on operating expenses.

Additional facilities can also be provided by the STL. These include remote control and the relaying of secondary program material, such as SCA program audio. In this concluding segment on aural studio-transmitter links, we will discuss some additional services, current Rules and Regulations and their relation to the operation of an STL and license applications.

Quadraphonic stereo

The block diagrams included in the first part of this article outlined two methods for conveying stereo program material. These were the dual STL, which consists of two monaural STLS (one to accommodate left program audio; the other, right program audio). The second approach is the utilization of the composite STL. With the composite STL, the stereo generator is actually positioned at the studio with the STL relaying the composite stereo waveform.

For the FM broadcaster, one future requirement may be worth considering in selecting an aural STL. This requirement is quadraphonic stereo. This reference to quadraphonic stereo relates to discrete methods of transmission rather than matrix approaches. At this writing, Rules concerning the exact method of transmission for discrete quadraphonic stereo are still pending. The transmission for audio components as separate entities, while maintaining phase integrity, will be extremely difficult with individual program circuits.

The composite STL is the ideal alternative for the transmission of quadraphonic stereo. Such an STL was utilized as part of the EIA field tests conducted at KIOI in San Francisco. This particular STL was a standard-production unit whose baseband response had been extended slightly to accommodate the additional bandwidth dictated by quadraphonic stereo. These tests indicated that the composite STL was essentially transparent. Many STLS in service today need only slight modifications to accommodate quadraphonic stereo. (See Figure 1.)

Intercity relay

Within the U.S., the Rules that establish aural STL service also establish another service—the intercity relay station. This service allows for the transmission of aural program material between stations located in separate cities, between broadcast stations, or similar type applications. Many stations are currently adapting this service to a variety of applications. One such station is WGH, licensed to the city of Newport News, Virginia. WGH has additional studios located in the nearby city of Norfolk. Intercity links are used daily to relay programming between the Norfolk studios and Newport News studios. A second set of

Figure 1 This is a block diagram of a composite STL for quadraphonic stereo applications.

* Moseley Associates, Inc., Goleta, California
Better ideas for better quality.

Your goal is better sound quality. Our goal is to come up with better ways for you to get it.

So far, we think we've done pretty well, with ideas like:

- a limiter that works as a fast peak limiter and an average-responding limiter—simultaneously and independently.
- an audio level optimizer that combines a compressor, peak limiter, and de-esser in one package.
- a multiband audio processor that gives you independent compression adjustments in eight frequency bands.
- a single-ended noise suppressor that can also restore program dynamics.
- tape record and reproduce electronics that set new standards for features, performance, and reliability.
- a tape tension control kit that improves speed accuracy and high-frequency performance.

There's more to come. We're working on still other ideas for helping broadcasters and recording studios get better sound. Of course, when those products come along, they'll have the same high quality and dependability that you expect from Inovonics.

All of our better ideas are available from Inovonics dealers throughout the country. See one soon, and pick up an idea or two.

New York: Martin A/V; Dave Bain Associates
Massachusetts: Lebow Labs

Inovonics Inc.
503-B Vandell Way
Campbell, CA 95008

Telephone (408) 374-8300

September, 1977

New Jersey: Joel Associates
Maryland: Recording Consultants
Kentucky: Sonic Services
Florida: The Harris Company
Tennessee: Broadcast Equipment & Supply
Missouri: Communications Systems
Texas: Savco; Collins Radio
California: Taber Mfg & Eng; VIF International; Accurate Sound; Sound Dynamics; Sigma Audio
Washington: Track Audio

www.americanradiohistory.com
STL Operating Techniques

continued from page 76

links is utilized for relaying program material from New York News to the Norfolk studios, thus providing full-duplex service. Aural STLs are also utilized by WGH between the New York News studios and their remotely-located AM and FM transmitting facilities.

WEAU-FM, Eau Claire, Wisconsin has a similar requirement. The main studios of WEAU-FM are located in Eau Claire. A secondary studio exists in Chippewa Falls, Wisconsin and the FM transmitter facility is located near Fairchild, Wisconsin.

A composite link relays programming from the Eau Claire studio to the transmitter site. The input of the composite STL transmitter can be fed either from a stereo generator in the Eau Claire studio, or from a second link coming from Chippewa Falls. When programming is originating from the Chippewa Falls studio, a second stereo generator is utilized feeding the composite link connecting the two studios. In this configuration, the FM transmitter of WEAU-FM is being fed, in essence, by a two-hop STL system.

As with WGH, a need existed for feeding program material from Eau Claire to Chippewa Falls. This service is being accomplished with a monaural STL link. An interesting point to be noted is that duplexers were utilized by the station for combining transmitters and receivers to function from a single antenna. This was necessary due to restrictions at the studio locations. Duplexers are more commonly found in communications applications. They permit the operation of the transmitter and receiver from a single antenna.

Educational radio stations have yet another interesting application of the intercity relay link. A number of stations have statewide FM broadcast facilities. Using some of these systems utilize satellite-type FM transmitting facilities to ensure coverage throughout the state. These satellites function as off-air repeaters. Because it is advantageous to limit the use of different FM frequencies, many statewide systems utilize only a limited number of channels throughout the state. For this reason, some satellite transmitters are operating on or very near the frequency of the station they are rebroadcasting. In these instances, a rebroadcast receiver is positioned some 10 or more miles from the satellite transmitter. An intercity relay link is then utilized for relaying the program material to the satellite transmitter.

Sometimes satellite transmitters cannot be positioned at a location that is ideal for reception of the station to be rebroadcast. Here again, the intercity relay link can provide a means of relocating the rebroadcast receiver at an appropriate site. Two states utilizing such service are Minnesota and Wisconsin. Monaural and composite STLs are in use in this type of service. A stereo rebroadcast receiver can feed a composite STL, thus maximizing the actual stereo performance obtained out of a satellite transmitting facility.

License applications

Applications for an aural broadcast or intercity link license is made by filing FCC Form 313. While it goes beyond the scope of this article to cover all aspects of license application, several areas are worth noting. Sections 3, 5, 7 and 8 require technical information to...
The Telemet Transmitter Test Package

The System That Helps You Stay in Shape

Whether you're peaking visual transmitter quality or fulfilling FCC requirements, the Telemet Transmitter Test Package provides the equipment you need at a price you can afford. And with Telemet equipment, you know you're getting all solid state, crystal controlled accuracy and reliability, featuring fast set-up without searching, precisely tuned to your station's frequency.

The Transmitter Test Package includes: Envelope Delay Measurement Set, Sideband Analyzer or Spectrum/Sideband Analyzer, Precision Broadcast Demodulator, Synchronous Detector and a Demodulator Tester.

For complete information and for a free copy of our transmitter performance test manual, contact Telemet today.

Telemet

185 Dixon Avenue, Amityville, N.Y. 11701
Tel. (516) 842-2300

Regional Sales Offices:
• Northeast: (914) 279-3231
• South: (212) 387-1389
• Midwest: (612) 574-1794
• West: (408) 249-1559

September, 1977
STL Operating Techniques
continued from page 78

be stated. This information, of course, is determined by the STL transmitter and transmitting antenna to be used for a given installation, and is readily available from the STL equipment manufacturer.

Typically, sample forms are available which provide pertinent details. The current Rules do not specify type approval or type acceptance of aural studio-transmitter link equipment, thus necessitating the filing of information in these sections. One important area worth noting is that, for STL or intercity license applications, both a new station (construction permit) and license may be requested with the initial application. It is not necessary to obtain a construction permit, install equipment, and then request the final license.

Frequency selection

One area requiring attention is the selection of a frequency. When Form 313 is filed, it must show the requested aural studio-transmitter link frequency. While frequency search services are available, one of the simplest methods for selecting a frequency is to poll other stations in your immediate area. Links operating in this frequency range are restricted to broadcast stations. No sharing with other services, such as land mobile, occurs in the 947-953 MHz spectrum. Local frequency coordination is the best method of assuring selection of a clear frequency or channel. Current PCC Rules suggest that the lowest suitable frequency be selected that can be used without creating interference with other stations operating in accordance with existing frequency allocations.

The emission designator and occupied bandwidth of the system also must be stipulated on the Form 313. Current Rules require that the maximum frequency excursion of a carrier resulting from modulation shall not exceed 200 kHz above and below the assigned frequency.

When the transmitter is multiplexed by one or more subcarriers, the maximum subcarrier frequency shall be used for calculating the occupied bandwidth based on $2M + 2D$. This is a formula where $M$ is the modulating frequency (in this case, the subcarrier frequency) and $D$ equals the transmitter deviation. Of course, the tolerance of the transmitter employed should be added to the bandwidth obtained to insure that no more than 500 kHz is occupied.

As a part of Form 313, the power output for the transmitter must be stated and maximum available power. The license obtained will specify the maximum authorized power. The current Rules state no maximum power limit. Rather, an STL transmitter shall have a power output not in excess of that required to produce satisfactory service. Most current equipment operates in the 5W to 8W range.

One area that shouldn't be overlooked is the requirement for a directional antenna. Specific directivity characteristics are set down in 74.536. Antennas commonly used for this service far exceed these requirements. In cities where frequency sharing occurs, special attention must be given to the side lobes and front-to-back ratios of the selected antennas.

Rules and regulations

Some of the existing Rules and Regulations under Part 74, Subpart E deserve special mention. If you are
The FASTEST A/D CONVERTER in the West (and East)!

Computer Labs MATV-0816 for TBC's, Frame Stores, and Synchronizers

When you convert video into 8-bit digital signals at rates through 16 MHz, you've got the fastest commercially available analog-to-digital converter in town.

That's 4 times NTSC — 3 times PAL!!!!

This represents a major breakthrough in high-speed A/D technology by the company that's been the leader of high-speed conversion for the last decade.

The most economical A/D in its performance class, the self-contained MATV-0816 occupies 21 cu. in., and requires only external power supplies and clock signal. Weighing less than 10 ounces and dissipating less than 9 watts, this modular A/D is ideal for use in time-base correctors, electronic frame stores, synchronizers and other video applications.

The MATV-0816 is the latest addition to Computer Lab's specialized equipment for digital video. Other recent products include the MATV-0808 (8-bit, 8-MHz A/D), MATV-0811 (8-bit, 11-MHz A/D), and the MDD-0820A (8-bit, 20-MHz "deglitched" D/A).

Computer Labs will supply video A/D and D/A's in modules, on our standard PC boards, or for a modest engineering charge, on customer-specified PC boards.

Write or call...
COMPUTER LABS, INC. • 505 EDWARDIA DRIVE • GREENSBORO, N. C. 27409
(919) 292-6427; TWX 510-922-7954

September, 1977
**STOP GROUND-LOOP HUM!**

**VIDEO HUM STOP**
**COIL...HSC 1**
Will ELIMINATE HUM and
other INTERFERENCE in
Video Lines caused by dif-
f erences in Ground Potential.

- For Color and Black and White.
- FLAT-DC to 6.5 MHz.
- No Low-Freq or Hi-Freq. Roll-off.
- No Differential Phase Distortion.
- No Differential Gain Distortion.
- No Envelope Delay.
- Passive Device - Failure Free-Low Price.
- Small Compact Package 4” x 4” x 2 1/4”

**ELIMINATES HUM**
**AND INTERFERENCE:**

**IN STUDIO**
- Between Buildings.
- On long runs in Buildings.
- Between Studio and Transmitter.
- On incoming Telco circuits.
- On Outgoing Telco circuits.

**IN FIELD**
- Between Remote Truck and Teico.
- Between Remote Truck and Microwave.
- For Intertruck Hookup.
- For VTR Units.
- For Monitoring Lines.

**NEW!**

**$140**
**F.O.B. N.Y.**

Available on 10 day free trial.

For More Details Circle (71) on Reply Card.

---

**STL Operating Techniques**

*continued from page 80*

Considering the use of an aural studio-transmitter link or intercity relay station, a complete and careful examination of Subpart E is recommended.

In many parts of the country, the aural STL band is extremely congested. As an example, in the Los Angeles area, all channels from 947 MHz through 952 MHz are in use. Likewise, all frequencies in the 942-947 MHz spectrum are occupied. In this city, a number of channels are occupied by two stations on a shared basis. Such sharing can occur when the diversity between the studio and transmitter site, as well as geographic location of the facility will permit operation of two links without interference.

As was indicated in Part I of this article, the National Association of Broadcasters (NAB) has filed a petition requesting the reassignment of the 942-947 MHz spectrum to aural STL service. All interested parties are encouraged to support this filing. It is the writer's understanding that the FCC is currently accepting requests for frequencies in the 942-947 MHz spectrum where no frequencies exist in the current STL spectrum (947-952 MHz). Those filings, however, must be such that, should the frequencies ever be employed by land mobile services, such services would have priority. It is recommended that filings of this type be closely coordinated by an engineering consultant and legal advisors.

**Remote control**

As with broadcast transmitters, aural STL intercity relay transmitters may be remote controlled. Requirements for remote control are not as stringent as they are with the actual broadcast transmitter. Means must be provided to allow the transmitter carrier to be turned on and off at will. A carrier-operated switch can be provided to show that the transmitter is actually radiating. Also acceptable is a device providing a continuous visual indication that control circuits have been placed in the mode that would produce radiation. In addition, off-air control is allowed in the case of intercity systems or two-hop type systems. Closer examination of 74.533 should be made if you are considering such modes of operation.

**More on the rules**

Current Rules and Regulations do not require the continuous use of any form of monitoring equipment. Only periodic checks are required to verify that the STL transmitter is operating within the allowable tolerance of the assigned frequency. This allowable tolerance is ±0.005%. When a dual STL is in use, it should be noted that a frequency stability of ±0.001% is required.

From an operational point of view, logs and station identification are required. Those logs are straightforward and should include the hours of operation, program transmitted, frequency checks, any additional pertinent remarks, and finally, entries required relating to tower lights, if tower lights are involved.

Station identification can occur in several ways. Transmission of a broadcast station call sign is considered acceptable identification. Such identification is to be made at least once each hour, except if it would interrupt certain types of programming. This, of course, follows the lines established for identification of the actual broadcast station. Of course, the call sign is also to be transmitted at the beginning and end of each period of operation.

---

**The Winsted Corporation**
8127 Pleasant Ave. So., Minneapolis, MN 55420
(612) 888-1957 • Toll Free No. (800) 328-2962

For More Details Circle (72) on Reply Card.
radio workshop

A systems concept for audio interface

By Peter Burk

One of the biggest frustrations facing broadcast engineers is doing everything "right" and still not achieving the desired sound. The proof looks good, the new "magic black box" for processing the audio is set up properly, and yet the station still doesn't sound right. Even more frustrating, maybe some things sound fairly good, but other sources don't quite make it.

Before you stop payment on the check to the magic black box company, let's look more closely at what we're feeding into the machine. "Hold it," you say, "I just checked everything in the chain... distortion is below one percent everywhere, and response is good to 15 kHz. I even put new stylin' in the turntables."

That's fine, but what about the way the equipment is connected together? If you're lucky, you got to start from scratch and put everything in the way you wanted it. If you're not so fortunate, you inherited someone else's dream, complete with ten years of add-ons. all documented on the back of an old maintenance log. If you're an inheritor, assume nothing about the interface between devices. Check out each junction yourself, and establish a plan for making the thing work like a system.

We're going to present a scientific approach for interfacing the entire system, but first let's review why we're having problems with program even though the proof looks good.

Peak vs. RMS

All of our testing is done with nice, pure sine waves. They're easy to make and easy to measure. Only problem is, program directors don't like sine waves a whole lot. They like messy, transient-ridden complex waveforms.

Sine waves are very efficient: the ratio of peak to RMS energy is just 3 dB. Complex waves aren't nearly as efficient with ratios on the order of 10 to 15 dB. The volume indicator (VU meter) doesn't really read either peak or RMS, but comes much closer to RMS on complex waves. This means that lots of nasty transients that don't contain much energy but require headroom are sneaking right past our meters.

There are several possible solutions, including peak program meters, but the simplest for the moment is merely to allow adequate headroom when using tones for setup. It's either that or find a program director that likes mostly sine waves.

The compromise

Before you start cranking the gain down on everything, consider the effect on the signal-to-noise ratio. Lots of headroom is nice, but not at the expense of hum and hiss between pauses in speech. Obvious-

continued on page 86
"WHAT here, with live-from-the-scene news coverage. We're using Farinon portable microwave links—13GHz to our truck, 2GHz to the station—to get rid of the cables that usually stand between us and the World As It's Happening. That tiny speck way up there is our cameraman. Our whole news gathering operation is now wire-less, cable-less, and film-less. Because Farinon microwave systems are frequency-agile, we have our choice of a dozen channels to get us on the crowded air. They give us the flexibility we need, whether we're on the floor of a political convention or tracking a hyperthyroid ape at the World Trade Center. We urge you to call Farinon for complete information."

Farinon Electric, 1691 Bayport, San Carlos, CA 94070. Phone (415) 592-4120. Telex: 34-8491.
In Canada: Farinon Electric of Canada, Ltd., 657 Orly Avenue, Dorval, P.Q., H9P 1G1, Canada. Tel. (514) 636-0974. Telex: 05-82-1893.

For More Details Circle (88) on Reply Card
Radio workshop
continued from page 84

ly, there must be a compromise. There is, and it's one that you'll have to establish yourself. The important thing is that we stick to the same compromise throughout the system. It doesn't do any good to have lots of headroom all through the system, then lose it in the last amplifier.

Same goes for noise. That is, if one amplifier has no headroom but 75 dB signal-to-noise ratio (S/N) and that amp is driven by a similar one that has 30 dB of headroom, but only 45 dB S/N, the net result is the worst of both...no headroom and 45 dB S/N. Merely readjusting the levels on those two amplifiers would produce the same net gain, but increase headroom by 15 dB and get the noise down to 60 dB. Quite an improvement! This, then is:

Axiom 1:
Establish a headroom vs. noise compromise and religiously adhere to it through the entire system.

The method outlined in the box will provide the information you need to determine the proper operating range for each device in the system. You may be surprised to find how much less range is available than the spec sheets indicate.

Impedance matching
It would be nice if we could assume everything was 600 ohms in and out. Since it's not, we'd better watch impedance matching a little more closely. Most consoles have 600-ohm high-level inputs, but don't count on it! Some older models are 150 ohms, and some are just plain...
GENERAL ELECTRIC Large Screen TV Projectors

The General Electric Large Screen Video Projectors incorporate advances in simplicity, reliability and performance in large screen television projection.

This solid-state, high-brightness television projector is engineered for remote control operation; with improved circuit design for enhanced picture quality, power efficiency, and increased ease of operation, maintenance and service.

It utilizes the exclusive GE light valve—single gun, single optical path system which requires no convergence adjustments to faithfully reproduce monochrome and natural color TV pictures of high resolution and contrast.

Built-in remote control capability allows set-up adjustment and operating control at the projector, or from 200 feet away, with the addition of an accessory cable.

APPLICATIONS

In addition to projecting information from all standard video sources such as off-air TV tuner, video tape, video cassette, live camera, closed-circuit data network, video film chain, etc., the versatile system can be coupled to computer facilities through suitable interface equipment. It can project alpha-numeric data, graphic displays and computer generated images in real time.

GE large screen TV projectors are now in use in Business, Industry, Education, Medicine, Military, Government, Entertainment and the Arts.

Business—Instant review and analysis of computer data bank information, stockholders meetings, conferences, presentation of advertising and sales promotional campaigns, sales meetings.

Industry—Safety and Industrial training programs.

Military—Command and control displays, computer read-out, dynamic visual simulators, tactical and operational situation displays.

Medicine—Teaching surgical techniques, medical procedures, nursing, training and consultation conference information displays.

Entertainment—Sports, CCTV, standard TV, concerts, box office extensions.

Education—Off-campus programs and seminars, demonstration of the arts, teaching sciences, lecture demonstrations.

"Thousand" Series Projectors. (PJ500 and PJ700 not shown.)

PERFORMANCE FEATURES

- High efficiency power circuits permit operation at low line voltages without affecting picture quality.
- Low input power ... 1,200 watts compared to 1,700 watts or more for other professional television projectors.
- Operates from standard 120v/20 amp appliance outlets.
- No radiation hazard. Highest voltage used is 7,200 v.
- LED circuit monitors and beam current meter included.
- Sweep reversal switches allow easy projected image changeover for front or rear screen applications.
- Variable picture size from 2 to 20 feet in width.
- Versatile projector mounting includes table top, gimbal, or on its matching, accessory base.
- Accessory rolling base allows easy transportability.
- Afocal lenses available to vary projection distance from standard 3.01 (throw distance to screen width) by factors of 2 or 1/2.

GE Large Screen Television Projector Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Projector Type</th>
<th>Minimum Output (in lumens)</th>
<th>Power Supply</th>
<th>Video Input &amp; Standards</th>
<th>Price*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJ500**</td>
<td>Color</td>
<td>220</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>NTSC &amp; RGB</td>
<td>$35,000</td>
</tr>
<tr>
<td>PJ700**</td>
<td>Monochrome</td>
<td>600</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>525 lines/60 f.p.s.</td>
<td>$30,000</td>
</tr>
<tr>
<td>PJ5000</td>
<td>Color</td>
<td>220</td>
<td>50/60 Hz, 117 v. ± 10%</td>
<td>525 lines/60 f.p.s. or 625 lines/50 f.p.s., NTSC &amp; RGB</td>
<td>$54,000</td>
</tr>
<tr>
<td>PJ5100</td>
<td>Color</td>
<td>220</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>1023 lines/60 f.p.s., RGB</td>
<td>$99,500</td>
</tr>
<tr>
<td>PJ5800</td>
<td>Color</td>
<td>220</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>.875 lines/60 f.p.s., RGB</td>
<td>$99,500</td>
</tr>
<tr>
<td>PJ6000</td>
<td>Color</td>
<td>220</td>
<td>50/60 Hz, 117 v. ± 10%</td>
<td>625 lines/50 f.p.s., RGB</td>
<td>$54,000</td>
</tr>
<tr>
<td>PJ7000</td>
<td>Monochrome</td>
<td>600</td>
<td>50/60 Hz, 117 v. ± 10%</td>
<td>525 lines/60 f.p.s.</td>
<td>$47,500</td>
</tr>
<tr>
<td>PJ7010</td>
<td>Monochrome</td>
<td>600</td>
<td>50/60 Hz, 117 v. ± 10%</td>
<td>625 lines/50 f.p.s.</td>
<td>$47,500</td>
</tr>
<tr>
<td>PJ7050</td>
<td>Monochrome</td>
<td>1000</td>
<td>50/60 Hz, 117 v. ± 10%</td>
<td>525 lines/60 f.p.s.</td>
<td>$52,500</td>
</tr>
<tr>
<td>PJ7100</td>
<td>Monochrome</td>
<td>600</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>1023 lines/60 f.p.s.</td>
<td>$51,000</td>
</tr>
<tr>
<td>PJ7150</td>
<td>Monochrome</td>
<td>1000</td>
<td>60 Hz, 117 v. ± 10%</td>
<td>1023 lines/60 f.p.s.</td>
<td>$56,000</td>
</tr>
</tbody>
</table>

**used/factory refurbished

*effective 1/77

For More Details Circle (90) on Reply Card

September, 1977

For Video Display Equipment Operation, Electronics Park, Building 6—206, Syracuse, New York 13201

Phones: (315) 456-2562/2533/2179

www.americanradiohistory.com
Radio workshop
continued from page 86

strange. If you're not sure, measure it. The easy way is by resistor substitution with a generator and voltmeter.

Output impedances are another story. When the book says 600 ohms out, that doesn't mean that the actual output impedance is 600 ohms; it means that the equipment is designed to work into 600 ohms. Most amplifiers exhibit lower distortion when the load is somewhat lighter than the maximum power transfer impedance. Just make sure that all sources are fed into an impedance equal to or slightly higher than the driving impedance.

Where transformers are used for impedance matching (or isolating an unbalanced line), several precautions are in order. Use a high quality unit with at least as much headroom as your design (compromise) value. Also beware of using more than one set of taps simultaneously on a multi-tapped transformer.

When a transformer output is connected directly to the input of another transformer, the impedance match becomes dependent on whatever is on the other windings of the transformers. To eliminate this problem, separate all transformer connections with a resistive pad, preferably at least 6 dB. Note that many units already have a pad on the input or output for this reason.

Gain limitations
We mentioned earlier that a compromise must be struck between headroom and noise. Whenever an amplifier contains an active stage before the input level control or after the output level control, we must observe some fairly tight limits on gain within the device.

For a typical line amplifier, the procedure in the box works fine, since it takes input and output stage overload and noise into account. Operation outside of these limits in even a small amplifier will defeat all of the efforts you put into the rest of the chain.

The gain limitations are much easier on sources where only output level is variable. It's only necessary to measure the clipping (3% THD) point and the output noise to arrive at a maximum and minimum output level.

Consoles really aren't too tough to measure, either. The position of the faders is arbitrary set to a point that is convenient for the operators.

continued on page 90
Announcing...... THE UNIKIT™

A MONEY-SAVING IDEA FROM UNIMEDIA!

- SELECTABLE INPUTS-LINE-VTR-TV
- TV VIDEO AND AUDIO OUTPUTS
- 8 PIN VTR CONNECTOR
- COMPATABLE WITH NTSC, PAL, AND SECAM
- PULSE CROSS WITH AUTO BRIGHT-UP 
  (BINARY PULSE CROSS SELECTION)
- POWER LINE ISOLATION
  120/240V; 50/60Hz
- LATEST STATE-OF-THE-ART “MOS” CIRCUITRY

The Unimedia Unikit mounts easily on all present production Sony receivers including the new SONY AC/DC KV-8000.

Illustrated step-by-step instructions make installation simple and fast.

Booklet includes receiver/monitor performance optimization procedures.

<table>
<thead>
<tr>
<th>SONY RECEIVER</th>
<th>UNIKIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>KV-800G</td>
<td>UMK-d</td>
</tr>
<tr>
<td>KV-1204G/KV-1204AG</td>
<td>UMK-12</td>
</tr>
<tr>
<td>KV-1512G</td>
<td>UMK-15</td>
</tr>
<tr>
<td>KV-1711DG/KV-1712DG</td>
<td>UMK-17</td>
</tr>
<tr>
<td>KV-2101G</td>
<td>UMK-21</td>
</tr>
</tbody>
</table>

ACCESSORIES:  
- YOKE MOUNT KIT  
  (Specify Sony Model #:)$49.95
- RACK MOUNT KIT 
  (12" Only)$29.95

All Unimedia Unikits $225.00 F.O.B. Auburn, California
Other kits upon request: write or phone for details.

The popular Unimedia UMT Series monitor/receiver is now being built by Unimedia with Unikits.

*Patent Pending

22525 KINGSTON LANE, AUBURN, CA 95603  (916) 878-1250 (916) 272-1971

IMAGINATIVE IDEAS, SYSTEMS AND PRODUCTS FOR THE WORLD OF AUDIOVISUAL COMMUNICATIONS
No camera...no lag...no complex optics

With the new Flying Spot MK3 Telecine, you can expect, and get, superb reproduction from color or mono, positive or negative, 16 or 35 mm film, or slides—all on the same transport.

Here's a film chain with no camera, no lag, no complex optics, no intermittent projectors. It has a silent capstan drive with shuttle forward and reverse. Electronic Cinemascope panning handles 16 or 35 mm, full frame.

It is designed to deliver what you have always wanted in film reproduction—the immediate look of live video from film and all the quality, color, definition and contrast that you shot, or bought, with the film.

Arrange for a demonstration. Call Neil Kempt (312) 297-7720 or write for literature: Rank Precision Industries, Inc., 411 East Jarvis Ave., Des Plaines, Ill. 60018

Mark 3 TELECINE by

RANK CINTEL

For More Details Circle (76) on Reply Card

Radio workshop
continued from page 88

but the master gain controls can be operated over a wider range than the headroom-noise compromise will allow. Consider the faders fixed and use the master gain control to vary gain for the measurements in the box. This will allow you to put limits on the input and output levels of the console. Just because the knob on the front goes to -90 dB doesn't mean that the console will meet specs over this entire range.

Dynamic devices such as compressors and limiters need to be measured the same way, but with the control signal defeated as you would for a proof.

Block it out

Put all of the data you've collected on a complete system block diagram. Each block should contain the following information:

- Input impedance;
- Output impedance;
- Permissible input levels;
- Permissible output levels;
- Available gain;
- Sketch of the input and output networks.

Indicate all jacks on your diagram. Part of our objective is to make impedances and levels as compatible as possible at the patch panel. [See Figure 1.]

Pads and things

The hard part is over. Now all we have to do is select places to insert pads, transformers, or possibly a couple of line amplifiers to make the whole system look like it was designed to work together.

Put matching and isolating transformers in first, then put isolation pads between all transformers. In some cases, you'll need to reduce the level anyway, so just pencil in the isolation pads at this time. When this is done, look for places where you can consolidate losses into a single pad.

Select a suitable patch panel level, based on the output and input ranges you have available. Zero dBm might work for you, but there's nothing wrong with -10 dBm or whatever it takes to fall between output and input levels.

Whenever possible, split losses on each side of the patch panel to preserve your patch panel level. For example, if your patch level is zero, and a +5 output must be connected to a -10 input, use two pads, 5 dB on the output and 10 dB on the input.

continued on page 92
FREE!

Your planning guide to a better sound

Whether you're in engineering or management, our newest catalog will prove indispensable when planning your audio requirements.

RAMKO manufactures over 70 different products designed specifically for the Broadcaster and those engaged in Professional Sound. All at prices you can afford, no matter how small your budget.

Audio consoles, audio DA's, mic. & line amplifiers, turntable preamps, limiter/compressors, equalizing amplifiers, tape winders, solid state meters and much more. We also distribute some of the finest names in turntables, tape recording accessories and other broadcast products.

In addition to the vast array of products, you'll find quality of design and performance that takes second place to none and is ahead of most. And we guarantee it with our 2 week free trial period and warranties of 2 & 4 years (depending on the item).

Call, write, or circle the bingo card today for your free copy of our newest 24 page catalog. The technical descriptions, specifications and illustrations will show you why RAMKO designed equipment offers the best cost/performance ratio in the industry.

Ramko understands your needs. After all, we're broadcast engineers too!

RAMKO RESEARCH
1355 "A" Folsom Blvd.
Rancho Cordova, CA 95670
(916) 635-3600
For More Details Circle (77) on Reply Card

September, 1977
Radio workshop
continued from page 90

Bridging inputs should be kept separate on the patch panel, or at least marked differently. If less than 20,000 ohm bridges are used, calculate the loading on the line to make sure it isn't excessive. Make sure that a 600 ohm termination appears somewhere on the line.

What have we gained?
The improvements in system performance will vary from subtle to dramatic, depending on the state of the system before you started. In any event, you should see better system signal-to-noise and headroom, easier operation for the jocks because of better consistency, and the joy of being able to patch without making gross level adjustments. The time that you spend setting up the system will be saved many times over in future troubleshooting.

The frill is gone.

Beaucart II

If you thought our original Beaucart tape cartridge machines were something, just wait until you get a look at our new Beaucart II. Great features! No frills! And lower price! Meets or exceeds NAB specs, of course. Incorporates the unique Beau pancake motor and our own Beau audio heads. Mono Record/Playback or Playback only for A-size carts in a compact 5½" x 15" x 5½" machine.

Let us tell you all about Beaucart II today. Write for our free brochure or call (203) 288-7731. Beaucart will perform for you!

UMC BEAUCART DIVISION UMC ELECTRONICS CO.
460 Sackett Point Rd. North Haven, CT 06473

See us at NRBA, Booth 30-31
For More Details Circle (78) on Reply Card
SHINTRON Produces the Largest Number of Switchers in the World ... as Well as the Best.

Production Switchers + Special Effects Generators

Model 370-Mark III Color Special Effects Generator

Model 371 Chromatic™ Special Effects Generator

Model 375 Chromatic™ Production Switcher

Model 373-DX Chromatic™ Production Switcher

Sync Generator and Related Equipment

Model 312 Genlock Monochrome Sync Generator

Model 383 (CB) Color Background + Bar + Black Generator

Model 315 Color Sync Generator

Distribution Amplifiers

Model 336 Video Distribution Amplifier

Model 316 Audio Distribution Amplifier

Special Video Accessories

Model 380 Video Pointer

Character Generator

Model 506 Videotypewriter

Model 361 Genlock "Basic Four" Switcher • SEG

Model 370-Mark 4 Chromatic™ Special Effects Generator

Edit Code, Time Domain Marking Products

Model 644 SMPTE Edit Code Reader • Raster Display

World Wide Phone 617-491-8700 Telex 921 497

Cambridge, MA 02142 U.S.A.

SHINTRON

For More Details Circle (92) on Reply Card

www.americanradiohistory.com
Digital technology course available at special rate

The SBE has entered into an agreement with the University of Wisconsin—Extension (UW) whereby SBE members will receive special low rates for UW's course entitled "Digital Technology for Broadcast Engineers." This agreement is designed to make it easier for SBE members to upgrade their knowledge and expertise in the rapidly expanding area of digital technology. Also, this agreement was made in response to a suggestion made from the floor at the SBE National Membership Meeting in Washington on March 27, 1977.

The UW course consists of 24 lessons. These lessons are taught by the use of half-hour videocassettes using the U-matic format. Written study guides, text books and lab experiments.

The SBE-UW agreement is in two parts: one applicable to SBE members belonging to chapters; the other for members in areas not included in chapters.

The following is the substance of the agreement between the Society of Broadcast Engineers and the University of Wisconsin—Extension:

SBE chapters
1. A special rate will be available to SBE members who enroll through a chapter. The cost per SBE enrollee will be $100 as compared to the normal $480 for the first student and $170 for each additional student. To qualify for this rate, there must be at least five enrollees in the chapter.

2. The University of Wisconsin (UW) will pay the SBE chapter $5 per enrollee to cover expenses associated with publicizing the course and enrolling the members.

3. The participating chapters will be responsible for either procuring a copy of the UW lesson tapes from a source which has them, such as a local PBS outlet, or making a dub from a tape supplied by UW. If UW must supply tapes, the chapters must designate to what person and what station the tapes are to be sent. If a local station provides tape dubbing facilities and desires to enroll employees who are not SBE members, then the $480 initial fee for that station will be waived by UW and the regular $170 enrollment fee will apply.

4. Each SBE enrollee will receive a three-volume study guide included with the basic fee. Two text books are also necessary for the course. The cost of these text books is $16 each or $32 per set. Ownership of these text books can be useful to each individual enrollee, but one set of the text books can be shared by up to five enrollees if they are in the same general location.

5. A laboratory kit can be supplied by UW for a cost of $75 or a parts list will be supplied at no

continued on page 96
COLOR GENLOCK SYNC GENERATOR
MODEL 5000 OPT: 01

SPECIFICATIONS MODEL 5000 OPTION: 01 (Helical)
Model 5000 Option 01: Helical tape recorder outputs have typically 1000 or more times the frequency variations of broadcast video. This new mode provides a very wide range genlock that is front panel selected to lock to helical recorder playbacks even with ± 1% speed variations, ± 10 microsecond skew and high amplitude head transition noise.
Price: Model 5000 Opt. 01 - $1895.00

BLACK BURST GENERATOR KIT
MODEL BBG-1
Low-cost black burst generator for driving new color cameras and for users of video switchers who desire to fade to color black.
Price: $89.00 F.O.B. Loveland, Colorado

VIDEO ACTIVATED POWER SWITCH
MODEL VPS-1
- Save electrical energy by using monitor only when video is present.
- Reduce color monitor maintenance when no drives are present.
- Eliminate distractions from free-running monitors.
- Eliminate special AC power lines or tall ladders to turn video monitors on and off in special locations.
Price: $85.00

VIDEO D/A
MODELS VDA-1, VDA-1P
The VACC Model VDA-1 is a video distribution amplifier which can be operated from any +12Vdc power supply capable of delivering 70 mA to the VDA-1. The Model VDA-1P has its own self-contained 12V power supply. No cabinet is included with the VDA-1 or VDA-1P. These video amplifiers have been designed in mind to install in TBC’s and other equipment where additional video outputs or feeds are required.
Price: VDA-1 - $79.50, VDA-1P - $125.00

PARTY LINE SYSTEM
MODEL PL-1 BENEFITS
- Individual volume control
- Model PLS-1 handles up to 10 headset units
- Low cost
- Small cabinet enables user to mount party line next to camera or to any convenient location.
Price: $50.00

BURST-PHASE & H-PHASE METER
MODELS BPM-1 & BPM-1 OPTION: 02
VACC’s BPM-1 Option: 02 Burst-Phase Meter and H-Phase Meter is both a low-cost substitute or replacement for most vectroscope applications where burst-phase errors need to be observed and measured. Likewise, the unit is a low-cost substitute for an oscilloscope where H-Phase errors need to be observed and measured.
Price: BPM-1 (cabinet) - $599.00, Option: 02 H-Phase - add $130.00

ELECTRO OPTICAL ISOLATORS
MODELS A-1, A-1A, D-1, D-1A, VL-1
Installing a VACC optical isolator circuit in your 12, 15, 17, 19, or 21 inch Sony Trinitron color receiver converts it for use as a high quality color monitor and/or demodulator while still retaining the receiver function. Besides low cost, VACC’s Video Line Isolator improves overall performance of your video system by providing better power-line isolation (80 dB) than traditional differential amplifiers.
Price: A-1, A-1A, D-1, D-1A - $171.00; VL-1 - $250.00
cost and the enrollee may acquire his own lab parts.

6. It is assumed that the following lab equipment is available:
   (1) Power supplies ± 15 V at 50 ma
   (2) One oscilloscope - dual trace
   (3) One signal generator - sine and square wave signals - DC offset would be convenient.

7. One person in each chapter is to be appointed to serve as the direct contact with Willis Long at UW. An instructor's guide will be supplied to this person.

SBE members not in chapters
1. If five or more SBE members who are not members of a chapter
   can arrange to group together to take the Digital Technology course, they will be entitled to receive the same deal and the same conditions from UW as that given to members who belong to chapters. The only exception will be that UW will not pay $5 per member to the local chapter.

2. Individual SBE members may also take the course at reduced rates. The cost for an individual will be $300 as compared to the regular cost of $480 for the first enrollee. Additional enrollees who are members of the SBE may take the course at a cost of $100 each.

3. The additional cost for individual enrollees is due to the wear and tear on the tape, handling charges and shipping charges.

4. UW agrees to send lesson tapes to groups of SBE members or to individual members. Members then have the option of dubbing the tapes and returning the originals to UW or keeping each cassette for two weeks, then returning it, and receiving the next one upon UW's receipt of the first tape. The last option might eliminate the necessity of dubbing.

5. It is understood that groups of SBE members and individual SBE enrollees must return lesson tapes to UW as directed by them prepaid.

SBE Chapters and members desiring to take advantage of this "Digital Technology for Broadcast Engineers" should contact the University of Wisconsin directly. Send all inquiries to: Willis F. Long, Department of Engineering - UW Extension, 432 North Lake Street, Madison, Wisconsin 53706.

CHAPTER REPORTS

Chapter 22—Central New York

The regional convention equipment show will be held September 30 at the Syracuse Hilton Inn, Syracuse, New York. For more information, write: Charles Mulvey, WNYT-TV, Syracuse, New York 13214.

Chapter 43—Sacramento, California

Chapter 43 met July 26th for a brief business meeting followed by an excellent program given by Jeff Mendenhall, senior FM transmitter engineer from Harris Corp., in Quincy, Illinois. Mendenhall presented his NAB paper on the new MS-15 Exciter and further described actual circuitry and construction of this equipment. He answered all questions and provided a very busy and interesting two and one-half hours. (Bob Venditti, KRAM/KEWT, 3551 William Way, Sacramento, CA 95821. 916/484-7100.)
TeleMation Announces First-Half Earnings

(SALT LAKE CITY, UTAH)—TeleMation, Inc., reported first-half profit of $257,000, or 25 cents per share, on revenues of $4,709,000. This compares to a loss of $316,000, or 52 cents per share, on revenues of $4,754,000 for the first half of 1976.

Results for the three-month period ended June 30, 1977 were a net profit of $213,000, or 21 cents per share, on revenues of $2,414,000 compared to the loss of $314,000, or 30 cents per share, on revenues of $2,339,000 for the three-month period ended June 30, 1976.

The above figures are after extraordinary credits resulting from reduction of taxes by use of a tax loss carry-forward. Profits before the extraordinary credits were $144,000, or 14 cents per share, for the first half and $120,000 or 12 cents per share, for the second quarter.

W. Paul Warnock, president of the video equipment manufacturing and television production company, said that the return to profitability in the first half of 1977 was due to the substantially improved performance of the hardware portion of the company's business. "TeleMation Productions, our television production studio in Chicago, continues profitable as in recent years," he stated.

He attributed the improvement in the company's hardware business to a continuing strong demand for the company's principal products and to extensive action taken at year-end 1976 to bring the company's expense level into line with revenues. Mr. Warnock pointed out that backlog at June 30 was $1.7 million compared to $2.1 million at December 31, 1976. "The return of our hardware business to profitability has been very gratifying to us at TeleMation. The dedicated efforts of all our employees have made it possible," he said.

TeleMation, Inc. A Salt Lake City based manufacturer of professional television equipment, maintains offices in San Francisco; Minneapolis; Danbury, Connecticut; Washington, D.C.; and London. TeleMation also operates a television commercial production division in Chicago.

Which character generator produces the highest-quality graphics?

Our customers tell us that the Compositor I Graphics System gives them the sharpest, clearest, most distinctive electronic characters they’ve ever seen. Like to see for yourself? Circle the number below on the reader reply card and we'll send you a series of actual untouched color monitor photographs of Compositor I graphics. Compare these pictures with those provided by any other manufacturer, and you’ll agree with what our customers are saying. Better yet, visit our booth at the SMPTE show in Los Angeles, October 17-20. Put in some keyboard time. Build some pages. Store. Recall. Edit. Whatever you want. Or, if you can't make it to the show, circle the alternate number below for a demonstration in your area. Find out why our customers call the Compositor I "the Excitement Generator". TeleMation, Inc., P.O. Box 15068, Salt Lake City, Utah, 84115. Call (801) 972-8000, ext. 350.
Who would buy a "preowned" 2" VTR from AFA?

TV STATIONS
KDAL-TV Duluth, MN □ AMPEX VR-2000
WAST-TV Albany, N.Y. □ RCA TR-70C
WHP-TV Harrisburg, PA □ AMPEX VR-1200
WAEO-TV Rhinelander, WI □ RCA TR-70C
WZTV-TV Nashville, TN □ AMPEX VR-2000
WVEC-TV Norfolk, VA □ AMPEX VR-2000
KEVN-TV Rapid City, SD □ (2) AMPEX VR-1200's
WCIX-TV Miami, FL □ (2) AMPEX VR-1200's

PRODUCTION FACILITIES
EUE Screen Gems New York, N.Y. □ (3) AMPEX VR-2000's
National Video Center New York, N.Y. □ AMPEX HS-100
Dolphin Production New York, N.Y. □ AMPEX VR-2000
Innervision Productions St. Louis, MO □ AMPEX VR-1200
Media Stream Lake Charles, LA □ (2) AMPEX VR-1200's
Upstairs Productions Portland, OR □ AMPEX VR-1200
Modern Telecommunications, Inc. New York, N.Y. □ AMPEX HS-200

MANUFACTURERS
Consolidated Video Systems, Inc. Santa Clara, CA □ AMPEX VR-2000
Recortec Inc. Sunnyvale, CA □ (2) AMPEX VR-1200's
Spin Physics, Inc. San Diego, CA □ AMPEX VR-1200
Computer Magnetics Corp. Sunnyvale, CA □ AMPEX VR-1200

INSTITUTIONS
N.Y. Institute of Technology - Video Center N.Y. □ AMPEX VR-2000
Kansas City Baptist Temple Kansas City, MO □ AMPEX VR-1200
National Aeronautics & Space Administration □ AMPEX VR-1200
Faith Tabernacle Church Baltimore, MD □ (2) AMPEX VR-1200's

They did... how about you?
AFA can fill your need with a customized, fully rebuilt video tape recorder. Call us today for complete information.

A.F. ASSOCIATES, INC.
100 Stonehurst Court
Northvale, N.J. 07647

201-767-1000
This is the largest Buyers' Guide edition of Broadcast Engineering ever published. Moreover, it's the largest single issue of Broadcast Engineering ever published in its 18-year history. Reflective of the current healthy state of this industry, the issue carries over 280 pages, and nearly 250 separate advertisers.

Buyers' Guide is designed as a year-round reference source, a ready guide to virtually everything that's sold in the broadcast/communications marketplace.

Special attention has been focused upon assembling these data in the most logical, legible and easy-to-use format as possible. The fundamentals:

The Product Directory. On the following pages, you'll find more than 800 categories of broadcast equipment, supplies and services. Under each heading is a complete list of every known supplier of that product. More than 725 different firms are listed this year.

Companies with advertising 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.

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 assigned company names and Red Listings to appropriate product headings.

A New Coding System. Dealers or distributors are identified in the Product Directory by the letter "D" after the company name, followed by a numerical code showing the geographical regions (or portion of a region) served. The following chart shows the states included in each region:

1. New England (ME, NH, VT, MA, RI, CT)
2. Middle Atlantic (NY, NJ, PA)
3. East North Central (OH, IN, IL, MI, WI)
4. West North Central (MN, IA, MO, ND, KS, SD, NE)
5. South Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)
6. East South Central (KY, TN, AL, MS)
7. West South Central (AR, LA, OK, TX)
8. Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)
9. Pacific (AK, WA, OR, CA, HI)

The Master Index of Manufacturers and Suppliers. Beginning on page 231 you'll 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. For your convenience, multiple Reader Service Cards are bound into this edition. 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 1978.
PRODUCT DIRECTORY

ATS - See Automated Transmission Systems

Alarms, Carrier

B & I Electronics, Inc. ....................................... 246

Delta Electronics Inc. ....................................... (Va.) ................................................... 183

Moseley Assoc. Inc. ......................................... 69

Collins Radio ................................................ 21

Robins Broadcast & Sound Equip. Corp. .............. 38

Amplifiers, AF-AGC

Audio Distributor Inc. ...................................... 247

BWG Systems Inc. .......................................... 58, 59

Collins Radio ................................................ 21

Russo Electronics Mfg. Inc. ................................ 18

Sound Dynamics, Inc. ...................................... 226

Wilkinson Electronics, Inc. .............................. 62

Allied Broadcast Equip. D 1-9

Altec Sound Products

Ampro Broadcasting Inc.

Audio Distributor Inc. D 1-9

BGW Systems Inc.

Belar Electronics Lab., Inc.

Broadcast Automation Assoc. D 1.2

Broadcast Component Dist.

Broadcast Equipment Distributors

Communication Media

Broadcast Equipment & Supply Co. D 1-9

Collins Radio Rockwell International

Dyne Engineering, Inc.

Etcom Engineering Co.

Eventide Clock Works Inc.

Harris Corp. Broadcast Products Div.

Inovonics

Landy Associates Inc. D 1.2

Lauderdale Electronics Lab.

Martin Electronics

Martin Audio/Video D2

McCurdy Radio Ind. Inc.

Microbase Assoc. Inc.

Modular Audio Products Unit of

Modular Devices, Inc.

Monroe Electronics, Inc.

Motorola Semiconductor Products, Inc.

Rupert Neve, Inc.

Opamp Labs, Inc.

The Orange County Electronics Corp.

Leds

Orban/Broadcast

Quad Eight Electronics

RCA Broadcast Systems

ROH Corporation

Ramko Research Inc.

Robins Broadcast & Sound Equip. Corp

Russo Electronics Mfg. Inc.

Share Brothers Inc.

Siena-Johnson

Singer Products Co. Inc.

Sono-Mag Corp.

Sound Dynamics, Inc. DB 8, 9

Sound Genesis DB 8, 9

Sparta - see Cetec Broadcast Group

Spectra Sonics

Sphere Electronics

Stancil-Hoffman Corp.

Thomson-CSF Laboratories, Inc.

Val-Tronic, Inc. D1-9

Wilkinson Electronics, Inc.

Yamaha International Corp.

Amplifiers, AF Compressing

See Adv. Page

Inovonics .................................................. 77

Moseley Assoc. Inc. ...................................... 69

Robins Broadcast & Sound Equip. Corp. .............. 38

Alloy Broadcast Equip. D 1-9

Altec Sound Products

Ampro Broadcasting Inc.

Automated Processes, Inc.

Belar Electronics Lab., Inc.

Bogen Div. Lear Siegler, Inc.

Broadcast Automation Assoc. D 1.2

Broadcast Communications Devices, Inc.

Broadcast Component Dist.

Communication Media

Broadcast Electronics, Inc.

Broadcast Equipment Distributors

Communication Media

Cetec Broadcast Group

Collins Radio Rockwell International

Dyna Engineering, Inc.

EMT Franz VGMH

Etcom Engineering Co.

Eventide Clock Works Inc.

Gotham Audio Corp.

Harris Corp. Broadcast Products Div.

Inovonics

Leds

Landy Associates Inc. D 1.2

Lauderdale Electronics Lab.

Martin Electronics

Martin Audio/Video D2

McCurdy Radio Ind. Inc.

Microbase Assoc. Inc.

Modular Audio Products Unit of

Modular Devices, Inc.

Monroe Electronics, Inc.

Moseley Assoc. Inc.

Rupert Neve, Inc.

Opamp Labs, Inc.

The Orange County Electronics Corp.

Leds

Orban/Broadcast

Quad Eight Electronics

RCA Broadcast Systems

ROH Corporation

Ramko Research Inc.

Robins Broadcast & Sound Equip. Corp

Russo Electronics Mfg. Inc.

Share Brothers Inc.

Siena-Johnson

Singer Products Co. Inc.

Sono-Mag Corp.

Sound Dynamics, Inc. DB 8, 9

Sound Genesis DB 8, 9

Sparta - see Cetec Broadcast Group

Spectra Sonics

Sphere Electronics

Stancil-Hoffman Corp.

Thomson-CSF Laboratories, Inc.

Val-Tronic, Inc. D1-9

Wilkinson Electronics, Inc.

Yamaha International Corp.

Amplifiers, AF General Purpose

See Adv. Page

BGW Systems Inc. ........................................ 58, 59

Lenco Inc. ................................................ 19

Russo Electronics Mfg. Inc. .......................... 18

Yamaha International Corp. ............................ 78

Alitech

Alloy Broadcast Equip. D 1-9

Altec Sound Products

Ampro Broadcasting Inc.

Audio Designs & Mfg.

Audio Distributor Inc. D 1-9

Autoform Corp.

Automated Processes, Inc.

BGW Systems Inc.

Belar Electronics Lab., Inc.

Bogen Div. Lear Siegler, Inc.

Broadcast Automation Assoc. D 1.2

Broadcast Component Dist.

Communication Media

Broadcast Electronics, Inc.

Broadcast Equipment Distributors

Communication Media

C-COR Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International

Collins Television Services

Crown International, Inc.

Datsel Corp.

Dyna Engineering, Inc.

Dutch Electric Co. Tubes/MW Devices

Harris Corp. Broadcast Products Div.

Health Co.

Holland Electronics

Industrial Sciences

International Nuclear Corp.

Landy Associates Inc. D 1.2

Lenco Inc. Electronics Div.

Logtek Electronic Systems

Marti Electronics

Martin Audio/Video D2

McKinnon Industries, Inc.

Micro-Track Corp.

Microwave Assoc. Inc.

Microwave Audio Products Unit of

Modular Devices, Inc.

Monroe Electronics, Inc.

Murphy Industries, Inc.

Orban/Broadcast

Quad Eight Electronics

RCA Broadcast Systems

ROH Corporation

Ramko Research Inc.

Richmond Sound Design, Ltd.

Robins Broadcast & Sound Equip. Corp

Russo Electronics Mfg. Inc.

Share Brothers Inc.

Siena-Johnson

Singer Products Co. Inc.

Sono-Mag Corp.

Sound Dynamics, Inc. DB 8, 9

Sound Genesis DB 8, 9

Sparta - see Cetec Broadcast Group

Spectra Sonics

Sphere Electronics

Stancil-Hoffman Corp.

Thomson-CSF Laboratories, Inc.

Val-Tronic, Inc. D1-9

Wilkinson Electronics, Inc.

Yamaha International Corp.

Amplifiers, AF General Purpose

See Adv. Page

BGW Systems Inc. ........................................ 58, 59

Lenco Inc. ................................................ 19

Russo Electronics Mfg. Inc. .......................... 18

Yamaha International Corp. ............................ 78
Collins Television Services ........................................ 194
Di-Tech Inc .......................................................... 263
Dynasciences .......................................................... 14
Lenco Inc .............................................................. 93
Shintron Co, Inc ......................................................... 5
Applied Video Electronics, Inc. D 1-9  
Broadcast Communications Devices, Inc. D9  
Broadcast Video Systems, Ltd.  
C-COR Electronics, Inc.  
Central Dynamics Corp.  
Cohu, Inc. Electronics Div.  
Collins Television Services dbx, Inc.  
DataTek Corp.  
Di-Tech Inc.  
Dyma Engineering, Inc.  
Dynair Electronics, Inc.  
Dynasciences Div. Whittaker Corp.  
General Electric Co. Tubing/MW Devices  
Grass Valley Group, Inc.  
Harris Corp Broadcast Products Div.  
Industrial Sciences  
International Nuclear Corp.  
KVC Video Systems Inc. D 1,2  
Kaitronics Corp.  
Landy Associates Inc. D 1,2  
Leitch Video Ltd.  
Lenco Inc. Electronics Div.  
Marconi Electronics Inc.  
Microwave Assoc. Inc.  
Charles Moore  
Motorola Semiconductor Products, Inc.  
Panasonic Video Systems Div.  
Peire-Phepls, Inc. D 2,5  
RCA Broadcast Systems  
RHG Elect Labs, Inc.  
Richmond Hill Laboratories Ltd.  
Roscor Corp. D3,4  
Scientific Systems Inc.  
Shintron Co Inc.  
Sigma Electronics, Inc.  
Tektronix Inc.  
Tele-Mation, Inc.  
Tele-Measurements, Inc. B-2  
Telemet a Geotel Co.  
Television and Computer Corp.  
Video Aids Cordova Colorado  
Vital Industries Inc  
Amplifiers, Pulse Delay  
See Adv. Page  
Collins Television Engineering ................................... 194
Di-Tech Inc .......................................................... 263
Lenco Inc .............................................................. 93
Broadcast Communications Devices, Inc. D9  
Broadcast Video Systems, Ltd.  
Central Dynamics Corp.  
Cohu, Inc. Electronics Div.  
Collins Television Services dbx, Inc.  
DataTek Corp.  
Di-Tech Inc.  
Dyma Engineering, Inc.  
Dynair Electronics, Inc.  
Dynasciences Div. Whittaker Corp.  
General Electric Co. Tubing/MW Devices  
Grass Valley Group, Inc.  
Harris Corp Broadcast Products Div.  
Industrial Sciences  
International Nuclear Corp.  
KVC Video Systems Inc. D 1,2  
Kaitronics Corp.  
Landy Associates Inc. D 1,2  
Leitch Video Ltd.  
Lenco Inc. Electronics Div.  
Marconi Electronics Inc.  
Microwave Assoc. Inc.  
Charles Moore  
Motorola Semiconductor Products, Inc.  
Panasonic Video Systems Div.  
Peire-Phepls, Inc. D 2,5  
RCA Broadcast Systems  
RHG Elect Labs, Inc.  
Richmond Hill Laboratories Ltd.  
Roscor Corp. D3,4  
Scientific Systems Inc.  
Shintron Co Inc.  
Sigma Electronics, Inc.  
Tektronix Inc.  
Tele-Mation, Inc.  
Tele-Measurements, Inc. B-2  
Telemet a Geotel Co.  
Television and Computer Corp.  
Video Aids Cordova Colorado  
Vital Industries Inc  
Amplifiers, Pulse Delay  
See Adv. Page
Robins Broadcast & Sound Equip. Corp.  
Dyma Engineering, Inc.
Kay Elemetrics Corp.
Lenco Inc. Electronics Div.
Microwave Assoc. Inc.
Tektronix Inc.

Amplifiers, Zero Studio Delay
Grass Valley Group, Inc.
Lenco Inc. Electronics Div.
Microwave Assoc. Inc.
Sigma Electronics, Inc.

Analysis Forms
Lauderdale Electronic Labs

Analyzers, Audio System
See Adv. Page

Potomac Instruments, Inc.
251

Analyzers, Distortion
See Adv. Page

The London Co.
256

Allied Broadcast Equip. D 1-9
Amber Electro Design, Ltd.
B & K Instruments Inc.
Broadcast Electronics, Inc.
Collins Radio Rockwell International
Crown International, Inc.
Dyna Engineering, Inc.
Ginsberg & Company, Inc.
Harris Corp. Broadcast Products Div.
Jofra, Inc.
Kahn Communications, Inc.
Marconi Instruments
Rohde & Schwarz Sales Co.
Tektronix Inc.

Analyzers, Harmonic
See Adv. Page

Sound Technology
47

Amber Electro Design, Ltd.
B & K Instruments Inc.
Collins Radio Rockwell International
Crown International, Inc.
Dyna Engineering, Inc.
Ginsberg & Company, Inc.
Harris Corp. Broadcast Products Div.
Kahn Communications, Inc.
Marconi Instruments
Rohde & Schwarz Sales Co.
Tektronix Inc.
Telemet

Analyzers, Insertion Signal
See Adv. Page

Marconi Instruments
11

Marconi Instruments

Analyzers, Intermodulation
See Adv. Page

The London Co.
256

Allied Broadcast Equip. D 1-9
Amber Electro Design, Ltd.
B & K Instruments Inc.
Crown International, Inc.
Dyna Engineering, Inc.
Ginsberg & Company, Inc.
Harris Corp. Broadcast Products Div.
Jofra, Inc.
Kahn Communications, Inc.
Marconi Instruments
Rohde & Schwarz Sales Co.
Tektronix Inc.

Antenna Alignment Systems, Microwave
Innovative Television Equipment, Inc.
Micro Communications, Inc.
Nurad Inc.
Scientific-Atlanta, Inc.
Varian/Beverly Micro-Link Products

Antenna and Tower Guys
See Adv. Page

Philadelphia Resins Corp.
20

Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
G.E. Communications
Jampro — see Cetec Broadcast Group

Antenna Ice Warning Systems
See Adv. Page

Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
G.E. Communications
Jampro — see Cetec Broadcast Group

RCA Broadcast Systems
Val-Tronics, Inc.

RF Antenna
183

Collins Radio Rockwell International
Dielectric Communications Div.
Sola Basic, Inc.

RCA Broadcast Systems

RF Current Controllers
See Adv. Page

Delta Electronics Inc.
(Va.)

Cetec Broadcast Group
Collins Radio Rockwell International
Dielectric Communications Div.
Sola Basic, Inc.

RCA Broadcast Systems

RF Current Controllers
See Adv. Page

Delta Electronics Inc.
(Va.)

Cetec Broadcast Group
Collins Radio Rockwell International
Dielectric Communications Div.
Sola Basic, Inc.

RCA Broadcast Systems

RF Current Controllers
See Adv. Page

Delta Electronics Inc.
(Va.)

Cetec Broadcast Group
Collins Radio Rockwell International
Dielectric Communications Div.
Sola Basic, Inc.

RCA Broadcast Systems

RF Current Controllers
See Adv. Page

Delta Electronics Inc.
(Va.)

Cetec Broadcast Group
Collins Radio Rockwell International
Dielectric Communications Div.
Sola Basic, Inc.

RCA Broadcast Systems

RF Current Controllers
See Adv. Page

Delta Electronics Inc.
(Va.)
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Elcom Engineering Co.
G.C. Electronics
Geleco Electronics Ltd.
Harris Corp. Broadcast Products Div.
Jampro - see Cetec Broadcast Group
Maury Microwave Corp.
Micro Communications, Inc.
Multirons, Inc.
North American Radio Corp.
Pacific Recorders and Engrg. Corp.
RCA Broadcast Systems
Sencore
Scientific-Atlanta, Inc.
Sitco Antenna Co.
Singer Products Co., Inc.
Sound Dynamics, Inc.
White Tower Communications, Ltd.
Wintronics, Inc.

Antennas, Receiving LF

See Adv. Page

Anitser-Mark
John Fluhe Mfg. Co., Inc.
KVC Video Systems Inc. D 1.2
McKay Dymek Co.
Rohde & Schwarz Sales Co.

Antennas, Receiving MF

Anitser-Mark
Belter Electronic Labs., Inc.
KVC Video Systems Inc. D 1.2
McKay Dymek Co.
Rohde & Schwarz Sales Co.
Singer Products Co., Inc.

Antennas, Receiving UHF

Anitser-Mark
Bonder-Tongue Labs.
EMC/EEE Broadcast Products
The Finney Co.
G.C. Electronics
Health Co.
Micro Communications, Inc.
Nurad, Inc.
Perce-Phelps, Inc. D 2.5
Phelps Dodge Communications Co.
Prodelin Inc.
RF Systems, Inc.
Rohde & Schwarz Sales Co.
Singer Products Co., Inc.
Sitco Antenna Co.
Winegard Television Systems

Antennas, Remote Pickup

See Adv. Page

CCA Electronics Corp. 99-106

Allied Broadcast Equip. D 1-9
Andrew Corp.
Anitser-Mark
Belter Electronic Labs., Inc.
Broadcast Broadcast Equipment Corp.
Broadcast Consultants Corp. D5, 6
CCA Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyma Engineering, Inc.
Farinon Electric
Masterton Co., Inc.
McMartin Industries, Inc.
Micro Communications, Inc.
Moseley Assoc.
Nurad, Inc.
Singer Products Co., Inc.
Sparta  - see Cetec Broadcast Group
Wilkenson Electronics, Inc.

Antennas, Remote Transmitting, Radio

See Adv. Page

Broadcast Component Dist. Communication Media

CCA Electronics Corp. 99-106

Allied Broadcast Equip. D 1-9
Broadcast Broadcast Equipment Corp.
Broadcast Consultants Corp. D5, 6
CCA Electronics Corp.
Cetec Broadcast Group
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Farinon Electric
Micro Communications, Inc.
Moseley Associates
Nurad, Inc.
Singer Products Co., Inc.
Wilkenson Electronics, Inc.

Antennas, Transmitting LF

Cetec Broadcast Group
Confidential Electronics Mfg. Co.
Dielectric Communications Div. Sola Basic, Inc.
Jampro  - see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
Shively Laboratories, Inc.

Antennas, Transmitting MF

Cetec Broadcast Group
Collins Radio Rockwell International
Confidential Electronics Mfg. Co.
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Jampro  - see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
Shively Laboratories, Inc.

Antennas, Transceiving UHF

See Adv. Page

Bogner Broadcast Equipment Corp.

See Adv. Page

Phelps Dodge Communications Co. 16

Sound Dynamics, Inc. 226

Alford Mfg. Co.
Bogner Broadcast Equipment Corp.
Broadcast Automatic Assoc. D 1-2
Broadcast Component Dist.
Communication Media D 1-9
CCA Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyma Engineering, Inc.
Farinon Electric
Micro Communications, Inc.
Moseley Associates
Nurad, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
Prodelin Inc.
RCA Broadcast Systems

114

Company Mailing Addresses Begin on Page 231.

www.americanradiohistory.com
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbx, Inc.</td>
<td>Dyma Engineering, Inc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landy Associates Inc.</td>
<td>D 1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marolti Electronics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro Control Associates, Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potomac Instruments, Inc.</td>
<td>QEI Corp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rivers Associates, Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eric Small &amp; Associates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sono-Mag Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Camera Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dbx, Inc.</td>
<td>Landy Associates Inc. D 1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marconl Communication Systems Ltd.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Color Corrector</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohu, Inc. Electronic Div.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dbx, Inc.</td>
<td>Landy Associates Inc. D 1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marconl Communication Systems Ltd.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Data Processing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See Adv. Page</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation Electronics, Inc.</strong></td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Dynamics Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richmond Associates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Equipment Control, Radio</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See Adv. Page</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation Electronics, Inc.</strong></td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component D 1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dist. Communication Media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media Sys. Inc.</td>
<td>269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGM</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aitken Communications Inc.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allied Broadcast Equip.</td>
<td>D 1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autogram Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation Electronics, Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td>D 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D 5, 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGM</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aitken Communications Inc.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allied Broadcast Equip. D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autogram Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation Electronics, Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td>D 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D 5, 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGM</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Electronics, Inc.</strong></td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D 5, 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGM</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Projector</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Dynamics Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaitronics Corp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L&amp;D Industries Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumitrol, Ltd.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studer Revox America</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, Switching</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See Adv. Page</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation Electronics, Inc.</strong></td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D 5, 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGM</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIF International</td>
<td>246</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation, TV, Tape Control, Switch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See Adv. Page</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automation Electronics, Inc.</strong></td>
<td>225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media D 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NEC America, Inc. Broadcasting Equipment Div.
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
Roscort Corp. D3, 4
Sigma Electronics, Inc.
Sony Corp. of America VTR Div.
Tel-Measurements, Inc. B 2
Teleopt, Inc.
Trenton Electronics D 1-9
Videodetics Corp.
Weather Scan, Inc.

Cameras, Film Chain
See Adv. Page

Ikegami Electronics (USA) Inc. 36,37
Broadcast Communications Devices, Inc. D9
Cohu, Inc. Electronics Div.
Commercial Electronics, Inc.
Comquip, Inc.
dbx, Inc.
Fernshe Group Robert Bosch Corp.
GBC Closed Circuit TV Corp.
General Electric Co. ISO Div.
General Electric Co. Tubes/MW Devices
Harris Corp. Broadcast Products Div.
Hitachi Denshi America, Ltd.
Ikegami Electronics (USA) Inc.
KVC Video Systems Inc. D 1, 2
Landy Associates Inc. D 1, 2
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
Philips Broadcast Equip Corp.
RCA Broadcast Systems Research Corp. D3, 4
Sony Corp. of America VTR Div.
Systa-Matics.
Tele-Measurements, Inc. B 2
Trenton Electronics D 1-9
Thomson-CSF Laboratories, Inc.

Cameras, TV ENG
See Adv. Page

All Mobile Video, Inc. 271, 99-106
Asaca Corp. of America 271
CCA Electronics Corp. 99-106
C.R. V.S. Systems, Inc. 274
The Camera Mart, Inc. 64
Commercial Electronics, Inc. 181
Hitachi Denshi America, Ltd. 67
Ikegami Electronics (USA) Inc. 36,37
NEC America, Inc. 215
Philips Broadcast Equip Corp. 45

Broadcast Communications Devices, Inc. D9
CCA Electronics Corp.
Cohu, Inc. Electronics Div.
Commercial Electronics, Inc.
dbx, Inc.
Dyma Engineering, Inc.
Hitachi Denshi America, Ltd.
Ikegami Electronics (USA) Inc.
KVC Video Systems Inc. D 1, 2
Landy Associates Inc. D 1, 2
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
NEC America, Inc. Broadcasting Equip Div.
Peirce-Phelps, Inc. D 2, 5
Philips Broadcast Equip Corp.
RCA Broadcast Systems Research Corp. D3, 4
Sony Corp. of America VTR Div.
Tele-Measurements, Inc. B 2
Thomson-CSF Laboratories, Inc.

Cameras, TV Color Field
See Adv. Page

II CA Electronics Corp. 99-106
Commercial Electronics, Inc. 181
Hitachi Denshi America, Ltd. 67
Ikegami Electronics (USA) Inc. 36,37
Marconi Electronics Inc. 41
NEC America, Inc. 215
Philips Broadcast Equip Corp. 45

Broadcast Communications Devices, Inc. D9
CCA Electronics Corp.
Cohu, Inc. Electronics Div.
Commercial Electronics, Inc.
dbx, Inc.
Dyma Engineering, Inc.
Hitachi Denshi America, Ltd.
Ikegami Electronics (USA) Inc.
KVC Video Systems Inc. D 1, 2
Landy Associates Inc. D 1, 2
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
NEC America, Inc. Broadcasting Equip Div.
Peirce-Phelps, Inc. D 2, 5
Philips Broadcast Equip Corp.
RCA Broadcast Systems Research Corp. D3, 4
Sony Corp. of America VTR Div.
Tele-Measurements, Inc. B 2
Thomson-CSF Laboratories, Inc.

Cameras, TV Color Studio Broadcast
See Adv. Page

All Mobile Video, Inc. 271, 99-106
Commercial Electronics, Inc.
dbx, Inc.
Dyma Engineering, Inc.
Ikegami Electronics (USA) Inc.
Marconi Electronics Inc. 41

Broadcast Communications Devices, Inc. D9
Commercial Electronics, Inc.
dbx, Inc.
Dyma Engineering, Inc.
Ikegami Electronics (USA) Inc.
Marconi Electronics Inc.
Martin Audio/Video D2
Peirce-Phelps, Inc. D 2, 5
Philips Broadcast Equip Corp.
Power-Optics Inc.
RCA Broadcast Systems Research Corp. D3, 4

Capacitors, Transmitting, Mica and Vacuum
See Adv. Page

ITT Jennings 206
Surcom Associates 271

C, S, P, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International Corning Glass Works
Harris Corp. Broadcast Products Div.
ITT Jennings
Sparta -- see Cetec Broadcast Group
Surcom Associates

Cartridge Machine Alignment Tape
Allied Broadcast Equip. D 1-9
Ampro Broadcasting Inc.
Broadcast Communications Div.
Commercial Electronics, Inc. D9
Broadcast System Dist.
Broadcasting Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcasting Electronics, Inc.
Broadcast Distributors
Communication Media
Cetec Broadcast Group
Collins Radio Rockwell International
dyma Engineering, Inc.
Fidelips
Fischer Bailer Broadcast Consultants
Joe Cartridge Service D2
Lauderdale Electronic Labs
Norton Inc.
Professional Audio Service
Sparta -- see Cetec Broadcast Group
Taber Mfg. Co., Inc.
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D1-9

Cartridge Machines, Dual Deck
See Adv. Page

Broadcast Consultants Corp. 83
CCA Electronics Corp. 99-106
Collins Radio 21
minutes
Advanced Audio

Allied Broadcast Equip. D 1-9
Ampro Broadcasting Inc.
Broadcasting Electronics, Inc.
Beaumac Div. UMC Electronics Co.
Broadcast Automation Assoc. D 1-9
Broadcast Communications Devices, Inc.
Broadcast Consultants Corp. D5, 6
Broadcast Equipment & Supply Co. D
CCA Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Consolidated Electronic Industries
Harris Corp. Broadcast Products Div.
IMA Div. of Northwestern Tech.
International Electromagnetics
KVC Video Systems Inc. D 1, 2
Lauderdale Electronic Labs
MacKenzies Laboratories, Inc.
Martin Audio/Video D2
Mastervision, Inc.
Maze Corp D9
McGurty Radio Ind. Inc.
RCA Broadcast Systems

September, 1977

Company Mailing Addresses Begin on Page 231.
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA Media</td>
<td></td>
</tr>
<tr>
<td>LPB Inc.</td>
<td></td>
</tr>
<tr>
<td>Landy Associates Inc.</td>
<td>D 1,2</td>
</tr>
<tr>
<td>Mackenzie Laboratories, Inc.</td>
<td></td>
</tr>
<tr>
<td>Mastertone Co., Inc.</td>
<td></td>
</tr>
<tr>
<td>Maxwell Corp. of America Media Concepts, Inc.</td>
<td>D 1-9</td>
</tr>
<tr>
<td>Memorex Corp. Professional Products Group</td>
<td></td>
</tr>
<tr>
<td>Professional Audio Service</td>
<td></td>
</tr>
<tr>
<td>RCA Broadcast Systems</td>
<td></td>
</tr>
<tr>
<td>Re-Play Video Cartridge Service</td>
<td></td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td></td>
</tr>
<tr>
<td>Sono-Mag Corp.</td>
<td></td>
</tr>
<tr>
<td>Sound Dynamics, Inc. D 8, 9</td>
<td></td>
</tr>
<tr>
<td>Sound Genesis D 8, 9</td>
<td></td>
</tr>
<tr>
<td>Sparta - see Cetec Broadcast Group</td>
<td></td>
</tr>
<tr>
<td>Tapex Communications, Inc.</td>
<td></td>
</tr>
<tr>
<td>Tapex Corp.</td>
<td></td>
</tr>
<tr>
<td>Telecontrol Systems Corp.</td>
<td></td>
</tr>
<tr>
<td>Telex Communications, Inc.</td>
<td></td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td></td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td></td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td></td>
</tr>
</tbody>
</table>

**Cartridges, Phono**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast Component</td>
<td>Dist. Communication Medias</td>
</tr>
<tr>
<td>-</td>
<td>271</td>
</tr>
<tr>
<td>Broadcast Consultants Corp.</td>
<td>83,84,86</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>79-106</td>
</tr>
<tr>
<td>Professional Audio Service</td>
<td>274</td>
</tr>
<tr>
<td>Stanton Magnetics Inc.</td>
<td>195</td>
</tr>
</tbody>
</table>

**AKG Acoustics**

Allied Broadcast Equip. D 1-9

Ampro Broadcasting Inc.

Broadcast Automation Assoc. D 1-2, 5, 6

Broadcast Communications, inc. D 9

Broadcast Component Dist.

Communication Medias D 1-9

Broadcast Consultants Corp. D 5, 6

Broadcast Electronics, Inc.

Broadcast Equipment Distributors

Communication Medias

Broadcast Equipment & Supply Co. D 1-9

CCA Electronics Corp.

Cetec Broadcast Group

Collins Radio Rockwell International dbx, Inc.

Dudtone Co. Inc.

Dyna Engineering, Inc.

EMT Franz VGBM

Fisher-Burke Broadcast Consultants

Golden Audio Corp.

Harris Corp. Broadcast Products Div.

LPB Inc.

Landy Associates Inc. D 1-2

Masterstone Co., Inc.

McCurdy Radio Ind. Inc.

Media Concepts, Inc. D 1-9

Micro-Trak Corp.

Professional Audio Service

QRK Electronic Products

RCA Broadcast Systems

Ram Audio Systems, Inc.

Real-Kut Inc.

Shure Brothers Inc.

Singer Products Co., Inc.

Sound Genesis D 8, 9

Sparta - see Cetec Broadcast Group

Stanton Magnetics

Track Audio, Inc. D 1-9

Val-Tronics, Inc. D 1-9

Westlake Audio

Wilkinson Electronics, Inc.

**Cartridges, Stereo**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension 3 Recording Co.</td>
<td>277</td>
</tr>
<tr>
<td>Fidelipac</td>
<td>172</td>
</tr>
<tr>
<td>Tape Communications, Inc.</td>
<td>8</td>
</tr>
</tbody>
</table>

Allied Broadcast Equip. D 1-9

Ampro Broadcasting Inc.

Aristocrat Div. Western Broadcasting Co., Ltd.

Broadcast Automation Assoc. D 1-2, 5, 6

Broadcast Cartridge Service D 1-9

Broadcast Communications, Inc.

Broadcast Component Dist.

Communication Medias D 1-9

Broadcast Consultants Corp. D 5, 6

Broadcast Electronics, Inc.

Broadcast Equipment Distributors

Communication Medias

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd. dbx, Inc.

Dimension 3 Recording Co.

Dyna Engineering, Inc.

EMT Franz VGBM

Fidelipac

Fisher-Burke Broadcast Consultants

Harris Corp. Broadcast Products Div.

Landy Associates Inc. D 1-2

Masterstone Co., Inc.

Media Concepts, Inc. D 1-9

Micro-Trak Corp.

Professional Audio Service

RCA Broadcast Systems

Ram Audio Systems, Inc.

Real-Kut Inc.

Shure Brothers Inc.

Singer Products Co., Inc.

Sound Genesis D 8, 9

Sparta - see Cetec Broadcast Group

Stanton Magnetics

Tape Communications, Inc.

Telex Communications, Inc.

Track Audio, Inc. D 1-9

Westlake Audio

Wilkinson Electronics, Inc.

**Characters, Generators, Wire Service Memory System**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Data Systems</td>
<td>275</td>
</tr>
</tbody>
</table>

**Choppers**

Comark Industries Inc.

Motorola Semiconductor Products, Inc.

Tektronix Inc.

Townsend Associates, inc.

**Chroma Key Background Movement Devices**

Dyna Engineering, Inc.

Industrial Sciences

KWC Video Systems Inc. D 1, 2

Marconi Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Power-Optics Inc.

**Chroma Keyer-Decoders**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynasciences</td>
<td>14</td>
</tr>
</tbody>
</table>

Lenco Inc. | 19 |

Broadcast Video Systems, Ltd.

Central Dynamics Corp.

Dyna Engineering, Inc.

Dynasciences Div. Whittaker Corp.

Grass Valley Group, Inc.

Industrial Sciences

Lenco Electronics, Inc.

Marcon Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Tetemet a Geestel Co.

**Chrom King**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Dynamics Corp.</td>
<td>230</td>
</tr>
</tbody>
</table>

Dynasciences | 14 |


Broadcast Communications Devices, Inc. D 9

Broadcast Video Systems, Ltd.

Central Dynamics Corp.

Computer Image Video Controllers

Dytek Industries, Inc.

Corning Glass Works

Dyma Engineering, Inc.

Dynar Electronics, Inc.

Dynasciences Div. Whittaker Corp.

Glentronix Ltd. D 1-9

Grass Valley Group, Inc.

Industrial Sciences

KWC Video Systems Inc. D 1, 2

Marconi Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Shintron Corp. Co. Inc.

Video Data Systems

Video Devices Co.

**Character Generators, Wire Service Memory System**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Data Systems</td>
<td>275</td>
</tr>
</tbody>
</table>

**Choppers**

Comark Industries Inc.

Motorola Semiconductor Products, Inc.

Tektronix Inc.

Townsend Associates, inc.

**Chroma Key Background Movement Devices**

Dyna Engineering, Inc.

Industrial Sciences

KWC Video Systems Inc. D 1, 2

Marconi Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Power-Optics Inc.

**Chroma Keyer-Decoders**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynasciences</td>
<td>14</td>
</tr>
</tbody>
</table>

Lenco Inc. | 19 |

Broadcast Video Systems, Ltd.

Central Dynamics Corp.

Dyna Engineering, Inc.

Dynasciences Div. Whittaker Corp.

Grass Valley Group, Inc.

Industrial Sciences

Lenco Electronics, Inc.

Marcon Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Tetemet a Geestel Co.

**Chrom King**

See Adv. Page

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Dynamics Corp.</td>
<td>230</td>
</tr>
</tbody>
</table>

Dynasciences | 14 |


Broadcast Communications Devices, Inc. D 9

Broadcast Video Systems, Ltd.

Central Dynamics Corp.

Computer Image Video Controllers

Dytek Industries, Inc.

Corning Glass Works

Dyma Engineering, Inc.

Dynar Electronics, Inc.

Dynasciences Div. Whittaker Corp.

Glentronix Ltd. D 1-9

Grass Valley Group, Inc.

Industrial Sciences

KWC Video Systems Inc. D 1, 2

Marconi Communication Systems Ltd.

Pierce-Phelps, Inc. D 2, 5

Shintron Corp. Co. Inc.

Video Data Systems

Video Devices Co.
McCurdy Radio Ind. Inc. ...................... IBC
Modular Audio Products .......................... 252
Rupert Neve, Inc. ............................. 169
Quantum Audio Labs, Inc. ......................... 276
Ramko Research Inc. ............................ 91
Robins Broadcast & Sound Equip. Co. .......... 269
Tangent Systems, Inc. ............................ 172
Ward-Beck Systems, Ltd........................... 4

AMCO Engineering Co.
Allied Broadcast Equip. D 1-9 .................. 197

Broadcast Consultants Corp. .................... 83

C.R.V. Systems, Inc. ........................... 274

Dyna Audio, Inc. ................................. 196

Dytek Industries, Inc. ............................ 35

Magazine Associates Inc. D 1-9................ 276

 broadcasts & Broadcast Equipment Distributors Communication Media's

Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialities
Bud Industries, Inc.
C.C.A. Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Components Television Service
Custom Audio Electronics
db, inc.
Dyma Engineering, Inc.
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Industrial Sciences
International Communications & Control Corp.
L.P.B. Inc.
Landy Associates Inc. D 1-2
Martin Audio/Vide D 2
Mastertone Co. Inc.
Maze Corp D 6
McCurdy Radio Ind. Inc.
McMartin Industries, Inc.
Media Concepts, Inc. D 1-9
Micro-Trak Corp.
Modular Audio Products Unit of Modular Devices, Inc.
Minutes Moore
Rupert Neve, Inc.
Opamp Labs, Inc.
Oregon Sound D 9
Public Dynamics Mfg. Corp. (PDMC)
Quad Eight Electronics
Quantum Audio Labs, Inc.
R.C.A. Broadcast Systems
Ramko Research Inc.
Rek-O-Kut Inc.
Richard Sound Design, Ltd.
Robins Broadcast & Sound Equip. Corp.
Russee Electronics Mfg. Inc.
Scientific Systems, Inc.
Shure Brothers Inc.
Singer Products, Inc.
Sound Genesis D 8, 9
Sparta—see Cetec Broadcast Group
Spectra Sonics
Sphere Electronics
Studer Revos America
Superconcope
T.E.A.C. Corp of America
Tele-Measurements, Inc. B 2
Television and Computer Corp.
Track Audio, Inc. D 1-9
Tri-Tronics Professional Electronics
Ultra Audio McG.
Val-Tronics, Inc. D 1-9
Ward-Beck Systems, Ltd.
Ward Audio
Yamaha International Corp.

Consoles, Audio Recording

See Adv. Page

Audio Designs & Mfg. .................................. 27
Auditionics, Inc. .................................... 196

Broadcast Consultants Corp. .................... 83

Cetec Audio ........................................... 217

Collins Radio ........................................... 21

Dyma Engineering, Inc. ......................... 276

Industrial Sciences ................................. 250

L.P.B. Inc. ........................................... 172

AMCO Engineering Co.
Allied Broadcast Equip. D 1-9
American Data Div. Philips Broadcast Equip. Cor.
Ampro Broadcasting Inc.
Audio Designs & Mfg.
Audironics, Inc.
Automated Processes, Inc.
B.S.C. Inc.
Boston Sound & Power Systems
Broadcast Automation Assoc. D 1-2, 5, 6
Broadcast Communications, Inc. D 9

Broadcast Component Dist.
Communication Media's D 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialities
Bud Industries, Inc.
C.C.A. Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Components Television Service
Custom Audio Electronics
db, Inc.
Dyma Engineering, Inc.
Fisher-Burke Broadcast Consultants
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Holland Electronics
Industrial Sciences
International Communications & Control Corp.
L.P.B. Inc.
Landy Associates Inc. D 1-2
M.C.L. Inc.
Magnat-Electronico Co., Inc.
Martin Audio/Vide D 2
Maze Corp D 6
McCurdy Radio Ind. Inc.
McMartin Industries, Inc.
Media Concepts, Inc. D 1-9
Micro-Trak Corp.
Modular Audio Products Unit of Modular Devices, Inc.
Minutes Moore
Rupert Neve, Inc.
Opamp Labs, Inc.
Oregon Sound D 9
Quad Eight Electronics
Quantum Audio Labs, Inc.
R.C.A. Broadcast Systems
Ramko Research Inc.
Richmond Sound Design, Ltd.
Robins Broadcast & Sound Equip. Corp.
Russee Electronics Mfg. Inc.
Scientific Systems, Inc.
Shure Brothers Inc.
Singer Products, Inc.
Sound Genesis D 8, 9
Sparta—see Cetec Broadcast Group
Spectra Sonics
Sphere Electronics
Studer Revos America
T.E.A.C. Corp of America
Tele-Measurements, Inc. B 2
Television and Computer Corp.
Track Audio, Inc. D 1-9
Tri-Tronics Professional Electronics
Ultra Audio McG.
Val-Tronics, Inc. D 1-9
Ward-Beck Systems, Ltd.
Ward Audio
Yamaha International Corp.

Consoles, Audio TV

See Adv. Page

American Data Div. ................................... 197
Broadcast Consultants Corp. .................... 83

C.R.V. Systems, Inc. ............................... 274

Dyna Audio, Inc. ................................. 196

Dytek Industries, Inc. ............................ 35

Magazine Associates Inc. D 1-9

broadcasts & Broadcast Equipment Distributors Communication Media's

Broadcast Equipment & Supply Co. D 1-9

Audio Designs & Mfg.
Audio Distributor Inc.
Audio Designs, Inc.
Broadcast Component Dist.
Communication Media's
Broadcast Consultants Corp. D 5, 6
C.C.A. Electronics Corp. 99-106
Cetec Audio ........................................... 217

Cetec Broadcast Group ............................ 276

Dyna Engineering, Inc. ......................... 276

Industrial Sciences ................................. 250

L.P.B. Inc. ........................................... 172

McCurdy Radio Ind. Inc. ......................... 1BC

Modular Audio Products .......................... 252

Rupert Neve, Inc. ................................. 169

Rek-O-Kut Systems, Inc. ......................... 269

Tangent Systems, Inc. ............................ 172

Ward-Beck Systems, Ltd............................ 4

AMCO Engineering Co.
Allied Broadcast Equip. D 1-9
American Data Div. Philips Broadcast Equip. Cor.
Ampro Broadcasting Inc.
Audio Designs & Mfg.
Audironics, Inc.
Automated Processes, Inc.
B.S.C. Inc.
Broadcast Automation Assoc. D 1-2, 5, 6
Broadcast Communications, Inc. D 9

Broadcast Component Dist.
Communication Media's D 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialties
Bud Industries, Inc.
C.C.A. Electronics Corp.
Cetec Audio ........................................... 217

Cetec Broadcast Group ............................ 276

Dyna Engineering, Inc. ......................... 276

Industrial Sciences ................................. 250

L.P.B. Inc. ........................................... 172

McCurdy Radio Ind. Inc. ......................... 1BC

Modular Audio Products .......................... 252

Quantum Audio Labs, Inc. ......................... 276

Ramko Research Inc. .............................. 91

Robins Broadcast & Sound Equip. Co. .......... 269

Tangent Systems, Inc. ............................ 269

Ward-Beck Systems, Ltd............................ 4

AMCO Engineering Co.
Allied Broadcast Equip. D 1-9
American Data Div. Philips Broadcast Equip. Cor.
Ampro Broadcasting Inc.
Audio Designs & Mfg.
Audironics, Inc.
Automated Processes, Inc.
B.S.C. Inc.
Broadcast Automation Assoc. D 1-2, 5, 6
Broadcast Communications, Inc. D 9

Broadcast Component Dist.
Communication Media's D 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Broadcast Equipment & Supply Co. D 1-9

Broadcast Communications Devices, Inc. D 9

Broadcast Component Dist.
Communication Media's D 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Broadcast Equipment & Supply Co. D 1-9
Richmond Ward
United Recording Electronics
Tri-Tronics Professional
Track Audio, Telex Communications, Teletangent Systems, Sphere Electronics
Studer Revox America
Tangent Systems, Inc.
Tele-Measurements, Inc., B-2
Telex Communications, Inc.
Three Peak, Inc., D-19
Tri Tronics Professional
United Recording Electronics
United Systems, Ltd.
Val-Tronics, Inc., D1-9
Ward-Beck Systems, Ltd.
Westlake Audio
Wilkinson Electronics, Inc.

Consoles, Video Portable

American Data Div. ......... 197
C.R.V. Systems, Inc. ....... 274
Central Dynamics Corp. ....... 230

Dytek Industries, Inc. ....... 35

Shrintron Co. Inc. ....... 93

Winsted Corp. ....... 82

AMCO Engineering Co.
Broadcast Communications Devices, Inc., D9

Broadcast Video Systems, Ltd.
Broadcast Consultants Group
Broadcast Consultants Ltd.
Broadcast Consultants, Inc.

Broadcast Consultants Corp. D5, 6

Central Dynamics Corp.

Computer Image Video Controllers
Dytek Industries, Inc.
Dage MTI, Inc.
Dyman Engineering, Inc.
Dynasciences Div. Whaltek Corp.
Dytek Industries, Inc.
GBC Closed Circuit TV Corp.
Glentronix Ltd. D 1-9
Grass Valley Group, Inc.
Industrial Science Laboratories, Inc.
International Nuclear Corp.
J&D Electronics Div.
Marcon Electronics Inc.
Peirce-Philps, Inc. D 2, 5
RCA Broadcast Systems
Richmond Hill Laboratories Ltd.
Roscor Corp. D 3, 4
Singer Products Co., Inc.
Sony Corp. of America VTR Div.
Tele-Measurements, Inc. B-2
Teletem a Geotel Co.

Video Components, Inc.
Videotelecom Corp.
Viscount Industries Ltd.
Vital Industries Inc.
Weather Scan, Inc.
Winsted Corp.

Controllers, Equipment, Network Tone Activated

Ampro Broadcasting Inc.
Broadcast Consultants Group D5, 6

Cetec Broadcast Group

The Widget Works, Inc.

Converters, A/D and D/a

Computer Labs

Kay Industries, Inc. ....... 220

AEI, Inc.
Aiken Industries Inc.
Catel Div. United Scientific Corp.
The Finney Co.
Fung Engineering Inc.
Kay Industries, Inc.
Marcon Electronics Corp.
Motorola Semiconductor Products, Inc.
North Hills Electronics, Inc.
Oak Industries, Inc.
Philips Test & Measuring Instruments, Inc.
Teletem a Geotel Co.

Converters, Phase -- Phase Converters, Single to Three-Phase

Counter-Timers

Artist's Engineering ....... 275

Broadcast Consultants Corp. ....... 83

ESE ..... 63, 65

Glentronix Ltd. ....... 254

Sound Dynamics, Inc. ....... 226

Allied Broadcast Equip. D 1-9
Ampro Broadcasting Inc.

Artist's Engineering Visual Communications Div.
Broadcast Aids, Inc.
Broadcast Communications Devices, Inc., D9

Broadcast Consultants Group D5, 6

Broadcast Consultants Corp. D5, 6
Broadcast Consultants Ltd.

Collins Radio Rockwell International

Conrac Corp.

CoverCast, Inc. D9

Dana Laboratories, Inc.

Digi-Tech
Dyman Engineering, Inc.
EIP, Inc.
ESE

John Fluke Mfg. Co., Inc.
Glentronix Ltd. D 1-9

Gothen Audio Corp.

Hickok Broadcast Products Div.
Hickok Elect. Instrument
Laird Telemedia Inc.

Lectrotech Inc.
Motorola Semiconductor Products, Inc.
Pacific Recorders and Engrg. Corp.
Philips Test & Measuring Instruments, Inc.

Rampko Research Inc.
Sigma Electronics, Inc.
Sound Dynamics, Inc., D9, 8
Sound Generals D 8, 9
Specialized Industries, Inc.
Systron Donner

Tapecasters, Inc.
Tektronix Inc.

Time & Frequency Tech., Inc.
Track Audio, Inc., D 1-9

United Systems Corp.

Vit-Tronics, Inc., D1-9

Vanco Engineering

Counters, Frequency

Idaho Magnetics

Broadcast Communications Devices, Inc. D9

Collins Radio Rockwell International

Dana Laboratories, Inc.

Dyman Engineering, Inc.

EIP, Inc.

Elcom Engineering Co.

Rupert Electric, Inc.

Hickok Elect. Instrument

Idaho Magnetics

Lauderdale Electronic Labs

Leader Instruments Corp.

Scientific-Atlanta, Inc.

Sencore Inc.

Tektronix Inc.

United Radio Supply Inc. D9

United Systems Corp.

Couplers, Hybrid

Broadcast Consultants Corp. ....... 84

Alford Mfg. Co.
Arvin CAV

Broadcast Consultants Corp. D5, 6

Coaxial Dynamics

Comark Industries Inc.

Dyman Engineering, Inc.

Electro Impulse, Inc.

Harris Corp. Broadcast Products Div.

Holland Electronics

Maury Microwave Corp.

Micro Communications, Inc.

Microwave Assoc.

Monroe Electronics Inc.

Narda Microwave Corp.

North Hills Electronics, Inc.

Saxon Products Inc.

Shively Laboratories, Inc.

Wide Band Engineering Co., Inc.

Crystals, Quartz

Edison Electronic Co.

Harrys Corp. Broadcast Products Div.

Marcon Communication Systems Ltd.

Custom Control Systems

Accurate Sound Co. ....... 223

Ampro Broadcasting Inc.

Audio Designs & Mfg. ....... 70

Communications, Ltd., ....... 270

Dytek Industries, Inc. ....... 35

Industrial Sciences ....... 250

Micro-Trak Corp. ....... 260

Modular Audio Products

Rupert Neve, Inc. ....... 169

A. F. Associates, Inc.

Accurate Sound Co.


Ampro Broadcasting Inc.

Audio Designs & Mfg.

BJA Systems, Inc.

Broadcast Consultants Corp. D5, 6

Central Dynamics Corp.

Cetec Broadcast Group

Communications, Ltd.

Custom Audio Electronics

Datalogic Ltd.

Dytek Industries, Inc.

Eino Forenno Associates, Inc.

Fisher-Burke Broadcast Consultants

Holland Electronics

IBM Div. of Northwestern Tech.

Industrial Sciences

Micro-Trak Corp.

Vanco Engineering

Wilkinson Electronics, Inc.

Cyclorama, Studio Drapery

Janson Industries

Kiepl Bros. Lighting

Lumitrol, Inc.

Roscor Corp. D3, 4

Data Receivers -- See Receivers, Data

Data Transmitters

Moseley Assoc. Inc. ....... 69

Boston Sound & Power Systems

Bristol Div. of Acco

Marcon Communication Systems Ltd.

Moseley Assoc.

TerraCom

The Widget Works, Inc.

Decoders, Digital Sync

The BTX Corp.

The BTX Corp.

Digital Video Systems

Television Research International

Decoders, Four Channel Stereo

Motorola Semiconductor Products, Inc.

Sansei Electronics Corp.

Sound Generals D 8, 9

Technics by Panasonic

Decoders, Tone

Broadcast Component Dist.

Communication Medias, Inc. ....... 273

Frequency Devices Inc. ....... 222, 273

American Microsignal Co.

Ampro Broadcasting Inc.

Broadcast Component Dist.

Communication Medias D 1-9

Di-Tech Inc.

September, 1977 Company Mailing Addresses Begin on Page 231.
Digitizers, ColorVideo

BJA Systems, Inc.
Central Dynamics Corp.
Dyma Engineering, Inc.
Micro Consultants
Tektronix Inc.
Thomson-CSF Laboratories, Inc.

Diaplexers

Alford Mfg. Co.
CCACorporations, Inc.
C. S. P. Inc.
Cetec Broadcast Group
Coastcom
Collins Radio Rockwell International
Comark Industries Inc.
Continental Electronics Mfg. Co.
Diestlectric Communications Div. Sola
Basic, Inc.
Dyma Engineering, Inc.
Jampco - see Cetec Broadcast Group
Laird Telemedia Inc.
Micro Communications, Inc.
Microwave Assoc, Inc.
Multironic, Inc.
North American Radio Corp.
Pacific Recorders and Engrg. Corp.
Philips Dodge Communications Co.
RCA Broadcast Systems
RCA Community Television Systems
Shively Laboratories, Inc.
Singer Products Co., Inc.
Teltonic Altair
tek Electronics Inc.
Wide Band Engineering Co., Inc.

Discs, Video

See Adv. Page

Computer Magnetics
Corp. ........................................ 248,249

Ampex Corp.
Arvin/Echo Co.
Chyrion Telesystems
Computer Magnetics Corp.
dbx, Inc.
Eigen Video
Glentronics Ltd. D 1-9
Landy Associates Inc. D 1,2
Peirce-Phelps, Inc. D 2, 5
Roscor Corp. D 3, 4
Teknekon/ TRAX

Display Equipment, Tiltin

BJA Systems Inc.
Broadcast Communications Devices, Inc.
Chyrion Telesystems
Conquip, Inc.
dbx, Inc.
General Television Ntwk. D 3
Landy Associates Inc. D 1,2
Photo Research Div. of Kollmorgen Corp.
Reynolds/Leteron Co.
Tektronix Inc.
Telation Inc.
Telescript, Inc.
Thomson-CSF Laboratories, Inc.
3MC Mincon Div.
Ultra Audio Pixtec
Video Data Systems

Display Units, Digital

See Adv. Page

The BTX Corp. ................................ 208
ESE ........................................ 63, 65
Moseley Assoc. Inc. .......................... 69

BJA Systems, Inc.
The BTX Corp.
Beta Technology, Inc.
Broadcast Communications Devices, Inc.
Cetec Broadcast Group
Convergence Corp.
ESE
G.C. Electronics
Ikegami Electronics (USA) Inc.
Javelin Electronics D9
Kallman Associates, Inc.
Moseley Assoc. Inc.
SC Electronics, Inc.
Schluter - see Cetec Broadcast Group
Scientific-Atlanta, Inc.
Tektronix Inc.
Thomson-CSF Laboratories, Inc.
3MC Mincon Div.
Vanco Engineering
Video Data Systems

Display Units, Time-
Temperature-ID

Boston Sound & Power Systems
Broadcast Communications Devices, Inc.
D9
EG
IGM Div. of Northwestern Tech.
Javelin Electronics D9
Laird Telemedia Inc.
Merrill Cable Equipment Corp.
Thomson-CSF Laboratories, Inc.
3MC Mincon Div.
Time & Frequency Tech., Inc.
Track Audio, Inc. D 1-9
Video Data Systems

Dividers, Frequency

Broadcast Communications Devices, Inc.
D9
General Electric Co. Tubes/MW Devices
Maury Microwave Corp.
Micro Communications, Inc.
Moseley Assoc. Inc.
Multironic, Inc.
Narda Microwave Corp.
North American Radio Corp.
North Hills Electronics, Inc.
Pacific Recorders and Engrg. Corp.
Philips Dodge Communications Co.
Scal Radio Corp.
Shively Laboratories, Inc.
Singer Products Co., Inc.
Sparta - see Cetec Broadcast Group
Tektronix Inc.
Trompeter Electronics
Weinreishe Engineering Co.
Wide Band Engineering Co., Inc.

Dividers, Power

See Adv. Page

Moseley Assoc. Inc. .......................... 69

Alford Mfg. Co.
Bird Electronic Corp.
Cetec Broadcast Group
Comark Industries Inc.
Diestlectric Communications Div. Sola
Basic, Inc.
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
Harris Corp. PRD Electronics Div.
Maury Microwave Corp.
Micro Communications, Inc.
Moseley Assoc. Inc.
Multironic, Inc.
Morse Associates, Inc.
Narda Microwave Corp.
North American Radio Corp.
North Hills Electronics, Inc.
Pacific Recorders and Engrg. Corp.
Philips Dodge Communications Co.
Scal Radio Corp.
Shively Laboratories, Inc.
Singer Products Co., Inc.
Sparta - see Cetec Broadcast Group
Tektronix Inc.
Trompeter Electronics
Weinreishe Engineering Co.
Wide Band Engineering Co., Inc.

Editors, Audio Tape

See Adv. Page

Sound Dynamics, Inc. ........................ 226

AEG-Telefunken Magnetic Tape Recorder Dept.
Automated Processes, Inc.
Broadcast Communications Devices, Inc.
D9
Broadcast Communications Devices, Inc.
CMX Systems Div. of Orro Corp.
Central Dynamics Corp.
Conquip, Inc.
dbx, Inc.
Datatron, Inc.
Dyma Engineering, Inc.
EECO
Glentronics Ltd. D 1-9
International Communications & Control Corp.
Kaitronics Corp.
Landy Associates Inc. D 1,2
Recortec Inc.
Shintron Co. Inc.
Skelol
Television Research International
Time Tech Corp.
Westlake Audio

Edit Code Receivers

See Adv. Page

The BTX Corp. ................................ 208
Central Dynamics Corp. .................... 230
Gould, Inc. .................................. 44
Kaitronics Corp. ............................. 211
Time Tech Corp. ............................. 275

Automated Processes, Inc.
The BTX Corp.
Beta Technology, Inc.
Broadcast Communications Devices, Inc.
CMX Systems Div. of Orro Corp.
Central Dynamics Corp.
Chrono-Log Corp.
dbx, Inc.
Datatron, Inc.
Dyma Engineering, Inc.
EECO
Glentronics Ltd. D 1-9
International Communications & Control Corp.
Kaitronics Corp.
Landy Associates Inc. D 1,2
Recortec Inc.
Shintron Co. Inc.
Skelol
Television Research International
Time Tech Corp.
Westlake Audio

Editors, Film

See Adv. Page

Lipsner-Smith Corp. .......................... 60
Research Technology, Inc. .................. 60

Broadcast Communications Devices, Inc.
Comquip, Inc.
Image Devices Inc.
Kalart Victor Corp.
Lipsner-Smith Corp.
Magnasync/Moviola Corp.
Neumann Products Corp.
Research Technology, Inc.
Sound Genesis DB, 9
Super 8 Sound, Inc.
Victor Duncan, Inc.

Editors, Video Tape

See Adv. Page

Artist's Engineering ....................... 275
CMX Systems ................................ 9
Central Dynamics Corp. .................... 230
Convergence Corp. .......................... 39
Kaitronics Corp. ............................. 211
Panasonic Video Systems Div. 30, 31
Vanco Engineering ......................... 198

Ampec Corp.
Artist's Engineering Visual Communications Div
Beta Technology, Inc.
Broadcast Communications Devices, Inc.
CMX Systems Div. of Orro Corp.
Central Dynamics Corp
Cetec Broadcast Group
Conquip, Inc.
Convergence Corp.
dbx, Inc.
Datatron, Inc.
Dyma Engineering, Inc.
EECO
ELPA Marketing Industries, Inc.
JVC Industries, Inc.
Kaitronics Corp.
Landy Associates Inc. D 1,2
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
RCA Broadcast Systems
Recortec Inc.
Roscov Corp. D 3, 4
Sony Corp. of America VTR Div.
Spectra-Vision Corp.
Tele-Measurements, Inc. B-2
Television Research International
Vanco Engineering
Video Ads Corp. of Colorado
Video Associates
Video Devices Co.

Educational Courses, Electronic

Computer Image Video Controllers
Dytek Industries, Inc.
Comquip, Inc.
Convergence Corp.
dbx, Inc.
Datatron, Inc.
Dyma Engineering, Inc.
EECO
ELPA Marketing Industries, Inc.
JVC Industries, Inc.
Kaitronics Corp.
Landy Associates Inc. D 1,2
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
RCA Broadcast Systems
Recortec Inc.
Roscov Corp. D 3, 4
Sony Corp. of America VTR Div.
Spectra-Vision Corp.
Tele-Measurements, Inc. B-2
Television Research International
Vanco Engineering
Video Ads Corp. of Colorado
Video Associates
Video Devices Co.

Enclosures, Module Card Tray

Dyna Engineering, Inc.
Modular Audio Products Unit of Modular Devices, Inc.
Monroe Electronics, Inc.
The Orange County Electronics Corp.
Ltd.
Quad-Eight Elec
ROH Corporation
Robins Broadcast & Sound Equip.
Corp.
Tele-Measurements, Inc. B-2

Encoding Systems, Quad

Sansui Electronics Corp.

September, 1977

Company Mailing Addresses Begin on Page 231.
Encoders, Color Video
Amltron Corp.
Broadcast Video Systems, Ltd.
Chyron Telesystems
Cohu, Inc. Electronics Div.
dbx, Inc.
Dyma Engineering, Inc.
Georgia Electronics Co.
Harris Corp. Broadcast Products Div.
Landy Associates Inc. D 1,2
Lenco Inc. Electronics Div.
Marconi Electronics Corp.
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
Phelps Test & Measuring Instruments, Inc.
Rank Precision Industries, Inc. (III)
Rank Cintel Div.
Sigma Electronics, Inc.
Sensop, Inc. Corp. America VTR Div.
Telefation, Inc.
Television Measurements, inc. B-2
3M Co. Mincom Div.

**Equalizers, Audio Emphasis**

**Broadcast Component Dist. Communication Media**

- **International Electro-Magnetics**
- **Opamp Labs, Inc.**
- **M. Palmer & Associates**
- **Pulse Techniques Inc.**
- **Ramko Research Inc.**
- **Sound Dynamics, Inc.**

Accurate Sound Co.
Allied Broadcast Equip. D 1-9
Altaec Sound Products
Audio Designs & Mfg.
Audio Distributor inc. D 1-9
Auditionics, Inc.
Automated Processes, Inc.
Bell P/A Prod. Corp.
Bogen Div. Leair Siegler, Inc.
Broadcast Communications, Inc.
Broadcast Component Dist.
Communication Media's D 1-9
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Media's
Broadcast Equipment & Supply Co. D 1-9
Cetec Broadcast Group
Color Video Rockwell International
Dyna Engineering, Inc.
ESC Electronics Corp.
Gotham Audio Corp.
Holland Electronics
International Electro-Magnetics
Kahn Communications, Inc.
Landy Associates Inc. D 1,2
Maze Corp D6
McCurdy Radio Ind. Inc.
Micro-Trak Corp.
Modular Audio Products Unit of
Modular Devices, Inc.
Rupert Neve, Inc.
Opamp Labs, Inc.
The Orange County Electronics Corp.

- **Orban/Parasound**
- **Oregon Magnetics**
- **Oregon Sound D 9**
- **M. Palmer & Associates**
- **Pulse Techniques Inc.**
- **Quad-Eight Electronics**
- **RIO Corporation**

- **Richmond Sound Design, Ltd.**
- **Robins Broadcast & Sound Equip.**
- **Sescom, Inc.**
- **Shure Brothers Inc.**
- **Sinha, John**
- **Sound Dynamics, Inc. D 8, 9**
- **Sound Genesis D 8, 9**
- **Spartha - see Cetec Broadcast Group**
- **Westlake Audio**

**Equalizers, Vertical Aperture**

**Microtime, Inc.**

- **Broadcast Communications Devices, Inc.**
- **D-9**
- **Dynasences Div. Whittaker Corp.**
- **ESC Electronics Corp.**
- **Landy Associates Inc. D 1,2**
- **Microtime, Inc.**
- **Peirce-Phelps, Inc. D 2, 5**
- **Tele-Measurements, Inc. B-2**
- **Thomson-CSF Laboratories, Inc.**

**Exciters, AM**

**Broadcast Component Dist. Communication Media**

- **AEI, Inc.**

- **Allied Broadcast Equip. D 1-9**
- **Broadcast Consultants Corp. D5, 6**
- **Broadcast Equipment & Supply Co. D 1-9**
- **Broadcast Specailties**
- **CCA Electronics Corp.**
- **Cetec Broadcast Group**
- **Collins Radio Rockwell International**
- **Dyna Engineering, Inc.**
- **Fung Engineering Inc.**
- **Harris Corp. Broadcast Products Div.**
- **Marconi Communications Systems Ltd.**
- **Masterstone Co., Inc.**
- **Maze Corp D6**
- **McMaster Industries, Inc.**
- **North American Radio Corp.**
- **QEI Corp.**

**Exciters, Stereo**

**Broadcast Component Dist. Communication Media**

- **AEI, Inc.**

- **Allied Broadcast Equip. D 1-9**
- **Broadcast Consultants Corp. D5, 6**
- **Broadcast Equipment & Supply Distributors**
- **Broadcast Specialties**
- **CCA Electronics Corp.**
- **CSF Electronics Corp.**
- **Cetec Broadcast Group**
- **Collins Radio Rockwell International**
- **Dyna Engineering, Inc.**
- **Fung Engineering Inc.**
- **Harris Corp. Broadcast Products Div.**
- **Marconi Communications Systems Ltd.**
- **Masterstone Co., Inc.**
- **Maze Corp D6**
- **McMaster Industries, Inc.**
- **Moseley Assoc. Inc.**
- **QEI Corp.**

**Exciters, SCA**

**Broadcast Component Dist. Communication Media**

- **AEI, Inc.**

- **Allied Broadcast Equip. D 1-9**
- **Broadcast Consultants Corp. D5, 6**
- **Broadcast Equipment & Supply Co. D 1-9**
- **Broadcast Specailties**
- **CCA Electronics Corp.**
- **CSF Electronics Corp.**
- **Cetec Broadcast Group**
- **Collins Radio Rockwell International**
- **Dyna Engineering, Inc.**
- **Fung Engineering Inc.**
- **Harris Corp. Broadcast Products Div.**
- **Marconi Communications Systems Ltd.**
- **Masterstone Co., Inc.**
- **Maze Corp D6**
- **McMaster Industries, Inc.**
- **Moseley Assoc. Inc.**
- **QEI Corp.**

**Exciters, Stereo**

**Broadcast Component Dist. Communication Media**

- **AEI, Inc.**

- **Allied Broadcast Equip. D 1-9**
- **Broadcast Consultants Corp. D5, 6**
- **Broadcast Equipment & Supply Distributors**
- **Broadcast Specialties**
- **CCA Electronics Corp.**
- **CSF Electronics Corp.**
- **Cetec Broadcast Group**
- **Collins Radio Rockwell International**
- **Dyna Engineering, Inc.**
- **Fung Engineering Inc.**
- **Harris Corp. Broadcast Products Div.**
- **Marconi Communications Systems Ltd.**
- **Masterstone Co., Inc.**
- **Maze Corp D6**
- **McMaster Industries, Inc.**
- **Moseley Assoc. Inc.**
- **QEI Corp.**

**Exciters, TV Image**

**Dynasences**

- **Microtime, Inc.**

- **Broadcast Communications Devices, Inc.**
- **Cohu, Inc. Electronics Div.**
- **Corning Glass Works**
- **dbx, Inc.**
- **Dynasences Div. Whittaker Corp.**
- **Glentronix Ltd. D 1-9**
- **Harris Corp. Broadcast Products Div.**
- **Landy Associates Inc. D 1,2**
- **Microtime, Inc.**
- **Peirce-Phelps, Inc. D 2, 5**
- **Rank Precision Industries, Inc. (III)**
- **Rank Cintel Div.**
- **Rocstar Corp. D-3, 4**
- **Telecommunications, Inc. B-2**
- **Telnet Pl. a Geolol Co.**
- **Television Research International**
- **Thomson-CSF Laboratories, Inc.**
- **3M Co. Mincom Div.**

**Equalizers, Audio Emphasis**

**Broadcast Component Dist. Communication Media**

- **International Electro-Magnetics**
- **Opamp Labs, Inc.**
- **M. Palmer & Associates**
- **Pulse Techniques Inc.**
- **Ramko Research Inc.**
- **Sound Dynamics, Inc.**

- **Accurate Sound Co.**
- **Allied Broadcast Equip. D 1-9**
- **Altaec Sound Products**
- **Audio Designs & Mfg.**
- **Audio Distributor inc. D 1-9**
- **Auditionics, Inc.**
- **Automated Processes, Inc.**
- **Bell P/A Prod. Corp.**
- **Bogen Div. Leair Siegler, Inc.**
- **Broadcast Communications, Inc.**
- **Broadcast Component Dist.**
- **Communication Media's D 1-9**
- **Broadcast Electronics, Inc.**
- **Broadcast Equipment Distributors**
- **Communication Media's**
- **Broadcast Equipment & Supply Co. D 1-9**

**Exciters, Stereo**

**Broadcast Component Dist. Communication Media**

- **AEI, Inc.**

- **Allied Broadcast Equip. D 1-9**
- **Broadcast Consultants Corp. D5, 6**
- **Broadcast Equipment & Supply Co. D 1-9**
- **Broadcast Specailties**
- **CCA Electronics Corp.**
- **CSF Electronics Corp.**
- **Cetec Broadcast Group**
- **Collins Radio Rockwell International**
- **Dyna Engineering, Inc.**
- **Fung Engineering Inc.**
- **Harris Corp. Broadcast Products Div.**
- **Marconi Communications Systems Ltd.**
- **Masterstone Co., Inc.**
- **Maze Corp D6**
- **McMaster Industries, Inc.**
- **Moseley Assoc. Inc.**
- **QEI Corp.**

Company Mailing Addresses Begin on Page 231.
### Generators, Background Color

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenco Inc.</td>
<td>167</td>
</tr>
<tr>
<td>Shinton Co. Inc.</td>
<td>168</td>
</tr>
<tr>
<td>NEC America, Inc.</td>
<td>187</td>
</tr>
<tr>
<td>Space Industries Inc.</td>
<td>215</td>
</tr>
</tbody>
</table>

### Generators, Color Sync

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenco Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Shinton Co. Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Video Aids Corp. of Colorado</td>
<td>95</td>
</tr>
</tbody>
</table>

### Generators, Burst

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenco Inc.</td>
<td>14</td>
</tr>
<tr>
<td>Shinton Co. Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Video Aids Corp. of Colorado</td>
<td>95</td>
</tr>
</tbody>
</table>

### Generators, Color Bar

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenco Inc.</td>
<td>19</td>
</tr>
<tr>
<td>Shinton Co. Inc.</td>
<td>93</td>
</tr>
</tbody>
</table>

### Generators, Cross Pulse

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td>19</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>19</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>19</td>
</tr>
<tr>
<td>Sigma Electronics, Inc.</td>
<td>19</td>
</tr>
<tr>
<td>Tektronix Inc.</td>
<td>19</td>
</tr>
</tbody>
</table>

### Generators, Digital Sync

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Broadcast Video Systems, Ltd.</td>
<td>93</td>
</tr>
<tr>
<td>Central Dynamics Corp.</td>
<td>93</td>
</tr>
<tr>
<td>Digital Video Systems</td>
<td>93</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>93</td>
</tr>
<tr>
<td>Industrial Sciences</td>
<td>93</td>
</tr>
<tr>
<td>International Communications &amp; Control Corp.</td>
<td>93</td>
</tr>
<tr>
<td>Javelin Electronics D9</td>
<td>93</td>
</tr>
<tr>
<td>Landy Associates Inc.</td>
<td>93</td>
</tr>
<tr>
<td>Leitch Video Ltd.</td>
<td>93</td>
</tr>
<tr>
<td>Leitch Video Co.</td>
<td>93</td>
</tr>
<tr>
<td>Lenco Inc. Electronics Div.</td>
<td>93</td>
</tr>
<tr>
<td>Marconi Communication Systems Ltd.</td>
<td>93</td>
</tr>
<tr>
<td>National Instruments</td>
<td>93</td>
</tr>
<tr>
<td>Philips Test &amp; Measuring Instruments, Inc.</td>
<td>93</td>
</tr>
</tbody>
</table>

### Generators, Error Insertion

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Electrolab Ltd.</td>
<td>69</td>
</tr>
</tbody>
</table>

### Generators, FM Subcarrier

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
</tr>
<tr>
<td>AEL, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Allied Broadcast Equip. D 1-9</td>
<td>69</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>69</td>
</tr>
<tr>
<td>CSI Electronics, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Catel Div. United Scientific Corp.</td>
<td>69</td>
</tr>
<tr>
<td>Cetec Broadcast Group</td>
<td>69</td>
</tr>
<tr>
<td>Coastcom</td>
<td>69</td>
</tr>
<tr>
<td>Collins Radio Rockwell International</td>
<td>69</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>69</td>
</tr>
<tr>
<td>Martini Electronics</td>
<td>69</td>
</tr>
<tr>
<td>Masterstone Corp.</td>
<td>69</td>
</tr>
<tr>
<td>McMartin Industries, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Moseley Assoc. Inc.</td>
<td>69</td>
</tr>
<tr>
<td>OMS Co.</td>
<td>69</td>
</tr>
<tr>
<td>RCA Broadcast Systems</td>
<td>69</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Sparta -- see Cetec Broadcast Group</td>
<td>69</td>
</tr>
<tr>
<td>Tektronix Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Tele-Measurements, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Watanabe, Inc.</td>
<td>69</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>69</td>
</tr>
</tbody>
</table>

### Generators, Monoscope

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telemet a Geotel Co.</td>
<td>19</td>
</tr>
</tbody>
</table>

### Generators, NTSC Signal Test

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asaca Corp. of America</td>
<td>15</td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc.</td>
<td>15</td>
</tr>
</tbody>
</table>

---

www.americanradiohistory.com
Track Audio, Inc. D1-9
United Radio Supply Inc. D9
Westlake Audio
Wilkinson Electronics, Inc.

Headphones, Broadcast Monitoring

See Adv. Page

Broadcast Equipment & Supply

Broadcast Consultants

Corp. .......... 84, 86
Maze Corp .......... 270
Sound Dynamics, Inc. .......... 226

AKG Acoustics
Allied Broadcast Equip. D 1-9
Broadcast Automation Assoc. D 1-2-5-6
Broadcast Communications Devices, inc. D9
Broadcast Component Dist. Communication Media, inc. D9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors Communication Media
Broadcast Equipment & Supply Co. D 1-9
David Clark Co., Inc.
Collins Radio Rockwell International
Duotone Co. Inc.
Dyna Engineering, Inc.
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Image Devices Inc.
Koss Corp
LPS Inc.
Magatone Co., Inc.
Maze Corp D6
Media Concepts, Inc. D1-9
Oregon Sound D9
Professional Audio Service
Sennheiser Electronic
Sound Dynamics, Inc. D8, 9
Stanton Magnetics Inc.
Studer Revox America
Television Equipment Associates
Telex Communications, Inc.
Track Audio, Inc. D 1-9
VIF International
Val-Tronis, Inc. D1-9
Westlake Audio
Wilkinson Electronics, Inc.

Headphones, Mono

See Adv. Page

Broadcast Consultants

Corp. .......... 84, 86

CCA Electronics Corp. .......... 99-106

Allied Broadcast Equip. D 1-9
Bell & Howell Audio Visual Div.
Broadcast Automation Assoc. D 1-2-5-6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Media, Inc. D1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors Communication Media
CCA Electronics Corp.
Cakewalk International, Inc.
Cetec Broadcast Group
G.C. Electronics
Harris Corp. Broadcast Products Div.
Health Co.
Image Devices Inc.
Koss Corp.
Mastertone Co., Inc.
Media Concepts, Inc. D 1-9
Nagra Magnetic Recorders, Inc.
Oregon Sound D 9
Professional Audio Service
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Singer Products Co., Inc.
Sound Dynamics, Inc. D8, 9
Sparta -- see Cetec Broadcast Group

Val-Tronis, Inc. D1-9
Stanton Magnetics Inc.
Studer Revox America
Superscope, Inc.
Television Equipment Associates
Telex Communications, Inc.
Track Audio, Inc. D 1-9
VIF International
Val-Tronis, Inc. D1-9
Wilkinson Electronics, Inc.

Headphones with Announcers Microphone

See Adv. Page

Broadcast Consultants

Corp. .......... 84, 86

CCA Electronics Corp. .......... 99-106

AKG Acoustics
Allied Broadcast Equip. D 1-9
Broadcast Communications Devices, inc. D9
Broadcast Component Dist. Communication Media, Inc. D1-9
Broadcast Consultants Corp. D5, 6
Broadcast Equipment Distributors Communication Media
CCA Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Fisher-Burke Broadcast Consultants
Hitchcock Dictaphone, Ltd.
Koss Corp.
Lauderdale Electronic Labs
Oregon Sound D 9
Sparta -- see Cetec Broadcast Group
Television Equipment Associates
Track Audio, Inc. D 1-9
United Radio Supply Inc. D9
VIF International

Val-Tronis, Inc. D1-9
Wilkinson Electronics, Inc.

Val-Tronis, Inc. D1-9
Saki Magnetics, Inc. .......... 214

Accurate Sound Co.
Ampro Broadcasting Inc.
Broadcast Communications Devices, inc. D9
Computer Magnetics Corp.
International Electromagnetic
Lips Inc.

Norton Associates Inc.
Norton Co., Inc.
Professional Audio Service
Saki Magnetics, Inc.
Tabor Mfg. & Engr. Co.
Track Audio, Inc. D 1-9
VIF International
Val-Tronis, Inc. D1-9
Westlake Audio

Heads, Contactor

See Adv. Page

Nortonics Co., Inc. .......... 68

Broadcast Component Dist. Communication Media D 1-9
Broadcast Equipment Distributors Communication Media
Lauderdale Electronic Labs
Lips Inc.
Nortonics Co., Inc.
Professional Audio Service

Saki Magnetics, Inc. .......... 214

Ampro Broadcasting Inc.
Beauart Div. UMC Electronics Co.
Broadcast Automation Assoc. D 1-2-5-6
Broadcast Communications Devices.
inc. D9
Broadcast Electronics, Inc.
Broadcast Equipment Distributors Communication Media
Canon USA, Inc. Optics Div.
Computer Magnetics Corp.
International Electromagnetic
James Cartridge Service D2
Lips Inc.
Magni-Tech Electronic Co., Inc.
Magnunisic Devices Inc.
Mastertone Co., Inc.
Minneapolis Magnetics, Inc.
Norton Associates Inc.
Nortonics Co., Inc.
Professional Audio Service

Heads, Film Stripe

See Adv. Page

Canon USA, Inc. Optics Div.
Image Devices Inc.
International Electromagnetic
Lips Inc.

Magna-Tech Electronic Co., Inc.
Norton Associates Inc.
Nortonics Co., Inc.
Saki Magnetics, Inc.
Victor Duncan, Inc.

Heads, Reconditioned or Reconditioning Services for Audio and/or VTR Audio

See Adv. Page

Computer Magnetics

Corp. .......... 248,249
Taper Mfg. & Engr. Co. .......... 224

Accurate Sound Co.
Audio Distributor Inc. D 1-9
Broadcast Automation Assoc. D 1-2-5-6
Computer Magnetics Corp.
Electro Sound, Inc.
International Electromagnetic
Lips Inc.

Minneapolis Magnetics, Inc.
Nagara Magnetic Recorders, Inc.
Nortonics Co., Inc.
Saki Magnetics, Inc.
Sound Dynamics, Inc. D8, 9
Tabor Mfg. & Engr. Co.
VIF International
Victor Duncan, Inc.

Heads, Reconditioned or Reconditioning Services for Video

See Adv. Page

Computer Magnetics

Corp. .......... 248,249
Spin Physics, Inc. .......... 171
Videomagnetics, Inc. .......... 178,179
Videomax Div. .......... 1

Amplex Corp

Computer Magnetics Corp.
Comquip, Inc.
Glentronix Ltd. D 1-9
Saki Magnetics, Inc.
Spin Physics, Inc.
Taber Mfg. & Engr. Co.
Videomagnetics, Inc.
Videomax Div. Orrox Corp.

Heads, Recorder Replacement

See Adv. Page

Audio Distributor Inc. .......... 247
Beauart Div. .......... 28
Broadcast Component Dist. Communication Media, inc. D1-9
Nortronics Co., Inc. .......... 68
Professional Audio Service

Saki Magnetics, Inc. .......... 214
Tabor Mfg. & Engr. Co. .......... 224

Audio Distributor Inc. D 1-9
Beauart Div. UMC Electronics Co.
Broadcast Automation Assoc. D 1-2-5-6
Broadcast Communications Devices.
inc. D9
Broadcast Electronics, Inc.
Broadcast Equipment Distributors Communication Media

Accurate Sound Co.
Amplex Corp

Glentronix Ltd. D 1-9
International Electromagnetic
James Cartridge Service D2
Lips Inc.

Minneapolis Magnetics, Inc.
Norotronics Co., Inc.
Professional Audio Service
Saki Magnetics, Inc.
Sound Dynamics, Inc. D8, 9
Spin Physics, Inc.
Taber Mfg. & Engr. Co.
Tapex Corp.
Leased Broadcast Equipment

See Adv. Page

All Mobile Video ........................................ 271
Broadcast Component
Dist. Communication
Medias ......................................................... 271

NEC America, Inc. ............................. 273

All Mobile Video
Ampro Broadcasting Co.
Angenieux Corp. of America
Broadcast Automation Assoc. D 1,2,5,6
D9
Broadcast Component Dist.
Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Equipment Distributors
Communications Media
Broadcast Equip. Leasing Co.
CSI Electronics, Inc.
Cetev Broadcast Group
Collins Radio Rockwell International
Comquip, Inc.
D and S Corley Ltd.
Ediel Communications
Harris Corp. Broadcast Products Div.
Industrial Sciences
International Tapetronics Corp.
Janpro -- See Cetect Broadcast Group
NEC America, Inc., Broadcasting Equip.
Div.
The Orange County Electronics Corp. 199
RCA Broadcast Systems
Ramko Research Inc.
Schater -- See Cetect Broadcast Group
Schtronics Corp.
Sparta -- See Cetect Broadcast Group
Spectra Sonics
Tele-Cine Inc.
Wilkinson Electronics, Inc.

Lens Repair Services

See Adv. Page

Angenieux Corp. of America: See Adv. Page

Achro Video Ltd.
Angenieux Corp. of America
Rank Precision Industries, Inc. (N.Y.)
Tele-Cine Inc.

Lenses, Optical Fixed

See Adv. Page

Angenieux Corp. of America: See Adv. Page

C.R.V., Systems, Inc. ............................. 274
Canon USA, Inc. .................................. 177
Fujinon Optical, Inc. ............................... 253
Telemtron Electronics ............................... 273

ATV Research
Angenieux Corp. of America
Anatec-Mark
Ariflex Co. of America
Broadcast Communications Devices, Inc. D9
Buhl Optical Co.
C.R.V., Systems, Inc.
Canon USA, Inc., Optics Div.
Cohu, Inc., Electronics Div.
Comprehensive Video Supply Corp. D 1-9
Comquip, Inc.
Cosmatic Lens Div. Asahi Precision
Co. Ltd.
Dage-MTI, Inc.
Denson Electron Corp. D 1-9
Fujinon Optical, Inc.
Image Devices Inc.
Javelin Electronics D9

Lenses, Optical Zoom

See Adv. Page

Angenieux Corp. of America: See Adv. Page

C.R.V., Systems, Inc. ............................. 246, 247
Canon USA, Inc. .................................. 177
Fujinon Optical, Inc. ............................... 253
Telemtron Electronics ............................... 273

ATV Research
Angenieux Corp. of America
Anatec-Mark
Ariflex Co. of America
Broadcast Communications Devices, Inc. D9
Buhl Optical Co.
C.R.V., Systems, Inc.
Canon USA, Inc., Optics Div.
Cohu, Inc., Electronics Div.
Comprehensive Video Supply Corp. D 1-9
Comquip, Inc.
Cosmatic Lens Div. Asahi Precision
Co. Ltd.
Dage-MTI, Inc.
Denson Electron Corp. D 1-9
Fujinon Optical, Inc.
Image Devices Inc.
Javelin Electronics D9

Lighting, TV Controls

See Adv. Page

Electronics Diversified, Inc. ......................... 219
Strand Century, Inc. ................................ 193
Waters Mfg. Inc. ...................................... 252

Berkey-Colortran Inc.
Broadcast Communications Devices, Inc. D9
Comquip, Inc.
Dyna Engineering, Inc.
Electronics Diversified, Inc.
Janson Industries
Klieg Bros. Lighting
Landy Associates Inc. D 1,2
Lumitrol, Ltd.
Strand Century, Inc.
Tele-Measurements, Inc. B-2
Waters Mfg. Inc.

Lighting, TV Controls

See Adv. Page

Electronics Diversified, Inc. ......................... 219
Strand Century, Inc. ................................ 193
Waters Mfg. Inc. ...................................... 252

Berkey-Colortran Inc.
Broadcast Communications Devices, Inc. D9
Comquip, Inc.
Dyna Engineering, Inc.
Electronics Diversified, Inc.
Janson Industries
Klieg Bros. Lighting
Landy Associates Inc. D 1,2
Lumitrol, Ltd.
Strand Century, Inc.
Tele-Measurements, Inc. B-2
Waters Mfg. Inc.

Lighting Hangers, Studio

See Adv. Page

Decca Austin Insulators .......................... 62
Hughey & Phillips Inc. ............................ 200

Broadcast Communications Devices, Inc.
Comquip, Inc.
Harris Corp. Broadcast Products Div.
Hughey & Phillips Inc.
MCG Electronics Inc.

Lighting Arresters

See Adv. Page

Wilkinson Electronics, Inc. ......................... 62

Collins Radio Rockwell International
Cook Electric Co.
Dielectric Communications Div. Sola
Basic, Inc.
Dyma Engineering, Inc.
General Electric Co. Tubes/IMW
Devices
Harris Corp. Broadcast Products Div.
Jolly Electronic Sys.
MCG Electronics Inc.
Pacific Recorders and Engrg. Corp.
Safton Products Inc.
T.I. Corp.
Transistor Systems Div. Konic
International Corp.
Wilkinson Electronics, Inc.

Lighting Protection Systems

See Adv. Page

Collins Radio Rockwell International
Cook Electric Co.
Jolly Electronic Sys.
Lighting Elimination Assoc., Inc.
MCG Electronics Inc.
Singler Products Co., Inc.
Sontronic Corp.
Transistor Systems Div. Konic
International Corp.
Wilkinson Electronics, Inc.

Lights, HMI Ballast

See Adv. Page

Broadcast Component
Dist. Communication
Medias ..................................................... 273

Ampro Broadcasting Inc.
Broadcast Component Dist.
Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Collins Radio Rockwell International
Communications, Inc.
Comprehensive Video Supply Corp. D 1-9
Fideispac
Klieg Bros. Lighting

September, 1977
Company Mailing Addresses Begin on Page 231.

135

www.americanradiohistory.com
<table>
<thead>
<tr>
<th>Lights, Portable, Battery and AC</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.R.V. Systems, Inc.</td>
<td>274</td>
</tr>
<tr>
<td>Berkey-Colorran inc.</td>
<td>219</td>
</tr>
<tr>
<td>Cine 60, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Cinema Products Corp.</td>
<td>219</td>
</tr>
<tr>
<td>Comprehensive Video Supply Corp.</td>
<td>219</td>
</tr>
<tr>
<td>Custom Audio Electronics dbx, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Electronics Diversified, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>219</td>
</tr>
<tr>
<td>Kliegl Bros. Lighting &amp; Sound Associates Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Lower-Light</td>
<td>219</td>
</tr>
<tr>
<td>Strand Century, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Lights, Studio Set</td>
<td>See Adv. Page</td>
</tr>
<tr>
<td>Electronics Diversified, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Bardwell &amp; McAllister</td>
<td>219</td>
</tr>
<tr>
<td>Berkey-Colaran inc.</td>
<td>219</td>
</tr>
<tr>
<td>Cinema Products Corp.</td>
<td>219</td>
</tr>
<tr>
<td>Comprehensive Video Supply Corp.</td>
<td>219</td>
</tr>
<tr>
<td>Custom Audio Electronics dbx, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Electronics Diversified, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>219</td>
</tr>
<tr>
<td>Kliegl Bros. Lighting &amp; Sound Associates Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Lower-Light</td>
<td>219</td>
</tr>
<tr>
<td>Strand Century, Inc.</td>
<td>219</td>
</tr>
<tr>
<td>Lights, Tower Control</td>
<td>See Adv. Page</td>
</tr>
<tr>
<td>Elcom Engineering Co.</td>
<td>275</td>
</tr>
<tr>
<td>Hughy &amp; Phillips Inc.</td>
<td>200</td>
</tr>
<tr>
<td>Cetec Broadcast Group</td>
<td>275</td>
</tr>
<tr>
<td>Collins Radio Rockwell International Crouse Hinds Co.</td>
<td>275</td>
</tr>
<tr>
<td>Elcom Engineering Co.</td>
<td>275</td>
</tr>
<tr>
<td>Harris Corp. Broadcast Products Div.</td>
<td>275</td>
</tr>
<tr>
<td>Hughy &amp; Phillips Inc.</td>
<td>275</td>
</tr>
<tr>
<td>Jampro -- see Cetec Broadcast Group</td>
<td>275</td>
</tr>
<tr>
<td>Magnum Towers, Inc.</td>
<td>275</td>
</tr>
<tr>
<td>Masterton Co., Inc.</td>
<td>275</td>
</tr>
<tr>
<td>Erick Small &amp; Associates</td>
<td>275</td>
</tr>
<tr>
<td>Limiter Compressors</td>
<td>See Adv. Page</td>
</tr>
<tr>
<td>Audio Distributor Inc.</td>
<td>247</td>
</tr>
<tr>
<td>Broadcast Component Dist. Communication Media</td>
<td>269</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
</tr>
<tr>
<td>Collins Radio</td>
<td>21</td>
</tr>
<tr>
<td>Elcom Engineering Co.</td>
<td>27</td>
</tr>
<tr>
<td>Inovonics</td>
<td>77</td>
</tr>
<tr>
<td>International Electro-Magnetics</td>
<td>184</td>
</tr>
<tr>
<td>Marti Electronics</td>
<td>57</td>
</tr>
<tr>
<td>Maze Corp.</td>
<td>270</td>
</tr>
<tr>
<td>Moseley Assoc.</td>
<td>69</td>
</tr>
<tr>
<td>Orban/Broadcast</td>
<td>189</td>
</tr>
<tr>
<td>Pacific Recorders and Engrg. Corp.</td>
<td>210</td>
</tr>
<tr>
<td>Ramko Research Inc.</td>
<td>38</td>
</tr>
<tr>
<td>Robins Broadcast &amp; Sound Equip. Corp.</td>
<td>38</td>
</tr>
<tr>
<td>Wilkinson Electronics</td>
<td>62</td>
</tr>
<tr>
<td>Load Resistors, Coaxial</td>
<td>See Adv. Page</td>
</tr>
<tr>
<td>Cetec Broadcast Group</td>
<td>Collins Radio Rockwell International</td>
</tr>
<tr>
<td>Crouse Hinds Co.</td>
<td>Elcom Engineering Co.</td>
</tr>
<tr>
<td>D9</td>
<td>Digital Electronics Div.</td>
</tr>
<tr>
<td>Cetec Broadcast Group</td>
<td>Broadcast Communications Devices, Inc.</td>
</tr>
<tr>
<td>Communication Media D 1-9</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance Services, FM</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Video Electronics, Inc.</td>
<td>1-9</td>
</tr>
<tr>
<td>Atlantic Research Corp.</td>
<td>1-9</td>
</tr>
<tr>
<td>Cetec Broadcast Group</td>
<td>Collins Radio Rockwell International</td>
</tr>
<tr>
<td>Communications, Ltd.</td>
<td>Comark Industries Inc.</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants</td>
<td>Fort Worth Tower Co., Inc.</td>
</tr>
<tr>
<td>Fort Worth Tower Co., Inc.</td>
<td>Hallikainen &amp; Friends, Inc.</td>
</tr>
<tr>
<td>1-2</td>
<td>Magnus Towers, Inc.</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>Professional Audio Service</td>
</tr>
<tr>
<td>RCA Broadcast Systems</td>
<td>Tri-Tronics Professional Electronics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance Services, Microwave</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic Research Corp.</td>
<td>Collins Radio Rockwell International</td>
</tr>
<tr>
<td>Comark Industries Inc.</td>
<td>Fairnon Electric</td>
</tr>
<tr>
<td>Fort Worth Tower Co., Inc.</td>
<td>Microwave Assoc. Inc.</td>
</tr>
<tr>
<td>KVC Video Systems Div.</td>
<td>Prodlin Assoc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance Services, TV</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Video Electronics, Inc.</td>
<td>1-9</td>
</tr>
<tr>
<td>Atlantic Research Corp.</td>
<td>Comark Industries Inc.</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants</td>
<td>Fort Worth Tower Co., Inc.</td>
</tr>
<tr>
<td>1-2</td>
<td>Magnus Towers, Inc.</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>Professional Audio Service</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meters, Antenna Base</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta Electronics Inc.</td>
<td>183</td>
</tr>
<tr>
<td>(Va.)</td>
<td>C. S. P. Inc.</td>
</tr>
<tr>
<td>Collins Radio Rockwell International</td>
<td>Delta Electronics Inc. (Va.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meters, Antenna Impedance</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfred Mfg. Co.</td>
<td>Delta Electronics Inc. (Va.)</td>
</tr>
<tr>
<td>Delta Electronics Inc. (Va.)</td>
<td>Leader Instruments Corp.</td>
</tr>
<tr>
<td>Potomac Instruments, Inc.</td>
<td>Val-Tronics, Inc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meters, Field Strength AM and FM</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
</tr>
<tr>
<td>Potomac Instruments, Inc.</td>
<td>251</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance Services, Cartridge Tape</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampyro Broadcasting Inc.</td>
<td>Broadcast Cartridge Service D 1-9</td>
</tr>
<tr>
<td>Broadcast Component Dist.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Communication Media D 1-9</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Electronics, Inc.</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors</td>
<td>Broadcast Component Dist.</td>
</tr>
<tr>
<td>Communication Media D 1-9</td>
<td>Broadcast Component Dist.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meters, Field Strength AM and FM</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCA Electronics Corp.</td>
<td>99-106</td>
</tr>
<tr>
<td>Potomac Instruments, Inc.</td>
<td>251</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arvin CATV</th>
<th>Broadcast Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cetec Broadcast Group</td>
<td>Collins Radio Rockwell International</td>
</tr>
</tbody>
</table>

| Engineering Associates | Harris Corp. Broadcast Products Div. |
Broadcast Communications Devices, Inc. D-9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Broadcast Equipment & Supply Co. D 1-9
Cetec Broadcast Group
Collins Radio Rockwell International Comrup, Inc.
dbx, Inc.
Dyna Engineering, Inc.
Fisher-Burke Broadcast Consultants G.C. Electronics
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Image Devices Inc.
KVC Video Systems Inc. D 1.2, 5, 6
LPi Inc
Landy Associates Inc. D 1.2
Maze Corp D6
Media Concepts, Inc. D 1.9
Oregon Sound D 9
Paso Sound Products Inc.
RCA Broadcast Systems
Sennheiser Electronic
Shure Brothers Inc.
Singer Products Co., Inc.
Sparta, see Cetec Broadcast Group
Strand Century, Inc.
Studer Revox America
Telex Communications, Inc.
Track Audio, Inc. D 1.9
Turner Div. Conrac Corp.
Val-Tronics, Inc. D 1-9
Victor Duncan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.

Microphones, Boom
See Ad. Page

Broadcast Consultants Corp. 83, 84
CCA Electronics Corp. 99-106
Maze Corp 270
Sennheiser Electronic 168

AKG Acoustics
Accurate Sound Co.
Altec Sound Products
Applied Video Electronio, Inc. D 1-9
Broadcast Automation Assoc. D 1.2, 5, 6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
Cetez Broadcast Group
Collins Radio Rockwell International Comrup, Inc.
dbx, Inc.
Deyon Electronic Corp. D 1-9
Dyna Engineering, Inc.
Fisher-Burke Broadcast Consultants G.C. Electronics
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Image Devices Inc.
KVC Video Systems Inc. D 1.2, 5, 6
LPi Inc
Landy Associates Inc. D 1.2
Martin Audio/Video D2
Mastertone Co., Inc.
Maze Corp D6
Media Concepts, Inc. D 1-9
Micro-Track Corp.
Oregon Sound D 9
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Professional Audio Service
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Shure Brothers Inc.
Small-Johnson
Singer Products Co., Inc.
Sony Corp. of America VTR Div.
Sound Dynamics, Inc. D 9
Sparta, see Cetec Broadcast Group
Studer Revox America
Technics by Panasonic
Tele-Measurements, Inc. B-2
Telex Communications, Inc.
Track Audio, Inc. D 1.9
Turner Div. Conrac Corp.
Val-Tronics, Inc. D 1-9
Victor Duncan, Inc.
Weather Scan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.

Microphones, Floor
See Ad. Page

Broadcast Consultants Corp. 83
Maze Corp 270
Sennheiser Electronic 168

AKG Acoustics
Altec Sound Products
Ampro Broadcasting Inc.
Audio Distributor Inc. D 1-9
Bogen Div. Lear Siegler, Inc.
Broadcast Automation Association D 1.2, 5, 6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Broadcast Equipment & Supply Co. D 1-9
Cetec Broadcast Group
Collins Radio Rockwell International Comrup, Inc.
dbx, Inc.
Dyna Engineering, Inc.
Electro-Voice Inc.
Fisher-Burke Broadcast Consultants G.C. Electronics
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Image Devices Inc.
KVC Video Systems Inc. D 1.2, 5, 6
Landy Associates Inc. D 1.2
Mastertone Co., Inc.
Maze Corp D6
Media Concepts, Inc. D 1-9
Oregon Sound D 9
Panasonic Video Systems Div.
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Professional Audio Service
Pulse Dynamics Mfg. Corp. (PDMC)
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Shure Brothers Inc.
Sinn-Johnson
Singer Products Co., Inc.
Sound Dynamics, Inc. DB, 9
Sparta, see Cetec Broadcast Group
Studer Revox America
Superscope, Inc.
Telex Communications, Inc.
Turner Div. Conrac Corp.
United Radio Supply Inc. D9
VIF International
Val-Tronics, Inc. D 1-9
Victor Duncan, Inc.
Weather Scan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.

Microphones, Lavalier
See Ad. Page

Broadcast Consultants Corp. 83
CCA Electronics Corp. 99-106

AKG Acoustics
Altec Sound Products
Ampro Broadcasting Inc.
Bigeis, Inc.
Broadcast Automation Assoc. D 1.2, 5, 6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
Cetez Broadcast Group
Collins Radio Rockwell International Comrup, Inc.
dbx, Inc.
Dyna Engineering, Inc.
Electro-Voice Inc.
Fisher-Burke Broadcast Consultants G.C. Electronics
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Image Devices Inc.
KVC Video Systems Inc. D 1.2, 5, 6
Landy Associates Inc. D 1.2
Mastertone Co., Inc.
Maze Corp D6
Media Concepts, Inc. D 1-9
Nagra Magnetic Recorders, Inc.
Oregon Sound D 9
Panasonic Video Systems Div.
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Professional Audio Service
Pulse Dynamics Mfg. Corp. (PDMC)
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Superscope, Inc.
Telex Communications, Inc.
Turner Div. Conrac Corp.
United Radio Supply Inc. D9
VIF International
Val-Tronics, Inc. D 1-9
Victor Duncan, Inc.
Weather Scan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Professional Audio Service
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Sescom, Inc.
Shure Brothers Inc.
Sinai Johnson
Singer Products Co., Inc.
Sony Corp. of America VTR Div.
Sound Dynamics, Inc. D 8, 9
Sparta - see Cetec Broadcast Group
Studer Revox America
Superscope, Inc.
Tele-Measurements, Inc. B-2
Track Audio, Inc. D 1-9
Turner Div. Concor Corp.
United Radio Supply Inc. D 9
Val-Trons, Inc. D 1-9
Victor Duncan, Inc.
Weather Scan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.

Microphones, Parabolic and Shotgun

See Adv. Page

Broadcast Consultants Corp. 83

Sennheiser Electronic 168

AKG Acoustics
Audio Distributor Inc. D 1-9
Broadcast Communications Devices, Inc. D 9
Broadcast Component Dist.
Communication Medias 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distrubutors
Communication Medias
Broadcast Equipment & Supply Co. D 9
Collins Radio Rockwell International
Comquip, Inc.
Dyna Engineering, Inc.
Electro-Voice Inc.
Fisher Burns Broadcast Consultants
Image Devices Inc.
KVC Video Systems Inc. D 1, 2
Masterstone Co., Inc.
Oregon Sound D-9
Peirce-Phelps, Inc. D 2, 5
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Superscope, Inc.
Track Audio, Inc. D 1-9
VIF International
Val-Trons, Inc. D 1-9
Victor Duncan, Inc.
Westlake Audio

Microphones, Wireless

See Adv. Page

Audio Distributor Inc. 247
Sound Dynamics, Inc. 226
Thomson-CSF Laboratories, Inc. 202
Vega 198

AKG Acoustics
Audio Distributor Inc. D 1-9
Broadcast Communications Devices, Inc. D 9
Broadcast Component Dist.
Communication Medias 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Equipment Distributors
Communication Medias
Broadcast Equipment & Supply Co. D 1-9
Ceteo; Broadcast Group
Collins Radio Rockwell International
Comquip, Inc.
Comrex Corp.
Dyna Engineering, Inc.
Editor Div. of P.A.C.
Electro-Voice Inc.
HM Electronics, Inc.
Ikegami Electronics (USA), Inc.
Image Devices Inc.
KVC Video Systems Inc. D 1, 2, 5
LPB Inc.
Landy Associates Inc. D 1, 2
Oregon Sound D 9
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Sound Dynamics, Inc. D 8, 9
Sparta - see Cetec Broadcast Group
Studer Revox America
Television Equipment Associates
Telecommunications, Inc.
Thomson-CSF Laboratories, Inc.
Track Audio, Inc. D 1-9
VIF International
Val-Trons, Inc. D 1-9
Vega Div. of Ceteo Corp.
Victor Duncan, Inc.
Westlake Audio
Wilkinson Electronics, Inc.

Microwave Antenna Towers, ENG Van

VanLadder, Inc. 204

Varian/Beverly Micro-Link Products
Wilkinson Electronics, Inc.

Mixers --see also Consoles

See Adv. Page

Broadcast Component Dist. Communication Medias 273

Broadcast Consultants Corp. B-8, 84, 86
Cetec Audio 217
Collins Radio 21
LPB Inc. 172
M. Palmer & Associates 260
Quantum Audio Labs, Inc. 276
ROH Corporation 259

Russco Electronics
Mfg. Inc. 18
Wilkinson Electronics, Inc. 62

Accurate Sound Co.
Altec Sound Products
Ampro Broadcasting Inc.
Audio Design & Mfg.
Audiontrics, Inc.
Automated Processes, Inc.
Bogen Div. Lea Siegler, Inc.
Broadcast Automation Assoc. D 1, 2, 5
Broadcast Communications Devices, Inc. D 9
Broadcast Component Dist.
Communication Medias D 1-9
Broadcast Consultants Corp. D 5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Central Dynamics Corp.
Ceteo Audio
Ceteo Broadcast Group
Collins Radio Rockwell International
Collins Television Services
Computer Image Video Controllers
Dytek Industries, Inc.
Custom Audio Electronics
Dage-MTI, Inc.
Delta Electronics, Inc. (N.C.)
Dyna Engineering, Inc.
Grass Valley Group, Inc.
KVC Video Systems Inc. D 1, 2
LPB Inc.
James B. Lasling Sound, Inc.
Lauderdale Electronic Labs
Martin Audio/Video D2
McCuredy Radio Inc.
MCMartins Industries, Inc.
Media Concepts, Inc. D 1-9
Modular Audio Products Unit
Modular Devices, Inc.
Charles Moore
Nagra Magnetic Recorders, Inc.
Rupert Neve, Inc.
Oregon Magnetics
Oregon Sound D 9
Pacific Recorders and Engrg. Corp.
M. Palmer & Associates
Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Pulse Dynamics Mfg. Corp. (PDMC)
Pulse Techniques Inc.
Quad-Eight Electronics
Quantum Audio Labs, Inc.
ROH Corporation
Ramko Research Inc.
Rek-O-Kut Inc.
Richmond Hill Laboratories Ltd.
Richmond Sound Design, Ltd.
Robins Broadcast & Sound Equip.
Ross Broadcasting Corp.
Ross Broadcast Products Ltd.
Russo Electronics Mfg. Inc.
Ryder Magnetic Sales Corp.
Shure Brothers Inc.
Sina-Johnson
Singer Products Co. Inc.
Sono-Mag Corp.
Sound Dynamics, Inc. D 8, 9
Sparta - see Ceteo Broadcast Group
Spectra Sonics
Sphere Electronics

Studer Revox America
Superscope, Inc.
Switchcraft Inc.
TEAC Corp of America
Television, Inc.
Beverly Micro-Link Products
United Radio Supply Inc. D 9
Univox Recording Electronics
VIF International
Viscont Industries Ltd.
Wars-Delia Sales, Ltd.
Weather Scan, Inc.
Weissnich Engineering Co.
Westlake Audio
Wilkinson Electronics, Inc.

Mobile Communication Vans, TV

See Adv. Page

CCA Electronics Corp. 99-106
A. F. Associates, Inc.
Atlantic Research Corp.
CCP Hill Electronics Corp.
Comquip, Inc.
Editel Communications
International Microwave Corp.
KVC Video Systems Inc. D 1, 2
Marconi Communication Systems Ltd.
Micro Control Associates, Inc.
Peirce-Phelps, Inc. D 2, 5
Teile-Measurements, Inc. B-2
TerraCom
Ultra Audio Pixtec

Modulators, TV

See Adv. Page

Belar Electronics Lab., Inc. 264
Phillips Test & Measuring Instruments, Inc. 15

Acrodyne Industries Inc.
Belar Electronics Lab., Inc.
Broadcast Communications Devices, Inc. D 9
CCA Electronics Corp.
Catel Div. United Scientific Corp.
Dyna Electronics Corp.
EMCEE Broadcast Products
Fung Engineering Inc.
Harris Corp. Broadcast Products Div.
Javelin Electronics D9
KVC Video Systems Inc. D 1, 2
Lenovo Communications Div.
Marconi Communication Systems Ltd.
Media Concepts, Inc. D 1-9
Media Components, Inc.
Motorola Semiconductor Products, Inc.
Peirce-Phelps, Inc. D 2, 5
Phillips Test & Measuring Instruments, Inc.
RCA Community Television Systems
Rohde & Schwarz Sales Co.
Roiare Sales Corp.
Roscor Corp. D 3, 4
Scientific-Atlanta, Inc.
Tele-Measurements, Inc. B-2
Telemat & Geotel Co.
Video Components, Inc.

Monitor Controls, Remote

See Adv. Page

Gorman-Redlich Mfg. Co. 262
Image Magnification, Inc. 206

Unimedia Corp. 89

Gorman Reilich Mfg, Co.
Image Magnification, Inc.
Unimedia Corp.

Monitors, AM System

See Adv. Page

Belar Electronics Lab., Inc. 264

Paso Sound Products Inc.
Peirce-Phelps, Inc. D 2, 5
Professional Audio Service
RCA Broadcast Systems
Ryder Magnetic Sales Corp.
Sennheiser Electronic
Sescom, Inc.
Shure Brothers Inc.
Sinai Johnson
Singer Products Co., Inc.
Sony Corp. of America VTR Div.
Sound Dynamics, Inc. D 8, 9
Sparta - see Cetec Broadcast Group
Studer Revox America
Superscope, Inc.

September, 1977 Company Mailing Addresses Begin on Page 231.
Broadcast Component Dist. Communication Media ................. 273
ROH Corporation ........................................ 259
Belar Electronics Lab., Inc. Broadcast Automation Assoc. D 1, 2, 5, 6
Broadcast Communications Devices, Inc. D 9
Broadcast Consultants Corp. D 5, 6
CETEC Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Edison Electronic Co.
Gorman Relich Mfg. Co.
Harris Corp. Broadcast Products Div.
Lampkin Lab. Inc.
Mastertone Co., Inc.
Mazer Co. D 6
Mclntosh Industries, Inc.
Mazer Corp. D 6
McMartin Industries, Inc.
McMartin Industries.-RCX
.Broadcast Systems
Singer Products Co., Inc.
Sparta - see Cetec Broadcast Group
Teletron a Geotel Corp.
Time & Frequency Techn., Inc.
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Monitors, Antenna Base Current

See Adv. Page

Delta Electronics Inc. (Va.) ........................................ 183
Potomac Instruments, Inc. ........................................ 251

Collins Radio Rockwell International
Delta Electronics Inc. (Va.)
Gorman Relich Mfg.
Potomac Instruments, Inc.
Val-Tronics, Inc. D 1-9

Monitors, Antenna Sampling

See Adv. Page

Delta Electronics Inc. (Va.) ........................................ 183
Gorman-Relich Mfg. Co. ............................................ 262
Potomac Instruments, Inc. ........................................ 251

Broadcast Specialties
CETEC Electronics Corp.
Collins Radio Rockwell International
Dyna Engineering, Inc.
Edison Electronic Co.
Fix Tune Solid State Electronics, Inc.
Harris Corp. Broadcast Products Div.
Lampkin Lab. Inc.
Mastertone Co., Inc.
Mazer Co. D 6
McMartin Industries, Inc.
North American Radio Corp.
RCX Corp.
RCX Broadcast Systems
ROH Corporation
Singer Products Co., Inc.
Sono-Mag Corp.
Sparta - see Cetec Broadcast Group
Studer Revial America
Time & Frequency Tech., Inc.
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Monitors, Directional Antenna

See Adv. Page

Gorman-Relich Mfg. Co. ............................................ 262

Broadcast Consultants Corp. D 5, 6
Broadcast Specialties
Collins Radio Rockwell International
Comark Industries Inc.
Delta Electronics Inc. (Va.)
Dyna Engineering, Inc.
Edison Electronic Co.
Fix Tune Solid State Electronics, Inc.
Harris Corp. Broadcast Products Div.
Lampkin Lab. Inc.
Mastertone Co., Inc.
Mazer Co. D 6
McMartin Industries, Inc.
North American Radio Corp.
RCX Corp.
RCX Broadcast Systems
ROH Corporation
Singer Products Co., Inc.
Sono-Mag Corp.
Sparta - see Cetec Broadcast Group
Studer Revial America
Time & Frequency Tech., Inc.
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Monitors, Frequency

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264
Elcom Engineering Co. ........................................... 275

Belar Electronics Lab., Inc. Broadcast Automation Assoc. D 1, 2, 5, 6
Broadcast Consultants Corp. D 5, 6
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CETEC Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Edison Electronic Co.
Elcom Engineering Co.
Harris Corp. Broadcast Products Div.
Heath Co.
Lampkin Lab. Inc.
Master tone Co., Inc.
McMartin Industries, Inc.
RCX Broadcast Systems
Singer Instrumentation
Sparta - see Cetec Broadcast Group
Time & Frequency Tech., Inc.
Track Audio, Inc. D 1-9
Wilkinson Electronics, Inc.

Monitors, Power

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264
Moseley Assoc. Inc. ............................................... 69

B & I Electronics, Inc. Broadcast Specialties
Belar Electronics Lab., Inc.
Bird Electronic Corp.
Cetec Broadcast Group
Coaxial Dynamics
Delta Electronics Inc. (Va.)
Dyna Engineering, Inc.
Edison Electronic Co.
Elcom Engineering Co.
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Harris Corp. PRD Electronics Div.
Holland Electronics

Maze Corp. D 6
Moseley Assoc. Inc.
Sparta - see Cetec Broadcast Group
Wide Band Engineering Co., Inc.

Monitors, Program Audio

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264
ROH Corporation ............................................. 259
Attoc Sound Products
Amber Electro Design, Ltd.
Audio Designs & Mfg.
Audio Distributor Inc. D 1-9
Autogram Corp.
Audio Processors, Inc.
B & I Electronics, Inc.
Belar Electronics Lab., Inc.
Broadcast Component Dist. Communication Media D 1-9
Broadcast Equipment Distributors
Communication Media.
CETEC Broadcast Group
Collins Televisions Services
Comrex Corp.
Crown International, Inc.
Digi-Tech
Digi-Tech
Dyma Engineering, Inc.
Electro-Voice Inc.
Goeddel Audio Corp.
Harris Corp. Broadcast Products Div.
James B. Lansing Sound, Inc.
Marconi Communication Systems Ltd.
Marl Electronics
Maze Corp. D 6
Modular Audio Products Unit of Modular Devices, Inc.
Rupert Neve, Inc.
The Orange County Electronics Corp.
LTD.
ROH Corporation
Rolling Broadcast & Sound Equip.
Corp.
Scientific Systems, Inc.
Sennheiser Electronic
Sparta - see Cetec Broadcast Group
Studer Revial America
Teletron a Geotel Corp.
Television and Computer Corp.
Track Audio, Inc. D 1-9
The Widget Works, Inc.

Monitors, RF Level

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264
Sound Dynamics, Inc. ........................................... 226

B & I Electronics, Inc. Broadcast Specialties
Belar Electronics Lab., Inc.
Bird Electronic Corp.
Coaxial Dynamics
Electro-Impulse, Inc.
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
North American Radio Corp.
Sound Dynamics, Inc. D 8, 9
Tektronix Inc.
Vitek Electronics Inc.
Wide Band Engineering Co., Inc.
The Widget Works, Inc.

Monitors, Set-Up and Matching Equipment

See Adv. Page

B & I Electronics, Inc. Power-Optics Inc.

Monitors, Stereo

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264
Broadcast Component Dist. Communication Media D 1-9

Belar Electronics Lab., Inc.
Belar Electronics Lab., Inc.
Broadcast Automation Assoc. D 1, 2, 5, 6
Broadcast Consultants Corp. D 5, 6
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CETEC Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Edison Electronic Co.

Broadcast Communications Devices, Inc. D 9
Broadcast Consultants Corp. D 5, 6
CETEC Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Fix Tune Solid State Electronics, Inc.
Harris Corp. Broadcast Products Div.
Master tone Co., Inc.
Mazer Co. D 6
McMartin Industries, Inc.
McMartin Industries.-RCX
.Broadcast Systems
Singer Products Co., Inc.
Sparta - see Cetec Broadcast Group
Teletron a Geotel Corp.
Time & Frequency Techn., Inc.
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Monitors, FM System SCA

See Adv. Page

Belar Electronics Lab., Inc. ........................................ 264

Belar Electronics Lab., Inc.
Belar Electronics Lab., Inc.
Broadcast Automation Assoc. D 1, 2, 5, 6
Broadcast Communications Devices, Inc. D 9
Broadcast Consultants Corp. D 5, 6
CETEC Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Edison Electronic Co.
Broadcast Consultants Corp. D5, 6
Broadcast Specialties
Cetec Broadcast Group
Collins Radio Rockwell International
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
Mastertone Co., Inc.
Maze D6
McMartin Industries, Inc.
Motorola Electronics, Unit of Modulator Devices, Inc.
QEI Corp.
Schafer Inc.
Sparta -- see Cetec Broadcast Group
Time & Frequency Tech., Inc.
Track Audio, Inc. D1-9
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Monitors, TV System

See Adv. Page
Belair Electronics Lab., Inc.
Broadcast Communications Devices, Inc. D9
Cohu, inc. Electronics Div.
dbx, inc.
Dyman Engineering, Inc.
Electrohome Ltd.
General Electric Co. ISO Div.
Jacobs Engineering Co.
KVC Video Systems Inc. D 1,2
Landy Associates Inc. D 1,2
Marconi Communication Systems Ltd.
Marconi Instruments
Percek Philips, Inc. D 2, 5
Tektronix Inc.
Television Measurements, Inc. B-2
Track Audio, Inc. D 1-9
World Video Inc.

Monitors, Video B&W

See Adv. Page
C.R.V. Systems, Inc.
Electrohome Ltd.
Gould, Inc.
Industrial Sciences
Telectron Electronics
Unimedia Corp.

Amtron Corp.
Asaca Corp. of America
Ball Bros. Research Corp. Electronic Display Div.
Beta Technology, Inc.
Broadcast Communications Devices, Inc. D9
C.R.V. Systems, Inc.
Cohu, Inc. Electronics Div.
Comquip, Inc.
Conrac Div. Conrac Corp.
dbx, Inc.
Dyman Engineering, Inc.
Edith Communications
Electrohome Ltd.
Fernseh Group Robert Bosch Corp.
GBC Closed Circuit TV Corp.
General Electric Co. ISO Div.
Harris Corp. Broadcast Products Div.
Hitachi Dentshi America, Ltd.
Ikegami Electronics (USA) Inc.
KVC Video Systems Inc. D 1,2
Kalmann Associates
Landy Associates Inc. D 1,2
Media Concepts, Inc. D 1-9
Panasonic Video Systems Div.
Percek Philips, Inc. D 2, 5
Pleasantville Labs
RCA Broadcast Systems
Rohde & Schwarz Sales Co.
Roscopo Corp. D3, 4
SC Electronics Inc.
Sony Corp. of America VTR Div.
Television Inc.

Monitors, Video Color

See Adv. Page
Amtron Corp.
CCA Electronics Corp.
C.R.V. Systems, Inc.
Electrohome Ltd.
Gould, Inc.
Image Magnification, Inc.
Pleasantville Labs
Unimedia Corp.

Amtron Corp.
Asaca Corp. of America
Ball Bros. Research Corp. Electronic Display Div.
Beta Technology, Inc.
Broadcast Communications Devices, Inc. D9
C.C.A. Electronics Corp.
C.R.V. Systems, Inc.
Cohu, Inc. Electronics Div.
Commercial Electronics, Inc.
Conquip, Inc.
Conrac Div. Conrac Corp.
Dyman Engineering, Inc.
Electrohome Ltd.
Fernseh Group Robert Bosch Corp.
GBC Closed Circuit TV Corp.
General Electric Co. ISO Div.
Harris Corp. Broadcast Products Div.
Hitachi Dentshi America, Ltd.
Ikegami Electronics (USA) Inc.
KVC Video Systems Inc. D 1,2
Kalmann Associates
Landy Associates Inc. D 1,2
Media Concepts, Inc. D 1-9
Panasonic Video Systems Div.
Percek Philips, Inc. D 2, 5
Pleasantville Labs
RCA Broadcast Systems
Rohde & Schwarz Sales Co.
Roscopo Corp. D3, 4
SC Electronics Inc.
Sony Corp. of America VTR Div.
Television Inc.

Monitors, Video Pulse Cross

See Adv. Page
Unimedia Corp.

Amtron Corp.
Broadcast Communications Devices, Inc. D9
Dyman Engineering, Inc.
Electrohome Ltd.
KVC Video Systems Inc. D 1,2
Panasonic Video Systems Div.
Percek Philips, Inc. D 2, 5
Tektronix Inc.
Television Measurements, Inc. B-2
Videotek, Inc.

Network Joiners

Automation Electronics, Inc.
Broadcast Consultants Corp. D5, 6
Cetec Broadcast Group
ESE
IGM Div. of Northwestern Tech.
Schafco -- see Cetec Broadcast Group

Networks, Matching Audio

Atec Sound Products
Collins Radio Rockwell International
Dyma Engineering, Inc.
Fisher-Burke Broadcast Consultants
Charles Moore
The Orange County Electronics Corp.
Quad-Eight Electronics
Robins Broadcast & Sound Equip.
TT Electronics, Inc.
Tech Laboratories, Inc.

Networks, Matching RF

Aldorf Mfg. Co.
C.S.I. Electronics, Inc.
C.S.P. Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Comark Industries Inc.

Networks, Mixing

Dielectric Communications Div. Sola Basic, Inc.
Dyman Engineering, Inc.
The Orange County Electronics Corp.
Pacific Recorders and Engrg. Corp.
Quad-Eight Electronics
Robins Broadcast & Sound Equip.
Tech Laboratories Inc.

Noise Reduction Systems

See Adv. Page
Broadcast Component Dist. Communication
Medias

C.C.A. Electronics Corp. 99-106
Sound Dynamics, Inc.

September, 1977

Company Mailing Addresses Begin on Page 231.
Semiconductors, Thyristor
Amperex Electronic Corp. A-Tel-A-Matic
Calvert Electronics Inc. D 1-9
Ceco Communication Inc.
Dyma Engineering, Inc.
English Electric Valve North America Ltd.
G.C. Electronics
General Electric Co. Tubes/MW Devices
JSН Electronics, Inc.
C. M. Levit Electronics D 1-9
Motorola Semiconductor Products, Inc.
RCA Distributor & Special Products Div.
Singer Products Co., Inc.
Thor Electronics Corp.
United Radio Supply Inc. D 9

Semiconductors, Transistor AF
Amperex Electronic Corp. A-Tel-A-Matic
Calvert Electronics Inc. D 1-9
Ceco Communications Inc.
G.C. Electronics
JSН Electronics, Inc.
C. M. Levit Electronics D 1-9
Motorola Semiconductor Products, Inc.
RCA Distributor & Special Products Div.
Singer Products Co., Inc.
Thor Electronics Corp.
United Radio Supply Inc. D 9

Semiconductors, Transistor FET
Amperex Electronic Corp. A-Tel-A-Matic
Calvert Electronics Inc. D 1-9
Ceco Communications Inc.
G.C. Electronics
Hitachi Denshi America, Ltd.
JSН Electronics, Inc.
C. M. Levit Electronics D 1-9
P. R. Malloy & Co. Inc.
Microwave Assoc.
Motorola Semiconductor Products, Inc.
RCA Distributor & Special Products Div.
Singer Products Co., Inc.
Temtron Electronics D 1-9
Thor Electronics Corp.

Semiconductors, Transistor General
Amperex Electronic Corp. A-Tel-A-Matic
Calvert Electronics Inc. D 1-9
Ceco Communications Inc.
G.C. Electronics
General Electric Co. Tubes/MW Devices
Hitachi Corp. Broadcast Products Div.
JSН Electronics, Inc.
C. M. Levit Electronics D 1-9
Microwave Assoc.
Motorola Semiconductor Products, Inc.
RCA Distributor & Special Products Div.
RCA Solid State Div.
Singer Products Co., Inc.
Temtron Electronics D 1-9
Thor Electronics Corp.

Microwave Assoc. Inc.
Motorola Semiconductor Products, Inc.
RCA Distributor & Special Products Div.
Singer Products Co., Inc.
Thor Electronics Corp.

In addition to the above, a list of companies and products is provided, including:

- Sensors, Tone
- Broadcast Component Dist.
- Communication Media D 1-9
- Broadcast Consultants Co. D 5, 6
- Media Concepts, Inc. D 1-9
- Moseley Assoc. Inc.
- The Orange County Electronics Corp. Ltd.

Further companies and products are listed including:

- Audio Distributor Inc.
- Accurate Sound Co.
- Broadcast Component Dist.
- Communication Media D 1-9
- Broadcast Equipment Distributors
- The Orange County Electronics Corp. Ltd.

September, 1977
Company Mailing Addresses Begin on Page 231.
STL Equipment

CCA Electronics Corp. .................................. 99-106
Martini Electronics ........................................ 57
Micro Control Associates, Inc. ......................... 257
Moseley Assoc. Inc. ...................................... 69
Wilkinson Electronics, Inc. ............................. 62
Allied Broadcast Equip. D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Specialties
CCA Electronics Corp. D1-9
Cetelec Broadcast Group
Coastcom
Collins Radio Rockwell International
Contel Mfg.
Dobly Laboratories, Inc.
Faronic Electronic
GET, Lenkurt, Inc.
Harris Corp. Broadcast Products Div.
Martini Electronics
Mastertone Co., Inc.
Maze Corp D6
McMartin Industries, Inc.
Micro Communications, Inc.
Micro Control Associates, Inc.
Microwave Assoc. Inc.
Moseley Assoc. Inc.
Nurad, Inc.
QEI Corp.
RCA Broadcast Systems
Rheo Elect Labs, Inc.
Singer Products Co., Inc.
Sparta -- see Cetelec Broadcast Group
Tele-Measurements, Inc. B-2
Tekpop Corp.
TerraCom
Time & Frequency Tech., Inc.
Val-Tronics, Inc. D1-9
Varian/Beverly Micro-Link Products
Wilkinson Electronics, Inc.

Stopwatches, Digital

Allied Broadcast Equip. D 1-9
Broadcast Consultants Corp. D5, 6
ESE
Health Co.
Image Devices Inc.
Jules Racine & Co., Inc.
Sigma Electronics, Inc.
Track Audio, Inc. D 1-9

Studio Design and Construction Services

See Adv. Page

Accurate Sound Co ....................................... 223
Communications, Ltd. .................................. 270
A. F. Associates, Inc.
Aertien Construction Co.
American Data Div. Philips Broadcast Equip.
Ampco Broadcasting Inc.
Applied Video Electronics, Inc. D 1-9
Artist's Engineering Visual Communications Div.
Berkley Colortron, Communications, Ltd.
Dyna Engineering, Inc.
Imcro Fiorentino Associates, Inc.
Fisher-Burke Broadcast Consultants Hallikainen & Friends, Inc.
The Orange County Electronics Corp.
Ltd.
Sound Genesis D8, 9
Track Audio, Inc. D 1-9
Ultra Audio Pixtec
Val-Tronics, Inc. D1-9
Westake Audio

Studio Scenery

Imcro Fiorentino Associates, Inc.
Janson Industries

Studio Systems, Audio

See Adv. Page

Ampco Broadcasting Inc. ............................... 70
Dyna Electronics, Inc. .................................. 175
Micro-Trak Corp. ........................................... 260
Accurate Sound Co.
Ampco Broadcasting Inc.
Artist's Engineering Visual Communications Div.
Broadcast Component Dist.
Communication Medias D 1-9
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Cetelec Broadcast Group
Communications, Ltd.
Custom Audio Electronics
Dyna Engineering, Inc.
Dynair Electronics, Inc.
Eventide Clock Works Inc.
Fisher-Burke Broadcast Consultants Harris Corp. Broadcast Products Div.
LPB Inc.
McMagnus Tech-Electronic Co., Inc.
McCurrency Radio Ind. Inc.
McMartin Industries, Inc.
Media Concepts, Inc. D 1-9
Micro-Trak Corp.
Modular Audio Products Unit of Modular Devices, Inc.
Charles McRobert
Oopam Labs, Inc.
The Orange County Electronics Corp.
Ltd.
Quad-Eight Electronics
ROH Corporation
Richmond Sound Design, Ltd.
Robins Broadcast & Sound Equip.
Sound Genesis D8, 9
Sparta -- see Cetelec Broadcast Group
Specialty Systems
TEAC Corp of America
Track Audio, Inc. D 1-9
Ultra Audio Pixtec
Ward-Beck Systems, Ltd.
Westake Audio
Whirwind Music

Subcarrier Multiplex Equipment

See Adv. Page

Moseley Assoc. Inc. ...................................... 69
CCA Electronics Corp.

Coastcom
Collins Radio Rockwell International
Colorado Video Inc.
Farinon Electric
Fung Engineering Inc.
GTE Lenkurt, Inc.
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
Micro Control Associates, Inc.
Moseley Assoc. Inc.
Orban/Broadcast Tape-Athon Corp.
Tecop Corp.
TerraCom

Switchers ...See also Console Listings

See Adv. Page

American Data Div ..................................... 197
Audio Designs & Mfg. ................................... 27
Audio Distributor Inc. ................................. 247
Broadcast Consultants Corp. ........................... 83
C.R.V. Systems, Inc. ..................................... 274
Central Dynamics Corp. ................................. 230
Cetelec Audio .............................................. 217
Communications Technology, Inc. ..................... 194
Di-Tech Inc. .................................................. 263
Dynair Electronics, Inc. .................................. 175
Dynamics Inc. ............................................. 14
Dytek Industries, Inc. .................................... 35
Glentronix Ltd. ............................................. 222
Grass Valley Group, Inc. .................................. 188
Industrie Sciences .......................................... 3
LPB Inc. ...................................................... 172
Lenco Inc. .................................................... 19
McCurrency Radio Ind. Inc. ............................. 180
Modular Audio Products ................................ 252
Rupert Neve, Inc. ........................................... 169
Quantum Audio Labs, Inc. .............................. 276
ROH Corporation .......................................... 259
Ramko Research Inc. ...................................... 91
Robins Broadcast & Sound Equip. Corp. ............... 38
Shintron Inc. ............................................... 93
Sound Dynamics, Inc. ................................. 226
Tangent Systems, Inc. .................................... 264
Vamco Engineering ....................................... 198
Vital Industries Inc. ................................. BC-9
Ward-Beck Systems, Ltd. .............................. IFC

Also Electronic Products, Inc.
American Data Div. Philips Broadcast Equip.
Ampro Broadcasting Inc.
Audio Designs & Mfg.
Audio Distributor Inc. D 1-9
Auditorium, Inc.
Automated Processes, Inc.
Broadcast Communications Devices, Inc.
D9
Peirce-Phips, Inc. D 2, 5
ROH Corporation
Ramko Research Inc.
Robins Broadcast & Sound Equip. Corp.
Shintron Co., Inc.
Sigma Electronics, Inc.
TeleMatlon, Inc.
Teletronics Co.
Vamco Engineering
Viscount Industries Ltd.

Switchers, Coaxial

Aldo Mfg. Co.
A-Tel, A-Matic
Bird Electronic Corp.
Blonder-Tongue Labs, Inc.
C. P. Inc.
Cetelec Broadcast Group
Collins Radio Rockwell International
Comark Industries Inc.
Delta Electronics Inc.

Javelin Electronics D9
Kay Elecmetrics Corp.
LBP Inc.
Lenco, Inc. Electronic Div.
Marconi Electronics Inc.
McCurdy Radio Ind.
Modular Audio Products Unit of Modular Devices, Inc.
Rupert Neve, Inc.
Quantum Audio Labs.
RCA Broadcast Systems
RH Corporation
Ramko Research Inc.
Richmond Sound Design, Ltd.
Robins Broadcast & Sound Equip. Corp.
Ross Broadcast Products Ltd.
Shintron Co. Inc.
Solar Mfg. Corp.
Sony Corp. of America VTR Div.
Sound Dynamics, Inc. D8, 9
See Cetelec Broadcast Group
Tangent Systems, Inc.
Teletem & Geotel Co.
3M Co. Minwom Corp.
Vamco Engineering
Video Components, Inc.
Vital Industries Ltd.
Ward-Beck Systems, Ltd.
Weather Scan, Inc.
Yamaha International Corp.
<table>
<thead>
<tr>
<th>Tape, Magnetic Recording Video</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.R.V. Systems, Inc.</td>
<td>274</td>
</tr>
<tr>
<td>Dimension 3 Recording Co.</td>
<td>277</td>
</tr>
<tr>
<td>3M Co.</td>
<td>24</td>
</tr>
</tbody>
</table>

Tape Cartridge Loaders

**Broadcast Component Dist. Communication Media**

Audio, Ltd.
Broadcast Component Dist.
Communication Media D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Media
Broadcasting & Supply Co. D 1-9
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Tape Cassette Loaders

Audio, Ltd.
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Recording Supply Co. 250

**Telex Communications, Inc.**

<table>
<thead>
<tr>
<th>Tape, Recording Logging</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampex Corp.</td>
<td>5, 6</td>
</tr>
<tr>
<td>Broadcast Automation Assoc. D</td>
<td>1,2,5,6</td>
</tr>
<tr>
<td>Broadcast Component Dist, Communication Media D 1-9</td>
<td>273</td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D5, 6</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td>24</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants Moseley Assoc. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Recording Supply Co.</td>
<td>24</td>
</tr>
<tr>
<td>Singer Systems Co. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Sony-Mag Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Sound Genesis D8, 9</td>
<td>24</td>
</tr>
<tr>
<td>SoundScriber Magnetic Recording Co., Inc. Stancil-Hoffman Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Track Components, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Measurements, Inc. B-2</td>
<td>24</td>
</tr>
<tr>
<td>3M Co. Magnetic Audio/Video Prod. Div.</td>
<td>24</td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td>24</td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td>24</td>
</tr>
</tbody>
</table>

Tape, Time Announced

**Broadcast Component Dist. Communication Media**

<table>
<thead>
<tr>
<th>Tape, Time Announced</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampex Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Audio Magnetics Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc. D9</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D5, 6</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td>24</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants Moseley Assoc. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Recording Supply Co.</td>
<td>24</td>
</tr>
<tr>
<td>Singer Systems Co. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Sony-Mag Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Sound Genesis D8, 9</td>
<td>24</td>
</tr>
<tr>
<td>SoundScriber Magnetic Recording Co., Inc. Stancil-Hoffman Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Track Components, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Measurements, Inc. B-2</td>
<td>24</td>
</tr>
<tr>
<td>3M Co. Magnetic Audio/Video Prod. Div.</td>
<td>24</td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td>24</td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td>24</td>
</tr>
</tbody>
</table>

Tape Cassette Loaders

**Broadcast Component Dist. Communication Media**

Audio, Ltd.
Broadcast Component Dist.
Communication Media D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Media
Broadcasting & Supply Co. D 1-9
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Tape Cassette Loaders

Audio, Ltd.
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

**Telex Communications, Inc.**

<table>
<thead>
<tr>
<th>Tape, Recording Logging</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampex Corp.</td>
<td>5, 6</td>
</tr>
<tr>
<td>Broadcast Automation Assoc. D</td>
<td>1,2,5,6</td>
</tr>
<tr>
<td>Broadcast Component Dist, Communication Media D 1-9</td>
<td>273</td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D5, 6</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td>24</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants Moseley Assoc. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Recording Supply Co.</td>
<td>24</td>
</tr>
<tr>
<td>Singer Systems Co. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Sony-Mag Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Sound Genesis D8, 9</td>
<td>24</td>
</tr>
<tr>
<td>SoundScriber Magnetic Recording Co., Inc. Stancil-Hoffman Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Track Components, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Measurements, Inc. B-2</td>
<td>24</td>
</tr>
<tr>
<td>3M Co. Magnetic Audio/Video Prod. Div.</td>
<td>24</td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td>24</td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td>24</td>
</tr>
</tbody>
</table>

Tape, Time Announced

**Broadcast Component Dist. Communication Media**

<table>
<thead>
<tr>
<th>Tape, Time Announced</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampex Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Audio Magnetics Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Communications Devices, Inc. D9</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D5, 6</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td>24</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants Moseley Assoc. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Recording Supply Co.</td>
<td>24</td>
</tr>
<tr>
<td>Singer Systems Co. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Sony-Mag Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Sound Genesis D8, 9</td>
<td>24</td>
</tr>
<tr>
<td>SoundScriber Magnetic Recording Co., Inc. Stancil-Hoffman Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Track Components, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Measurements, Inc. B-2</td>
<td>24</td>
</tr>
<tr>
<td>3M Co. Magnetic Audio/Video Prod. Div.</td>
<td>24</td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td>24</td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td>24</td>
</tr>
</tbody>
</table>

Tape Cassette Loaders

**Broadcast Component Dist. Communication Media**

Audio, Ltd.
Broadcast Component Dist.
Communication Media D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Media
Broadcasting & Supply Co. D 1-9
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

Tape Cassette Loaders

Audio, Ltd.
Dyna Engineering, Inc.
Electro Sound, Inc.
Mare Cdb
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Re-Play Video Cartridge Service
Track Audio, Inc. D 1-9
Val-Tronics, Inc. D 1-9

**Telex Communications, Inc.**

<table>
<thead>
<tr>
<th>Tape, Recording Logging</th>
<th>See Adv. Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampex Corp.</td>
<td>5, 6</td>
</tr>
<tr>
<td>Broadcast Automation Assoc. D</td>
<td>1,2,5,6</td>
</tr>
<tr>
<td>Broadcast Component Dist, Communication Media D 1-9</td>
<td>273</td>
</tr>
<tr>
<td>Broadcast Consultants Corp. D5, 6</td>
<td>24</td>
</tr>
<tr>
<td>Broadcast Equipment Distributors Communication Media</td>
<td>24</td>
</tr>
<tr>
<td>Dyma Engineering, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Fisher-Burke Broadcast Consultants Moseley Assoc. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Recording Supply Co.</td>
<td>24</td>
</tr>
<tr>
<td>Singer Systems Co. Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Sony-Mag Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Sound Genesis D8, 9</td>
<td>24</td>
</tr>
<tr>
<td>SoundScriber Magnetic Recording Co., Inc. Stancil-Hoffman Corp.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Track Components, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>Tele-Measurements, Inc. B-2</td>
<td>24</td>
</tr>
<tr>
<td>3M Co. Magnetic Audio/Video Prod. Div.</td>
<td>24</td>
</tr>
<tr>
<td>Track Audio, Inc. D 1-9</td>
<td>24</td>
</tr>
<tr>
<td>Val-Tronics, Inc. D 1-9</td>
<td>24</td>
</tr>
</tbody>
</table>
Tape Racks, Cartridge
McCurdy Radio Ind. Inc...........................IBC Professional Audio Service ..........................274 Sound Dynamics, Inc. ..........................226
Audio Distributor Inc. D 1-9
Audio Magnetics Corp. Broadcast Automation Assoc. D 1.2,5,6
Broadcast Cartridge Service D 1-9
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Communications, Inc. D9
Broadcast Consultants Corp. DB, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Capitol Magnetic Products
Cetec Broadcast Group
Collins Radio Rockwell International
Cornquip, Inc.
dbx, Inc.
Dyna Engineering, Inc.
ELPA Marketing Industries, Inc.
Electro Sound, Inc.
Electro Voice Inc.
Fidelipac
G. C. Electronics
LPR, Inc.
Landy Associates Inc. D 1,2
Lipsner-Smith Corp.
Martin Audio/Video D2

Master tone Co., Inc.
Media Concepts, Inc. D 1-9
Micro-Tek Corp.
Microtron Co., Inc.
Nagra Magnetic Recorders, Inc.
Nortronics Co., Inc.
Nova Corp.
Professional Audio Service
RCA Broadcast Systems
Ramko Research Inc.
Recording Supply Co.
Recro Inc.
Robins Broadcast & Sound Equip. Corp.
Scully Recording Instrument Div. of Dictaphone Corp.
Sound Dynamics, Inc. D8, 9
Sound Genesis Dist. 9
Sparta - see Cetec Broadcast Group
Studer Revox America
TEAC Corp of America
Taber Mfg. & Engr. Co.
Tapex Corp.
Telecro Systems Corp.
Telex Communications, Inc.
Tentel
Track Audio, Inc. D 1-9
VIF International
Vanaco Engineering
Videomax Div. Orrox Corp.
Westkape Audio

Tape Splice Finders
Beaucast Dist. ..........................28
Broadcast Component Dist. Communication Medias ..........................269
Ampro Broadcasting Inc.
Beaucast Div. UMC Electronics Co.
Broadcast Communications Assoc. Dist. 1.2,5,6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. DB, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Cetec Broadcast Group
Collins Radio Rockwell International
Dyna Engineering, Inc.
Harris Corp. Broadcast Products Div.
IGM Div. of Northwestern Tech
International Tapetronics Corp.
Recro Inc.
Research Technology, Inc.
Sparta - see Cetec Broadcast Group
Tapecaster TCM, Inc.
Track Audio, Inc. D 1-9
VIF Electronics, Inc.
Vanoco Engineering

AEG Telefunken Magnetic Tape Recorder Dept
Ampro Corp
Ampro Broadcasting Inc.
Broadcast Automation Assoc. D 1.2,5,6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Consultants Corp. DB, 6
Broadcast Electronics, Inc.
Broadcast Equipment Distributors
Communication Medias
Capitol Magnetic Products
Cetec Broadcast Group
Collins Radio Rockwell International
Cornquip, Inc.
dbx, Inc.
Dyna Engineering, Inc.
ELPA Marketing Industries, Inc.
Electro Sound, Inc.
Electro Voice Inc.
Fidelipac
G. C. Electronics
LPR, Inc.
Landy Associates Inc. D 1,2
Lipsner-Smith Corp.
Martin Audio/Video D2

Image Devices Inc.
Joa Cartridge Service D2
Master tone Co., Inc.
Nagy Research Products
Nortronics Co., Inc.
Panasonic Video Systems Div.
Professional Audio Service
Research Technology, Inc.
Robins Broadcast & Sound Equip. Corp.
Sound Genesis Dist. 8, 9
Studer Revox America
TEAC Corp of America
Track Audio, Inc. D 1-9
Victor Duncan, Inc.

Tape Spot Assemblers, Video
Recro Inc.

Tape Transport Reconditioning Services
Accurate Sound Co.
Merin Engineering Works, Inc.

Tape Transports

Broadcast Component Dist. Communication Medias ..........................223
Audio Distributor Inc. ..........................287
Broadcast Component Dist. Communication Medias ..........................8
AEG-Telefunken Magnetic Tape Recorder Dept
Accurate Sound Co.
Ampro Broadcasting Inc.
Audio Distributor Inc. D 1-9
Broadcast Automation Assoc. D 1.2,5,6
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Communications, Inc.
Broadcast Equipment Distributors
Communication Medias
Cetec Broadcast Group
Cornquip, Inc.
Cook Electric Corp.
Electro Sound, Inc.
IGM Div of Northwestern Tech
International Electro-Magnetics International Tapetronics Corp.
Lauderale Electronic Labs
Master tone Co., Inc.
McCurdy Radio Ind. Inc.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
International Tapetronics Corp.
Broadcast Equipment Test

Comprehensive Broadcast

Mastertone

Broadcast Consultants Corp. D5, 6

Gotham Audio Corp.

Martin Audio/Video D2

Mastertone, Inc.

Nagra Magnetic Recorders, Inc.

Nortonics Co., Inc.

Pentagon Industries, Inc.

Professional Audio Service

Sound Dynamics, Inc. DB, 9

Sound Genesis DB, 9

Sparta - see Cetec Broadcast Group

TEAC Corp of America


Tapex Corp.

Track Audio, Inc. D 1-9

VIF International

Val-Tronics, Inc. D1-9

Westlake Audio

Testers, Demodulator/Detector

See Adv. Page

Test Sets, Multifunction

See Adv. Page

Telemet

Amber Electro Design, Ltd.

Dielectric Communications Div. Sola Basic, Inc.

Kay Eleometrics Corp.

Lampkin Lab. Inc.

Leitch Video Ltd.

Lenco Inc. Electronics Div.

Pacific Recorders and Engrg. Corp.

Potomac Instruments, Inc.

Richardson Hill Laboratories Ltd.

Sadelco, Inc.

Singer Products Co., Inc.

Systrom-Doner

TM Systems, Inc.

Telemet a Geotel Co.

Thomson-CSF Laboratories, Inc.

Val-Tronics, Inc. D1-9

Test Sets, Vertical Interval

Broadcast Communications Devices, Inc. D9

Lenco Inc. Electronics Div.

Marconi Instruments

Rohde & Schwarz Sales Co.

Telemet a Geotel Co.

Television Equipment Associates

Test Slides, Video

See Adv. Page

D and S Corley Ltd. ............ 202

Tele-Measurements, Inc. ........ 224

Comprehensive Video Supply Corp. D 1-9

dbx, Inc.

D and S Corley Ltd.

Laird Telemedia Inc.

Landy Associates Inc. D 1,2

Marconi Electronics Inc.

Specialized Industries, Inc.

Telecommunications Industries Ltd.

Tele-Measurements, Inc. B-2

Test Tapes, Audio

See Adv. Page

Broadcast Component Dist. Communication Media .................. 269

Sound Dynamics, Inc. ........ 226

Accurate Sound Co.

Ampex Corp.

Ampro Broadcasting Inc.

Audio Distributor Inc. D 1-9

Broadcast Component Dist. Communication Media D 1-9

Broadcast Consultants Corp. D5, 6

Broadcast Electronics, Inc.

Broadcast Equipment Distributors Communication Media

Cetec Broadcast Group

Colorado Magnetics

Dyma Engineering, Inc.

Gotham Audio Corp.

Martin Audio/Video D2

Mastertone Co., Inc.

Nagra Magnetic Recorders, Inc.

Nortonics Co., Inc.

Pentagon Industries, Inc.

Professional Audio Service

Sound Dynamics, Inc. DB, 9

Sound Genesis DB, 9

Sparta - see Cetec Broadcast Group

TEAC Corp of America


Tapex Corp.

Track Audio, Inc. D 1-9

VIF International

Val-Tronics, Inc. D1-9

Westlake Audio

Testers, Demodulator/Detector

See Adv. Page

Telemet ........................................... 79

Telemet a Geotel Co.

Testers, Integrated Circuit

Health Co.

Motorola Semiconductor Products, Inc.

Tektronix Inc.

Testers, Semiconductor

B & K Precision Dynascan Corp.

Datatron, Inc.

Delta Electronics Inc. (N.C.)

Harris Corp. PDR Electronics Div.

Health Co.

Hickok Elec. Instrument

Lauderdale Electronic Labs

Leader Instruments Corp.

Lectrotech Inc.

Micro-Technical Industries

Motorola Semiconductor Products, Inc.

Rohde & Schwarz Sales Co.

SPI-IT Metrix Instruments Div.

Sencore Inc.

Snai-Johnson

Tektronix Inc.

United Radio Supply Inc. D9

Testers, Tape Recorder

Amber Electro Design, Ltd.

Broadcast Aids, Inc.

Fidelipac

Lauderdale Electronic Labs

Marconi Instruments

Professional Audio Service

Tentel

Testers, Vacuum Tube

B & K Precision Dynascan Corp.

Health Co.

Hickok Elec. Instrument

Lectrotech Inc.

SPI-IT Metrix Instruments Div.

Sencore Inc.

Snai-Johnson

Singer Products Co., Inc.

United Radio Supply Inc. D9

Textbooks, Communications

See Adv. Page

Howard W. Sams & Co., Inc. ........ 258

Comprehensive Video Supply Corp. D 1-9

Image Devices Inc.

Olpamp Labs, Inc.

Howard W. Sams & Co., Inc.

Ultra Audio Pixet

United Radio Supply Inc. D9

Time Annunciators

Automation Electronics, Inc.

Beta Technology, Inc.

Broadcast Consultants Corp. D5, 6

Cetec Broadcast Group

Collins Radio Rockwell International

Consolidated Electronic Industries

Harrillian & Friends Inc.

IBM Div. of Northwestern Tech.

Mastertone Co., Inc.

Schaffer - see Cetec Broadcast Group

Sono-Mag Corp.

Stant-Collins-Hoffman Corp.

Tape-Alton Corp.

Time Base Correctors, Helical Scan and Quad

See Adv. Page

C.R.V. Systems, Inc. ............ 274

Consolidated Video Systems .. 199

Edutron, Inc. ....................... 213

Micro Consultants .......... 187

Microtime, Inc. ................. 55

NEC America, Inc. ............... 215

Ampex Corp.

Broadcast Communications Devices, Inc. D9

C.R.V. Systems, Inc.

Consolidated Video Systems

dbx, Inc.

Digital Video Systems

Dyna Engineering, Inc.

Edutron, Inc.

General Television Ntwk. D 3

Landy Associates Inc. D 1,2

Martin Audio/Video D2

Media Concepts, Inc. D 1-9

Merlin Engineering Works, Inc.

Micro Consultants

Microtime, Inc.

NEC America, Inc. Broadcasting Equip. Division

Peice-Phillips, Inc. D 2, 5

RCA Broadcast Systems

Roscrap Corp. D 3, 4

Sony Corp. of America VTR Div.

Syst-Matics, Inc.

Timers, Program

See Adv. Page

Broadcast Component Dist. Communication Media .......... 273

Broadcast Consultants Corp. .................. 83

ESE ...................................... 63, 65

Glentronix Ltd. ................. 254

Audio Distributor Inc. D 1-9

Beta Technology, Inc.

Broadcast Aids, Inc.

Broadcast Component Dist. Communication Media D 1-9

Broadcast Consultants Corp. D5, 6

Conrac Corp. Cramer Div.

Digital Concepts Corp.

Dyna Engineering, Inc.

ESE

Glentronix Ltd. D 1-9

Gotham Audio Corp.

IBM Div. of Northwestern Tech.

Pacific Recorders and Engrg. Corp.

Sound Genesis DB, 9

Standard Electric Time

Tapecaster TCM, Inc.

Track Audio, Inc. D 1-9

Val-Tronics, Inc. D1-9

Vanco Engineering

Video Devices Co.

Timers, Videotape

See Adv. Page

Artist's Engineering .................. 275

Recortec Inc. ................. 265

Vanco Engineering ............... 198

Artist's Engineering Visual Communications Division

Broadcast Aids, Inc.

Convergence Corp.

Digital Concepts Corp.

Dyna Engineering, Inc.

Dynamics Div. Whittaker Corp.

Martin Audio/Video D2

Merlin Engineering Works, Inc.

Recortec Inc.

Vanco Engineering

Tiltling Systems

See Adv. Page

Knox Ltd. .................. 256

TeleMapping, Inc. ............... 97

3M Co. ................. 33

BJA Systems, Inc.

Beaton Electronics Inc.

Broadcast Communications Devices, Inc. D9

Chyron Telesystems

Intercom Corp. Teletwister, Inc.

International Communications & Control Corp.

Knox Ltd.

Laird Telemedia Inc.

Reynolds/Leteron Co.

System Concepts Inc.

TeleMapping, Inc.

Telescript, Inc.

Thomson-CSF Laboratories, Inc.

3M Co. Mincom Div.

Video Data Systems

Tool Kits (Hand Tools)

See Adv. Page

Jensen Tools & Alloys .......... 277

A-Tel-A-Matic

Conhesive Video Supply Corp. D 1-9

G.C. Electronics

Health Co.

Image Devices Inc.

Jensen Tools & Alloys

Marconi Video/DVD D2

Mountain West Alarm D8

P. K. Neuses Inc.

Sono-Mag Corp.

United Radio Supply Inc. D9

Upson Tools Inc.

Tower Beacon Light Flashers

See Adv. Page

CCA Electronics Corp. ....... 99-106

Elcom Engineering Co. .......... 275

Hughey & Phillips Inc. .......... 200

SSAC Inc. .................. 275

CCA Electronics Corp.

Cetec Broadcast Group

Collins Radio Rockwell International

Crouse Hinds Co.

Dyna Engineering, Inc.

Elcom Engineering Co.

Flash Technology Corp. of America

Harris Corp. Broadcast Products Div.

Hughey & Phillips Inc.

Jarrinco - see Cetec Broadcast Group

Lauderdale Electronic Labs

Magnun Towers, Inc.

Mastertone Co., Inc.

SSAC Inc.

Tuner Communications Service, Inc.

Unaro-Roth Div. of Unaro Ind., Inc.

Tower Guyss - See Antenna and Tower Guys

Philadelphia Resins Corp.

Tower Installation and Services - See Antenna and Tower Installation and Services

Tower Light Failure Alarms

See Adv. Page

Hughey & Phillips Inc. ........ 200

Moseley Assoc. Inc. ............ 69

Harris Corp. Broadcast Products Div.

Company Mailing Addresses Begin on Page 231.

BROADCAST ENGINEERING
Transmitter Modulation Controllers, Automatic

See Adv. Page

Delta Electronics Inc. (Va.) ... 183

Delta Electronics Inc. (Va.)

Transmitter Output Controllers, Automatic

Delta Electronics Inc. (Va.)

Transmitters, AM Carrier

See Adv. Page

Broadcast Component Dist. Communication Medias ... 273

Collins Radio ... 21

Broadcast Automation Assoc. D 1.25:6

Broadcast Component Dist. Communication Medias D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Ceco Communications Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

GTE Lenkurt, Inc.

Linc Inc.

Masterstone Co., Inc.

Maze Corp D6

North American Radio Corp.

Singer Products Co., Inc.

Sintronic Corp.

Sparta — see Cetec Broadcast Group

Taper Corp.

Transmitters, AM Low Power

See Adv. Page

Broadcast Component Dist. Communication Medias ... 273

Broadcast Component Dist. Communication Medias D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Ceco Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Ikegami Electronics (USA) Inc.

LPH Inc.

Marconi Communication Systems Ltd.

Mastertone Co., Inc.

North American Radio Corp.

Singer Products Co., Inc.

Sparta — see Cetec Broadcast Group

Transmitters, AM 250 Watt

See Adv. Page

CCA Electronics Corp. ... 99-106

McMartin Industries, Inc. ... 174

McMartin Industries, Inc. (Va.)

Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Sparta — see Cetec Broadcast Group

Wilkinson Electronics, Inc.

Transmitters, AM 2 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

CCA Electronics Corp.

Transmitters, AM 2.5 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

CCA Electronics Corp.

McMartin Industries, Inc.

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 3 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

McMartin Industries, Inc.

Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Sparta — see Cetec Broadcast Group

Wilkinson Electronics, Inc.

Transmitters, AM 5 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 204,271,273

McMartin Industries, Inc.

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 10 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

Continental Electronics

Mfg. Co. ... 204,271,273

McMartin Industries, Inc.

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 50 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 15 kw

See Adv. Page

Sintronic Corp.

Broadcast Equipment & Supply Co. D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 20 kw

See Adv. Page

Willkinson Electronics, Inc.

Transmitters, AM 25 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Sintronic Corp.

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 50 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 15 kw

See Adv. Page

Sintronic Corp.

Broadcast Equipment & Supply Co. D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 20 kw

See Adv. Page

Willkinson Electronics, Inc.

Transmitters, AM 25 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Sintronic Corp.

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 50 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 15 kw

See Adv. Page

Sintronic Corp.

Broadcast Equipment & Supply Co. D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 20 kw

See Adv. Page

Willkinson Electronics, Inc.

Transmitters, AM 25 kw

See Adv. Page

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Sintronic Corp.

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 50 kw

See Adv. Page

Broadcast Component Dist. Communication Medias ... 271

CCA Electronics Corp. ... 99-106

Collins Radio ... 21

Continental Electronics

Mfg. Co. ... 247,250,269

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 15 kw

See Adv. Page

Sintronic Corp.

Broadcast Equipment & Supply Co. D 1-9

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

Collins Radio Rockwell International Communications, Ltd.

Mastertone Co., Inc.

McMartin Industries, Inc.

RCA Broadcast Systems

Sintronic Corp.

Wilkinson Electronics, Inc.

Transmitters, AM 20 kw

See Adv. Page

Willkinson Electronics, Inc.
Transmitters, AM to order

CCA Electronics Corp. 99-106

Collins Radio 21

McMartin Industries 174

Transmitters, FM 10 Watt

See Adv. Page

CCA Electronics Corp. 99-106

McMartin Industries 174

Wilkinson Electronics 62

Broadcast Component Dist. Communication Media 273

CCA Electronics Corp. 99-106

McMartin Industries 174

Wilkinson Electronics 62

AEL, Inc. Broadcast Equipment & Supply Co. D 1-9

Broadcast Specialties 99-106

Cetec Broadcast Group

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.

Broadcast Specialties

CCA Electronics Corp.

CSI Electronics, Inc.

Cetec Broadcast Group

CCA Electronics Corp.

Bielsa Corp.
Transmitters, TV 1 kw

See Adv. Page

Acrodyne Industries
CCA Electronics Corp. 99-106
Howe-Yin Research Co. Inc. 259

CCA Electronics Corp. 99-106

Transmitters, TV 2 kw


Transmitters, TV 3 kw

See Adv. Page

Howe-Yin Research Co. Inc. 259

Transmitters, TV 5 kw


Transmitters, TV 6 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 10 kw


Transmitters, TV 11 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 12 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 12.5 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 15 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106
Harris Corp. Broadcast Products Div. Marconi Communication Systems Ltd. Marconi Electronics Inc. RCA Broadcast Systems

Transmitters, TV 17.5 kw

See Adv. Page

CCA Electronics Corp.

CCA Electronics Corp. 99-106

Transmitters, TV 24 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 25 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 30 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Transmitters, TV 35 kw

See Adv. Page

CCA Electronics Corp. 99-106

CCA Electronics Corp. 99-106

Turnkey Equipment Installation Services

See Adv. Page

Rhoades National Corp. 277

Turnkey Equipment Installation Services

See Adv. Page

Rhoades National Corp.

Bartele Communications

Broadcast Consultants

See Adv. Page

Broadcast Consultants Corp.

Broadcast Consultants Corp. 83, 84

CCA Electronics Corp. 99-106

Collins Radio

McCurdy Radio Ind.

Micro-Trak Corp. 260

Ramko Research Inc. 97, 176

Radio Electronics

Mfg. Inc. 18

Sound Dynamics, Inc. 226

Ampro Broadcasting Inc.

Audio Distributor Inc. D 1-9

Broadcast Automation Assoc. D 1,2,5,6

Broadcast Communications Devices, Inc. D 9

Broadcast Component Dist. Communication Media D 1-9

Broadcast Consultants Corp D5, 6

Broadcast Electronics, Inc.

Broadcast Equipment Distributors Communication Media

Broadcast Equipment & Supply Co. D 9

Broadcast Specialties

CCA Electronics Corp.

Cetel Broadcast Group

Collins Radio Rockwell International

Dyna Engineering, Inc.

ELPA Marketing industries, Inc.

EMT Fronz VGmbH

Gotham Audio Corp.


International Electro-Magnetics

LPI Inc.

Martin Audio/Vide D2

Mastertone Co., Inc.

McCurdy Radio Ind. Inc.

Media Concepts, Inc. D 1-9

Micro-Trak Corp.

QRK Electronic Products

RCA Broadcast Systems

Ramko Research Inc.

Russco Electronics Mfg. Inc.

Sansui Electronics Corp.

Singer Products Co., Inc.

Sintronic Corp.

Sound Dynamics, Inc. D 8, 9

Sound Genesis D8, 9

Sparta -- See Cetel Broadcast Group

Stanton Magnetics Inc.

TEAC Corp of America

Technics

Val-Tronics Inc. D1-9

Wilkinson Electronics, Inc.

TV Systems, Closed Circuit

See Adv. Page

TV Systems, Closed Circuit

A. F. Associates, Inc.

ATV Broadcast


A Tel-A-Matic

Atlantic Research Corp.

Berkeley-Colortron Inc.

Boston Insulated Wire & Cable Co.

Broadcast Communications Devices, Inc. D 9

Broadcast Video Systems, Ltd.

Catel Div. United Scientific Corp.

Ceco Communications Inc.

Central Dynamics Corp.

Colorado Video Inc.

Communications Technology, Inc.

Comtronics Inc.

Dage-MTI Inc.

Davis & Sanford Co. Inc.

Delta Electronics Inc. (N.C.)

Denson Electronic Corp. D 1-9

Dynair Electronics, Inc.

Fernser Group Robert Bosch Corp.

GBC Closed Circuit TV Corp

General Electric Co. ISO Div.

General Electric Co. Tubes & Devices

General Television NWm. D 3

Hitachi Denki America, Ltd.

Ikegamni Electronics (USA) Inc.

International Nuclear Corp.

Javelin Electronics D9

Laird Telemedia Inc.

Leitch Video Ltd.

See Adv. Page

Broadcast Component Dist. Communication Media

See Adv. Page

Broadcast Component Dist. Communication Media
Voltmeters, AC
Aiken Industries Inc.
B & K Instruments Inc.
B & K Precision Dynascan Corp.
Boonton Electronics
Bristol Div. of Acco
Dana Laboratories, Inc.
Dranetz Engineering Labs., Inc.
Dyna Engineering, Inc.
John Fluke Mfg. Co., Inc.
General Electric Co. Tubes/MW Devices
Gralex Industries
Harris Corp. Broadcast Products Div.
Heath Co.
Hickok Elect. Instrument
ITT Jennings
International Instrument Div.
Lauderdale Electronics Labs
Leader Instruments Corp.
Lectrotech Inc.
Philips Test & Measuring Instruments, Inc.
Rhode & Schwarz Sales Co.
Rycom Instruments
SPI-ITT Metric Instruments Div.
Sencore Inc.
Tektronix Inc.
United Systems Corp.
Hickok Elect. Instrument
ITT Jennings
International Instrument Div.
Lauderdale Electronic Labs
Leader Instruments Corp.
Lectrotech Inc.
Philips Test & Measuring Instruments, Inc.
Rhode & Schwarz Sales Co.
Rycom Instruments
SPI-ITT Metric Instruments Div.
Sencore Inc.
Tektronix Inc.
United Systems Corp.

Voltmeters, FET
B & K Precision Dynascan Corp.
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
Heath Co.
Hickok Elect. Instrument
Leader Instruments Corp.
Lectrotech Inc.
Philips Test & Measuring Instruments, Inc.
Rhode & Schwarz Sales Co.
Sencore Inc.
Sina-Johnson
United Systems Corp.

Voltmeters, Vacuum Tube
B & K Precision Dynascan Corp.
Boonton Electronics
Dyma Engineering, Inc.
Gralex Industries
Health Co.
ITT Jennings
Lectrotech Inc.
Rhode & Schwarz Sales Co.
Sina-Johnson
Voltohm Metors --See meters, Volt Ohm

Wattmeters
Allied Broadcast Equip. D 1-9
Bird Electronic Corp.
Boonton Electronics
Coaxial Dynamics
Collins Radio Rockwell International
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Electro Impulse, Inc.
Harris Corp. Broadcast Products Div.
Heath Co.
Hickok Elect. Instrument
Lampkin Lab. Inc.
Leader Instruments Corp.
Micro Communications, Inc.
Philips Test & Measuring Instruments, Inc.
Rhode & Schwarz Sales Co.
SPLITT Metric Instruments Div.
Singer Products Co., Inc.
Val-Tronics, Inc. D1-9

Waveguides
Nurad, Inc. See Adv. Page

Weather Instruments
See Adv. Page
ESE ........................................... 63, 65
Scientific Radio Systems, Inc. .................... 208
Texas Electronics .................................. 207

Weather Radar -- See Radar, Weather

Wiring and Cabling Services
Audio Accessories Inc.
Belden Corp.
Beta Technology, Inc.
Boston Insulated Wire & Cable Co.
C. S. P. Inc.
Cablewave Systems Inc.
Communications, Ltd.
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
Hitachi Denashi America, Ltd.
Maury Microwave Corp.
Micro Communications, Inc.
Microwave Assoc. Inc.
Nurad, Inc.
RCA Broadcast Systems
Rex Rheostat & Co., Inc.
SGL Wagner Electric
Sono-Mag Corp.
Sound Genesis DB, 9
Teledynamics
Tele-Measurements, Inc. B-2
Times Wire and Cable
Union Connector Co., Inc.

To get overseas trade leads like this, you could open offices in 127 countries.

Or use our computer.

The U.S. Commerce Department's computer-operated Trade Opportunities Program (TOP) can supply you with immediate, continuing, specific leads tailored to your sales objectives for any of 127 countries. So if you can't be all over the world at one time, we've got the answer. To learn more, write Secretary of Commerce, U.S. Department of Commerce, BIC-9B, Washington, D.C. 20230.

Company Mailing Addresses Begin on Page 251.
On June 25, 1876, George Armstrong Custer ignored his scouts' warnings of many Indians gathered at Little Big Horn. So he rode out with 250 men to "surround" 6,000 Indians. This was a serious error.

Numbers can make all the difference.

It is always a serious error to ignore numbers or talk about them in vague terms. BPA (Business Publication Audit of Circulation, Inc.) guarantees the circulation figures of our member magazines — issue after issue. When you advertise in BPA- audited magazines, you get precise, nonpromotional numbers.

BPA We count, so your ads will.

This BPA- audited magazine donated the space for this ad, with creative and production costs contributed by BPA agency and advertiser members.
Here's everything you need to pull an FM Proof!

The first COMPLETE FM Proof Manual ever offered

Here's everything you need to comply with the FCC's annual proof-of-performance test. Every procedure, every detail is spelled out step-by-step in simple, concise language—all reviewed by the FCC. You save time, money, headaches—and you're sure of doing it right the first time.

Broadcast Engineering's FM Proof-of-Performance Manual includes all required logging forms for pulling both mono and stereo proofs. A complete chapter on FCC Rules. Dozens of helpful troubleshooting tips and time-saving measurement and logging techniques. Detailed procedures on how to pre-test your station before pulling the Proof. And more.

Your FM Proof Manual shows you

- how to prepare the test equipment
- how to connect the test equipment
- an efficient method of measurement and a look at the performance requirements
- how to use the data summary sheet and evolve the graphs
- how to comply fully with FCC rules and standards PLUS...you get individual replaceable forms for completing the equipment performance tests.

All this in one package. And all for $6.95

SPECIAL OFFER!
Order Both Manuals AND SAVE!

ONLY $12 for both! Over 2,500 AM manuals now in use
and 1,500 FM manuals
Volume discounts available on request.

P.O. Box 12901, Overland Park, Ks. 66212

[Please send me______ copies of the FM Proof-of-Performance Manual @ $6.95 each
Please send me______ copies of the AM Proof-of-Performance Manual @ $6.95 each
Please send me______ sets of the FM and AM Proof-of-Performance Manuals @ $12 for BOTH.]

[My check or money order is enclosed] [Please bill me]

Name ____________________________ Address ____________________________
City ____________________________ Zip __________ State ________________

NOTE: Broadcast Engineering pays the postage on all orders!

September, 1977

www.americanradiohistory.com
Up to your pattern in alligators

By Bob Jones & Dennis Ciapura

Don’t laugh, it’s true. There is one station now in the United States that does have its own alligator farm and believe us this is no laughing matter!

Like many old time stations, WFUN has found it economical to move its transmitter site further away from the metro area. This is because of both the appreciated value of its land and the need to improve its suburban coverage.

So, when you’re faced with a decision to move out, and your city of license is Miami, Florida, there is only one place to go—into the Everglades. WFUN has successfully engineered the first radio station ever constructed in the Everglades Swamp.

Physical Problems

The greatest problem is access. There are only two roads now criss-crossing the Everglades. The famous Tamiami Trail and the newer Alligator Alley. Take your pick. The WFUN site we selected is located 21 miles west of Miami along the Tamiami Trail. As an engineer what’s the first problem you encounter? The stubborn environmentalists! With 10,000 acres of no good swamp, they want to protect the 10 acres we need. So who really cares? Needless to say the FCC Rules on Environmental Impact are a “piece of cake” compared to the environmentalists of Dade County Florida.

The next problem you encounter is muck. That’s right, muck. Like in swamp muck. Before you can install towers, guy anchors, etc., you need to be able to drive to such sites. This requires roads which require removal of the muck. Or as we learned, you need to “demuck.”

Step one is to dig out the muck, fill it with rock, and keep on filling until you can get to the place where the towers and anchors are to be erected. Of course the muck will flow, and there is no guarantee on how long you will be able to reach your towers.

The second physical problem is living creatures—like snakes, alligators, scorpions, etc. While I realize other stations have faced similar problems before, I doubt anybody has seen so many so often in one place. It really is hard to work when you keep looking over your shoulder to watch out for what is sneaking up behind you. We, of course, ignore the little creatures like mosquitoes, deer flies, wasps, etc.

Installation

Unlike many new stations, WFUN had to bury all its cables. Not really, but we didn’t want some environmentalist to accuse us of tripping an alligator or a swamp deer.
Doghouses must be elevated to guard against seasonal flooding. There is a wet season and a dry season in the Everglades. Plus of course one must protect against hurricanes. Whether we have elevated our doghouses and tower piers sufficiently, we will never know until the next hurricane comes. But by careful calculation from long time residents of the swamp, we feel confident we have.

Again with adverse weather in mind, we placed our studio-transmitter building up near the Tamiami Trail. This provides for maximum accessibility in bad weather as well as minimizes the length of driveway we have to maintain.

It goes without saying that standby power is a necessity when constructing in the Everglades Swamp. As with the doghouses and tower piers, the studio transmitter building has been elevated to be above the “high water” mark.

One of the special problems we had was the construction of the doghouses. In the case of WFUN they have to be tight. Varmint tight we mean. After all nobody wants to run a motel for rattlesnakes or mud-dauber. This means that all excessive holes must be plugged. Stripping must be placed around any warped doorways, etc. Whether chemicals will be required in the future to assist in the control of snakes, bugs, wasps, etc., we just do not know yet, but we presume they will.

Field Intensity Survey

Normally when one sets out to prove a directional pattern he takes readings on foot or by auto. In our case neither of these methods were generally available. As noted we constructed 21 miles out in the Everglades Swamp, and there are only two roads. Even if the water level were not so deep it would be madness to attempt to walk any close-in points. We did find access to a few points we could drive to, in the direction of Miami, Florida.

At one time we considered calling this story by a very bicentennial name: One If By Land, Two If By Sea, and Three If By Air. For this is just what we did. Where we could, we took readings by land on accessible roads, levees or trails. When this failed we took measurements by water. As can be seen this is by air boat. In fact to the best of our knowledge this is the first directional proof ever, where an air boat was used. And when that failed we resorted to the trusty helicopter. Enough has been said about helicopters and helicopter technique, but at this point we believe it may be of general interest to discuss a bit about the use of air boats.

Special Field Techniques

There are really two problems when one sets out to conduct field measurement by air boat. These are knowing the distance and the bearing you are from the towers. This really means you have to stay within visual sight of the towers. Or in flat swamp land about four to five miles. There is no substitute for an Indian guide who knows every blade of grass and can tell you exactly where you are. In our case we used both an experienced guide as well as aerial photos. Ours were on a scale of 600 feet to the inch. We began at the furthest point we desired to take readings and rode the boat into the tower site. The tower will serve as a natural visual compass to keep you on course. By use of a watch, or clock readings can be obtained at uniform intervals.

Care must be taken that the metal in the air boat does not affect the accuracy of the field intensity meter. This is no different than the precautions one needs to take when making readings in a boat or helicopter, etc. If the air boat does, and ours did, affect your meter you must correctly determine a calibration factor to be applied to the readings obtained. This is generally in the magnitude of 15-20 percent.

Audio And Transmitting

Now that WFUN had been provided with the best possible R.F. field that a new directional antenna system could provide, it was up to the station's engineering staff to devise the best possible signal to drive the array. A new Harris MW-5, pulse duration modulation transmitter was installed, while the

continued on page 164
original R.C.A. transmitter was retained as an auxiliary. The MW-5 was selected because the design appeared to be capable of delivery clean positive peak performance and low I.M. distortion, due partly to the absence of high level audio transformers. The R.C.A. was a good choice as a backup transmitter despite its relative age because of its good reliability record and excellent audio performance.

The station's programming is an automated tape format consisting of easy listening music and a very limited number of commercials. While we naturally wanted to obtain the best possible average modulation level for optimum coverage, we also felt that it was imperative that good audio fidelity and dynamic range be maintained, so that listening fatigue due to compression could be minimized.

This balance between average level and fidelity is difficult to arrive at and is different for every radio market, depending upon market size, competition and class of station as well as coverage restrictions due to the directional array. Although the classic approach is to increase audio processing until the signal starts to sound bad and cut back a little, we decided to take a somewhat different approach with WFUN. The processing gear was selected and set up for maximum loudness level first and then the processing parameters were rolled back until a noticeable drop in apparent loudness level was detected. As we had suspected, a little processing in the right places produced nearly the same apparent loudness level as gross processing but with a much more pleasing air sound.

The Audio Chain

The output of the console is fed into a C.B.S. Audimax which has been modified so that the expansion characteristic is limited to about 5 dB. This allows the unit to correct level errors at the board without seriously affecting the dynamic range of the music. The Audimax output is then fed to a Durrough DAP-1 three band audio processor which is set up to compensate for the loss of highs that most AM receivers inflict on their detected audio. The 3 to 5 kHz region is very important to perceived loudness and unfortunately, most AM sets are already down a few dB at 5 kHz. Very low frequencies which most radios won’t cleanly reproduce are limited at this point to avoid wasting modulation capability and generating unnecessary distortion at the receiving end. For although it is possible to transmit excellent low distortion, wideband AM audio, most receivers would reproduce this audio diet with a combination of bass indigestion and treble suffocation. Rolling the lowest octave and brightening the highs yields a much cleaner sound in the field.

The Last Step

Finally, the audio is passed on to a C.B.S. AM Volumax for asymmetrical peak limiting. Only a few dB of peak limiting was used at WFUN to avoid a compressed sound with the easy listening, soft M.O.R. format. The final result is a very good average level with a very musical open sound and surprisingly good subjective fidelity.

Since the new system has been on the air, WFUN has received reception reports from England, Ireland, Norway and Canada. The fellow in Norway sent a tape along with his reception report, which gave us excellent opportunity to see how effectively our system was working in keeping the audio above the QRMs. Although WFUN does not expect to do very well in radio ratings in northeastern Europe, the interference from Cuba can sometimes be as strong in southern Florida as the interference on the Norwegian tape from across the sea.

All in all, the WFUN project can be described as an interesting blend of modern broadcast technology and the primitive beauty and challenge of one of America’s last remaining wildernesses...and from it all comes music, which we hope, as one poet has suggested, “soothes the savage beast” or was it breast?
...or dial for an RF load or plug-in element. Dielectric Communications now offers toll free dialing for easy ordering and quick shipment of its complete line of RF instruments.

- **Quick** — Same day shipment, prepaid, with established credit
- **Easy** — dial 800-341-9679 to order
- **Reliable** — Full two-year-warranty on all RF wattmeters, loads and elements
- **Convenient** — Use MasterCharge or (BankAmericard) VISA

A complete line of terminating loads: 5 to 150 watt dry loads, 100 watt to 10 kilowatt liquid filled load, 10 to 250 kilowatt water cooled heat exchanger type. Accurate and portable insertion wattmeters measure forward and reflected radio frequency powers. Large scale, easily read meter movement with plug-in power detectors and quick match RF connectors.

Equipment is tested and serviced to exact specifications. Now it’s covered with two-year warranty. Terms of warranty available upon request.

Sola Basic Divisions: Anchor Electric • Bishop Electric • Dielectric Communications • Dowzer Electric • Guth Lighting • Hevi-Duty Electric • Lindberg • Nelson Electric • Sierra Electric • Sola Electric • Tempress Microelectronics • Warren G-V Communications

For More Details Circle (103) on Reply Card

www.americanradiohistory.com
WTAR-TV/AM combines operation for better news coverage  

By Dave Busch

"Combined radio and television news coverage can add up to better and more comprehensive news service for the listening and viewing public," reports James E. Mays, news director of WTAR-TV-AM in Norfolk, Virginia.

"Smaller, separate news staffs for each would duplicate efforts in many cases. The result of a combined staff is that we have more people on the street reporting what is happening," Mays says.

A tightly-run, efficient news operation is especially essential in the Hampton Roads area WTAR serves. Slow news days are a rarity. Mays' biggest problem is deciding what local stories of strictly regional interest to mix in with a host of nationally important stories developing in the area at the same time.

The radio and television news staff covers a market ranked 50th nationwide, which has more dramatic happenings for any area its size in the country, according to Mays. The bay area consists of seven cities ranging in population from Suffolk's 80,000 to Norfolk's 350,000. It is the seat of the world's largest shipbuilding industry, headquarters for the NATO naval force, and the site of 12 major military bases.

"A lot of our local news affects people all around the world," Mays says. "We pretty much dismiss fender-benders and concentrate on hard news for our radio and television newscasts."

The news director depends heavily on six, two-person news crews, each consisting of a reporter and cameraperson. The reporter audi-tapes each interview with news-makers for radio with a small cassette recorder while the photographer exposes television footage. For fast-breaking stories, the reporter scripts the report at the scene and phones it into the station.

The telephoned report is taped by the radio news editor along with actuality segments fed from the reporter's recorder into the remote telephone. The WTAR radio news editor then puts the pieces together for the next newscast.

"If there is time, of course, we have the reporter come back to the station and record his or her report," Mays says, "but the reporter may have to remain on the scene for further developments."

On the hour, every hour

WTAR's radio newscasts are scheduled for every hour on the half hour. The CBS affiliate carries the network news on the hour. For each newscast, stories are rewritten, with additional taped comments spliced in and lengthened or shortened, depending on the development of the story. This revamping can take place up to 19 times a day with the work done by both the reporter and radio editor.

continued on page 168
End your still library woes forever with the new ESP-100 Electronic Still Library.

Now you can produce and store stills instantly using latest generation microcomputer technology. Get a better picture in seconds instead of hours. And save up to $20,000 a year in still production and library overhead costs.

There's a better way than relying on 35 mm slides or graphic cards. The ADDA ESP-100 creates stills reliably, electronically, and stores them permanently. Choose your inputs: VTR, slide, film, graphic card or remote camera feed.

Once the still is captured it's converted to digital impulses and stored in the system's disk memory—untouched by human hands. You retrieve your still in half a second by pushing a button. Select one still, edit several or sequence an entire program automatically. You have up to 400 stills on-line, ready for use. And each disk pack stores 100 images in safe, goof-proof off-line storage.

Think of it. No more costly, time consuming slide production. No more lost or damaged slides. No more slide chain problems. No more embarrassing on-air bloopers. Think of it. Then think of ADDA.

Call or write today for a brochure and specs. We're doing our best to end your video slide library woes. Forever.
1671 Dell Avenue / Campbell, CA 95008 / (408) 379-1500
WTAR news coverage
continued from page 166

Mays adheres to a strict "first in, first out" rule. That is, a new story is carried first either on television or radio depending on which medium has the next scheduled newscast.

WTAR has two daily televised news programs, one at 6 p.m. and another at 11 p.m. Preparation of stories for these shows is only slightly less hectic than radio.

"The reporter is able to take the audiotape he or she prepared for radio and write the television report including cues from that," Mays explains. "This eliminates having to wait for film to be processed. Reporting for both television and radio dovetails very nicely in this respect and in several others."

Mays says that there are obvious differences in radio and television news reporting. For radio, the reporter must emphasize setting more and concentrate on descriptive aspects that are captured on film. But, he points out the key comments from newsmakers provide the "nut" of the story for both television reports and taped radio interviews.

"The reporter audiotapes each interview with newsmakers for radio with a small cassette recorder while the photographer exposes television footage."

"The important thing," he continues, "is hiring people who have worked in one medium or the other. It is relatively easy to teach experienced reporters the requirements of the other medium but difficult to train a neophyte in both from scratch."

The importance of visuals
Mays joined WTAR 10 years ago from the newspaper business. He was both a reporter and a photographer, and so he places a great emphasis on content of words—for radio as well as television—and visuals for the TV screen. Because of the large number of nationally important stories that originate in Hampton Roads, he says that it is essential that new stories be compact but comprehensive. "Good visuals," he says, "are one way of presenting complex stories in an easily understood way."

"For example, we must often explain the city budgets for the seven municipalities we serve," Mays says. "We could display charts showing the figures, but instead, we shoot film of a sewer project and superimpose the costs of that project. This ties the two together."

"The reporter is able to take the audiotape he or she prepared for radio and write the television report including cues from that."

Recently, three cities held city council meetings at the same time. Because six to 10 local stories were going to be used on the half-hour evening news programs, Mays didn't want three of them to focus on city council meetings.

"But these were important discussions," Mays adds. "So, we interviewed the council presidents

continued on page 170

AND NOW,
AWORD ABOUT OVERLOAD,
FROM SENNHEISER'S
MD 421:

NONE:

A lot of musicians are worried about overload these days. And no wonder: special effects, high amplification and combinations of acoustical and electronic instruments all make it more necessary than ever for microphones to be overload-free as well as accurate.

Like our tough MD 421 cardioid dynamic:

In a test beyond what any musical instrument or voice can produce, we used a starter pistol to produce an instantaneous sound-pressure level of 175 dB, which the MD 421 handled with no trace of distortion.

Whatever your application—sound reinforcement, recording or broadcasting—consider our MD 421. Besides freedom from overload, you'll discover its precise cardioid directional, rugged design and wide smooth response give you superb results. Even under difficult conditions:

- The price won't overload you, either.

*Outdoor test with Tektronix scope, set for 10V/division vertical, 0.1 μsec/div horizontal
  22 cal starter's pistol mounted 15 cm from MD 421 measured pressure of 111,000 dynes/cm²
  (175 dB SPL). Smooth, rounded scope trace indicates total lack of distortion.

SENNHEISER
ELECTRONIC CORPORATION
10 West 37th Street, New York 10018 (212) 239-0190
Manufacturing Plant Bissendorf/Hannover, West Germany

For More Details Circle (98) on Reply Card
The world's foremost name in professional mixing consoles

The NEW AM/FM Radio Console
After nearly two years in the making, Neve is introducing model 5402 (CRC), a low profile console primarily designed for radio station applications, on-air and production. Configured with mono and/or stereo channels, mic and/or line inputs, simple plug-in circuit cards also offer facilities for voice-over, echo, foldback and DA outputs. And the price is very attractive starting around $7,500* for a 10 input stereo configured console.

Model 5402

Model 5305 TV Production Console
Designed as a 4 bus 2 main output console, this model is ideal for the small to medium sized TV station for production as well as on-air use. Many optional facilities are available, enabling us to customize a console for your particular application and keep delivery lead times to a minimum. A fully fitted 12 input console with good equalization is priced at $17,950*. This is exceptionally good value in the marketplace.

Custom Designed Consoles
Neve is believed to be the largest producer of sound mixing consoles in the world, employing around 400 dedicated people in two manufacturing plants and four subsidiary sales and service companies. Our consoles are in use in over 50 countries, many in network and station broadcast facilities in Canada and the U.S. We have the capability to design and build any type and size of console to the state of the art, and pride ourselves in keeping delivery promises. Please accept our invitation to discuss your custom console requirement with us.

Multitrack Production Consoles
Through our leading position in the field of music recording, we are able to deliver Broadcast Multitrack Production Consoles with optimum multitrack as well as broadcast facilities. 8, 16 and 24 track consoles are often in stock, and we are eager to please customers by incorporating special facilities on short lead time. 8 track consoles start around $29,000*, 16 track around $38,000*, and 24 track around $66,000*. Check our competition, and you'll be surprised to realize our price competitive position! 
Close cooperation is evident between radio and television news operations at WTAR. Here, the television news producer hands a story list to the radio anchorman. (Photo courtesy of Eastman Kodak)

WTAR news coverage

and various dissident members of council and summed up the actions of all three meetings in three separate stories. Good editing techniques kept the visuals interesting."

Mays believes the ability to add visual highlights and sidebars to breaking stories is often an important difference between radio and television coverage. The added dimension of sight comes at no penalty in maneuverability and flexibility for the reporter. The small CP-16 cameras used by WTAR are lightweight and can be taken anywhere the reporter goes with his recorder.

"Film cameras are the most durable image recording equipment now available," Mays says. "ENG equipment still has considerable amount of catching up to do. We can send a film crew 600 miles and not have to worry about the equipment working. In addition, because of the portability of the camera we work with smaller crews. This is important to a station our size."

The sturdiness of film cameras was pointed out in the spring of 1977 when a tanker split in two off the coast of Virginia. WTAR-TV commissioned a helicopter, flew a news crew to the deck of one half of the stricken ship, and brought back film coverage amidst rocking waves and billowing spume. By filming at 64 frames per second, the crew produced rock-steady, hand-held footage. The film got back to the station at quarter to five, and led off the six o'clock TV news.

WTAR crews use Eastman Ekachrome video film 7239 (daylight) and 7240 (tungsten) which allows them to do much of their work by available light. Each pho-

continued from page 168

continued on page 172

Jamieson No.1 in TV!

Why is the Jamieson Processor No. 1 in TV? The best answer is from someone who owns one. Someone you know owns a Jamieson. Probably a lot of people you know. Why not ask them about it? The best way to get an unbiased appraisal of its performance. Or ask us ... we'll be more than happy to tell you about the Jamieson Processors and give you references.

JAMIESON'S ADVANCED DESIGN TECHNOLOGY FEATURES

- Film advance virtually tension-free. The demand top-overdrive film transport uses no clutches, floating rollers or film sprockets.
- Smaller machines take only half the floor space.
- Solution volumes reduced 15 times over open-tank designs.
- Temperature in primary solutions is controlled to an accuracy of a few hundredths of a degree.
- The elliptical shape of the tube protects the film and provides high induced turbulence.

Please send information on Jamieson Processors and a list of some users.

Name ___________________________ Title ___________________________
Firm ___________________________ Phone ___________________________
Address ___________________________ City ___________________________
State __________________ Zip. __________________ JAMIESON FILM COMPANY
6911 Forest Park Rd. Dallas, TX 75235

For More Details Circle (59) on Reply Card

BROADCAST ENGINEERING
QUAD PANEL REFURBISHING SERVICE

Let Spin Physics prove to you why our hot-pressed ferrite video heads with the 1000 hour warranty are your best buy.

ENGINEERING, FINANCE, OPERATIONS MANAGEMENT.
Everyone gains from the dramatically longer lifespan of Spin Physics hot-pressed ferrite video heads.
Since we entered the quad panel refurbishing field early in 1976, we have experienced consistently growing acceptance from broadcasters and producers at all levels.
We have established Spin Physics as a service-minded supplier of a proven product. We have demonstrated our claims that the Spin Physics manufactured Manganese-Zinc hot-pressed ferrite does provide a superior quad picture and does maintain compatible picture performance, many times well in excess of our 1000 hour non-prorated warranty.

NOW IS THE TIME to find how especially responsive we are to new customers. Contact our Field Engineer who serves your region, listed below, or our San Diego home office.

SPIN PHYSICS, INC.
A KODAK COMPANY
11633 Sorrento Valley Road, San Diego, California 92121
Telephone: 714-453-5410 Cable: SPINEX SANDIEGO TWX: 910-322-1737

EASTERN REGION Gene Long 301-753-6731 NORTHEAST Ben Everett 301-730-6855
SOUTHEAST Knowlton Harrell 404-296-4072 MIDWEST Ray Kundrot 312-325-1009 CENTRAL Leroy Koonsman 214-245-1816
PACIFIC Ken Thompson 415-961-7794 SOUTHWEST Ed Gehle 805-964-3316 NORTHWEST Dave Franssens 916-332-0885
WESTERN EUROPE Bill Kroon, Putten, The Netherlands (03416) 3689 or Telex (844) 47589
For mono, stereo...AM, FM, TV...
ONLY FIDELIPAC® GIVES YOU A CHOICE

MODEL 300
The most popular NAB cartridge...performance and price make it the mono broadcaster's first choice.

MASTER CART
For the modern stereo broadcaster satisfied with nothing less than the ultimate in performance.

MODEL 350
For use in stereo machines with inadequate tape guidance. The precision is provided by adjusting the cartridge.

AND, for extended play...Fidelipac's Models 600 and 1200.
For details, contact your Fidelipac Distributor or

FIDELIPAC®
109 Gaither Drive · Mt. Laurel, NJ 08057 · (609) 235-3511

4, 5, 8, 10-
Mono, Stereo!

LPB has 7 models of audio consoles to suit your individual requirements. Since space won't permit us to list all their features and specifications in this ad, we've prepared a series of data sheets which show why our Signature II Console Series is the practical choice of the discriminating Broadcaster. Call or write today for your copies.

LPB®
LPB Inc.
520 Lincoln Highway, Frazer, PA 19355 · (215) 644-1123

WTAR news coverage
continued from page 170

tographer carries four lights and a battery unit for extreme low-light conditions. Film processing using Process VNF-1 takes around 30 minutes.

Looking ahead
Mays is pleased with the fast processing and says it helps negate part of ENG's current main advantage: getting to look at visuals immediately. He has been hesitant to make a strong commitment to electronic journalism until technology improves. WTAR has several Akai ¼-inch units, which were bought for one purpose: experience.

"We wanted to gain expertise so that we will be ready when, hopefully, digital technology is available four or five years down the line. Until then, only competitive pressures could force us to make a bigger investment in analog gear," he says.

The electronic cameras and recorders are currently used several times a week under controlled situations such as press conferences. Six news photographers use CP 16 cameras.

WTAR produces eight public affairs documentaries a year—many an hour long—and a weekly half-hour program, Newsmakers. The latter is unusual in two aspects: It is presented in prime time and though it originally started out as a studio production, a major segment is now produced on film.

"Newsmakers leads into our 11 p.m. news on Sundays." Mays says. "This is a new time slot for the program, but it had captured about 29% of the viewing audience in its old position."

Newsmakers was a talk show until the idea was hatched of using a film background on the topic of the day as an introduction. "It is a very effective way of presenting facts that can't be covered in the studio," Mays says. The film usually consumes 15 to 22 minutes of the half-hour with the studio portion serving more or less as a wrap-up.

Get out of the studio
"We are getting out in the community, looking at urban renewal, solar energy, health care, and other topics that the man on the street cares about." Mays points out. For example, WTAR visited a man who had complained about the noise from low-flying jet planes. The

continued on page 174
Copper Corrugated, Air Dielectric for High Power — Low Loss Applications, Specifically — FM Broadcasting and AM, VHF/UHF TV Antenna Feeders

This 3½” air dielectric Wellflex consists of a corrugated tubular copper center conductor, unique polyethylene locked vertebrae helix dielectric, copper corrugated outer conductor and black polyethylene jacket. It is remarkably flexible, has excellent mechanical stability and extremely low attenuation.

SPECIFICATIONS:

- Velocity of Propagation: 96%
- Attenuation at 100 MHz: 0.110 dB/100 ft.
- Average Power at 100 MHz: 50.06 kW
- Peak Power: 940 kW

Send for our new 3½” Coax Data Sheet and our complete catalog.

Cablewave Systems Inc.
60 Dodge Avenue, North Haven, Connecticut 06473
203-239-3311 • TWX: 710-465-0244
For More Details Circle (107) on Reply Card
WTAR news coverage
continued from page 172

station showed, on the air, just how bad the problem was.
Another time, a nearby beach was shown as it is today and as it was many years ago. Then through studio discussion, a picture was developed on how the same area could look with community involvement.
"That was a lot more effective than having an urban renewal spokesperson sit in a chair and tell us all the wonderful things that could be happening. We showed, rather than told," Mays says.

Photographers edit their own film to insure that the person who knows the most about that particular footage does the final assembling. (Photo courtesy of Eastman Kodak)

The background function of News-makers is so important that the show's producer is finding increasing use for WTAR's morgue of black-and-white film and stills. "He mines these," he says, "like a treasure trove of past information."
Mays feels the program epitomizes efficient use of personnel. A producer-reporter and photographer shoot film on Wednesdays. The story is scripted and edited Thursdays, and on Friday evenings the studio portion is taped and interwoven with the film footage.
"It may seem like a hectic schedule, but actually, our news photographers enjoy the assignment. It gives them more time to experiment with angles and editing than they usually have," Mays says.

The documentary Each photographer also works about once a year on a docu-
continued on page 176

For Tape Heads Head for TABER

At Taber you get precision work, quality results and low price... unmatched by any other audio head manufacturer.

We will recondition your three head assembly... F/T $45.00... 2 TRK $60.00. Three new 2 TRK heads installed and aligned in your AG-440B for $264.00... Scully 280 at $270.00.

Ampex TRK audio is priced at only $38.50 for four new heads installed, or $110.00 for four reconditioned heads. (Add $38.50 if monitor post needs lapping.) RCA VTR audio heads are available for only $475.00.

Loaner assemblies are available.

For heads, head for Taber... the best source available.

Send for free brochure.

TABER Manufacturing & Engineering Company
2081 Edison Ave., San Leandro, Ca. 94577, (415) 635-3831

For More Details Circle (108) on Reply Card

Photographers edit their own film to insure that the person who knows the most about that particular footage does the final assembling. (Photo courtesy of Eastman Kodak)

The background function of News-makers is so important that the show's producer is finding increasing use for WTAR's morgue of black-and-white film and stills. "He mines these," he says, "like a treasure trove of past information."

Mays feels the program epitomizes efficient use of personnel. A producer-reporter and photographer shoot film on Wednesdays. The story is scripted and edited Thursdays, and on Friday evenings the studio portion is taped and interwoven with the film footage.

"It may seem like a hectic schedule, but actually, our news photographers enjoy the assignment. It gives them more time to experiment with angles and editing than they usually have," Mays says.

The documentary Each photographer also works about once a year on a docu-
continued on page 176

For Tape Heads Head for TABER

At Taber you get precision work, quality results and low price... unmatched by any other audio head manufacturer.

We will recondition your three head assembly... F/T $45.00... 2 TRK $60.00. Three new 2 TRK heads installed and aligned in your AG-440B for $264.00... Scully 280 at $270.00.

Ampex TRK audio is priced at only $38.50 for four new heads installed, or $110.00 for four reconditioned heads. (Add $38.50 if monitor post needs lapping.) RCA VTR audio heads are available for only $475.00.

Loaner assemblies are available.

For heads, head for Taber... the best source available.

Send for free brochure.

TABER Manufacturing & Engineering Company
2081 Edison Ave., San Leandro, Ca. 94577, (415) 635-3831

For More Details Circle (108) on Reply Card

COULD BE A RECORD!

It's 3 watts, six pounds and very portable. Report in first with the new McMartin RPU-1103, a self-contained 150 MHz battery-operated, remote pick-up transmitter. It exceeds all the latest F.C.C. requirements. The RPU-1103 has dual frequency operation and an audio compressor that functions on both line (portable cassettes, etc.) and microphone inputs to allow simple talk over operation. This ENG machine is the latest addition to the McMartin broadcast line.

MCMARTIN

4500 South 76th St • Omaha, Nebraska 68127 · (402) 331-2000 Telex 484485

For More Details Circle (109) on Reply Card
SWITCHING EXPERIENCE

What... DYNAIR'S 20 years does for you!

EXPERIENCE — Who needs an experienced supplier with electronic technology moving as fast as it does? You do! Here are a few reasons.

CONTROL — We've supplied most types of control systems, from mechanical pushbuttons to computers. This experience helps you select the most cost effective combination for your application.

HARDWARE — We've switched almost everything from DC through 80 MHz: audio, video, data, microwave IF, and control. On navy ships to broadcast stations we've experienced the specifications on our catalog sheets and know why they are all there. We've got the mechanical packages to hold the latest in circuitry and can solve your specific application problem quickly.

PEOPLEWARE — Our president started DYNAIR; many key people have been here over ten years. Our experience is more than documented... it's remembered! Because we have "been there before" we are able to assist our customers in major expansions of ten-year-old systems, meeting today's needs.

Write us. We'll send you a book on switching techniques and a story on a DYNAIR switcher with over 360 inputs and 800 outputs. It might lead to a long time friendship.

U. S. Government buyers, please ask us to include our GSA price list.

DYNAIR ELECTRONICS, INC.
5275 MARKET STREET, SAN DIEGO, CA. 92114
TEL.: (714) 263-7711 TWX.: (9101) 335-2040
See us at SMPTE, Oct. 16-21, Booth No. 28
For More Details Circle (100) on Reply Card
WTAR news coverage continued from page 174

WTAR has a successful series running under the title Winds of Change.

"Our working theme is that change is not necessarily bad, but things will change just the same. These are the things that are changing in your area, and here is how they will affect you, our viewers," Mays says.

Frequently, Winds of Change's investigative efforts uncover a whole chain of impending incidents.

"When we looked at medical malpractice, we found that it was just one symptom in a whole series of changes in the health care field— one that was going to affect how we all deal with our doctors," Mays says. "We titled it 'Malpractice-Symptom One,' and looked at some of the other symptoms of change—such as the use of nurse-practitioners instead of doctors for basic health care, changes in family practice and so on."

"Good visuals are one way of presenting complex stories in an easily understood way," reports Mays.

In another in the series, WTAR found that offshore oil well drilling was coming to Virginia. Mays dispatched a crew to the Gulf Coast where offshore drilling has been under way for some time. The resulting documentary gave local viewers an idea of what happens to an area—good and bad—when offshore drilling begins.

The challenge for quality

All these film stories were produced with maximum image quality in mind. One thing Mays insists on is that each photographer edit his or her own film.

"After all, he or she is the one who knows the most about what is on that reel," Mays says. "The photographer won't get lazy if he or she has to edit the material brought back."

"It is difficult boiling down some of these complex issues into a one-minute news story," Mays says. "With so many municipalities, we find ourselves flooded with city-government stories competing with the military news events that spring up both here and in Washington. But it certainly is a challenge to all of us."
Whether you're investing in new cameras or updating the ones you have, it pays to talk to Canon. As an optics manufacturer who deals with all the top camera suppliers, we can put a lot of information at your disposal. As well as some helpful objective advice. Because we've no axe to grind... and the better you look, sooner or later the better we'll look to you.

When your problems have optical solutions, we can offer you the most comprehensive lens line in the business. Compatible with Ampex, Fernseh, Harris, Hitachi-Shibaden, Ikegami, Panasonic, Philips, RCA, Sony, Thomson-CSF... and just about anyone else you can name. In any standard professional format.

We can give you more flexibility, too. With the largest choice of focal lengths. Wider wide-angle shots. Tighter telephoto angles. Shorter MOD's. Larger relative apertures. More compact size. And often, more 'compact' price. In full servo or manual, for ENG/EJ, studio or field. Backed by comprehensive factory service.

Whatever your needs, before you make a move, make a phone call to Canon. It's a small price to pay for peace of mind.
More Value to Ampex Quad Users!

Quad Refurbishing
VMI's craftsmanship guarantees you the highest quality refurbished quad video head at the lowest price available. VMI's specific technology and experience surpass any other refurher.

Special Conversions
I. MK-X ball bearing to air bearing—$200.00 above normal refurbish cost.
II. Axial transformer to radial transformer—$250.00.

Tech Updates
VMI incorporates 26 basic improvements to the standard MK-X under our first time refurbish cost of $895.00 (future refurbishing of the same head—$825.00).

Every head sent to VMI receives all factory updates the first time in. To have the best performing Ampex quad heads on your machines, send them to us where you will get all the above extra value plus the lowest price.

155 San Lazaro Avenue - Sunnyvale, CA 94086 (408) 737-8300

For More Details Circle (111) on Reply Card

people in the news

Recently elected to the board of directors of Telecommunications Technology, Inc., Vernon R. Anderson brings more than 24 years of professional telephony, electronics and mechanical engineering experience to his new position. Jack M. Ducart, formerly with Moseley Associates, has joined Ramko Research as general sales and marketing manager. Leon A. Wortman, new marketing manager at Otari Corporation, will be responsible for overall management of sales and marketing efforts in the U.S. and Mexico, as well as new product and long-range planning...

Keith Y. Reynolds is the new marketing manager at Unimedia Corporation. Pat Bohana has been appointed western regional representative for Scientific-Atlanta...Following the resignation of William H. Butler as president of Commercial Electronics, Inc. (CEI), the board of directors elected William R. Riester and Alan K. Jensen executive vice presidents. Butler continues as a member of the board...

Central Dynamics Corp. announces the appointment of Buddy Naeyaert as vice president of marketing. Howard Shephard, vice president of product planning, and Vince Lyons, western regional manager...Arnold Taylor moves from senior product manager to national sales manager for Ampex Corporation's audio-visual systems division...

A. H. Bott joins Broadcast Electronics, Inc. as vice president, engineering...Herman D. Post, president of Robins Broadcast & Sound Equipment Corporation, announces the appointment of Steven N. Friedman as vice president of the professional products division...As religious broadcasting sales specialist for CCA Electronics Corp., Bill Kitchen will maintain close liaison with religious broadcasters both in engineering and sales capacities...

Patricia A. Rooney has been promoted to sales coordinator for the cable communications division of Scientific-Atlanta, Inc. The new director of communication product sales for Time and Frequency Technology is Robert W. Cochran, it has been announced by Joe Wu, president...Richard Pass, president of Pass Associates, will be directing sales in Eastern Pennsylvania, Delaware and Southern New Jersey for Robins Broadcast & Sound Equipment Corporation...Neville H. "Doc" Bennett moves from director of program management to acting engineering administrator for TeleMation, Inc....

John Woods has been named vice president, engineering, for Galal, a division of United Scientific Corporation...Donald Dworkin, formerly with Manhattan Cable TV, joins Warner Cable Corp. as manager of cable TV engineering...John K. Major is the new general manager of WONO(FM), Syracuse, New
York...Jerry Bridges moves from chief financial officer to executive vice president at Taft Broadcasting Corp....Radford Associates announces the appointment of Ralph L. Hucaby, former vice president and director of engineering of television station WTVF in Nashville, as an associate of the firm...

Fred Layn, appointed to the newly created position of eastern regional manager for Studer Revox America, Inc., will handle both sales and service on the Studer line of professional studio recording equipment. James M. Keane has been promoted to vice president, engineering, for Systems Resources Corporation....The board of governors of the International Telecommunications Satellite Organization (INTELSAT) has elected José Martinez-Villarejo of Spain chairman and Marcel Perras of Canada vice chairman....John J. Sie becomes vice president, marketing and affiliates, for SHOWTIME. Viacom’s pay-cable subsidiary...Brigadier General Harold R. Johnson, USAF (Ret.) has joined American Satellite Corporation as vice president for marketing....The appointment of David Orienti as CCA Electronic Corp.’s area manager for Michigan, Indiana and Ohio has been announced by Arthur Silver, vice president-sales...

Paul P. Hoppe, Jr., is the new vice president of engineering for Switchcraft, Inc....New buyer for Radio Shack. Garrett B. Burkhart, will be responsible for the primary purchasing of electronic parts and components, alarm systems, wire and cable. North American Media Company has elected Jack O. Koonce as president....David DiManna has joined the staff of TPC Communications in Pittsburgh as a staff director....Tom E. Paro becomes executive vice president of the Association of Maximum Service Telemasters....John T. Shafer moves from Foto-Kem Industries to Deluxe Laboratories, where he assumes duties in the marketing department....Maurice P. Talbot, Jr. has been named legal assistant to FCC Commissioner Margita E. White....As manager of sales for Studer Revox America, Inc., James Woodworth will be continued on page 180
people
in the news

continued from page 179

Responsible for domestic sales of Studer’s Revox line of tape recorders, tuners, amplifiers and other consumer audio products...N. H. Bennett, new customer service manager at TeleMation, Inc., was formerly service operations manager for Beehive International...

Linda Feldman, a sound engineer who has been involved in equipment testing and consumer education at TEAC Corp. of America, has been named manager of the company’s training department...KVC, Inc. has established an international division headed by Sidney C. (Chuck) Sterchele, former president of Global Television Associates...New director of technical services at KVC, Inc. is Joseph F. "Chip" Chiappalone...

The promotion of Bud Yankowski to manager of engineering has been announced by Edward M. Mullin, president of Ampro Broadcasting...The board of directors of Penril Corp. has elected Paul Keane vice president, Joseph Gregory corporate secretary, and Gloria Ehrlich assistant corporate secretary...Justin Camerlengo moves from manager of public relations to public relations director at Panasonic...

Ray Mattinson, chief engineer and account executive at KAPX Radio, San Clemente, Calif., passed away August 2 following a stroke. Mattinson had spent several decades in the field of broadcast engineering prior to coming to KAPX. He was with KOGO Radio in San Diego and KERO TV in Bakersfield, and was chief engineer at KAPX since September 1975. His friendly manner and courageous spirit following the recent discovery of extensive internal cancer will be sorely missed by his friends both at KAPX and in the San Clemente community. He is survived by his wife Lillian of San Juan Capistrano, and four children.

Len Hensel, vice president and general manager, WSM, Nashville, has been elected chairman of the radio board of directors of the National Association of Broadcasters, as Kathryn F. Borman, president, Springfield (Mass.) Television Broadcasting Co., becomes chairwoman of NAB’s television board of directors...New chairman of the 45-member board of directors of the NAB is Donald A. Thurston, president of Berkshire Broadcasting Co., North Adams, Mass.

Richard Estell, general manager of Michigan State University’s public radio stations, WKAR AM and FM, has been elected president of the Public Broadcaster’s Organization of Michigan (PBOM)...Raymond Telesky, recently appointed director of quality control and reliability engineering for computer products at the Computer Products Group, will be responsible for maintaining high standards of quality control...Leo Mahan is the new assistant manager, product planning and national manager for product training, for the video products division of Sony Corporation of America...

Lynn Ronan becomes assistant manager of video administration at Sony...

continued on page 182
The new CEI-310. Is it really that good?

A lot of people who saw our new broadcast quality field production camera at NAB could hardly believe it. They asked us a lot of incredulous questions.

Is it really that small? That portable? Is it really making those incredibly good pictures we’re seeing on the monitors? Even at those outrageously low light levels? Is the resolution actually as good as it looks?

Does it really require only one lightweight cable out to the electronics unit—for video and broadcast quality audio? Up to 400 feet? And up to 2500 feet with a systems integration unit?

Is it really that automatic? Does it really have full signal processing? Does it really accept different tube types—2/3 inch Saticon or Plumbicon?

Can it really operate from battery belt? Battery pack? Any 12-volt DC source? Or normal AC power?

Is it really totally modular? Can it truly be reconfigured in minutes to a full-fledged studio camera—self-contained or system—with a big 8-inch viewfinder?

The answer to all these questions, of course, is yes. Now ask yourself this question. Shall I play it safe with a big name like Philips or RCA or Fernseh? Or shall I show a little initiative and take a look at this new CEI camera everybody’s talking about?

Just give us the chance to show you. Call your local CEI representative now. Or get in touch with us directly at 880 Maude Avenue, Mountain View, California 94043, (415) 969-1910.

TAKE A NEW LOOK

It's really that good!

CEI
THE WILKINSON
AM2500B 2.5 KW AM BROADCAST TRANSMITTER

FEATURES
- Solid State Modulator Driver
- Solid State Exciter
- Only One Tube Type - 4A4-1000A
- Variable Vacuum Capacitor Tuning
- Motorized Variable Capacitor Loading
- Low Distortion, High Level Modulation
- Accessible Drawer Construction
- Solid State Timing Circuits
- Self-Testing Silicon Power Supplies
- Automatic Recycle
- Simplified PA Tuning - Only two controls
- Double Duty Plate & Modulation Transformers
- Pretuned at Customer's Frequency
- Power Cutback (optional)
- Designed for Remote Control
- Ample, Roomy Cabinet for Ease of Service
- Completely Metered
- Uses Standard Parts with Original Maker Numbers

WILKINSON ELECTRONICS, INC.
P.O. BOX 736, TRAINER, PA. 19013
TELEPHONE (215) 497-5100

For More Details Circle (135) on Reply Card

people
in the news

continued from page 180

Preston Weber moves from product marketing manager for data acquisition system products to national sales manager at the data tech division of Perkin Corp. Michael Marcovsky has been named general manager of Columbus, Ohio programming for the QUBE division of Warner Cable Corporation. As sales manager, photo tubes. David Farrar will be responsible for the marketing function of English Electric Valve Company's photo tubes worldwide.

MARCOVSKY RAY HORN

Don Rhodes, national sales manager for TeleMotion, Inc., has announced the appointment of James Kubit as field sales engineer for the western region. Paul C. Gordon is the new president of Federal Electric Corporation. John Semenuk, who has been with GTE Sylvania since 1957, was recently appointed materials manager for the parts division.

Two weeks after rejoining National Semiconductor Corp. as technical director, Pierre Lumond was elected to vice president. Carroll B. Ray, Jr. will handle corporate development for Radio Shack. Harvey Schoin, who has been president and chief executive officer at Sony Corp. of America for the past five years, has been promoted to chairman of the board. He will continue as the company's chief executive officer.

Setsutaro Kobayashi, chairman of the board, Fuji Photo Film Co., Ltd., Japan and president of Fuji Photo Film USA, Inc., died August 12, 1977 (Tokyo time). He was 77 years of age. Kobayashi joined the company in 1934 and served in a variety of sales and executive positions. In 1937 he was named a director of the board of Fuji and in 1943 became executive managing director. He was promoted to executive vice president in 1958 and president in 1960.

Warner Cable Corp., a subsidiary of Warner Communications Inc., has announced the appointment of four executives in its QUBE division, set up to introduce the company's new two-way communication service to the Columbus, Ohio area. Vice president of marketing, J. Ronald Castell, joins Warner Cable from WBNS radio and TV in Columbus, where he was in charge of marketing; vice president of operations is James L. Fischer, who will direct overall technical operations; Dr. Vivian Horner, vice president of educational and children's programming, was formerly the director of research for The Electric Company, a production of Children's Television Workshop; and Harlan P. Kleiman, vice president of premium programming, pioneered the first specials in the cable TV industry.
DELTA ELECTRONICS

OIB-3 OPERATING IMPEDANCE BRIDGE — The new OIB-3 features direct reading of ‘R’ to 1000 Ohms and ‘X’ to 900 Ohms. The OIB-3 also contains an integral rf amplifier.

AMC-1 AMPLITUDE MODULATION CONTROLLER — Provides automatic control of the modulation levels of an AM broadcast transmitter.

APC-1 AUTOMATIC POWER CONTROLLER — Provides automatic control of the antenna current of an AM broadcast transmitter.

TCA-N-EX AND TCA-N-EXR SERIES RF AMMETERS — Equipped with output provisions for direct attachment of remote reading meters. Complies fully with new FCC regulations for remote metering.

AAM-1 ANALOG ANTENNA MONITOR — FCC type approved. Provides accurate true ratio and phase readings. Easy to interface with existing control systems. AAMH-1 provides hardwired remote control of AAM-1.

DAM-1 DIGITAL ANTENNA MONITOR — FCC type approved. Provides digital readout of amplitude, ratio and phase. Also available: DAMA-1 Base Current Adapter for remote digital readout of antenna base currents; DAMX-1 to extend capacity of DAM-1 up to 12 towers.

TMCS-1 TRANSMITTER/ANTENNA REMOTE CONTROL SYSTEM — Provides digital readout and control of the DAM-1 and transmitter over a single voice channel. Other systems available: DAMR-1/DAML-1 for digital readout and control of the DAM-1 only; DAMH-1 for use where the remote control point is close enough to the monitor to permit hardwired inter-connection.

OIB-1 OPERATING IMPEDANCE BRIDGE — For antenna system measurements under transmitter power. May also be used as a conventional bridge.

RG-1B RECEIVER/GENERATOR — Two-watt signal generator with a tracking detector. Built-in rechargeable battery power supply for full portability in making low power impedance measurements. For use with OIB-1 or other RF bridges.

CPB-1 COMMON POINT IMPEDANCE BRIDGE — Monitors common point impedance continuously. Designed for permanent installation.

TCT-( ) TOROIDAL CURRENT TRANSFORMER — Provides accurate, stable R.F. samples for phase and amplitude measurements. Available in three sensitivities. Also available: TCTR-1 Compensated Rectifier Circuit to provide DC voltage for remote current measurement when used with TCT-( ).

MJ-50 METER JACK — A make-before-break in line jack assembly that permits “hot” insertion of OIB-1 Bridge or Ammeters.

DELTA ELECTRONICS
5634 PORT ROYAL ROAD
SPRINGFIELD, VIRGINIA 22151
TELEPHONE: 703/321-9845  TWX: 710-831-0620

For More Details Circle (112) on Reply Card

www.americanradiohistory.com
Spurious emissions proposal faces opposition from NAB

Compliance with the FCC's proposal to limit spurious emissions from high-power broadcast transmitters to -90 dB would impose unjustified hardships upon licensees, according to the NAB. The NAB urged that the present tolerance be maintained.

Spurious emissions are those outside authorized channels and the FCC has proposed the new tolerance for submission to the 1979 World Administrative Radio Conference.

The NAB said there is no evidence that nations meeting the present international standard are causing widespread interference across their borders.

The NAB stated that the suggested suppression levels may be beyond practicality because the measurement could be made under ideal conditions such as during the manufacturing process, but would be difficult if not impossible under actual field conditions.

The majority of high-power broadcast transmitters have a normal life span of approximately 20 to 25 years, according to the NAB. Those now in operation unable to meet the new emission requirements by the mandatory compliance date in 1982 would have to be replaced or substantially modified even though their electronic life span was not finished.

First-class FCC licensing course being offered

Designed to prepare students for a career in the communications industry, "Radiotelephone Electronics: 1st Class Licensing Preparation" will be offered September 26 through spring 1978 at the New School for Social Research in New York City.

The 300-hour course covers several diverse areas of electronics and radio-frequency theory, developing basic skills at each level, culminating in the 1st- and 2nd-class exams. The student receives 19 undergraduate credits at the completion of the course.

Some of the topics covered in the program are: the structure of matter, conduction; DC-circuit analysis; batteries; induction; generators; motors; transformers; AC-circuit analysis; resonant circuits; vacuum-tube, gas-tube, solid-state rectification; filter networks; AF and RF amplifiers, multipliers, oscillators; AM and FM modulation, transmission and reception; antenna theory; transmission-line theory; microwave; FCC regulations; television transmission; directional-antenna theory; and op-amp circuits.

The final sessions of the course will feature visits to actual studios for transmitter and student orientation. Resources are available for individual instructional assistance.

Due to the extensive technical material a student must grasp, the course requires a two-semester commitment and intensive study.
We asked broadcasters all over the country what they wanted most in an audio control system. They told us and we built it. We call it BASIC.

Everybody wants a system that talks English ... not computerese. BASIC will find the next station ID if you ask it to "find the next station ID" just like that. You can insert your programming commands in broadcast language phrases.

Everybody wants a system that will perform all important functions (not everyone agreed on what was important and what wasn't). Nevertheless, BASIC performs all of the functions all IGM systems ever have ... and more.

Everybody wants a system that handles thousands of events. BASIC A employs RAM (Random Access Memory) to store 4000 events, expandable to 8000 in 2000 increments. BASIC B employs "floppy discs" to store eight days of up to 6000 events each day plus 8000 events common to all days.

Everybody said "those big systems cost too much. Produce one that we all can afford." So we did. We call it BASIC ... and it's the finest thing IGM ever did.

See Basic at NRBA BOOTH 119-120

For More Details Circle (115) on Reply Card
Developed originally for Network ENG

... over 170 delivered
Sony KV5100 5” color receiver/monitor
- Protective isolation between video/audio input and set
- AC/12v DC or external battery (88.50 option)

Pleasantville Labs
P.O. Box 15068
Baltimore, MD 21208
202/223-3749

For More Details Circle (116) on Reply Card

industry news continued from page 184

FCC modifies equal time recommendations to Congress

The FCC has voted against recommending that Congress consider an exemption to Section 315 of the political equal-time laws which would apply only to candidates demonstrating substantial support among the electorate. The exemption would apply if they polled 2% of the vote in the last general election or received support by petition from 1% of the electorate.

This modifies the FCC's May 4 recommendations to Congress: exempting Presidential and Vice Presidential candidates from the equal-time opportunities of Section 315: that a "major candidates test" be applied to other partisan races; and review of Section 399 and Section 312(a) (7) with respect to noncommercial broadcast stations.

The recommendations to exempt Presidential and Vice Presidential candidates and to review the public broadcasting sections were upheld.

Under current law, every use of a broadcast station by a candidate triggers an obligation to provide equal time unless the candidate is presented on an exempt newscast, news interview, documentary or in on-the-spot coverage of a bona fide news event.

continued on page 188

The New Reverb Price/Performance Leader:

Introducing the new dual channel Orban/Parasound Spring Reverb. The new 111B retains all of the electrical features of its popular single channel predecessor and augments them with a new bass control and "quasi-parametric" midrange control. The new midrange equalizer permits stepless adjustment of its ±12 dB equalization range, as well as continuously variable center-frequency and bandwidth. This equalization flexibility is unparalleled in the low-cost reverb field and effectively complements the simple equalizers usually found on low-cost mixers and consoles.

Included in the new package is our unique "floating threshold limiter" which minimizes "spring twang" and provides absolute protection from overload. And our highly-respected electronics provides a bright, super-clean sound with the best signal-to-noise in the spring reverb field. Most remarkably, the two-channel 111B costs exactly as much as our single channel model. The only thing you give up is the flexibility of our dual-chasis construction—now the spring is mounted with the electronics.

At $695 for two channels, the 111B provides the quality alternative to the cheaper, consumer-quality reverb already on the market. With industrial-quality construction, line-level balanced outputs, compact size, and smooth, four-spring (per channel) sound, the 111B is the ideal choice for the user with space and/or budget limitations. And as always, you can count on Orban/Parasound's reliability and prompt service.

For more information on the new 111B, see your local Orban/Parasound distributor, or contact

orban/parasound
680 Beach St., San Francisco, CA. 94109 (415) 673-4544

For More Details Circle (117) on Reply Card

BROADCAST ENGINEERING
GREAT MOMENTS IN DIGITAL VIDEO HISTORY.

THE FIRST TRULY MODULAR TIME BASE CORRECTOR IS DEVELOPED

AND MICRO CONSULTANTS IS THERE WITH THE QUANTEL DTC 300.

The same people who brought you the world’s most advanced digital framestore synchronizer now bring you the world’s most advanced digital time base corrector—the new DTC 300. The DTC is advanced not only in its performance specifications, but also in its modularity. Now, for the first time in digital video history, you can buy a top-of-the line time base corrector at an attractive price, and broaden its capabilities as your needs broaden. True modularity means that upgrading is simply plugging in new boards. That’s all there is to it.

The basic unit handles a variety of VTR’s—helical, segmented field, etc. With plug-in options, you can also handle heterodyne and non-capstan servo units. In short, any VTR.

Additional plug-in options are drop-out compensator, look-ahead velocity compensator, sync generator output driver, and jittered subcarrier output to convert heterodyne VTR’s to direct color VTR’s. They take minutes to install.

With products like the DTC 300, Micro Consultants is creating great moments in digital video history. Shouldn’t you be creating your own? Make a start. Call your local Micro Consultants representative. Or write us at P.O. Box 10057, Palo Alto, California 94303.
Section 312(a) (7) permits the FCC to revoke any station license or construction permit for willful or repeated failure to allow reasonable access to or to permit purchase of reasonable amounts of broadcast time by a legally qualified candidate for federal office. Section 399 prohibits a noncommercial educational broadcast station from engaging in editorializing, supporting or opposing any candidate for political office.

**PMPEA aids recovery of lost or stolen equipment**

Notification of lost or stolen equipment can be sent to the Professional Motion Picture Equipment Association. The PMPEA circulates the information to the repair and used equipment departments of its 50 members, including manufacturers and dealers of professional motion picture equipment throughout the U.S. and Canada.

Should any loss of this nature occur, forward a list of the equipment, with serial numbers and other pertinent data to: Lee A. Duncan, PMPEA Secretary-Treasurer, c/o Victor Duncan, Inc., 2659 Fondren Drive, Dallas, TX 75206.

---

**Meet the MILLION DOLLAR Success Story: the SMC DP-2 Digital Programmer**

We've sold over one million dollars of DP-2 automation so far in 1977. And that's a success story we want you to investigate. Because the DP-2 is the finest microprocessor automation system available today — out-performing the human functions of action and decision-making. To discover how the DP-2 can work for your station, call:

Southeast: Joe Toher, Box 4468
Columbia, SC (803) 788-5683

Central: Bob Pepke, 805 Yule Lane
Highland Park, IL (312) 433-1253

Southwest: Pete Charlton,
491 Elbow Ct.
Weatherford, TX (817) 441-8052

National & Foreign Sales:
Stephen S. Sampson,
1005 W. Washington St.
Bloomington, IL (309) 829-6373

World's largest maker
of automated broadcast equipment

With over 30 years of quality products and service to the broadcast industry.

SONO-MAG CORPORATION
1005 W. Washington Street
Bloomington, IL 61701 (309) 829-6373

Send me more information:
Name _______________________
Address _____________________
City ____________________________
State ______ Zip __________

BROADCAST ENGINEERING
New Orleans Moves Up To OPTIMOD-FM!

In New Orleans the FM dial is dominated by the cleaner, brighter, louder sound of OPTIMOD-FM. Eight out of nine FM's licensed to New Orleans have purchased OPTIMOD-FM. Like hundreds of other broadcasters, they recognize OPTIMOD-FM as the easy-to-install, cost-effective breakthrough to better FM audio.

Call us toll-free (800)227-4068. In California (415) 441-0666, and we'll tell you how to move up to OPTIMOD-FM and put its unique advantages to work for your station.

See us at NRBA NEW ORLEANS (Booths 15 and 16) October 9-12 and listen to OPTIMOD-FM.
Changes proposed in radio operator licensing

Persons holding a restricted radiotelephone operator permit may be authorized to operate AM and FM stations if the FCC passes a proposed rules amendment. No examination is required to obtain the permit as opposed to the currently required limited radiotelephone operator permit.

Other changes being considered are:
- A dual-license structure: one series for the routine operation, and one for the technical operation and maintenance of the various classes of radio stations and for the retitling of licenses;
- A new class of operator license for the operation of television broadcast transmitters;
- A strengthening of the current rules regarding operator responsibility by adding requirements that the licensed operator or technician responsible for the maintenance of a transmitter will: (1) ascertain that the station is authorized by the Commission, (2) make no modifications to the transmitter that would void FCC type-acceptance or type-approval, and (3) be responsible for making the required entries in the station records;
- A new requirement that the technician responsible for maintenance, upon completion of his duties, enter a signed statement in the station record that the continued on page 192
Maximum Signal Performance
In Harris’ FM Transmitters
with the MS-15 Exciter...
for the Sound of the Century!

There's no doubt about it, your listeners will hear the difference with the new Harris 'K' line of FM transmitters featuring the MS-15 solid-state exciter, employing Digitally Synthesized Modulation (DSM)* and overshoot compensation. These advanced design techniques offer higher stereo separation, and increased loudness with no degradation of audio quality. DSM affords the ultimate in stereo and SCA performance, with 40 dB or better separation, 30 Hz through 15 kHz. Modulation of the 19 kHz pilot and crosstalk into the subchannel are eliminated with this technique.

The new Dynamic Transient Response filter (DTR) allows no greater than 2° overshoot. Thus, a 2 to 6 dB increase in loudness can be achieved while maintaining excellent transient response, high stereo separation, low crosstalk and low intermodulation distortion.

For the clearest, loudest sound around, write for information on the new Harris FM transmitters with the MS-15 exciter to: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

* Patent applied for

For More Details Circle (118) on Reply Card
industry news continued from page 190

station is operating in compliance with FCC rules and authorization; if the station is in noncompliance, the technician would be required to give the particulars and additionally to notify the licensee in writing:

- A simplified examination for the limited radiotelephone operator permit by combining two examination elements into one.

New FCC office opens

A new FCC field office in Pittsburgh is charged with investigating violations of federal laws and regulations concerning radio communication. It will be staffed with three persons to meet the needs of the growing number of users of radio communications within approximately 200 miles of Pittsburgh.

Since the technical staff will be performing tasks away from the office most of the time, answers to questions frequently asked about radio operator examination schedules, citizens radio license issuance, television interference, etc., will be provided by a recorded telephone message, (412)823-3553. Call (412) 823-3380 for other communications.

Wolfe P. Huber will be engineer in charge. The mailing address is Federal Communications Commission, William Penn Highway, Monroeville, PA 15146.
What's new? micro-Q
A memory lighting control system complete with 2 scene preset capability.

Strand Century's new Micro-Q is economical, compact, portable and designed to grow with you. You can buy Micro-Q with memory or, if your budget doesn't allow for it now, install the memory later by plugging it in. All it takes is a screwdriver. Micro-Q — the new modular 2 scene preset system with Independent Master, Grand Master and split dipless Crossfader, with a 200 preset memory, microprocessor controlled. Micro-Q offers timed crossfades, cue insert, preview and submastering. For your newscasts, commercials or more sophisticated production, be creative with your lighting — memorize it the Micro-Q way. Ask for your new Micro-Q brochure.

Strand Century leads in memory lighting control systems for the broadcast industry. At Strand Century we speak your language.
**news briefs**

TeleMation reports first half profit
Recovering from a first half loss in 1976 of $536,000, TeleMation, Inc., has reported a first half profit in 1977 of $213,000, or 21 cents per share, on revenues of $4,709,000. For the quarter ending June 30, 1977 TeleMation reported a net profit of $213,000, or 21 cents per share, compared to loss for the same three-month period in 1976 of $134,000, or 30 cents per share. W. Paul Warnock, president, attributed the return to profitability to the improved performance of the hardware portion of the company's business.

Dynatech creates new division
Dynatech Corporation has separated the data division from the laboratory products division. In order to provide a name more closely identified with its primary area of business, the new division has been named Dynatech Data Systems.

Maintenance training seminar slated
Cinema Products Corp. will hold its two-day "CP Maintenance Training Seminar" October 14-15, just prior to the opening of the SMPTE 119th Conference & Equipment Exhibit. The seminar will feature sessions conducted by representatives from several equipment manufacturers who will report on current practices continued on page 196

---

**Two top-of-the-line broadcast switchers from**

**ComTEC**

From the company with 8 complete lines of routing switchers.

**20X**

- 5 level (video, 2 audio, 2 aux.) matrix
- Or 3 level (video, audio, aux.) matrix
- 20 x 10 or 20 x 20 Mainframes
- Each channel separately programmable
- Vertical interval switching (optional)
- Complete control flexibility
- Breakaway audio (optional)
- Emergency and back-up supplies available
- Unlimited Expansion

**40X**

- 3 level matrix
- 40 x 20 or 40 x 10 Mainframes
- Any size matrix
- Separate microprocessor controlling every channel
- 10 x 1 crosspoint modules
- Breakaway audio (optional)
- Vertical interval switching
- Emergency and back-up supplies available
- Unlimited Expansion

Communications Technology, Inc. 3070 Leeman Ferry Rd. Huntsville, Alabama 35801 Tel. 883-7370

For More Details Circle (182) on Reply Card
Better stereo records are the result of better playback pick-ups

Enter the New Professional Calibration Standard, Stanton's 881S

The recording engineer can only produce a product as good as his ability to analyze it. Such analysis is best accomplished through the use of a playback pick-up. Hence, better records are the result of better playback pick-up. Naturally, a calibrated pick-up is essential.

There is an additional dimension to Stanton's new Professional Calibration Standard cartridges. They are designed for maximum record protection. This requires a brand new tip shape, the Stereohedron®, which was developed for not only better sound characteristics but also the gentlest possible treatment of the record groove. This cartridge possesses a revolutionary new magnet made of an exotic rare earth compound which, because of its enormous power, is far smaller than ordinary magnets.

Stanton guarantees each 881S to meet the specifications within exacting limits. The most meaningful warranty possible, individual calibration test results, come packed with each unit.

Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the STANTON 881S.

For further information write to Stanton Magnetics, Terminal Drive, Plainview, New York 11803

For More Details Circle (142) on Reply Card
The Optek 7400C Automatic Bulk Tape Degausser

- Most powerful—degausses 3/4" cassettes
- Fully automatic
- Selectable flux pattern
- Rugged—built for broadcasters
- Adapters for ACR25/TCR100 and 3/4" cassettes

Price $2,695.00

OPTEK
5526 E. La Palma Ave.
Anaheim, CA 92807 (714) 528-2321

For More Details Circle (143) on Reply Card

news
briefs

continued from page 194

and the latest developments in their field. These include: John Norris, Eastman Kodak Co., who will present Kodak's new, fast film stock, VNF 7250; Bern Levy, Angenieux Corporation of America, who will demonstrate the proper use and care of both zoom and fixed focal length lenses; and Nat Tiffen, Tiffen Optical Corp., who will discuss special filter applications. Also scheduled is a special session on Cinema Products' STEADICAM™, a film/video camera stabilizing system.

IFPA 18th annual conference scheduled

IFPA, Film and Video Communicators will hold its annual meeting, Trade Show and Cindy Awards Festival October 5-8 at Chicago's new Holiday Inn in the Chicago City Centre. Filmmakers, video and filmstrip producers, writers, camerapeople, managers, industrial representatives, representatives from government, education, and a wide range of allied A-V professionals and students are expected to attend.

INTELCOM '77 to include 250 exhibitors

More than 250 communications companies from all over the world will exhibit their products and services at INTELCOM '77, the first International Telecommunications Exposition to be held in the U.S. In

continued on page 198

"II" is more. That's what broadcasters have been asking for in production consoles. Flexibility. Capability. And totally unique Grandson has it all.

There is nothing else like it anywhere!

Equalization at each input position. Don't laugh. If you don't think it's needed, that's because you haven't tried it. EQ is only the most useful, creative tool in audio. And Grandson's EQ is something special. One major network has bought a bunch. That's special.

Monitoring and foldback flexibility to let you and the talent have separate monitor mixes! And changes of monitor mode at the push of a single button. Here's the key to fast, creative production.

Internal patch point, after mic preamp before fader, brought out to permit inserting special devices. How about plugging in a limiter just ahead of the pot for the screamer, or mic swaller. Think that would be neat? So do we. Grandson will let you do it!

Four reasons Grandson was selected by ABC-TV, Hughes Sports Network and WWL in the Superdome. There are more. None accidental. Because you said it's needed.

Grandson is "II". A totally unique approach. Want more details? Write or phone today.

AUDITRONICS, INC.
3750 Old Getwell Road, Memphis, TN 38118, 901-362-1350

The closer you look, the better we look.

For More Details Circle (144) on Reply Card
THE ONLY THING WE’VE HELD BACK ON.... IS THE PRICE!

MODEL 2104
VIDEO PRODUCTION SWITCHER

Features:
- 3 input linear effects keyer
- Downstream linear mix/keyer
- Color background & black burst generator
- Color matte generator
- Blink and wipe key functions
- Multiple drive modulator
- Pattern preset controls
- Joystick pattern positioner
- 12 wipe patterns
- Programmable diode pattern matrix
- Full-range softness control
- 3 x 1 preview selector
- Cutbar

Uncompromising quality and reliability make the ADC Model 2104 a production tool that is ideal for use in even the most exacting applications.

For more information about the complete line of American Data professional video products, simply call or write the regional sales office nearest you.

AMERICAN DATA

September, 1977
addition, the exposition has scheduled 70 technical sessions covering all aspects of telecommunications, financial seminars, and 19 intensive short courses on computer networks, satellites, digital trends, management of communication systems, marketing and finance. Bjorn Lundvall, chairman of the board of directors, L. M. Ericsson, Sweden, will be a keynote speaker at INTELCOM '77, being held at the Georgia World Congress Center in Atlanta October 9-15. Lundvall will speak on Telecommunications and Economic Development in the Developing Countries.

NAB task force on minority ownership proposed

The executive committee of the National Association of Broadcasters has directed that a task force be established to attempt to foster an increase in minority broadcast ownership. The NAB staff was asked to prepare an organizational plan for the establishment of such a task force for presentation at the next executive committee meeting.

Broadcasters clinic scheduled for October 19-20

The 23rd Annual Broadcasters Clinic sponsored by the University of Wisconsin-Extension will be held in Madison October 19 and 20. Among the speakers at continued on page 200

The Ultimate in Wireless Microphone Systems

Vega's new Model 63 Diversity Receiving System virtually eliminates problem noise and signal dropouts that are occasionally encountered when a wireless microphone system is used on a set, in studios, and in theatres. Moreover, because excellent soundtracks can be obtained from fully concealed wireless mics, much of the tedious dialogue looping on taped programs is no longer necessary. When used with any of Vega's fine wireless transmitters, the audio is like a hardwired connection. Of course, Vega's Diversity Receiving System will improve the performance of any brand VHF wireless mic. It's no surprise that the Model 63 Diversity Receiving System is being used by all major network studios. Try one, and see what it can do for you.
New! For heterodyne VTRs

It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it comes with features that, before, you'd find only in TBCs costing up to twice as much.

For example, correction of chroma/luminance delay problems, a 3 dB chroma noise reduction, velocity compensation and color dropout compensation are standard.

So is "Gyrocomp," an exclusive, use-proven CVS memory design that easily handles severe gyroscopic distortions—without breakup.

There's also a broadcast stable, gen-lock sync generator, automatic VTR advanced sync and a built-in completely adjustable processing amplifier.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise and significantly improves subjective resolution. And, to tame even the wildest instability, you can add our optional 16 line window.

Simple operation is another plus for the CVS 516. Front panel controls give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

All this, and more, is contained in a package that weighs only 25 pounds, is only 3½ inches high and uses only 175 watts—major advantages with today's increasing emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516. For full details and/or a demonstration, contact your authorized CVS Distributor or CVS.

And ask for our new booklet about the basics of digital time base correction. It's free.
the "Broadcasters Clinic '77" will be Matti Siukola, director of antenna design for RCA, and Howard Shepard, director of advance planning for Central Dynamics. Other companies represented will include Ampex and Harris Corporation.

NAB meetings scheduled
The NAB will conduct three meetings this fall to give the public an opportunity to ask questions about the Radio and Television Codes and broadcast policies. The meetings are scheduled for Cambridge, Mass. (October 18), San Diego (November 11) and Dallas (November 15). Participants will include NAB executives, members of the NAB code boards, representatives from the networks, local radio and television stations, and television writers and producers.

Multi-Image workshop
The Association for Multi-Image (AMI) will sponsor a production workshop at Rhode Island College in Providence, September 29 through October 2. The event is being staged by Hans-Erik Wennberg and will feature multi-image presentations by various practitioners who will explain and discuss related production problems as the presentations proceed.

news briefs continued from page 198
In the beginning, Time was a reflection of motion in the universe.

Today Time is earth-bound, measured precisely by action of the Cesium-133 atom.

With the coming of the twentieth century man has discovered space travel and broadcasting. Both demand micro-second accuracy to a degree never imagined before.

Leitch provides it with the Leitch Precision Impulse Clock. Controlled by impulses accurate to within one nine billionth of a second, Leitch clocks can be fully synchronized to the exact second. Compatibility with other impulse drive systems allows them to be added to existing drivers or to be installed separately as a totally new system.

Exclusive U.S. distributor:
Leitch Video Incorporated
230 Mineola Blvd.
Mineola, New York 11501.
Tel: (516) 248-4858.

In Canada:
Leitch Broadcast Products Limited
705 Progress Avenue
Scarborough, Ontario M1H 2X1
Tel: (416) 438-5060.
VIDEO TEST FILM...

NEW TEST FILM AND SLIDES
FOR PRECISION TELECINE ALIGNMENT

- MT Multitest—A pattern of neutral grays and colors available in 16 mm film loop or slide.
- TA2—Five-step crossed gray scale slide, 2.5 power law.
- CB2 Color Bar slide—six colors plus white, colors designed to fail on vistroscope radials.
- TM, TA2 and CB2 have a mid gray (50 IRE) surround to the active area and have the same spectral characteristics as the majority of programming material.
- DM—Depth of Modulation slide.
- TC—General Purpose Test Chart incorporating registration, centering, focus and safe title patterns.
- FT Flare Test slide—instantly shows the existence of optical flare.

The above patterns are available in 3½" x 4" and 35 mm slide sizes. All DSC test materials are computer calibrated to an accuracy of ±1 IRE unit. May be purchased or leased. DSC also has a complete line of 8″ x 10″ test slides for studio camera alignment.

Since 1965, DSC has been supplying precision test materials to the television community. For additional information, please telephone or write:

D and S Corley Limited
80 Galaxy Boulevard, Unit 3
Rexdale, Ontario, Canada M9W 4Y8
Telephone: (416) 675-3511

One (or two) for the road.

Thomson-CSF Laboratories keeps breaking conventional sound barriers (cords and booms) with RF microphone systems that offer reliable transmission with excellent range and true high fidelity.

First, the RM-102 single channel portable system provides one full diversity channel for field and remote broadcast use. Or, if multiple channels are needed, where no AC power is available, the RM-104 solves the problem. Two full diversity channels can capture action dialog on the set or in the field, making it fully usable for filming or taping. 950 MHz diversity reception achieves drop-out free performance, and both systems come with transmitters and antennas so they’re complete and completely portable.

Now Portability Plus. Thomson-CSF takes portability a step further with its new ENG 101 single channel miniature, portable diversity microphone system, specifically designed for use with today’s miniature ENG cameras.

THOMSON-CSF LABORATORIES, INC.
37 Brownhouse Rd., Stamford, CT 06902
(203) 327-7700/TWX (710) 474-3346

from blue bananas to sag tails

Old record books never tell the truth

While working the midnight shift in Armed Forces Radio at Lajes Field, Azores, Portugal, I had what I thought was a great idea to get our listeners involved. I would ask questions on a particular sport. I am not a sports fan, but in our news room I found a book on baseball statistics.

Baseball season was over; the book looked brand new and I was ready to go. I announced that questions on baseball would be asked and that persons with the correct answers would have their names aired along with the acknowledgment of answering correctly.

I aired a question. While a record was playing I received many calls. None were correct. I gave the book’s answer, asked another question, played another record. Again, no correct answer. I kept this up for about 20 minutes. My idea worked—I involved quite a few listeners, all of whom were becoming irritated at my answers.

I would have defended that book to no end. So you can imagine my empty feeling and rapid pulse when, after one particular phone call, I read the cover of my reference book. It was one year old! Anthony Mollica, Santa Monica, Calif.

Roaring to the rescue

At one of the transmitter sites in the bay area, the chief engineers of the stations at the site would all come in on the same evening for transmitter maintenance. One of the stations had a remote control for an AM transmitter at another site which was a classic home-brew unit twice nominated for kludge of the year. There were no drawings and plenty of clip leads.

One of the chief engineers was a joker. One night he secretly wired a sparkler under the remote control and touched it off with a match to cries of, “Bob, Bob!” Victim Bob entered the room and set the world’s record for widest opened mouth with a lit cigarette still dangling from lower lip before roaring to the rescue. Roy H. Trumbull, Loney College, Oakland.
Regardless of who made your 2/3-inch Plumbicon* TV camera, or where it was made—Amperex has the exact replacement for the tube that came with the camera.

We know this tube as only its originator can know it. You can take our word for it... *there is only one Plumbicon.* And no matter where your Plumbicon camera comes from, whether it's a full-sized studio camera or one of the new hand-held portables... Amperex has the replacements for your equipment that will give you equal or better performance compared to any tube that came with the camera.

There is this difference. Amperex replacement tubes are immediately available, off-the-shelf, for delivery within 24 hours through local distributors and Amperex factory sales representatives. And Amperex tube distributors (your own local businessmen), are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and on-the-spot customer service.

For more information on Plumbicon TV camera tubes, write or phone: Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

Amperex
TOMORROW'S THINKING IN TODAY'S PRODUCTS
A NORTH AMERICAN PHILIPS COMPANY

*Trademark of N.V. Philips of the Netherlands

For More Details Circle (148) on Reply Card

September, 1977
Allen Avionics, Inc.—Catalog 11V for 1977-78 features video and pulse delay lines. L-C filters and video equalizers. The illustrated catalog describes and gives specifications for this line of video units designed to achieve precise short delays.

Featured in the catalog are pulse and video delay lines. models VP0635, VP1270 and VP0010, which have flat amplitude response to 5.5 MHz, small increments of delay variation, low signal distortion and tight delay tolerance.

Also included in the catalog are models VE300 and AV-535. TV line equalizers: Spiradel®, a fixed delay line; delay equalized NTSC lowpass filters; NTSC reject filters; and an NTSC bandpass filter.

For More Details Circle (300) on Reply Card

Cetec Sparta—New full-color literature describing the latest broadcast (radio and TV) audio consoles is available from Cetec Broadcast Group.

Labeled Cetec Sporto Audio Equipment/1, the 12-page booklet is devoted to the Centurian Series and 3000-Series consoles. Audio Equipment/2, also a 12-page booklet, is expected soon. It will describe other console lines, studio and remote broadcast furniture, speakers and related studio equipment.

For More Details Circle (301) on Reply Card

VanLadder, Inc.—Catalog 11V for 1977-78 features video and pulse delay lines. L-C filters and video equalizers. The illustrated catalog describes and gives specifications for this line of video units designed to achieve precise short delays.

Featured in the catalog are pulse and video delay lines. models VP0635, VP1270 and VP0010, which have flat amplitude response to 5.5 MHz, small increments of delay variation, low signal distortion and tight delay tolerance.

Also included in the catalog are models VE300 and AV-535. TV line equalizers: Spiradel®, a fixed delay line; delay equalized NTSC lowpass filters; NTSC reject filters; and an NTSC bandpass filter.

For More Details Circle (300) on Reply Card

Cetec Sparta—New full-color literature describing the latest broadcast (radio and TV) audio consoles is available from Cetec Broadcast Group.

Labeled Cetec Sporto Audio Equipment/1, the 12-page booklet is devoted to the Centurian Series and 3000-Series consoles. Audio Equipment/2, also a 12-page booklet, is expected soon. It will describe other console lines, studio and remote broadcast furniture, speakers and related studio equipment.

For More Details Circle (301) on Reply Card

Frequency Devices, Inc.—A 36-page catalog has been offered featuring electrical specifications complete with tabulated amplitude, phase data and mechanical dimension drawings of 10-product families.

These help the designer select the correct filter for any specific application in question. The catalog simplifies selection by dividing the filter types into four categories: highpass, lowpass, bandpass and band reject.

A one-page selection guide intro-continued on page 206
Lower loss, improved moisture barrier, plus all the traditional advantages of HELIX foam-dielectric cable. New low density foam dielectric reduces attenuation, almost to that of air-dielectric cables. Annular corrugations, in conjunction with connector "O" ring seals, provide a positive longitudinal moisture block.

Connectors have been improved too. New features include self-flaring assembly, superior electrical contact, high resistance to pull-off and twist-off, moisture seals, and low VSWR through cable cut-off frequency.

Two sizes, 1/2" and 7/8" are available now for immediate shipment. For further information contact your Andrew Sales Engineer or ask for Bulletin 1160.
The unique construction of these capacitors combines a tunable and a fixed capacitor in the same ceramic envelope with a VACUUM dielectric. This combination offers higher current ratings, smaller size, greater thermal stability and better reliability than conventional designs. They are ideal for high frequency unattended transmitter operation or anywhere stable peak signal output is important.

- Current ratings: 200 A rms. @ 9 KVAC to 85 A rms. @ 50 KVAC.
- Capacitance values available from 20 to 1357 pF.
- Size: All models are just 4.5" tall by 5.3" in diameter and come with built-in mounting rings for ease of installation.
- Operating Temperature: -55°C to +125°C.

If you are concerned with antenna phasing or matching, or working with grid bias or tank filter networks, you will want to know more about the Trimmmable Vacuum Capacitors from ITT Jennings. For more information contact ITT Jennings, 970 McLaughlin, San Jose, CA 95122 (408) 292-4025.

Marconi Instruments Ltd.—One of the many applications possible with the 110-MHz TF2370 Spectrum Analyzer is impedance measurement and matching. This is described in a new Applications Note, No. 18 in the Measuretest Series.

The TF2370 is accepted as an instrument for spectral analysis. Its signal handling and secondary features simplify its operation and enhance its usefulness.

The booklet shows that there are occasions when these secondary features can provide powerful measurement techniques which dominate its primary use as an analyzer of spectra.

Sencore, Inc.—Five product-line brochures, describing all 25 Sencore Instruments grouped in five product lines have been released. The six-page color “mini-catalogs” feature digital multimeters, communications and CB instruments, oscilloscope and power supplies, transistor and tube testers, and TV and radio service equipment.

Each brochure details applications and uses for each instrument, plus complete specifications for easy reference. Featured in the brochures are Sencore’s latest instruments, including the FC45 230-MHz frequency counter and the TF46 Portable Super Cricket Transistor and FET Analyzer, featuring battery-operated automatic “good-bad” testing and complete parameter analyzing.

Vector Electronic Company—A new 16-page short-form catalog lists 354 packaging products along with complete part nomenclature, an order form and price list.
OTARI MX-5050 the original
(and still the best)
compact professional recorder

Just over two years ago, Otari introduced a unique new product — the first truly professional recorder in a compact package — the MX-5050. Since then, the performance and reliability of this innovative new machine have been tested and proven in over a thousand critical professional applications — by broadcasters, recording studios, A/V departments, musicians, and semipro recordists worldwide. Universal acceptance and repeat orders by these satisfied customers tell this remarkable recorder’s success story better than we can.

Production Features: Creative production is simplified with:
- Front panel edit to spill tape.
- Lift-up head cover to mark splices and clean heads. Built-in splicing block on head cover. Adjustable cue to defeat head lifters. Selective reproduce to add new tracks in perfect time synchronization.
- Two speed operation, 15 and 17½ or 7½ and 3½ ips (field changeable in dc servo versions).

Performance Features: Headroom is 19 dBm, a full 15 dBm over the switch selectable fixed output of +4 dBm. This standard reference level output can be rear panel switched to –10 dBm to drive a PA system or power amplifier. S/N ratio is NAB weighted 69 dB full track, 68 dB half track, and 65 dB quarter track. Crosstalk is greater than 60 dB half track. Outputs are 600 ohm balanced (standard on half track) or unbalanced. Line input and output connectors are XLR.

Operating Features: Bias is front-panel continuously adjustable (not limited to fixed positions). With built-in test oscillator (not available on other compact professional recorders) bias can be optimized in seconds when changing tape. Record EQ and standard reference level are also front adjustable. Straight-line tape path simplifies threading. Capstan is located on back side of tape for improved tape life. An extra reproduce head is standard on all versions to allow playback of tapes in different formats. For pitch control and freedom from power line variations, an optional dc capstan servo is available with ±10% correction range.

Easy threading; capstan on back side.

Versatility: Available in full-track (with half-track reproduce capability standard), two-track, and quarter-track versions. Walnut case (standard), rugged portable road case, rack mounting adaptor, or floor console. Universal power supply standard. Low impedance input and output transformers and remote control also optional accessories.

See your nearest Otari dealer for the full story or contact Otari. And, if it’s multichannel you need, ask about the standard-setting four and eight channel versions of the MX-5050.
**Tech Data**

continued from page 206

An expanded section on plugboards includes many new microprocessor boards as well as dozens of time-proven cards for DIP and discrete components. Also listed are enclosures and card cages. Particular emphasis is placed on the Vector-Pak enclosure cases with internal structure for efficient mounting of cards and modules.

Other sections include kits, tools, connectors, sockets, terminals and patchboards. Accessories and associated equipment are cross-indexed for convenient reference.

For More Details Circle (305) on Reply Card

Verelco Ltd — Details covering the audio and power connector range are contained in a new 12-page brochure published by Elco.

The brochure provides details of six main connector ranges which include intermediate, medium and RF bypass power connectors, and audio connectors. All are suitable for applications ranging from headsets to military-specialization communications equipment where resistance to moisture, salt, temperature cycling, vibration and quick connecting actions are necessary.

All Elco connectors listed in the brochure are available in the United Kingdom through Varelco Ltd.

For More Details Circle (306) on Reply Card

Jamison Door Company — The Owner's Guide to Safety Management and Maintenance Scheduling deals with company's line of cold storage, sound reduction and other specialized doors.

In the forward of the two-color, 12-page guide, Jamison cites the added costs in lost production time, higher energy bills, inefficient performance, and other, sometimes hidden, expenses that can result if doors are not properly and safely used and carefully maintained.

Instructions on ordering recommended safety and maintenance information and equipment, as well as on establishing and keeping a maintenance log are included in the text.

For More Details Circle (307) on Reply Card

TeleMotion, Inc. — New literature has been released on the TVS/TAS-1000 Video-Audio Distribution Switching Systems.

The eight-page brochure outlines continued on page 210
FLUID FOR THOUGHT.

Your new portable camera needs a fluid head more than your heavy camera.

That's right! Just as a light sports car needs good shocks to hold it on the ground and smooth the ride, your light camera needs a good fluid head to steady the visual ride.

O'Connor has engineered the Model 30 to be the ultimate fluid head for portable cameras weighing up to 30 lbs.

It's small and weighs only 5 lbs., yet it has the smooth, steady action and features which are unique to all O'Connor heads. It pans 360° and tilts ±60°. The pan drag, pan lock, tilt drag and tilt lock all operate independently for greater flexibility and control.

The Model 30 has a totally unique counterbalance which is adjustable in the field. One simple tool will adjust the spring to match the weight of the camera. Adjustable counterbalance provides smooth, consistent, fluid action without the distracting influence of camera weight.

So, the next time your panning gets rough, turn your thoughts to fluid. O'Connor fluid... when you demand the very best.

1976 Scientific/Technical Academy Award recipient.

O'Connor FLUID CAMERA HEADS
100 Kalmus Drive, Costa Mesa, CA 92626

Please send more information.

Company ___________________________
Name __________________ Title ________
Address ___________________________
City ______ State ______ Zip _________
My camera weighs _______ lbs.

For More Details Circle (154) on Reply Card
THE SYSTEMS APPROACH
... at last, AGC/Processing and Peak Control in the proper packages.

MULTIMAX—the AGC/Processor with exceptional input headroom, low noise, and low distortion. Multimax is the 3 band processor which employs unique energy based, open-loop compressors as the active gain control elements. A special gated release circuit insures smooth gain control and band tracking performance. Separate cross-over frequencies are designed for AM and FM bandwidths.

MULTILIMITER—the limiter that features an input “gain riding” compressor, a variable compression ratio fast limiter and a ultra fast peak control limiter which provides modulation protection without relying on clippers.

The Multimax, Multilimiter “package” concept puts your processor and limiter where they belong...in separate boxes. Multimax and Multilimiter are available for AM or FM application.

Call, write or telex today...

PACIFIC RECORDERS AND ENGINEERING CORPORATION
11100 ROSELLE ST., SAN DIEGO, CALIFORNIA 92121
TELEPHONE (714) 453-3255   TELEX 695008

continued on page 212
Our Edit Memory Control can .....  

Memorize 128 Edit Points,  
Control VTR's for Multiple Edits,  
..... and is priced under $4,300

![Image of EMC-100](image)

The EMC-100 can memorize all the edit functions and execute the commands to make them happen for you.

As you watch the monitor, you punch the buttons to register the edit points into the memory, instead of jogging them down on a scratch pad.

The basic model stores up to 128 edit points (512 or more, optional). Four pushbuttons are provided to select control functions for each edit point (additional control functions optional).

In the Edit Memory mode, the edit points can be recalled, previewed, shifted or erased, as often as you like, before the final edit is made.

The EMC-100 will operate with both Quad and Helical VTR's. It controls the machine and its editor, via the remote control connections, to perform sequence of edit functions by strobing out commands, converted from the stored edit points, in the form of contact closures or logic level pulses.

The EMC-100 can be programmed for exact prerolls for any type of machine. A.B rolls and double system rolls for different types of machines can be performed with ease.

The EMC-100 is equally versatile for either off-line or on-line applications.

For daily ENG and Field Productions, whether to use edit code or not can be decided later at the studio. While previewing the 'raw footage', you can lay down the edit code and mark all your edit points, simultaneously, on the first pass, with the edit code generator feeding both the VTR and the EMC-100.

Together with an edit code generator, the EMC-100 gives you a new dimension of editing flexibility.

Other Kaitronics SMPTE Edit Code Products:

- SMPTE Edit Code Generator
- SMPTE Edit Code Reader
- Numeric Character Generator
- Widespread PreAmps & Accessories

For more information, send for brochures or call:
Paul Tarrodaychik, VP, Marketing
(408) 739-4262

KAITRONICS
870 MAHLER ROAD, BURLINGAME, CA Tel: (415) 697-9102

September, 1977
Tech Data
continued from page 210

One hundred forty models of line-operated supplies and DC/DC converters that are available from stock are described in two tables called In-Stock Selection guides.
Available sockets are described by both dimension drawings and a listing of the power supplies with which they will mate. Options are defined and then tabulated relative to product families.

For More Details Circle (311) on Reply Card

Newark Electronics—Over 100,000 electronic devices are listed in catalog number 103.
The catalog features the products of 166 leading electronic component manufacturers, including: Allen-Bradley, Alpha, Amphenol, Belden, Bourns, Bud, Centralab, TRW, Cinch, Cornell-Dubilier, Cutler-Hammer, General Electric, International Rectifier, Mallory, Motorola, Ohmite, Potter & Brumfield, RCA, SPC Technology, Sprague, Switchcraft, Texas Instruments and dozens of others. Several lines not previously stocked have been added.

Descriptions, electrical and physical specifications and illustrations are provided for semiconductors, resistors, capacitors, potentiometers, controls, switches, relays, fuses, circuit breakers, transformers, connectors, sockets, wire, cable, lamps, lights and other related electronics products.
Detailed product indexing and a separate index of manufacturers are designed to assist in product selection.

For More Details Circle (312) on Reply Card

Telex Communications, Inc.—Detailed in a new illustrated brochure is the full line of audio tape components. The brochure includes complete product specifications, descriptions and ordering information.
The catalog features heavy-duty open reel tape transports and tape cartridge transports. Endless loop NAB-type magnetic tape cartridges are also shown. The company's latest solid-state record/play, playback and power amplifiers for single and multi-channel systems are described in detail.

For More Details Circle (313) on Reply Card

Acrodyne Industries, Inc.—A new data and specification sheet on weatherproof enclosure system describes availability for solid-state translator applications up to 10 watts VHF and UHF and other equipment requiring a 19-inch width by a 17-inch maximum panel height.
The data sheet includes information on the new enclosure's features, a chart of available options, complete specifications and photographs illustrating both a close-up and an example of convenient mounting to a tower or pole.
A schematic is also included illustrating position of ventilating fans, prewired AC junction box, front door locking provisions and suggested mounting arrangements.

For More Details Circle (314) on Reply Card

Van Nostrand Reinhold—Covering product/service management, Product/Service Strategy provides a framework for making decisions about products and services. The 305-page book by Richard T. Hise shows how product/service decisions fit into the general marketing area. Discussion of material is approached on the premise that there are certain fundamental concepts common to all products and services. These concepts are drawn
continued on page 214
How can we offer digital TBC quality and flexibility—at a price this low?

Simply by designing a better time base corrector.

For example, the single most complex and expensive part of a digital TBC is the analog-to-digital converter. The TBC-110A eliminates the A to D converter through the use of a charge-storage analog memory. By sampling and storing the video signal at 14.318 MHz, the TBC-110A provides the same sampling speed and video bandwidth as the competition's highest priced model—without the expensive A to D converter.

A true time base corrector that does it all.

The TBC-110A will remove all high-frequency jitter, waterfall, skew, and geometry error (S banding) from any type of non-segmented helical scan recorder. H lock VTRs can be corrected to house sync and FCC specifications by locking the TBC-110A to EXT sync. Other types of VTRs, such as line lock models, can be locked to the center of the floating window in the INT sync mode.

Fades, wipes, and inserts possible with non H-lock VTR's.

The internal digital sync generator provides a full complement of pulse outputs that are locked to either the internal oven-controlled crystal, or a VCO that is tracking the video input. The tracking mode (floating window) can be used to lock cameras to the sync outputs of the TBC so that fades, wipes, and inserts can be accomplished with non H-lock VTRs.

Complete video processing.

The TBC-110A provides complete video processing, including such features as separate luminance and chrominance processing in all modes, so that negative black spikes below sync are removed without clipping negative chroma. Chroma Gain and Chroma Phase are also adjustable in all modes (het and direct).

Exceptional skew error correction.

The TBC-110A is capable of removing step errors within one line after they occur, thus providing total and almost instantaneous skew error correction.

Truly superior heterodyne processing.

Heterodyne chrominance jitter is minimized because the TBC-110A first demodulates chroma—then removes time base error in parallel luminance and chrominance memories. The result is superior heterodyne processing—minimal color error.

If your studio operates one or more helical scan recorders, a time base corrector is a virtual necessity. The TBC-110A has the credentials to satisfy the most demanding studio requirements, while maintaining a price that is comfortable even for small distribution systems.

The TBC-110A is now available at $4,990.00. Slide rails are an optional extra.

For More Details Circle (158) on Reply Card
Increased Performance for your Mincom

Think Ferrite 10 Times Life • All Track Formats •
100's in Service • Unconditional Warranty.
Ferrite Heads Available for all Professional Recorders.

1649 12th Street • Santa Monica, California 90404 • (213) 451-8611

For More Details Circle (159) on Reply Card

QUALITY+ PRICE+ DELIVERY-

THE BEST REASONS FOR SWITCHING TO—

B AL

VIDEO DELAY LINES

AUTHORIZED DEALERS

Broadcast Video Systems Ltd.
1050 McNabou Ave.
AGINCOURT
Ontario M1W 2L8
Tel. 416-977-7020

Broadcast Commmunications
Devices Inc.
3626 East
La Palma Avenue
ANAHEIM
California 92807
Tel. 714-528-9569

Listec, Television Equipment
Corporation.
36 Canby Dr.
PLAINVIEW
N Y 11803
Tel. 516-684-6863

Television Engineering
Corporation.
518 Rudder Rd.
FENTON. Missouri 63026
Tel. 314-343-3865

For More Details Circle (160) on Reply Card

Tech Data
continued from page 212

from the areas of behavioral science, organization theory, economics and quantitative methods.

Emphasis is placed on those current trends affecting product decisions. New product development, life-cycle management and product elimination are treated. Special attention is given to the product elimination decision.

Topics discussed include: introduction to product/service management, marketing consumer and industrial products and services, organizing the product/service function, developing objectives for products and services, developing successful new products and services and product management for managing products and services.

Acrodyne Industries, Inc.—A new data and specifications sheet has been released on the model TT-445 6-kilowatt VHF television transmitter utilizing low-level IF modulation. Carrier modulation, envelope delay and VSB shaping are performed in the low-level solid-state stages to guarantee the best video performance available for FCC and CCIR systems.

The data describes the modulator in depth, as well as detailing solid-state circuitry, required tubes and cavities, logic display, and an exclusive fault memory system.

Complete visual, aural service and mechanical specifications are included for both FCC and CCIR (system “B”) operations.

Electronic Industries Association—The 1977 Electronic Market Data Book presents statistics, facts and commentary on the growth and development of the U.S. electronics industry.

The book is a compilation of material that can assist in identifying possible growth areas and following market trends. The information covers: consumer electronics, communications and industrial products, government products, electronic components, world trade and related information such as employment and R&D trends.

3M Company—A four-page brochure containing information on two continued on page 216

BROADCAST ENGINEERING
You’ll hear about us, because we’re making it a practice to listen to you. As the world’s second largest maker of broadcast equipment, we’re not in a position to dictate; and we won’t—even when we’re number one.

We have a line of equipment in the U.S., that’s well worth your investigation: VTR’s, TBC’s, frame synchronizers, etc. And we’re ready to expand it. When you’re ready.

Just let us hear from you.

NEC

NEC America, Inc.
Broadcast Equipment Division
130 Martin Lane
Elk Grove Village, Illinois 60007
(312) 640-3792
For More Details Circle (80) on Reply Card
television-related products, model 5110 color insert keyer and model 5120 video outliner, is available from the company's Mincom Division.

The color insert keyer adds color and dimension to graphics produced by a character generator or camera. The video outliner, by offering a choice of five outline possibilities, furnishes new options for the display of alphanumeric characters and other TV graphics.

Also included in the two-color booklet are flow charts showing proper installations of the units in relation to video input and program output. In addition, detailed specifications are given for both pieces of hardware.

For More Details Circle (318) on Reply Card

National Association of Educational Broadcasters—Public broadcasting will be structurally and fundamentally altered within the next 18 months and the two papers that are the basis for this change are in the current Public Telecommunications Review.

The persuasive internal Task Force paper that was submitted to Carnegie Corporation calling for a commission on the future of public broadcasting appears in its entirety along with the options paper written by the House Subcommittee on Communication's chief counsel, Harry Shooshan, for this fall's hearings on the "review" of the Broadcasting Act of 1934.

Shooshan has prepared an examination of the obstacles faced by public broadcasting and describes options to consider for their resolution. Public broadcasting is beset with political and financial problems which have barred the system from developing to its full potential. In September, it is these problems that Congress will review.

For More Details Circle (319) on Reply Card

AMP Incorporated—A new 14-page booklet from the Capitron Division is designed to help anyone who buys or builds power supplies. The Power Supply Specifying Guide emphasizes high-voltage units. There are sections devoted to the make or buy decision, determining whether a custom or a standard package is needed. The guide also explains how to specify high-voltage power supplies, using oil as a high-voltage insulator and packaging high-voltage circuits.

For More Details Circle (320) on Reply Card

Labgear Ltd.—A slim pocket-size product planner which gives details of the company's television distribution, test and teletext equipment is now available.

Preamplifiers and power units, distribution equipment, repeater amplifiers, room aerials, test equipment and associated accessories are included, as well as "Colourtext," a teletext adapter. The planner also includes a dBmV conversion to voltage level chart.

For More Details Circle (321) on Reply Card

National Semiconductor Corporation—A comprehensive data book is being offered on field-effect transistors and analog switches.

The 277-page handbook provides many features helpful in choosing FET products. There are alphanumeric parts lists and cross-reference guides. The parts lists serve as an index to an FET selector guide, which includes n-channel, p-chan-
The Series 20A offers great flexibility in theatre sound mixing, television production, and concert sound reproduction.

The Series 20A is totally modular. That means you can have custom convenience at off-the-shelf prices. Because modularity lets you purchase only the modules you need. As your needs expand, you simply plug in more modules. And you can customize the arrangement for a particular show. Just plug the modules into any position on the chassis. No tools required.

The Series 20A simplifies your real time operation by allowing you to predetermine program content and distribution. Designed with human engineering in mind, the following features are provided:

- 4 chassis/enclosure sizes: 2.5' with 21 module positions, 4' with 31, 5' with 39, and 6' with 47 positions.
- Up to 37 input channels, each switch selectable for mic and line level signals. Optional switching modules for selection of up to 48 additional remote inputs.
- Presettable (mute) circuit for each of four independent pre-sets. Any input can be assigned to any combination of the four muting circuits. Allows instantaneous changeover from one "scene" to another.
- Two complete foldback buses having level and switching controls at each input, with sub master controls.
- 3-Knob equalization on every input channel—with boost or cut.
- Unique datacable and roadmap configuration to interconnect Cetec's all solid-state printed circuits. Straightforward design provides simple plug-in module positioning.

For further information, contact Cetec Audio
A division of Cetec Corporation
13035 Saticoy Street
No. Hollywood, CA 91605
Phone: (213) 875-1900 TWX: 9104992669

A division of Cetec Systems LTD.
U.K. Sapphire House, 16 Uxbridge Rd., Ealing, London W52BP
Phone: 01-579-9145 Telex: 837329

For More Details Circle (164) on Reply Card
The Ross RVS 16-6C pictured above features:

1. An additional matte generator (colorizer) which allows the titles to be colored independently of the main background generator in the switcher.
2. Switchable black or white borders.
3. Switchable OFF, BORDER, SHADOW and OUTLINE modes.
4. Master fade to black on downstream keyer.

PLUS all of the other unique features which have made ROSS the fastest-selling switchers in Canada!

MARKETED EXCLUSIVELY BY:

ENTRONIX (1977) LIMITED

160 DUNCAN MILL ROAD
DON MILLS, ONTARIO, CANADA M3B 1Z5
(416) 444-8497
Professional Control

DIMMER BANK DBM5
Modular system: The plug-in units can be removed from the rack for maintenance without the use of any tools. The module can be removed under power without any damage to the units.

- Modular Plug-In for easy service
- Magnetic Primary and Secondary Circuit Breaker
- Various Output Panels available
- Input wiring error indicator
- Convenience Outlet
- Less than 3% drift
- 97% efficient
- No interaction
- No silver sand fuses

DESK CONTROL CONSOLE
- "A" and "B" Subscenes
- Split Dipless Crossfader
- Independent Master
- Grand Master
- Black Out Switch
- White Controls and Switches
- Uncompensated Control Cable (1 ft. to 5000 ft. with no calibration)

Let us help you solve your lighting problems.

We invite your inquiries and will consult with you on any problems with which you may be faced. We have everything in lighting equipment. Brochures on request.

Write or Telephone:
(503) 645-5533
**new products**

**Low-frequency function generator**
A new low-frequency function generator has been developed by Phillips Test & Measuring Instruments, Inc. The PM5129 generator has an output from 1 Hz to 1 MHz. The low-distortion sine, square and triangle waveforms can be varied in amplitude, frequency, DC level and duty cycle. Output frequency is set by a linear scale over eight ranges and can be stable or swept by an internal ramp signal or modulated internally by a 2 Hz to 20 kHz tone. Two features of the PM5129 are the single shot and burst modes. Single shot outputs may be initiated by pushbutton control, a variable "peak-level" control or by external TTL signals. In burst mode the number of cycles in each burst can be varied by the period control over a 10 to 1 ratio.

The PM5129 has a maximum output of 30V into 50 ohms and can be step attenuated down to 68 dB. A variable of 0.2 dB amplitude control shows approximate output levels.

For More Details Circle (327) on Reply Card

**TV time code character generator**
Gould, Inc., Control and Systems Division, has expanded its Datametrics digital timing equipment for SMPTE editing to include the model SP-722, a single unit which will generate and read SMPTE time code and display the decoded time on an editing monitor.

The new feature of digitally displaying hours/minutes/seconds/frames is accomplished by "mixing" with the video signal. Time characters are adjustable to any position on the monitor, have switchable size and style, and can be adjusted for optimum intensity.

For More Details Circle (328) on Reply Card

**Tape transport consoles**
Rus Lang Corporation has introduced two new tape transport consoles, the RL 600 and RL 700.

The RL 600 is designed to accept the new style of tape decks 19" x (up to) 21" which have their electronics integrated with the transport. The RL 700 will accommodate tape transports 19" x (up to) 24½", such as the Ampex 300 Series. The RL 500, introduced last year, handles 19" x 15¼" decks.

All three models feature front panel access in both horizontal and vertical positions, plus a rear shelf for power supplies.

For More Details Circle (329) on Reply Card

**News lighting system**
Cinema Products Corporation has made available a new, lightweight CP/Newslite 12V/100W lighting system. It is ideal for use with the new, faster film stocks (Eastman VNF 7250 and Fujicolor RT400, both rated at 400 ASA) in most television

continued on page 222
MICROWAVE ANTENNA SYSTEMS
FOR EVERY REMOTE TV REQUIREMENT
ENG/EJ-STL’S-TSL’S-PORTABLES-MOBILE VANS

ANTENNAS FOR ALL BANDS
2.0 GHz
2.5 GHz
7.0 GHz
13.0 GHz
2.0 + 7.0 GHz
7.0 + 13.0 GHz
CIRCULARLY & QUAD POLARIZED REFLECTORS
GOLDENRODS
OMNIS FOR HELICOPTERS
SUPERQUADS
HIGH GAIN HORNS
DIGITAL REMOTE
CONTROL SYSTEMS

NURAD, INC.
2165 Druid Park Drive
Baltimore, Md. 21211
• 301-462-1700

For More Details Circle (168) on Reply Card

September, 1977
New Products
continued from page 220

newsgathering, documentary, and similar applications.

The ultra-lightweight lighting system consists of a focusing CP/Newslite, a 100W/12V 3400°K "Quartz" lamp, and a CP 12V battery (with built-in charger).

Designed to be top-mounted on CP-16, CP-16R and other 16mm cameras, the focusing CP/Newslite also features a convenient integral handle and a detachable yoke.

The CP 12V battery recharges overnight and includes a black leather case and shoulder strap.

Intercom interface adapter
Clear-Com will soon introduce Adapt-A-Com.

The Adapt-A-Com allows a Clear-Com user to interface their system with any known two-wire, three-wire or four-wire communication link. This includes carbon, Telco-loop telephone type or professional television closed-circuit systems.

Controls include a mode select switch, transmit and receive gains, and set-up functions. Connections include cannon type, connector for use with test headset and Clear-Com interconnection plus binding posts for interface to external communication systems.

For More Details Circle (330) on Reply Card

Microphones
A. B. Pearl of Sweden, manufacturer of high-quality microphones, has appointed Cara International, Limited as its import agent for the western section of the U.S.

Cara Pacific Sales Company will handle the Pearl line in the Pacific Coast states. All inquiries should be directed to Cara International Limited, 4145 Via Marina, #120, Marina del Rey, California 90291.

Pearl microphones have been available for several years under the PML trademark. Encompassing a wide range of microphones for all sound recording, broadcast, television, public address and home recording applications, the line includes a wireless mic system, an interference tube (shot-gun) system, and a complete range of accessories and power supplies for SYMSI 12- and 48-volt systems.

Suggested user net prices for the line of dynamic mics range from

continued on page 224

CKY-TV WINNIPEG chooses IMAGE VIDEO
Audio-Video Master Control Switcher designed for future computer operation

CKY-TV had a custom requirement which included a master control facility to control the main transmitter at Winnipeg and a satellite transmitter, machine controls for VTRs, 16mm and slide projectors. They also wanted to provide for the future installation of computer control. This was to be supplied with a console which matched up with an existing console at the station.

The complete equipment package was supplied by IMAGE VIDEO.

GENTRONICS (1977) LIMITED
MARKETED EXCLUSIVELY BY: 160 DUNCAN MILL ROAD, DON MILLS, ONTARIO M3B 1Z5  (416) 444-8497

CKY-V TV

For More Details Circle (170) on Reply Card

www.americanradiohistory.com
Audio Problems . . .
Contact
Accurate Sound

...Whatever your problems: new equipment, rebuilt equipment, reconditioning or updating. Accurate Sound's "Total Systems" capability can solve your problem. Our experts will design a system for your complete audio/video complex, including building construction and acoustics. This service also includes consultation to determine the exact equipment required for your particular application. In addition, we offer technical assistance in the construction and installation of your system. Accurate Sound assembles and pretests ALL equipment prior to shipment to your facility. Lease finance is available.

Accurate Sound / MCI 2600
This recorder/reproduce system provides complete recording using Invonics, three speed electronics, AG-440, Ampex 351, MCI JH5 or other electronics. The transport features our new tape motion control box that eliminates the tape handling deficiencies typical of most older tape transports. We offer a one year parts warranty with 90 days labor. Priced without console:
- $2,675.00 mono
- $3,265.00 2-channel
- $4,645.00 4-channel
For a walnut formica console, add $330.00 to the above prices.

2600 Transport
Functions are fully removable, including record and tape lift. Standard version includes constant tension holdback, delayed stop, three speed, constant tension tape capstan slow start and a two inch tape capability. The 2600 is available with Ampex, Accurate Sound, Invonics, MCI or Scully electronics. Standard version $1,495.00.

Accurate Sound
Model 445
Professional, high quality, two channel reproduce only electronics equally suited to new installations as well as updating existing systems. Features include: built in power supply providing transport power via a rear panel connector, dual EQ settings and remote EQ access for properly wired transports. Plus, the 445 makes use of plug-in, 44-style cards. Priced with meters at $695.00 and without meters for $595.00.

2400 Duplicator
Brings you real time duplication quality 16-times faster. It produces copies at 7½ ips, 30HZ to 18KHZ with less than 45 degrees phase error. Features: automatic recueing of master for preset number of cycles. Reload slaves while master rewinds. Precision-mounted ferrite heads. Head assemblies contain equalization level calibrations. State-of-the-art tape motion control includes constant tension holdback, motion sensing, dynamic and mechanical braking. Two channel systems from $7,500.00.

Cassette Recorder
Designed primarily as an on-line logging recorder for broadcast use. It is a four channel recorder/producer with many transport functions: skip-forward, skip-backward, automatic play with either continuous run or BOT/EOT sense, optional bi-directional play, optional capstan engage for search and cue, digital readout tape position indicator, any speed available between 5 and 20 ips with variable speed option...all with remote controllable functions. The system is packaged in a two module bay with provision for module to module dub function. The package size is 7" high x 19" wide x 12" deep. Price $4,800.00.

Tentelometer
The Tentelometer Tape Tension Gage can diagnose mechanical sources of WOW and flutter, in addition to helping set-up and maintain a quality audio recording. Priced from $179.00 complete.

Send for our illustrated catalog with new and used equipment listings.

September, 1977

For More Details Circle (171) on Reply Card
TELE-PAT PRECISION TEST SLIDES PUT YOU RIGHT IN THE PICTURE

Whether you're a top network station or an independent videotape producer, the picture your viewers see must be clear, sharp and color-true. There's only one way to make sure—and that's to check and align your TV cameras regularly with Tele-Pat precision test pattern slides.

Tele-Measurements provides 17 different test patterns in two sizes. The 100 series slides are 2” x 2” in size, for film multiplexers and spot scanners. The 300 series are 8” x 10” for use with Tele-Pat test pattern illuminators. Series 200 and 400 are special color patterns, and series 500 are customer specified slides, available on special order.

All test slides are mounted in optical glass and are electronically accurate to ± 1% of vertical and horizontal tolerances. Test patterns include:

**TM-101 & TM-301 Resolution Slide (Reina). Standard reference for measuring resolution, testing for streaking, interlace, shading, scanning linearity, and aspect ratio. Horizontal and vertical wedges with 200 to 800 line resolution.**

**TM-102 & TM-302 Resolution/Extended Gray Scale. Same as TM-101 and TM-301, with the addition of four logarithmic gray scales for transfer characteristic testing.**

**TM-202 & TM-402 Color Fractum Slide. For overall color performance and set-up purpose.**

**TM-501 Station I.D. Color Slides. Supplied with your station call letters, channel, and location. Professional identification for local monochrome and color programming.**

For a complete list of Tele-Pat test pattern slides and illuminators, call or write:

**TELE-MEASUREMENTS INC.**
145 Main Avenue, Clifton, New Jersey 07014
(201) 473-8822
(212) 581-9020

Change Sound to Silence with a TABERASER

This rugged, heavy duty bulk tape eraser wipes sound from all magnetic tapes, cartridges, cassettes and magnetic film stock; handling up to 2”.

It erases with minimum residual noise because the field automatically diminishes at the end of each 30-second cycle.

A thermal control and blower keeps the unit below 71°C.

Available for 60Hz or 50Hz operation.

For the distributor in your area—Call or write:

**TABER**
Manufacturing & Engineering Company
2081 Edison Ave. • San Leandro, Ca. 94577 • (415) 635-3831

New Products continued from page 222

under $40 to $170. The condenser prices range from $85 to $1,125. The condenser mics feature a rectangular diaphragm and employ FET preamplifiers. The models DC-63 and ST-8 are provided with variable pickup patterns.

For More Details Circle (331) on Reply Card

Power amplifier

BGW Systems' new professional power amplifier, model 250C, delivers 100 watts/channel into 8 ohms with less than 0.03% IM distortion, and 150 watts/channel into 4 ohms at 1 kHz. The 250C features: modularized amplifier output stages; front panel clipping indicators; relay-operated delay and speaker protection; front panel gain controls; front panel mounted magnetic circuit breaker; separate chassis and signal grounding panel connections for elimination of ground loops; rear panel convertible bridged mono operation slide switch; and plug-in matching input transformer provision with mechanical guard.

For More Details Circle (332) on Reply Card

Remotely operated television transmitters

Howe-Yin Research has announced the addition of a series of remotely operated, unattended service VHF television transmitters to its line of television broadcast equipment. Presently available in 100 watt and 1 kilowatt ratings, 3 kilowatt and 10 kilowatt models are scheduled as future additions. These transmitters feature low-level IF modulation and quarter-wave, re-entrant type cavities designed and manufactured by the company. Extensive use of CMOS logic circuitry provides complete manual and remote control, protective interlocking and monitoring of all vital functions, fault memory and display, and maximum "on air" reliability through automatic bypassing of any or all PA stages in the event of a continuous overload.

For More Details Circle (333) on Reply Card

Circulator polarized antenna

A circularly polarized TV broadcast antenna employing patented end-fire elements is being offered by CCA Electronics Corporation. The new antenna, specifically

continued on page 226
29 STATIONS
Have Chosen
Autotron
systems

A few have Autotron I, the complete automatic traffic and billing system, that provides several terminals, for several of your stations, doing several tasks all at the same time...

...others have selected Autotron IV, which does traffic and billing, but also does payables, general ledger and payroll, and is operated by one employee in a normal work week for the busiest AM/FM...

...still others have chosen Autotron VI, the only total automation system made, adding program automation control and memory (not just interface, CONTROL) to traffic, billing, payables, general ledger and payroll; and, throws Automatic Transmitter Logging in at no extra charge, while even automatically rescheduling discrepancies...

...finally a group or two has chosen one central computer with remote terminals at their other stations.

And now, we’re proud to introduce the ultimate program automation system—Cuerac®—Autotronics Division of Automation Electronics, Inc. exclusively presents Cuerac and Cueramate reel-to-reel and cartridge players and recorders, all automation party. Cuerac features—you name it—cartridges and is available as a stand-alone system or as a part of the Autotron business systems. Think of the walk-away possibilities. Until now programming formats have been limited to available automation equipment; now, at last a total system that can bring new dimensions to formatting. Economical when automation alone...it'll cherr combo with the Autotron system—it's absolutely great. The Autotron Systems and Cuerac are on display...ask about them and then see them in action...you'll wonder how you got along without them so long.

One turn-key purchase or lease/buy-end-fess, no percentage of billing, no add-on expenses, no line charges...
—completely in-house

Call Allen Collier or Rusty Gold at Autotron-Dallas...214-232-7100
or Larry Zaiser at Autotron-Lafayette...317-423-2572

or just put your business card in the mail, we'll show you want a brochure.

For More Details Circle (174) on Reply Card
New Products
continued from page 224

designed to eliminate ghosting problems in TV signal problems, is now permitted based on amended FCC rules. The rule changes allow television broadcasters to convert from horizontal to circular or elliptical polarization for their broadcast systems.

The antenna utilizes the slot array for the horizontal component and is the only currently manufactured antenna which allows future addition of circular polarization without incurring the cost at the time of initial purchase.

Color television camera

The FP-1212 color television camera from Hitachi Denshi America, Ltd. features a built-in IQ-type encoder which makes it possible to utilize the FP-1212 for broadcasting purposes by attaching an optional large magnification lens. Accurate fidelity in color reproduction is assured through the use of an RGB three-tube Plumbicon™ camera.

NTSC or PAL color composite signals can be obtained from the built-in encoder, without employing an accessory unit (broadcasting IQ encoder for NTSC color system). Independent RGB (red, green, blue) output terminals are provided to use with an external encoder. (RGB signals are available simultaneously with encoder signal.)

Additional features include: aperture correction circuit; built-in color bar generator; automatic iris control circuits; remote-controlled registration circuits; remote-controlled color temperature compensation circuits; removable viewfinder; and tally lamp and intercommunication circuit.

Solar electric generators

Solar Power Corporation has announced the availability of model P-1002 Solar Electric Generators and Arrays for remote powering of radio repeater stations, microwave links, signaling devices, cathodic protection, water pumps, telemetry equipment and other remote power applications.

Using 57mm silicon solar cells wired together in series and mounted in a UV-stable case made of polycarbonate, P-1002 Arrays withstand impact, wind, tempera-
Introducing two new ways to get the lighter side of the news.

Microwave Associates' MA-2CP and MA-2EP. They're by far the lightest, easiest to carry, simplest to use and maintain portable microwave radios to move onto the market. Because they're so light, the 2 watt MA-2CP and 8 watt MA-2EP open up a new era of flexibility in news gathering at 2GHz. You can go almost anywhere the news is.

Both models have a unique frequency offset capability that gives you a total of 21 microwave channels. Three times the frequency agility of older models.

If you want, we also offer the 2CP and 2EP in 1-channel and 7-channel versions.

In addition, the MA-2EP provides sophisticated diagnostics, switch-selectable tuning and the opportunity of mounting the RF head up to 30 feet away.

Both the MA-2CP and MA-2EP are engineered with people in mind. And each system is compatible with all our Portable Line accessories.

So if you need two great little portables for ENG remotes, write or call for the complete details.

The MA-2CP. And the MA-2EP.

They're guaranteed to give your news gathering a nice, light touch. Microwave Associates, Communications Equipment Group, Burlington, MA 01803. 617-272-3100.

Field Sales Offices: Atlanta, Ga. (404) 455-3815 • Dallas, Tx. (214) 234-3522 • Kansas City, Mo. (816) 891-8895 • Sunnyvale, Ca. (408) 733-0222.

For More Details Circle (177) on Reply Card

www.americanradiohistory.com
The Super System

THE TW INTERCOM SYSTEM: A refined, high-quality, and ultra-reliable Intercom system for the demanding professional. Employing only two wires for operation, up to fifty units may be connected on line without loading or serious performance degradation. Features include: mic level limiter, flash signal light, adjustable side tone, and powerful two watt headphone amp. Portable system standard with two channels, rack mount standard with three channels. The RTS TW Intercom System is compatible with all carbon or dynamic mic headsets. It is completely field serviceable and handsomely packaged to provide superior service under the toughest conditions. In addition, the system is uniquely flexible, allowing custom requirements such as multiple channels, discrete channel talk & listen switching, iso switching, and special interfacing.

For more information please call or write: RTS SYSTEMS, 4167 FAIR AVENUE, NORTH HOLLYWOOD, CA 91602 (213) 980-0511

NEW PRODUCTS

continued from page 226

Image Enhancer

The PAL/SECAM version of the "Crisp-Matic" image enhancer and noise reducer was displayed at the recent Montreux Symposium and Technical Exhibition. The PAL/SECAM "Crisp-Matic" is manufactured and sold by Yves Faroudja, Inc.

The three units on display at the company's booth were delivered to VCI in Paris (a duplication facility), the IBA in England, and a representative in Munich after the exhibition. European distribution is being arranged through video product representatives who saw the product on display and expressed an interest.

For More Details Circle (337) on Reply Card

Camera Lens System

Rank Precision Industries is offering a new Varotal Multi-Role Lens (MRL), which for the first time gives television camera users a common set of optical zoom lens modules for both TV broadcast standard cameras and for portable cameras.

Considered a major breakthrough in lens system design, this Rank Optics-Taylor Hobson MRL permits the user to select lens modules to make up a system tailored to his individual needs and budget. To extend lens usage, Rank has put together an extremely compact objective with a wide specification to full professional standards. Three interchangeable lens fronts give wide-angle, narrow-angle and standard possibilities—a total focal length range of 56 to 1. Rank offers the MRL for most broadcast TV cameras.

The MRL's location arrangement and release setup gives instantaneous lens interchange which needs no re-registration or camera adjustment.

The portable MRL was designed basically for use with tripod.

For More Details Circle (336) on Reply Card

A Rare Sight

YOU MAY NOT SEE IT FOR ANOTHER 10 MONTHS

When an installation such as this microwave station in Greenland is accessible for only a few months a year you need a dependable, remote power source. Inside the protective shelter TELAN thermoelectric generators are the sole source of power. For more information about TELAN please call or write to us today.

TELEDYNE ENERGY SYSTEMS
110 W. TIMONIUM RD., TIMONIUM, MD. 21093
Phone: 301-252-8220 Telex: 8-1780 Cable: TELISES

For More Details Circle (179) on Reply Card
High Precision Rebuilding—
Your Assurance of Quality

Putting it all together at Econco

SERVICE
Econco's prompt 30-day repair service, coupled with fast reliable UPS handling, makes getting tubes repaired a quicker method than ordering a new tube from a distributor. 7-Day repair rush orders and 1-day delivery available in emergencies. Add to this Econco's improved capability in making glass seals, mesh filaments and improved grid making capability.

RECYCLE USED TUBES
As we become more and more conservation conscious of energy and virgin materials, we encourage stations to consider selling their used tubes to us. Save your packaging and when you get a few or a lot, send them to us for cash. We'll make them better than new.

TUBE TESTING
All rebuilt tubes are fully tested and must meet new tube specifications or we do not ship them. Tubes which do not meet specs. are repaired again or scrapped if not repairable.

THE PRICE IS RIGHT
Econco's prices average approximately 50% of new tube prices. These savings are even greater when you include sales tax on new tubes.

HIGH POWER TUBE REPAIR . . .
With the trend to use higher power tubes and increased needs for this service, Econco now provides high power tube repair. Econco can now repair most internal defects on 5671's and 5681's. We have also been able to add the 4CX35, 000C, 6697A and 5682's to our price list.

Begin recycling today - send us your used tubes.

ECONCO BROADCAST SERVICE, INC.
Route 2, Box 188
1302 Commerce Avenue
Woodland, California 95695
Telephone (516) 662-4495 or (916) 662-6031

For More Details Circle (180) on Reply Card
New, Super Powerful CD 480 The Smart Switcher

Revolutionary modular switchers with unprecedented production power. They outperform the largest conventional switchers, yet are extremely simple to operate. Their power and ease of operation are due to CDL's new Sequential Effects (SFX) Amplifier, which can cut, mix or wipe between two Background Sources and two separate Key Sources either individually or in any combination. Models with one or two SFX Amplifiers provide all the standard and optional features you need, including Rotary & Random wipes, RGB Shadow keys, Hard and Soft Color Border wipes, Color Border keys, Quad with Color Borders, Encoded Chroma keying, Key Mask generator, and 16, 24 or 32 inputs. A variety of modular accessories will continue to keep your switcher smarter than the rest as new technology develops.

The CD-480 is now being shipped.

System 100

Computer controlled automation system for Technical Operations that communicates directly with a Business Computer System. Stores and retrieves the schedule with entry error checking, makes automatic time and holiday corrections, performs complicated audio/video switching sequences (including dissolve, fades, wipes and keys), assigns machines, verifies material and prints the "As-Aired" log.

PEC-120

Video Tape Editor

A computer editing system with easily operated control panel and CRT display for rapid and precise control of VTR's & Switcher. CDL's unique Self Learning Cueing Software Program is a new feature.

EDS-200

Video Tape Editor

A two machine Time Code microprocessor Editor that interfaces to Quad or Helical VTR's.

Also a complete line of production and TV terminal equipment, including:

- SMPTE Time Code Generators and Readers
- Video and Pulse Distribution Amplifiers
- Chroma Keyers: RGB and Encoded
- Processing Amplifiers
- Audio-Video Routing Switchers
- Pulse Assignment Systems
- Machine Control Systems

Master Control Switchers

Ranging from CDL's new CD 480 MC to a 2 Bus MCS-829 or a 3 Bus MCS-770. All 3 can be interfaced to System 100/Technical Automation System.
Not just another pretty interface

So okay. On the surface a reproducer is a reproducer. We all look pretty good in your rack.

But our beauty's more than centimeters deep. Because you're into automated broadcast you need something that's going to hang in there long after the warranty's gathered dust.

That's why we designed the 255 and hung the Scully marque on it. It's simple. Reliable. Tough. (And it's Scully quality at what's their name's prices.)

Let's start with the deck plate. It's not stamped. It's a heavy chunk of cast metal that's been precision machined. That makes it accurate. No tape skew.

Now take a look at the head to capstan distance. Short. Very. That makes the chances of flutter almost nil. Gives better tape to head contact and superior phasing.

The head cover slips off for easy access. There's protective TTL logic so you can't spill tape. And all the electronics are right behind the pull off front panel. (Like we said, simple.)

Connectors are XLR. (After all, that's what you use, isn't it?) And, if you're space conscious, our reels have a skinny overhang so you only need a 1½" panel between equipment.

There are other features, too. Like 5 to 10½ inch reel switching, ¼-½ or full track head configuration, front knob level controls. You can order it for NAB or IEC equalization. In 110/220V, 50 or 60 Hz. With a 25 Hz cue stop tone. Even with 600 ohm balanced output transformers.

Those are just a few of the highlights. A letter gets you all the specs. In detail. Ask for the Scully 255 at $1200.

Oh, another thing. If you should need it, we've got parts and service practically instantly anywhere in the country. (And a lot of places out.)

Remember. We've been in broadcast since ace
tate discs. You had to be good then. We still are.

Any questions, write. Scully Recording Instruments. Division of Dictaphone Corp., 475 M Ellis Street, Mountain View, CA. 94043. (415) 968-8389. TLX 34-5524.
For the professionals in sound

VIF has complete automation systems, plus a wide range of audio equipment, high quality components, readily available spare parts, and a full line of accessories. Professional sound equipment for the professionals in sound.

VIF

INTERNATIONAL
P.O. Box 1555
Mountain View, CA 94042
(408) 739-9740

For More Details Circle (192) on Reply Card

New Products
continued from page 228

mounted portable cameras; its focus is manually controlled, and the system is self-centering and light.

The packaged MRL accepts interchangeable manual or servo zoom and focus modules. It is the first package to incorporate the newest film wiring which is both reliable and lightweight. A set of three turret range extenders is optional.

For More Details Circle (338) on Reply Card

Digital antenna monitor

Gorman-Redlich Manufacturing Co. has a new FCC-type-approved digital AM antenna monitor, model CM, for stations that have a transmitter attended during hours of directional antenna operation.

Model CM features true ratio reading, exceptional stability, and a compact size in a 19-inch rack panel, 3 1/2-inches high, 6-inches deep, with power consumption of 6 watts. Weighing 7 pounds, the monitor can be mounted in a console and has LED display with continuous display of phase sign.

For More Details Circle (339) on Reply Card

NEW MONITOR-CONTROL-ALARM

- Saves on energy cost
- All solid state
- Six models same case style
- Eliminates idling motors

These are our new MCA series 100 plug-ins designed to provide you with a fast and attractive solution to monitoring station signals and controlling power loads and/or alarming on loss of signal.

For More Details Circle (193) on Reply Card
New Products

Automatic intermixer
Two new VIF Intermix models (model 3000-STB stereo and model 2000-B monaural), designed for use in background music applications and radio station automation, are now available. The new models offer completely automatic intermix between three sequential and one real time program sources.

For use in background applications, transferring between the sequential program sources is keyed through silence sensing, with switching taking place approximately seven seconds after the end of each program selection. When used in radio station automation, the VIF Intermix program transfer is keyed by a 25 Hz tone, depending on the mode selected. For maximum cueing flexibility, VIF provides a built-in variable delay which operates at either the beginning or ending of the tone, depending on the mode selected. For maximum cueing flexibility, VIF provides a built-in variable delay which operates in either mode. A silence sensing back-up continued on page 248

angénieux
The newest and largest selection of lenses providing the maximum optical flexibility for the diversified demands of the television and film industries.

angénieux corporation of america
1500 OCEAN AVE. BOHEMIA, NEW YORK 11716 • (516) 567-1800
13381-BEACH AVE. VENICE, CALIFORNIA 90291 • (213) 821-5080
4 HAVEN HILL SQ. AGINCOURT, ONT. M1V1M4 • (416) 291-2363

For More Details Circle (195) on Reply Card
New Products
continued from page 247

system is also included in case program material is missing.

Other features of the VIF Intermix models include: all solid-state circuitry utilizing computer type integrated circuit logic; plug-in cards for switching capability and all program sources; photo cells for completely noise-free switching of all audio functions; built-in speaker for cueing or off-the-air monitoring; light emitting diode program stage indicators; pushbutton rapid advance; and VU meter(s) pre-set so that zero equals plus 4 dBm, with other output levels available on request at no additional charge.

For More Details Circle (340) on Reply Card

Distribution amplifier
The Di-Tech model 170 audio D.A. features a 200K resistive input balanced or unbalanced with six 600-ohm outputs. Output type is balanced, resistive buildout.

Maximum input level is +24 dBm continuous. Distortion at these levels is 0.1% maximum. The six outputs are adjustable via a single control which is located on the front of the unit.

A unique feature of the model 170 is the front panel headphone jack. This jack permits a simple access to the audio D.A. for listening purposes either for program identification or for troubleshooting purposes. The audio signal is not disturbed when utilizing the headphone set.

Model 170 utilizes the standard Di-Tech frames, model 101 or 103, for mounting purposes.

For More Details Circle (341) on Reply Card

Zoom blow-up positioner
The Warren R. Smith Company has made the Zoom Blow-up Positioner available for use on telecine chain projectors. Models are available for both 16 mm and 35 mm projectors, including RCA FR-35, GPL, Simplex, RCA TP-66, Kodak CT-500, as well as Bell & Howell, Kodak and other AV types.

Using this unit, you can correct composition errors, zoom in or out while transferring film to tape, pan distill independently, reposition for title insertion, mix film with chroma-key scene and "build" commercials on telecine. The positioner also makes it possible to zoom without focus change, from twice to 1/4 film frame.

It has independent pan-tilt-focus iris controls and manual or servo motor drives. There is optional Cinemascope capability and a range of zoom lenses can be used. High resolution and ample light output are exhibited. No alteration to the projector is necessary.

A model for telecine slide projectors, which is now under development, will be available soon. With this unit any area of vertical or horizontal slides can be panned and zoomed.

For More Details Circle (342) on Reply Card

Video edit buzz tone eliminator
A. F. Associates has developed a gated video circuit that eliminates extraneous RF buzz tones during video only edits when using an Ampex VR 2000 or VR 1200.

This device can be installed in less than an hour, and it features CMOS technology, RF turn-on and RF turn-off, and plug-in connectors to the VTR's RF circuits. Designed to eliminate the 960 Hz tone in video-only edits, the device is good enough for network and post-production operations.

For More Details Circle (343) on Reply Card

CMC Provides Unexcelled Services For:

- Refurbishing Video Head Assemblies - Mark III, Mark X, Shibaden Mark X, Mark XV, Mark XX and RCA.
- Refurbishing Audio Heads for Ampex & RCA VTR's.
- Immediate Delivery - Video Discs & Heads for HS-100.

For more information, please write:

COMPUTER MAGNETICS CORP.
125 W. Providencia Ave.
Burbank, Calif. 91502
U.S.A.
(213) 843-6674

For More Details Circle (203) on Reply Card
Easily update your VR-2000 & VR-1200 to obtain full AUTOMATIC Line by Line and Channel by Channel Chroma Level Adjustment.

Video editing controller
Panasonic's model NV-A950, an editing controller, when combined with Panasonic model NV-9500 master cassette editing recorder and NV-9200 or NV-9300 slave-player cassette recorders, combine to create an efficient 3/4-inch cassette editing system that delivers broadcast quality programming.

The unit performs insert and assemble edits automatically, preroll function backspaces each recorder so they will be up to speed and locked in sync when edit point is reached.

Features include slow rewind, fast play, and search functions, non-locking pushbutton controls with logic memory, and light emitting diode (LED) function indicators.

For More Details Circle (344) on Reply Card

55 kw FM transmitter
CCA Electronics Corporation has added a new 55 kw FM broadcast transmitter, model FM55000EP, to its line of AM, FM and TV transmitters.

The 55 kw FM transmitter is conservatively rated for 55,000 watts power output, and is FCC type-accepted to operate from 25,000 to 60,000 watts power output. The CCA FM55000EP features parallel final amplifiers to eliminate down-time due to single amplifier design. Optional exciter and amplifier switching get around failures of individual component parts in the system which can cause transmitter shutdown.

The CCA FM55000EP utilizes a 100-watt solid-state frequency synthesized exciter with regulated power supplies. Stereo performance can be added with the optional CCA Optimod-FM stereo generator. Simultaneous SCA operation can also be added with the CCA SCA-1E sub-carrier generator.

The transmitter consists of two cabinets containing independent high-power amplifiers, a center cabinet housing the 100-watt exciter[s], hybrid splitter, exciter switching and system status and control equipment.

For More Details Circle (345) on Reply Card

Character generator
A television character generator with four times the memory capacity of its predecessor has been developed by 3M Company.

The new model D-3016 character generator features a 16-page capacity memory. Like the model it replaces, the D-3000, which had a 4-page memory, the new system is designed for professional television systems that require quality titling/captioning capability. From a character-quality point of view, both units are identical.

Three font styles are available with the D-3016: Video Gothic, Piper Roman and Helvetica Semi-Bold. All are available in upper-case style with matching lower-case characters. The D-3016 can accommodate either two different upper-case font styles or a matching upper and lower case font.

Like the D-3000, the new unit displays up to 22 characters in a row and 10 rows per page. It also features 3-speed vertical roll and horizontal crawl movements and automatic centering.

For More Details Circle (346) on Reply Card

Low drain weighting filter
A low profile C-message weighting filter, requiring ±3 mA of current from power supplies between ±5 and ±18 VDC, is now available continued on page 250

September, 1977

COMPUTER MAGNETICS CORPORATION
125 W. Providencia Avenue, Burbank, California 91502, USA: TEL: (213) 843-6674
For More Details Circle (197) on Reply Card
New Products (continued from page 249)

from Frequency Devices, Incorporated.

Specifically designed for use in portable telephone circuit test instrumentation, the model 581-3 frequency response characteristic simulates, to within ±1 dB, the perceived response of the human ear to telephone noise in accordance with Bell Technical Reference 41009.

Other key specifications include input impedance: 10 kohms minimum, output noise: 50μV DC to 50 kHz, rated output: ±10 volts at 2 mA, output impedance: less than 1 ohm. Over the 0°C to +70°C operating temperature range, output drift is 0.1μV°C.

This encapsulated modular package measures 0.7"x2"x2".

For More Details Circle (347) on Reply Card

Flying spot color film chains

Three new Rank Cintel MK3 Flying Spot Color Telecines have been installed by Rank Precision Industries, Incorporated. The major installations are in New York City, and in Los Angeles at MCA Discovision and Ruxton Limited. This brings the total number of MK3 Telecines operating in North America to seven. The other machines are located at Rombex (New York City); Transworld (Las Vegas); and Motion Picture Video and Advertel (Toronto).

Rank’s Flying Spot MK3 Telecine reportedly gives excellent reproduction from color or mono, positive or negative. 16 or 35mm film, or from slides with the use of the same transport mechanism.

The MK3 uses a flying spot system which eliminates the camera together with the problems of lag, color registration and noise in the picture low lights. The single scanning tube utilizes a short afterglow phosphor with the high intensity required for reproducing dense material.

Of particular interest to the U.S. market is the machine’s built-in capability to reproduce 16mm or 35mm Cinemascope films full frame with electronic panning. Its ability to handle negative stock safely opens possibilities for grading direct from camera original to videotape for editing.

The Telecine operates on either 625/50 or 525/60 standards. On 625 lines 50 Hz field rate, the film...
The AUTOMATIC Audio Test System
That Measures...

- Harmonic Distortion
- Intermodulation Distortion
- Volts
- dB
- Signal + Noise / Noise Ratio
- Wow and Flutter
- Stereo Phasing
- Differential Gain in Stereo Channels

Model AT-51
Audio Test System

Contact Us Now For Complete Details And Descriptive Literature.

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

For More Details Circle (266) on Reply Card

AGAIN & AGAIN
POTOMAC INSTRUMENTS IS

1ST PRODUCT INNOVATION

First
FCC Approved Antenna Monitor AM-19(204)
First
Harmonic Reading Standard Broadcast Field Strength Meter FIM-41
First
Digital Antenna Monitor AM-19D(210)
First
Frequency Synthesized RF Bridge Source and Coherent Detector SD-31
First
Solid State VHF Combination Field Strength Meter & RF Generator FIM-71
And
Other FIRSTS to be Announced

Contact Us Now For Descriptive Literature On Our Complete Line Of Broadcast Instrumentation.

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

For More Details Circle (267) on Reply Card

The company also has data input and work desks.

While Amco offers several options, the three most popular are the vertical racks (with side panels and with or without a door), and sloped and low silhouette versions that can be ordered with a writing surface that extends from the cabinet at typical table top heights.

Two-channel receiver
Edcor's new two-channel wireless receiver, model ST-3B2, allows two wireless microphones to be used at one time. The crystal-controlled receiver has both a high and low impedance audio output for each channel.

The unit has an external telescoping antenna split internally for two channels. Other features include: AC or DC operation, lightweight construction, easy installation, and it can be used with any Edcor wireless microphone.

Microphones
Audio-Technica's new microphones are available in three electrical...

continued on page 252
Before you settle for an inexpensive and inflexible off-the-shelf console... Or go to the great expense of having one custom designed... look at MAP's new IMPAC™ Series!

Modular Broadcast Consoles... For AM/FM and TV

- Truly outstanding performance specs
- More features
- More flexibility
- Exceptional value — surprisingly affordable
- Readily expandable to meet your growing needs.

This Model 6022. 16 Channel, Dual Output TV Audio Control Center is one of 3 new main frame configurations. Available fully wired. Or in do-it-yourself kit form.

For complete details contact Rick Belmont

50 Orville Drive
Airport International Plaza
Bohemia, N.Y. 11716
(516) 567-9620

For More Details Circle (244) on Reply Card

10-Station intercom

N.O.V.A. Corporation's new NOVA-COM is a 10-station speaker intercom system. Touch-tone operation requires only pushing the button for the desired station, talking into the microphone and releasing the button to listen. When the conversation is over, push the "off" button. There is an "all call" which when released is also an all listen. Every station is a master.

Installation requires a 4-conductor cable. A single 24 VDC power supply is needed. Additional stations can be added at any time.

For More Details Circle (352) on Reply Card

Production switcher

Shintron has announced the model 375 Chromatic Production Switcher for medium scale broadcast applications.

The model 375 switcher is a 12-input, all vertical interval switcher that will withstand continuous use in remote pick-up or ENG vans. Electrical specifications are fully broadcast. The electronic circuitry is packaged separately from the remote control panel.

Notable features of the model 375 are: built-in chroma keyer, soft and edge wipes, two independent color background generators (one for main matte, the other for down-
stream matte), and autotake. The wipe generator is equipped with 10 patterns all with wipe limit controls. Patterns can be modulated by the built-in audio generator. The main matte keyer uses a complementary color from the background generator. The downstream matte key can be dissolved to black for panic situations. The front panel design is human engineered for easy use and uses professional, high-reliability components. PAL version is also available. For More Details Circle (353) on Reply Card

English command control system
"BASIC" is IGM's new system control which uses English commands, virtually eliminating coding of information, event numbers or other alpha-numeric encoded data. Working with Intel and utilizing the latest microprocessor computer-based technology, IGM engineers designed BASIC systems A and B to perform more tasks than most existing systems. BASIC A is programmed, controlled and monitored from a single enclosure rack, using a standard keyboard with 18 special-function keys. It can handle 16 sources, expandable in increments of 16. Capacity of the static RAM memory system is 4,000 schedule entries, expandable to 8,000 in increments of 2,000. Programmable audio fade control for each source with un-continued on page 254

Color videomonitor
Incorporating the 25-inch Trinitron picture tube, the PVM-2550 has the largest screen-size of any color video monitor Sony has ever offered in the United States. The dual input color unit has external synchronization capability. The PVM-2550 employs a color picture tube with a beam scanning velocity modulation system. This innovation improves resolution, providing a sharp picture over the entire screen area. The new modulation system also suppresses white color distortion and eliminates "snow" noise. The monitor offers flexibility as a display device for video use at trade shows, point of purchase displays or wherever any large size displays are required. For More Details Circle (354) on Reply Card

Digital troubleshooting videotape program
"Digital Troubleshooting," a color videotape program with accompanying textbook and lab workbook designed to provide training in the growing field of digital instrumentation, is available in a completely updated version from the Hewlett-Packard Company. This 14-videotape program has a total running time of 5 hours and 31 minutes, and includes a 180-page textbook, lab workbook and study guide. The curriculum is designed to provide instruction for individuals learning digital troubleshooting for the first time and for technicians needing a refresher course on digital (versus analog) techniques. Topics discussed in the tapes include an introduction to digital electronics and the binary system; the basics of transistors and ICs; logic gates and symbols; digital IC families; troubleshooting digital ICs; flip flops; counters; shift registers; combinational logic circuits; display technologies; IC manufacturing; and memories.
PROVED on
TV networks in Canada.
Now Available in U.S.A.

Developed by Telcom Research, The Time Code Centre performs a variety of time code functions integrally. A single unit contains a Generator, a high speed Reader and a Calculator. They operate independently and are also able to “talk to each other.” THE TIME CODE CENTER lets you do things you couldn’t before. Call us at (416) 444-8497 for a free trial.

Distributed by: Glentronix Ltd., 160 Duncan Mill Road, Don Mills, Ontario. M3B 1Z5

For More Details Circle (246) on Reply Card

Does Your AM Tuner Sound Like Quality FM?

Our Dymek AM5 Does!

"Listening to a local classical-music station that carries the same programs on its AM and FM outlets, switching between the audio-output signals from an FM tuner (set to mono) and the AM 5, we found that the differences were very slight, actually comparable to those we have sometimes heard between different FM tuners. Much of the time no difference at all could be heard..." - JULIAN HIRSCH

Reprinted with permission,
Stereo Review, August 1976

Factory Direct, Money Back Guarantee Rent/Own Plan. Call or write for complete specs and details on the remarkable AM 5, its companion piece the DA 5 antenna, and other Dymek Products. Call toll free:
Nationwide 800/854-7769 California 800/472-1783

McKay Dymek Company 675 N. Park Ave., P.O. Box 2100 Pomona, Calif. 91766

For More Details Circle (247) on Reply Card

New Products
continued from page 253

limited real-time switching abilities is standard. English print-out logging is also standard.
BASIC B stores memory on floppy discs for up to 6,000 schedule entries per day with 8,000 format or subroutine entries common to all days and offers color CRT.
Four types of control procedures are included:
- Normal audio or external relay, and whether this event must be followed by another regularly scheduled event. Audio Fade-on and OFF controls and up to 30 classification descriptions like COMMERCIAL, PAS, ID, etc.;
- Branching control for switch "JUMP TO" subroutines;
- Real-time event control, including five functions: immediate, approximate, external, dead-roll and switch voice track; and
- Conditionals which remain in the system indefinitely and are only used under special conditions.

For More Details Circle (356) on Reply Card

Audio-video head cleaner

The recorder care division of Nortronics Company, Inc., is offering a new QM-35 Foam & Cleaner, an all purpose tape head cleaning combination for audio, video, instrumentation and digital recording equipment.

The kit contains a quantity of reusable cellular foam swabs, for removing oxide and dirt accumulations that build up on recorder heads, capstans and guides when used in conjunction with the liquid head cleaner supplied to loosen these accumulations.

Once the liquid cleaner breaks deposits away, the non-abrasive foam swabs permit heavy scrubbing action. The liquid head cleaner is specially formulated for safe use on rubber parts and tape heads and will not lose any residue. A special orifice on the cleaner bottle prevents accidental contamination.

For More Details Circle (357) on Reply Card

Microwave tower warning light control

Hughes & Phillips have developed a solid-state microwave tower warning light control and alarm unit for unmanned microwave radio-relay stations.

The unit is designed so it does not have to be removed from the housing for repair. Plug-in "modular-type" components are used for...
major broadcasting stations & networks on five continents are now specifying

ARISTOCART

No, we won't name them, but some of the best known broadcasters in the business have now switched to our cartridge for better sound reproduction in major markets from Chicago to Capetown — from Sydney to Stockholm.

There are some good reasons:

ARISTOCART is the only cartridge that guarantees you reel-to-reel fidelity (20 Hz to 15 kHz) and FM broadcast phase stability (better than 90° to 12.5 kHz). ARISTOCART is the only cartridge individually checked for phase, frequency response and overall performance.

WE'LL REPLACE ANY ARISTOCART CARTRIDGE WHICH FAILS TO PERFORM WITHIN ADVERTISED SPECIFICATIONS ON PROPERLY ALIGNED EQUIPMENT.

ARISTOCART

THE CARTRIDGE FOR PEOPLE WHO CARE HOW THEY SOUND

DISTRIBUTORS IN ALL MAJOR U.S. MARKETS

For the one nearest you, contact:

ARISTOCART DIV. WESTERN BROADCASTING LTD.
505 BURRARD ST. VANCOUVER, CANADA V7B 1M6
TEL (604) 667-2844
TELEX 04-54939

For More Details Circle (225) on Reply Card

September, 1977

Low Cost
High Performance
Professional Degaussers

- Save Time
- Save Tape and Film
- Save Money

WRE's wide range of degaussers are designed for years of dependable service for clean and simple erasure of magnetic film and tapes in just about any configuration. Backed by years of proven reliability, these units are the answer to cutting man-hours and reducing material costs by allowing reuse of prerecorded media.

Acoustic coupler

A new telephone coupler by Shure Brothers Incorporated features improved transmission quality and ease in feeding recorded material into a telephone for remote broadcasting.

Called the Shure 50AC, the coupler may be strapped to any telephone in seconds. Connect it to a cassette tape recorder, flip the "play" switch and the recorded material is automatically fed into the phone.

There is no need to tie into the telephone wiring system or to remove the telephone mouthpiece. The 50AC completely covers the telephone mouthpiece. There is no background noise, no loss in intelligibility and the unit has no induction coils. The 50AC may also be driven by the Shure SM82 Line Level Microphone.

A lever built into the 50AC also allows adding live commentary without interrupting the transmission of a taped interview or message. In addition, the 50AC may be used as a microphone by speaking directly into the unit while its "mini-plug" is connected to the MIC input of a recorder. A 300 to 3,000 Hz tailored frequency response approximates the response of the telephone.

ENG color camera

A three-tube color TV camera weighing only 21.1 pounds, including 10X1 zoom lens and built-in camera control unit, has been developed by JVC Industries Company.

The CY-8800U equipped with three ½-inch magnetic-focus, magnetic-deflection Plumbicon® tubes. Saticon tubes will also be available.

The CY-8800U is a self-contained

continued on page 256
New Products
continued from page 255

unit which can be activated by 12 VDC power. It features a 1.5-inch CRT view-finder that can be moved forward and back, up and down and laterally.

The camera has external synchronization capability (SC plus sync or composite video) and can be operated remote through an optional unit. It also features a built-in color bar generator and can be used as an encoder or color monitor for line checking.

Horizontal and vertical corrector circuits are provided for crisp pictures. Likewise, a circuit for indicating the wave form of the video signal is built in for constant monitoring.

The CY-8800U provides high sensitivity, high resolution color registration by combining the three-tube system with dichroic-mirror color-separating optics. It has a 49 dB signal-to-noise ratio at f/4.0 with 277 foot-candle illumination.

For More Details Circle (360) on Reply Card

Multiplexer
TeleMation’s new TMM-205 Multiplexer accepts up to three projector inputs and can accommodate 8mm, 16mm and 35mm film projectors for operation with a color or monochrome camera. Transitions between optical sources occur in approximately 0.5 of a second and are bounce-free. The entire mechanism is designed to eliminate acceleration and shock loading forces. A fiber-glass cover protects the optical assembly from dust and prevents extraneous light from entering the camera lens.

A local control panel permits selection of film 1, film 2 and slide, and contains the master AC switch and fuse. All equipment is connected to a shelf or pedestal with a three-point adjustable mount, making the system installation and optical alignment of the TMM-205 simple and permanent.

For More Details Circle (361) on Reply Card

Production switcher
3M Company’s Mincom division has developed a low-cost production switcher for industrial and educational video studios.

The model B12 production switcher is capable of 12 effects which are selected by knob control, including a circle, diamond, upper left corner, and square diagonal. A joystick positioner allows positioning of five effects. Effects can be enhanced
have you checked the competition?
NOW CHECK OURS!
Studio-Transmitter Link

For Transmission Of Superior Audio Program Quality
- A Full 10 Watts of RF Output Power
- Direct Reading Forward & Reflected Power
- 2 Watt Monitor Amplifier in Receiver
- Unique Oscillator Design Assures Maximum Stability
- Built-in RFI Modules on Transmitter and Receiver Input and Output

PTS-10 Series Studio-Transmitter Link & Inter-City Relay
Available as either a Wideband Composite or as a Narrowband. Single or Dual Channel system this new STL employs modern day technology. Using Phase Lock Loop Techniques in the Composite STL transmitter, and an accessory Sub-Channel Generator, all MCI systems are enhanced by the use of the very latest chips available. Field tested and proven, these systems provide unmatched quality attractive styling and superior performance.

Remote Control
The Best Of Two Worlds
digital for command accuracy
analog for telemetry speed
- Modern "Touch-Tone" Channel Address
- Compatible ATS Available
- Expandable to 19, 29, or 39 Channels
- Unique Expanded or Non-Expanded Scale Readout
- Continuous Verification of Channel Addressed

Model DLC-90/LT-9 "Digis-Log" Remote Control System
This all new Remote Control system achieves the ultimate in accuracy, stability, simplicity and speed, combining a unique blend of present day digital and analog technology. The MCI Automatic Transmitter System (ATS) is available as a plug-in, add-on unit to the Remote Control System for positive transmitter surveillance, alarm correction or automatic shutdown if necessary.

MICRO CONTROL ASSOCIATES
P.O. Box 13250 Arlington, Texas 76013
817/265-2912

September, 1977

Further by built-in softwipe and spotlight controls.

The unit has eight video inputs. The first seven are loop-through with built-in 75-ohm terminating switches. The eighth is selectable to either internal colorizer or internal color black generator signal.

The 812 features a 3-buss configuration: program, preview A and preview B. To assure a quality video output, a non-sync warning indicator alerts the operator to nonmixable video inputs.

A preset control allows for mix-to-preset-wipe and wipe-to-preset-mix operations. An auto mix/wipe button automatically mixes or wipes to the new input.

For More Details Circle (362) on Reply Card

Field-production TV camera
Commercial Electronics, Inc., (CEI) has agreed to manufacture the new EMI 2008 broadcast color television camera for EMI Sound and Vision who will market it primarily in Europe. The EMI 2008 is a field-production television camera nearly identical to the new CEI-310, recently developed by CEI.

For More Details Circle (363) on Reply Card

Satellite TV receivers
Microdyne Corporation's new model 1100-FFC is a single frequency, stand-alone satellite TV receiver designed to reduce the cost of adding TV channels to any existing or new domestic CATV or international satellite receive-only terminal. When using channel dedicated receivers and any type of frequency agile receiver as backup for any one channel, all current channels plus others soon to follow can be readily accommodated at minimum cost.

The 1100-FFC is a compact 3½-inch rack mount unit, fully EIA and CCIR compatible. It interfaces without system modifications and offers the same video, audio and related performance specifications as the standard model 1100-TVRVT receiver—including the 8 dB C/N threshold.

Options offered are: ability to change frequency, composite video output, monitor output for a redundancy network and split configuration.

For More Details Circle (364) on Reply Card

A-D and D-A converters
Tektronix, Inc. has introduced two new video devices: the ADC 820, an 8-bit 20 MHz analog-to-

continued on page 258

For More Details Circle (228) on Reply Card

For More Details Circle (232) on Reply Card

www.americanradiohistory.com
New Products continued from page 257

digital converter and the DAC 850, an 8-bit 50 MHz digital-to-analog converter. Both designs are optimized for video applications.

The ADC 820 is built on a single circuit board, 6"x8"x1" and dissipates less than 7 watts. Power requirements are ±12 volts, ±5 volts, ±5.2 volts. It has an on-board low pass anti-aliasing filter right at the input to the quantizer. The entire quantizing and digital coding process is performed by three proprietary Tektronix LSI chips. The architecture of the chips and the surrounding circuitry eliminates the need for a sample and hold. Differential phase and gain are less than 1/2° and 1/4% RMS.

The DAC 850 is also 6"x8"x1", and has the same voltage requirements. Dissipation is less than five watts. It comes with three times or four times subcarrier output filters, or with no filter. Differential phase and gain are less than 1/4° with 1/4% RMS.

For More Details Circle (365) on Reply Card

Real-time audio processor

A computer-based processor that eliminates unwanted noises from audio signals and recordings in real-time has been developed by Rockwell International Corporation’s Electronics Research Center.

The processor can be used either to "clean" an audio signal as it is being received, or to enhance a recording that has already been made. It can remove from 40 dB to 50 dB of highly-correlated noise with minimal degradation in the desired voice signal.

The portable Automatic Digital Audio Processor (ADAP) can be used both on-site (by police in making recordings, by on-scene reporters, or for on-location television and motion picture film, etc.) and in a studio or sound room in conjunction with other audio equipment.

The processor removes two types of noises from voice tracks: additive sounds, such as music, traffic or background noises; and convolutional sounds, such as resonances, room acoustics or noises inherent in recording equipment. The ADAP recognizes the undesired sound and eliminates it within 200 milliseconds.

The processor is easy to operate and fully automatic, adjusting itself to track and cancel undesired audio
Camera junction box

Sharp Electronics Corporation has introduced a rack-mounted junction box, XJB-2000. It is designed so that two junction boxes are mounted on a single 19-inch panel with all connections to the junction box made inside the rack. The only connections showing from the outside of the frame is the camera input. The XJB-2000 camera junction box is designed for use when interfacing the Sharp XC-2000 color camera into a system.

For More Details Circle (367) on Reply Card

Portable scope

Hitachi Denshi America, Ltd. has introduced the "mini-portable" V-059B and V-158 oscilloscopes.

Weighing less than 6¼ pounds, the V-059B is a 7 MHz oscilloscope designed for use in the field, as a troubleshooting tool, and as a TV waveform monitor. The TV sync separator provides automatic lockup at horizontal and vertical rates; a 2H-2V switch gives correct TV WFM presentation. Keyed DC restoration, external trigger input and external horizontal inputs are other features of this scope that may be powered from AC line, 12 VDC or self-contained rechargeable battery with built-in charger.

The V-059B also features direct or 10X probe input, vertical deflection sensitivity of 10mV/div, and sweep rates from 20ms/div to 10us/div, plus a 10X magnifier. The sweep may be triggered from internal, external or line with selection of positive or negative slope in either automatic or normal (triggered) mode. The internal graticule is an 8x10 division format with 6.35mm (.25 inch) divisions. The green light incorporates a 100-0-40 IRE graticule for TV waveform display.

For More Details Circle (368) on Reply Card

Parametric equalizer

A second-generation Parametric Equalizer (model 622) is now available from Orban/Parasound. Encompassing all of the features of the model 621 series, the new 622 offers in/out switches on each of its four bands, standard balance input with output transformer option, extensive RF shielding, and 115/230 volt.

Write for your free copy today or call (404) 449-0873

Roh 1977 Catalog of Modular Audio Equipment

Over 50 audio components designed for broadcast service

The most extensive modular audio product offering available

Includes many new and revised models for exceptional system capability

For More Details Circle (270) on Reply Card
New Products

continued from page 259

50-60 Hz AC power supply included in the package. A new proprietary parametric bandpass filter is virtually immune to the effects of control wear, and complements the unique "constant Q" design by permitting -40 dB notches to be consistently obtained. THD has been reduced to less than 0.025%, 20-20,000 Hz at +18 dBm. All other features of the 621 series are retained: four cascaded sections, each with non-interacting, continuously variable center frequency, bandwidth, and amount of boost or cut. Each section tunes over a 25:1 frequency range, with broadly overlapping coverage for maximum flexibility. An overload light is provided which monitors all potential overload points in the circuit, and overload can be easily corrected with the integral gain control.

Video monitor

A newly-styled 14-volt professional monochrome monitor for VTR over-console mounting in a tape bridge is available from Conrac. Model DZB offers the broadcast engineer a dependable, performance-stabilized picture. Modular design and quick-disconnect circuit boards permit rapid replacement of circuits.

The all-solid-state, ultra-rectangular 15-inch D6500 phosphor CRT monitor features horizontal and vertical delay switches, linearity within ±1% picture height and modular high voltage supply. A front panel selector switch, optionally remote, allows either of two matched video inputs to be viewed for picture comparison.

Since the model DZB utilizes a keyed back porch clamp, the black level will not vary more than 1 fl as the duty cycle is changed from 10% to 90% APL over a temperature range of 20°C to 55°C. The unit will display hum, noise and spurious signals on the incoming line. DC restoration can be cut in or out by a switch on the chassis deck. Sync signal analysis is accomplished through a front panel control which permits the operator to shift the picture one-half line, while simultaneously increasing the oscillator horizontal time-constant to display tape recorder jitter.

Directional wattmeter

Bird Electronic Corporation's model 4431 is a new Thruline® RF directional wattmeter for the measurement of forward or reflected CW power with the additional feature of an adjustable RF sampling output for frequency analysis on a scope, spectrum analyzer or frequency counter.

The wattmeter is designed for ±5% power measurement from 100 milliwatts to 5000 watts from 2 to 30 MHz and up to 1000 watts from 30 to 1000 MHz, using the same standard plug-in elements in dis-
crete bands and power-levels as catalogued with model 43. No plug-in elements are needed for RF analysis. The sample signal is adjustable from 15 dB to over 70 dB below the main line signal, offering protection from overload for high-sensitivity instrument inputs.

The model 4431 has a low insertion VSWR of 1.07 at most settings. A major feature resulting in this low VSWR value is the use of the QC Quick-Change Connectors, which permit mating with male or female N, BNC, TNC, UHF, C, SC, HN, GR, Type 874 and 7/8-inch EIA lines without the need for performance-degrading adapters.

For More Details Circle (371) on Reply Card

Condenser microphone system

Electro-Voice’s “System C” is a modular professional microphone system. It consists of a number of elements which can be interchanged to fit specific applications. Elements in the system include two electronic preamplifiers—one for handheld applications and one for boom use. The boom preamplifier operates from either phantom or AB remote power. Four interchangeable capsules are available: omnidirectional, cardioid, hyper-cardioid and Cardi-line® shotgun. Accessories, including wind screens and shock mounts, are also available.

System C is backed by a two-year, unconditional warranty.

For More Details Circle (372) on Reply Card

Remote pick-up transmitter

McMartin Industries has engineered a portable remote pick-up transmitter, the RPU-1103, to meet all the FCC requirements effective August 1, 1977. The unit is a 3-watt, 150 MHz solid-state, dual frequency transmitter. The RPU-1103 comes with a rechargeable nicad battery which will provide eight to ten hours on-the-job reporting at a 50% duty cycle.

Standard equipment includes a shoulder strap and whip antenna which can be replaced with the lower profile rubber duck type antenna. Two-frequency operation is achieved with a front panel switch when the optional second channel frequency element is installed.

Two audio inputs are provided. One is a mic input with 25 dB of compression with an LED indicator to display proper operation. A line input is provided for use with a portable tape recorder or cassette player. When combined with the

continued on page 262
New Products
continued from page 261

talk-over feature of the push-to-talk button on the microphone, the recorder of player allows for production in the field.

The unit is designed for broadcast quality type microphones and the input jack is provided so that any available microphone can be used. The unit displays typical distortion of 1% and audio response of less than 1 dB from 50 to 7500 Hz with 75 microsecond pre-emphasis.

For More Details Circle (373) on Reply Card

Camera tripod

Based on precision-made Swiss components, the new Images Devices Inc. Super Stix Tripod features lightweight, weatherproof aluminum construction (8½ lb.) with a maximum height of 67½” and a minimum height of 2'2". It is supplied with a Miller F head at $695, a Ronford F-1 head at $995, or an O’Connor 30 head at $960.

Other features include: removable leg wedges for low angles, adjustable leg friction, hanger hooks for paraphernalia, a reversible rising column, a balanced carrying handle, a D-ring for included leather shoulder strap, adjustable telescopic legs with rubber feet and steel spikes.

For present owners of similar Swiss tripods, IDI will modernize the units with the addition of leather shoulder strap, balanced carrying handle, hanger hooks, Velcro tieups, and extra D-ring; price: $35.

For More Details Circle (374) on Reply Card

Five-cavity klystrons

Varian has introduced two five-cavity vapor-cooled klystrons for use as final amplifier tubes in both
visual and aural sections of UHF-TV transmitters.

The VA-953H and VA-954-H offer improved linearity and higher operating efficiency by providing lower DC input power for the same transmitter power rating. Special design permits multiplexing both visual and aural signals at 50% to 75% of the visual-only rating.

Features include high gain of at least 47 dB producing a 55 kW peak-of-sync output with less than 0.7 watts of RF drive. Efficiency is up to 42% (standard tubes operate at 29% to 32% efficiency). Bandwidth of 1 dB is at least 7 MHz over the tuning range. Frequency range for the tubes is 470 MHz to 698 MHz. Peak output is 57 kW.

For More Details Circle (375) on Reply Card

Background music tape reproducer

A new background music tape reproducer is now available from VIF International for use in radio station automation as well as background music applications.

The model 450 offers individual amplifiers for each track, each equipped with level set and high/low frequency equalization adjustments. The amplifier assemblies, as well as all control circuitry components, are mounted on plug-in type printed circuit cards and are accessible from the rear of the machine.

The model 450 Background Music Tape Reproducer features low take-up tension; capstan mounted between the head stacks; high-level audio switching at each amplifier output; automatic reversal at the end of each playing direction; and "Reel Change" actuation that will shut the 450 off automatically at the end of a complete playing cycle when the supply reel is full.

continued on page 264

STAY A STEP AHEAD!

Shallco step attenuators assure you of reliable control of your audio. Always re-settable to your selected level.

Request catalog 102
Shallco, Inc. P. O. Box 1089
Smithfield, N. C. 27577
919/934-3135

Still the industry’s MOST POPULAR

VIDEO TAPE CONDITIONER

- Cleans and winds tapes
- Prolong tape life and reduce dropouts
- Extend VTR head life
- Hundreds installed worldwide
- Leasing program available

RECORTEC, INC.
777 PALOMAR AVE., SUNNYVALE, CA 94086 TEL: (408) 735-8821 TWX: 910-339-9367
Erases video cassettes in 5 seconds!

NEW GARNER VIDEO'RASER

Now you can completely automate your video tape erasing jobs with Garner's new Video'Raser unit. It's a simple one-step, in-and-out operation. Tapes pass on a continuous belt over high flux coils, giving you tape erasure depth exceeding professional standards. Built rugged and compact, it easily handles video cassettes. You'll also like the Video'Raser's competitive price.

Look to Garner for quality electronic audio and video products. For more information, write or call:

GARNER INDUSTRIES
4200 North 48th Street, Lincoln, Nebraska 68504, Phone 402-464-5911

For More Details Circle (208) on Reply Card

When accuracy Counts...Count on Belar for AM/FM/TV MONITORS

When accuracy counts, count on Belar for AM/FM/TV monitors.

BELAR CALL ARNO MEYER (215) 687-5550
ELECTRONICS LABORATORY, INC.
LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 828 • (215) 887-5550

For More Details Circle (209) on Reply Card

New Products
continued from page 263

The model 450 is capable of handling reels up to 14 inches in diameter, and is available in either 1/2-track monaural or 1/4-track stereo with playing speeds of either 3.75 inches per second or 7.5 inches per second.

For More Details Circle (376) on Reply Card

Soldering pistol

The Kager KL 3000 is a lightweight instrument as suited to precision applications in the electrical and electronics fields as it is to the production-line worker.

The solder is incorporated in the pistol. By simply squeezing the trigger, it is fed to the heated soldering tip. The precise amount of solder required for a particular joint may be selected by turning a knob. Cold soldering spots are minimized because the object being soldered or the copper lamination surrounding it is heated prior to the application of the solder.

The KL 3000 is available with power inputs of 20 to 60 watts.

For More Details Circle (377) on Reply Card

Color Monitor

A high-resolution 13V color monitor designed for size-limited signal evaluation applications in broadcasting and teleproduction is available in production quantities from Conrac.

The compact unit, model 5722, can be mounted over VTR consoles and is compatible with VTR instrumentation/monitor bridges. The monitor also has a cabinet configuration as an option for portable teleproduction use.

The model 5722 features a 13V high-resolution Colormatch shadow mask CRT which allows critical

Still the industry's MOST USEFUL VIDEO TAPE ADDRESSOR

- Off line time code writer
- Records at 8 times speed
- Writes both control and cue
- Saves VTR time and heads
- Cleans and rewinds tape

RECORTEC, INC. 777 PALOMAR AVE., SUNNYVALE, CA 94086 TEL: (408) 735-8821 TWX: 910-339-9367

For More Details Circle (219) on Reply Card
signal evaluation. The unit includes preset controls for contrast, brightness, chroma, phase and aperture; horizontal and vertical delay switches; a horizontal AFC time-constant switch; and phase linear aperture correction.

For More Details Circle (378) on Reply Card

Operational amplifier
A low-noise, general-purpose operational amplifier offering a wider bandwidth and improved output drive capability is now available from Signetics.

The SE/NE5534 is capable of driving 10V (RMS) into 600 ohms directly, and features a small-signal bandwidth of 10 MHz and power bandwidth of 200 kHz.

Other specifications of the 5534 include: DC voltage gain. 100,000; AC voltage gain, 6,000 at 10 kHz; and supply voltage range, ±3 to ±20V.

For More Details Circle (379) on Reply Card

FM audio processor
The broadcast products division of Harris Corporation has expanded its MSP-100 (Maximum Signal Processor) FM Audio Processor for use with AM.

The MSP-100 is an audio control package designed for ease of adjustment, enabling stations to tailor sound to individual formats.

This single unit incorporates a tri-band AGC which processes separate segments of the audio spectrum independently. Operational parameters, including frequency bandwidth, thresholds and shapes, and attack/recovery constants. The signal within the protection module, which follows the limiter, is split into two frequency bands to optimize the limiting of the high-frequency signal content.

continued on page 266
The NEW RFA-5 AM RF Amplifier

- 30dB AGC Range
- Signal Strength Meter
- Three RF Outputs for
  monitors, frequency counter and oscilloscope
- Optional 600 ohm Balanced Audio Output and Carrier/Audio-Fail Alarms.

"Set it and forget it" — that's the comment most often heard from AM station engineers who have installed a National Electrolab AM RF Amplifier. The new RFA-5 is even better than the previous RFA-4. AGC is now standard, and a built-in carrier level meter makes setup easy. As well as driving most modulation monitors, the RFA-5 also delivers a low level oscilloscope output and a clipped/limited output for a standard frequency counter. Four double-tuned selective stages in the preamp, combined with a MOS-FET front end, provide outstanding performance in frequency-congested areas. Over 250 radio stations in Canada and the U.S.A. are presently using National Electrolab RF amplifiers. Try one yourself — and forget it. For complete information, call any office of Gates Broadcast Equipment Div. of Harris Corp. or:

NATIONAL ELECTROLAB LTD.
Box 68, Blaine, Washington 98230
Canada: 1536 Columbia St., North Vancouver B.C. V7J 1A4 Phone (604) 985-0511

For More Details Circle (211) on Reply Card

New Products

continued from page 265

The only change necessary in converting from FM to AM is to replace the FM protection module with an AM protection module.

The AM protection module contains a fast broadband peak limiter featuring low distortion and low noise. Asymmetrical limiting of the signal is achieved through the use of innovative circuitry to allow 125% positive peak modulation. Noiseless switching is achieved through zero crossing phase reversal.

In the FM version of the MSP-100, pre-emphasis is selectable at 25 microsecond intervals from 0 to 75 microseconds.

Both AM and FM employ active input and output for the best frequency and transient response. In addition, a peak reading meter is provided.

For More Details Circle (380) on Reply Card

Stereo disc-equalizer

A stereo disc-equalizer, with a head amplifier developed especially for record reproduction in high-grade audio systems, has been introduced by Accuphase and distributed in the U.S. by TEAC.

The model C-220 has a built-in head amplifier, with a gain as high as 26 dB, and it accepts inputs from any brand of moving coil (MC) cartridge. The unit also exclusively employs a Class A symmetrical push-pull circuit and is the first MC cartridge head-amplifier to use a ring emitter transistor. The equalizer circuit employs a low-impedance differential amplification push-pull circuit, which can realize a signal-to-noise ratio of 85 dB against an input of 2 mV. The C-220 also has a large capacity power supply circuit.

Frequency response is ±0.2 dB.

Still the industry's MOST DESIRED

VIDEO TAPE EVALUATOR

- Tape evaluation at 16 times speed
- Cleans and winds tapes
- Standard in the industry
- World wide customer base
- Leasing program available

RECORTEC, INC. 777 PALOMAR AVE., SUNNYVALE, CA 94086 TEL: (408) 735-8821 TWX: 910-339-9367

For More Details Circle (213) on Reply Card

www.americanradiohistory.com
20 Hz to 20,000 Hz, and total harmonic distortion of 0.01% at rated output level, 20 Hz to 20,000 Hz.

For More Details Circle (381) on Reply Card

**Video distribution amplifiers**

Video Aids Corporation of Colorado has introduced two new video distribution amplifiers to their line. The model VDA-1 is a VDA which can be operated from any 12-volt DC power supply capable of delivering 70 mA. The model VDA-1P has its own self-contained power supply. These video distribution amplifiers are designed for installation in TBCs and other equipment where additional video outputs or feeds are required. The VDA-1 is priced at $79, and the VDA-1P at $125.

For More Details Circle (382) on Reply Card

**Stereo headphones**

Burwen Research's new family of stereo headphones includes two patented orthodynamic and three dynamic models. Produced in West Germany, the entire line features wide-range frequency response extending beyond the range of human hearing, extremely low distortion even at high sound levels, solid basses, clear trebles and precise transients.

Styling is simple, emphasizing light-weight comfort and featuring both around and on-the-ear models. Extras include solid RCA phono jacks, 10-foot cables and heavy-duty cable protection.

The orthodynamic driver used in the top-of-the-line model PMB 8 is a push-pull sound producing unit. It eliminates the cost, weight and technical complications of electrostatic or electret units. The PMB 8 utilizes an ultra thin voice coil diaphragm, positioned between two

continued on page 268
HERCULES HYDRO
Weight: 8.5 lbs. (3.9 kg)
Wt. capacity: 50 lbs. (22.7 kg)
Dimensions: 6" x 5" (cm. : 15.2x12.7)
Tilt: +30° Pan: 360° Code No. 4-5280-3

Introducing the perfect go-togethers for Cine/ENG.
Ideal combination of lightweight, high capacity, portability.

SAMSON Cine ENG
Weight: 9 lbs. (4.2 kg)
Wt. capacity: 70 lbs. (31.8 kg)
Max. M. : 56°
Min. M. : 32°
(147.3 cm.)
(81.3 cm.)
Code No. 4-7080-4

New Products
continued from page 267

perforated disc magnets. The diaphragm has coaxial conductors printed on its surface. These spiral in opposite directions to ensure uniform electrical impulses.

The two disc magnets are sintered, which provides a large surface area for the active magnetic material. Perforations allow the sound waves to pass through from the headphone to the ear. The drive unit segments are joined at the center and the edge, so that the segments respond in phase.

For More Details Circle (383) on Reply Card

Color camera service tapes
Hitachi Denshi America, Ltd. has just completed a series of set-up and maintenance tape programs for several of its cameras. The program covers complete set-up of a camera and explains each control or adjustment. It also shows by split screen, a waveform monitor resulting from the described adjustment.

The tape presentations on video cassette format are meant to be an aid to customers and dealers in correct set-up procedure of the Hitachi color cameras.

The tapes presently cover the SK-70, SK-80 and FP-1212 systems and others are in process of production. The price is listed at $90 and they will be available from Hitachi Denshi dealers across the country.

For More Details Circle (384) on Reply Card

Portable DMM
A new RFI shielded 3½-digit portable DMM has been announced by B&E Precision, Dynasonic Corporation. The model 2810 features .01 ohm resolution and selectable high-/low-power ohms.

The 2810 is a full-feature digital multimeter with a basic DC accuracy of 0.5%. The 3½-digit display uses bright 3-inch LED readouts. Twenty-nine overload protected ranges provide maximum resolution. Auto-ranging capability reduces the need for frequent range changes.

A highly valuable function of the 2810 is the 10-ohm range. This range, with its .01 ohm resolution, is ideal for locating a shorted winding in a transformer, motor or coil. A front panel 10-ohm ZERO control allows the user to zero-out the minute amount of test lead resistance.

The high-/low-power ohms switch is operated independently from the range switch, allowing high/low

ELECTRO IMPULSE
Thanks You for Making Our Model DPTC-20KFM Dummy Load One of our Most Successful Products!

MODEL
DPTC-20KFM
Rated 25KW
DC-110MHz
VSWR 1.15:1

Load is Dry, Forced Air Cooled, Fully Interlocked and WARRANTED FOR 25 MONTHS

Our New General Catalog 890 is now available upon request covering:
• Dummy Loads • Baluns • Calorimeters • Power Meters/Attenuators

28th YEAR OF GROWTH

116 Chestnut St., Red Bank, N.J. 07701
Telephone: 201-741-0404

For More Details Circle (257) on Reply Card
selection on four ranges. The low-power ohms position permits resistance measurements in solid-state circuitry without biasing semiconductor junctions.

AC and DC voltage ranges cover from 100 mV to 1000 volts with 100% overrange reading and automatic polarity indication. Four AC and four DC current ranges read from 1µA to 2 amps.

For More Details Circle (385) on Reply Card

Video cassette editing recorder

Panasonic has introduced model NV-9500, a high performance video-cassette editing recorder for color or black-and-white recording, editing or playback of 1/4-inch videocassettes.

Features include direct-drive video head cylinder motor for high stability and less jitter, capstan servo system to maintain precise head-to-tape speed, signal-to-noise ratio of better than 45 dB for excellent picture quality, even in second and third generation tapes, and high resolution of 330 lines monochrome and 250 lines color. Special features include a dubbing mode switch for improved dubbing and editing.

Model NV-9500 also offers automatic selection of color or black-and-white mode; vertical sync input and sub-carrier input for use with time base corrector; chroma level adjustment; dropout/noise compensator; HPF heads; diecast chassis for strength and durability; new gear tape loading system for reliable tape threading; three cooling fan blades for improved ventilation; and uniform design of printed circuit boards, with low density component layout on individually removable panels for easier servicing.

For More Details Circle (386) on Reply Card

Crystal filter

An 8-pole switchable bandwidth crystal filter has been designed as an AM/LSB IF filter for AM-SSB CB sets. The filter, by CTS Knights, incorporated, can be switched electrically from AM wide-band operation to SSB narrow-band operation by applying 7 VDC 50 mA to the switch terminal.

Minimum 3 dB bandwidth is 6 kHz in the AM mode and 2.7 kHz in the SSB mode. The new filter is available with center frequencies in the range of 10 to 13 MHz. Other operating characteristics include temperature range: -20°C to +60°C; band-continued on page 270
HAVE YOUR CAMERA TUBES RECYCLED BY PATENTED PROCESSES!

NEW TUBE WARRANTY!

SAVE APPROXIMATELY 50% OF THE COST OF A NEW TUBE!

ORTHICONS!
ISOCONS!
PLUMBICONS!
VIDICONS!

DELIVERY 2 to 6 WKS ARO!

ALSO, A LARGE SUPPLY OF ORTHICONS IN STOCK FOR IMMEDIATE DELIVERY!

For further information, write or call

IMAGE CONCEPTS INC.
216 Buttonwood St.
Reading, Pa. 19601
(215) 374-4932

New Products
continued from page 269

width at 3 dB; 6 kHz minimum with switching current off, 2.7 kHz mini-
mum with switching current on, switching power 7 VDC 50 mA; ter-
termination: 50-ohm resistive or natural 2.5 kilohms, 4.8 pf, center
frequency drift: 20 ppm maximum.

For More Details Circle (387) on Reply Card

Patchcord system
Data Sheet 75-350 from AMP Incorporated describes standard
and low-profile programming sys-
tems that provide signal and power
circuit capabilities in one unit.

Mechanical and electrical specifica-
tions are provided for eight sizes
ranging from 450 to 4,896 jack posi-
tions. These hybrid units have both
standard (single conductor) and
coaxial contacts. The standard con-
tacts are rated at 5 amperes with a
contact resistance of 6.5 milliohms.
Coaxial contacts exhibit better than
-60 dB crosstalk to 100 MHz (40 dB
to 600 MHz) with a VSWR of 1.2
maximum to 100 MHz (1.4 to 600
MHz) when used with RG-174/U
cable.

The low profile systems occupy
less than 7 inches of rack height in
a standard 19-inch wide cabinet.

For More Details Circle (388) on Reply Card

Lighting Color Filters
Berkey Colortron, Inc. has ex-
tended its line of Gelatran color
filter media to 60 by the addition of
30 new colors.

According to the company, the
new colors were selected to form "a
system of colors that would meet
any possible artistic requirement of
a lighting designer" in theatrical,
film and television applications.

For More Details Circle (389) on Reply Card

12 kW VHF transmitter
A new data and specification
sheet on a 12 kW transmitter, model
TT-447, utilizing two hybrid com-
bined but totally independent trans-
mitter assemblies to achieve 12 kW.

The data sheet provides informa-
tion on the specially designed modu-
lator operating at television IF
frequencies; complete specifications
are included on visual and aural
performance along with service
conditions and mechanical specifi-
cations for RCC and CCIR systems.

For More Details Circle (390) on Reply Card
advertisers’ index

AEG-Telefunken .................. 71, 73
A. F. Associates, Inc. .......... 32, 38
AMCO Engineering Co. .......... 96
Accurate Sound Corp. .......... 223
Acrodyne Industries, Inc. ..... 158
Adda Corp. ..................... 167
Alco Electronic Products, Inc. .. 92
Alexander Mfg. Co. ............. 258
All Mobile Video ................. 261
Allen Avionics ................... 274
Allied Broadcast Equipment ...... 226
American Data Div. .............. 100
Amperex Electronic Corp. ....... 203
Anmpo Corp. ..................... 77
Amtron Corp. .................... 257
Andrew Corp. .................... 205
Angenieux Corp. of America .... 246, 247, 277
Anixter-Mark ..................... 194
Aristocrat Div. Western Broadcasting Co., Ltd. 295
Artist’s Engineering ................ 270
Arvin/Echo Co. ................... 29
Asaca Corp. of America ......... 17
Audio Designs & Mfg. .......... 27
Audio Distributors, Inc. ........ 247
Audio-Vide Engineering Co. ..... 92
Audifronics, Inc. ............... 196
Audio-Technica .................. 227
Automation Electronics, Inc. ... 225
B & I Electronics, Inc. ......... 246
BGW Systems, Inc. .............. 56, 59
The BTX Corporation .......... 206
Beaucart Div., UMC Electronics Co. 26, 92
Belar Electronics Lab., Inc. ..... 264
Bigbner Broadcast Equipment Corp. 212
Broadcast Component Distributors 269, 271, 273
Broadcast Consultants Corp. ..... 83, 94, 96
Broadcast Equipment & Supply Co. 267
Broadcast Video Systems, Ltd. 214
Buhl Optical Co. ................. 272
CCG Electronics
Corporation ...................... 99, 100, 101, 102, 103, 104, 105, 106
CMX Systems .................... 9
CPR Systems, Inc. .............. 274
Cablewave Systems Inc. ........ 173
Calvert Electronics Inc. ......... 250
The Camera Mart, Inc. .......... 64
Canon USA Inc., Optics Div. .... 177
Central Dynamics Ltd. .......... 230
Cetec Audio ..................... 217
Cetec Broadcast Group .......... 25
Collins Television Services (See TelTeC) 197
Commercial Electronics Inc. .... 181
Communications Limited ......... 271
Communication Medias .......... 269, 271, 273
Communications Technology Inc. 194
Computer Labs .................. 34
Computer Magnetics Corp. ....... 248, 249
Consolidated Video Systems .... 136
Contel Mfg. ...................... 80
Continental Electronics Mfg. Co. 244, 247, 250, 269, 271, 273
Convergence Corp. .............. 39
D and S Corley Ltd. ............. 202
Decca Austin Insulators .......... 262
Delta Electronics Inc. .......... 183
Dielectric Communications ....... 165
Dimension-3 Recording Co. ...... 277
Di-Tech Inc. .................... 263
Dyna Engineering Inc. .......... 276
Dyna Electronics, Inc. .......... 175
Dynasciences ................... 14
Dynatech Data Systems .......... 192
Dytek Industries Inc. ............ 35
ES Enterprises .................. 68, 69
Econco Broadcast Service Inc. ... 229
Edutron, Inc. .................... 213
Elcom Engineering Co. .......... 275
Electro Impulse, Inc. .......... 268
Electrohome Ltd. ............... 40
Electronics Diversified, Inc. ... 219
Elfron Electric .................. 85
Fideltone Inc. .................. 172, 264
Flash Technologies Corp. of America 216
Frequency Devices Inc. .......... 222, 271
Frezziolfin Electronics, Inc. ... 88
Fujinon Optical, Inc. .......... 253
Garnet Industries ............... 264
Geleco Electronics Ltd. ........ 277
General Electric Co. Video Display Equip. Op. ... 87
Gentronics Ltd. ................. 218, 222, 254
GLOBAL ELECTRONICS

Broadcast Component Distributors

Scully

Recording Instruments

Program Loggers
Reel-to-Reel Tape Decks
Microphones & Stands
Headphones
Phono Cartridges
Replacement Magnetic Heads
Monitor Speakers
AM/FM/Stereo Exciters
5 KW AM Transmitter
10 KW AM Transmitter
50 KW AM Transmitter
2.5 KW FM Transmitter
10 KW FM Transmitter
15 KW FM Transmitter
25 KW FM Transmitter
40 KW FM Transmitter
50 KW FM Transmitter

Equipment Leasing

(215) 437-0607

Communication Medias

P.O. Box 54/Allentown, Pa. 18105

For More Details Circle (238) on Reply Card

QUALITY TALKS FOR
WRVA
Richmond, Virginia

Continental’s 317C is the best measure for any 50 kw AM transmitter purchase. Performance, 125% positive modulation and reserve power capabilities are unbeatable. Today’s best sound in 50 kw AM is Continental. Write for brochure: Continental Electronics Mfg. Co. Box 270079 Dallas, Texas 75207 (214) 391-7161

For More Details Circle (239) on Reply Card
World Video, Inc.
P. O. Box 117, Boyertown, Pa., 19512
Phone 215-367-6055

For More Details Circle (214) on Reply Card

MOBILE MULTIPLEXER!

Save the high cost of an extra color camera
Studio camera adapts to film chain use in seconds
Use standard TV zoom lens
Input: Two 35mm slide projectors in dissolve mode plus 16mm or Super-8
Mobile Multiplexer saves studio space
At $975.00, out performs units at twice the price!

For complete technical details—
Contact Buhl.

For More Details Circle (215) on Reply Card

A FILM CHAIN WITHOUT A DEDICATED CAMERA

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.

GUARDIAN TELEVISION LABORATORIES

Rochester, N.Y.
October, 1977

September, 1977

For More Details Circle (240) on Reply Card

For More Details Circle (243) on Reply Card

For More Details Circle (241) on Reply Card

For More Details Circle (242) on Reply Card

Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the cleanest sound around. Listen to Continental quality talks.

Write for brochure: Continental Electronics Mfg. Co., Box 270879 Dallas, Texas 75227 (214) 361-7161

www.americanradiohistory.com
DIGITRON PORTABLE FREQUENCY COUNTER

The Digitron 6550 portable frequency counter counts from 1 Hz to beyond 550 MHz with commercial accuracy. Time base is 10 MHz utilizing a high accuracy temperature-compensated crystal oscillator. The counter is totally portable weighing just 2½ pounds, with dimensions of 2.50 x 7.54 x 7.75. Noload power is 110 VAC provides power. The Digitron 6550 has a 6 digit display with 3 digit carry. Sensitivity is less than 50 mV. Only $349.95. Idaho Magnetics, Rt. 5, Box 509A, Caldwell, Idaho 83605 208-459-6557.

FILTERS

1,000,000 Standard Types

BANDPASS • BANDSTOP

Select any Frequency from 3Hz to 500MHz such as CUE TONE 25HERTZ NOTCH • LOW NOISE 50HERTZ HIGHPASS • STEREO GENERATOR 19KHZ LOWPASS

15.75KHz CATV Bandpass, 300 Hz Telephone Simulation Lowpass, 21Hz Bandpass, 1kHz Lowpass, 1kHz notch, 4MHz Lowpass, 7.6KHz Lowpass.

TX Electronics, Inc. 2214 Barry Ave Los Angeles, 90064, (213) 478-8224

SMpte EDITING TIME CODE PRODUCTS

The Model 9300 series character inserter consists of three products each will display time data on a video display. Featuring Preview and program outputs Black background Front panel adjustments for width, height and location Scan rates of 25, 62 or other rates optionally available. Other products Code Reader Code Generator Code Generator Reader /Printer Reader Comparator Vertical Time Insert System

More Details Circle (283) on Reply Card

www.americanradiohistory.com
professional services

RALPH E. EVANS ASSOCIATES
CONSULTING COMMUNICATIONS ENGINEERS
216 N. Green Bay Road
Suite 200
Thiensville, WI 53082
Phone: (414) 242-6000 Member AFCCE

VIR JAMES
CONSULTING RADIO ENGINEERS
Applications and Field Engineering
Computized Frequency Surveys
345 Colorado Blvd.
Phone: (Area Code 303) 333-5562
DENVER, COLORADO 80206
Member AFCCE

Applied Video Electronics, Inc.
STUDIO SYSTEMS DESIGN AND INSTALLATION ENGINEERING. REFINISHING/ MODIFYING COLOR CAMERAS AND QUADRAPLEX VIDEO TAPE RECORDERS
Post Office Box 25
Brunswick, Ohio 44212
Phone: (216) 225-4443

W. H. BRADLEY, P.E.
B. L. BRADLEY, BS/EE
Consulting Radio Engineer
Engineering Applications & Field Engineering
Phone: (309) 682-4233
Peoria, Illinois 61614
Member AFCCE

MIDWEST ENGINEERING ASSOCIATES
Consulting Engineers
6934 A N. UNIVERSITY
PEORIA, ILLINOIS 61614
(309) 682-4233
Member AFCCE

SMITH and POWSTENKO
Broadcasting and Telecommunications Consultats
2000 N. Street, N.W.
Washington, D. C. 20036
(202) 293-7742
James Tiner, President
TINER COMMUNICATIONS SERVICE, INC.
“...We Specialize in Towers”
Complete Tower and Antenna Installation and Service
P. O. Box 3827, 15201 Hickman Road
Des Moines, Iowa 50322
(515) 278-5501

M. PALMER & ASSOCIATES
Noise Measurement & Analysis
Sound & Cable Systems Design
Audio & Acoustic Consultation
Box 10941, Eugene, Oregon 97401
(503) 484-9343 Cable: MPA EUG

Joseph & Donna Roizen
VIDEO CONSULTANTS
International TV Systems
Marketing/Technical Writing
800 Welch Rd. Suite 354
Palo Alto, Ca. 94304
Tel: (415) 326-6103

For More Details Circle (261) on Reply Card

Four Professional Mixing Consoles

THE QM-8A.
- Recording
- Production
- Mixdown
- Remotes

Quantum Audio Labs
1905 Riverside Dr.
Glendale, Calif. 91201
(213) 641-0970

For More Details Circle (262) on Reply Card

For More Details Circle (263) on Reply Card

For More Details Circle (264) on Reply Card

IF YOU NEED ATTENUATORS
YOU NEED THIS CATALOG!

Here in one compact and informative 24 page booklet is all the data you need to select a Precision Audio and RF Attenuator for your application.

Reference Charts, Circuit Diagrams, Types and Uses, Current and Voltage Ratio Tables, Ratings, Etc., make this a handy and invaluable reference.

SEND FOR YOUR FREE COPY TODAY.

TECH LABS, INC.
Bergen & Edsall Blvds.
Palisades Park, N.J. 07650
Tel.: (201) 944-2221

DYMA ENGINEERING

Equipment representatives for:
- AUDIO
- VIDEO
- RF

Manufacturers of:
- AUDIO CONSOLES
- EQUIPMENT
- ENCLOSURES

DYMA ENGINEERING
Box 1697
Taos, New Mexico 87571
505-758-2686
213-674-3021

For More Details Circle (265) on Reply Card

BROADCAST ENGINEERING
EQUIPMENT FOR SALE

MOTORS FOR SPOTMASTERS
New Page 20 synchronous mot-HZ
20-50-4700 as used in series 400
and 500 machines. Price $49.00
each prepaid, while they last.
Terms: cash with order. Send check.
only, no C.O.D.'s. Not recommended for
Tapecaster series. (114)
TAPECASTER TCM, INC., Box 662
Rockville, Maryland 20851

278

MICA AND VACUUM
transmitting capacitors. Vacuum
parts also available. Call for price
lists on request. SU/RCOM ASSOCIATES,
306 Wisconsin Ave., Oceanseide, CA 92054, (714)
722-6162.

A FEW COMPETITIVELY
priced Used A77 &
A700 decks available. Completely
reconditioned by Revox, virtually in conditions from
new and pre-owned. A77 and A700 day warranty for
rebuilds. Satisfaction guaranteed. Write reorders to
Revox, Box 854, Mississippi Avenue,
11802 (516) 921-2620.

RAZOR BLADES—Single Edge, Tape Edging.
Raitec, 25884 Highland, Cleveland, Ohio 44143.

30 FT. MOBILE UNIT
3, PC70's, 1 PC70, 1 64x
Switcher, 1 62 Audio, Grass Valley
and Tektronix Console, Monitors. (215)
425-3620, P.O. 19131, Hawaiian Gardens,
California. (213)

FOR SALE—1,000 watts FM broadcast
transmitter less exciter. Exciter available if desired.
Contact John Torell, 2510 N.E. 47th
Avenue, St. Croix 00840.

TV HIGH BAND VHF 50 Kw Transmitter—
$15,500. RCA T600H AH. Excellent condition.
Presently on air. Includes VSFB and
control kit. Contact John Torell, Bone, Pooie Broadcast
Co., 25 Catamore Boulevard, East Providence.
R.I. 02914. Telephone: 401-438-7200.

BEAUCART MONO CART MACHINE
3-cue, Fast Forward, $550.00. Demo—$750.00. Hussco Mono
Phono Preamps, Balanced. Model FPBM,
New, $130. Demo—$55. Used Specter Sonic
Compilator, $450.00. New, $500. Used
and Trade Used Equipment. Fisher-Burke-Audio-
P.O. 2468, Phoenix, Ariz. 85003, (602)
357-2225.

CARTRIDGE LABELS: New, non-smear pressure
sensitive labels. Fits all cartridges. Comes white
& 4 colors. Write for FREE sample—MASTER-
TONE COMPANY, 1105 Maple, West Des Moines,
Iowa 50265, (615) 225-6122.

CUSB04 TIME BASE CORRECTOR. Good
condition. Currently in use. VIDCOM (513)
214-1331.

REVOX 1002 STEREO DECK. Factory aligned &

CLOSING PRODUCTION STUDIO. Everything
for sale including new IVC 7000 Color Camera, IVC
5000, IVC 300. VTR's. Ampex 4408 and
New more. Also, good Inventory of photographic
equipment. For information or copy of Inventory,
call (318) 435-3624, or write Louisiana Marketing,
901 Lakeshore Drive, Lake Charles, La.
70601.

FOR SALE: Three GE 350 studio cameras. All
in operating condition when taken out of service
in June 77. Best Offer. For Sale—Two TVP camera
packages. Two for Sale—One Technical
optical multiplexer, Model TMM-203. Best offer.
For Sale—Bell and Howell color camera model
297D. Best offer. Contact Jack Bar, Chief Eng.
WRET-TV 36, Box 12656, Charlotte, North
Carolina 28205. Phone: (704) 358-3583.

BEAUCART DEMO UNITS—20% OFF—We are
currently offering a 20% discount on 25
Beaucart audio cartridge tape machines used as
demonstration and evaluation units. These machines
are fully inspected and an inventory of standard tape
is available, ranging from mono, single cue
models, to 4 channel for a price of $600. All are
up to stereo, three cue, fast-forward models at
$1,450. Here's your opportunity to own a Beaucart
type 10 and 20 machines at a substantial, 20% discount.
For more information and a complete list of machines available, contact Beaucart Sales
Manager Chuck Rockhill (at (203) 286-7731.
Beaucart Division, UMC Electronics Co., 460
Savannah Point Road, North Haven, Conn.
06473.

GATES M5534 EXCITER, $500. Gates M5144A
Dual Peak Limiter, $275. Early Gates StudioFonie
Console, $150, available in summer. Hewlett
Packard 3538 Modulation Monitor, $275. Rust

BROADCAST CRYSTALS for AM, FM or
TV transmitters, frequency change, repair or replacement of
vacuum types for RCA, tycos, etc. Gate, Gates,
Collins, etc. transmitters. Quality products,
reasonable prices and better delivery! Don't be
without a spare crystal. Frequency change
and service for AM and FM monitors. Over 30 years
in the business. NOTE: We will be closed for
the month of November. Edision Electronic Co., Box
96, Temple, Texas 76551. Phone (617) 733-3901.

CLOSEOUT SPECIALS—CHARACTER
GENERATORS: Datavision Model D-5240 Character Generators. 3-4
pages memory—2-channel output
—Large, clear characters—horizontal crawl. Orig
ally $4,500—NOW ONLY $2,995. Datavis
Model D-1500 Character Generators. 32-charac
ters, 15 row page, horizontal crawl, audio storage
capability. Originally $4,000—NOW ONLY $2,650. Datavis
MODEL L100 VIDEO SWITCHING,
ORDER TODAY! Call (612) 733-8132, 3M Com-
pany, Minicom Division, 3M Center, Blvd. 223-5E.
St. Paul, Minnesota 55101.

BROADCAST AND STUDIO EQUIPMENT: New
and used. Cart and reel recorders, consoles,
limiters, monitors, mic's, turntables, speakers, keyers,
racks, furniture, riding consoles, trucking,
services, parts (including P76). Authorized
Datavisio

GATES AUTOMATION SYSTEMS—35 total products
including 3: 4408 decks, 4 criterion carts, 1
time announce, SCA-48 brain with capability of
marking 1200 sources, 9 source cross triggers.
Automatic logging with two 33 ASR typewriter
printers. Total studio system, all cables included.
Read for air and priced to sell. Call Kenny
Belford, (405) 235-1671, for total equipment list.

REVOX MODIFICATIONS: Variable Pitch for
A77. A Synchro A77. A Modifer. A
Programmer for A77. Thirty Inch Echo Rack
Mounts Slow Motion 1-700 Full Track. New
Sound Recording Machines available with or without mods at
low cost. All mods professionally performed by
Revox Mod. Rep. (415) 861-6780 Entertainment
and Services Inc., 78 North Franklin Avenue,
Hempstead, N.Y. 11550. (615) 536-2201.

HELP WANTED

Now we’re looking for:
• Marketing/Salespersons familiar with professional
  recording and/or broadcasting products.
• Production Technicians who know OAP circuit
  analysis and who are fast trouble shooters.
• Circuit Board Layout Person familiar with commercial
  standards and/or techniques.

Soon we’ll be needing
people in Production Staff, Engineering, Marketing
Support, Package Design.

If you’re working in the audio industry now or would like
 to fit in, send us your resume or an informative letter, and
let us know about yourself.

Send to: John Delantoni
Orban Associates Inc.
459 Bryant Street
San Francisco, CA 94107

VIDEO ENGINEERS

SRL is a highly successful and professional R & D organization offering an
environment of individual responsibility and continuing career development.
The following excellent opportunities are available:
(1) Video Systems Engineer, to be responsible for the maintenance,
modifications, design and production of a unique audio/visual control
used for flight controls for military and commercial purposes.
(2) Video Engineer, to design unique high
resolution video/television circuitry. Should have experience in analog circuits.
(3) Video Engineer, to maintain existing audio/visual equipment
utilizing high resolution video systems, integration of newly developed equipment
with existing hardware, computers and software. If you are interested in any of
these excellent opportunities then send your resume in strict confidence to:
SYSTEMS RESEARCH LABORATORIES, INC., 2800 Indian Ripple Rd., Dayton, OH 45440.
Equal Opportunity Employer M/F/H

278

BROADCAST ENGINEERING

www.americanradiohistory.com
HELP WANTED (Cont.)

MATV INSTALLERS: Want more profits with less headaches? Information $5.00. Box 809, Boynton Beach, Fla. 33435. 9-77-efi

BROADCAST ENGINEERING OPPORTUNITIES—(coast to coast). We specialize in the placement of well qualified people in the Broadcast Engi-
nering field. Openings at all levels—all locations—Confidential—no cost to applicant. Employer inquiries invited. Contact Alan E. Kornish,
Key PERSONEL, 115 South Main Street, South Main Towers, Wilkes-Barre, Pennsylvania 18701, (717) 822-2196.

TELEVISION CHIEF ENGINEER, management oriented, for leading network affiliate in Gulf Coast area. All new equipment and excellent facilities. Equal Opportunity Employer, Dept. 376, Broadcast Engineering, P.O. Box 12001, Overland Park, KS 66212. 6-77-f

HELP WANTED (Cont.)

MAJOR MARKET RADIO CHIEF ENGINEER—New England market requires new person with strong audio and directional experience. FM stereo experience desirable. Group operation with excellent fringe benefits. Top pay for right man. E.O.E. Send resume to: Walter J. Ellis, Box 7630, St. Paul, MN 55119. 9-72-11

EXPERIENCED ENGINEERS, Technical schooling and first phone license required. EOE. Send resume and salary requirement to KBMA-TV, 3017 Bellevue, Kansas City, MO 64108. 8-56-21

NEW YORK VIDEO teleproduction company wants talented, innovative and creative engineer-
ning staff. We need a Videolapper Editor, Telecine Operator, Assistant Chief Engineer and Sched-
uling personnel. Broadcast Engineering, Dept. 391, P.O. Box 12501, Overland Park, KS 66212. 9-77-11

HELP WANTED (Cont.)

TELEVISION—CCTV Video Maintenance Tech-
nician Benefits. Greater New York, Suffolk County or New Jersey Area. Send resume to: VPC, P.O. Box 268, New Hyde Park, N.Y. 11040. 9-77-f

CHIEF ENGINEER—Experienced Chief needed for 5 Kw AM, DA, and Class A automated FM. Good salary, equipment, and working conditions. Mid-
west small market has good school system and climate. Send resume, references, salary requirements to John David, KMPL Radio, P.O. Box 927, Sikeston, Mo. 63801. 8-77-3t

ASSISTANT CHIEF ENGINEER for TV station. Requires first phone, good maintenance back-
ground and supervisory experience. Equal opportunity employer. Send resume including salary history to: General Manager, KOLO-TV, P.O. Box 2610, Reno, Nevada 89505. 8-77-21

VIDEO STUDIO ENGINEERING LEADER

Intriguing, unusual opportunity for a true leader and innovator to plan, implement, and operate a technologically advanced recording studio. A firm, recognized for en-
couraging and supporting realistic creativity, is entering the home entertainment field with a major new product family using ad-
vanced technology. You will provide the leadership and make major technical deci-
sions. Must have managerial experience or obvious managerial potential.

Minimum of 10 years’ experience in video recording with intimate knowledge of sys-
tems hardware/architecture of a studio. Experience must be consistent with “lead-
ing edge” in the field in order to propose and implement Innovative approaches to program objectives. Must be familiar with editing and formatting process and equip-
ment.

Company paid fee, interviewing, and relocation expenses. Starting salary 25-40k plus outstanding growth opportunity.

Please call collect or send resume to Gene Henn, 716-442-5400. Brucaks Personnel Corp., 2541 Monroe Avenue, Rochester, New York 14618.

ENGINEERS SEEKING A FUTURE IN THE FAST GROWING VIDEO FIELD

Sony Corporation of America, the largest supplier of video equipment in the world, is expanding its technical staff to serve broadcast and industrial users of state-of-the-art video equipment. We are looking for engineers with strong technical backgrounds and maintenance experience with video products such as VTRs, studio color cameras, time-base correctors, and related signal-processing equipment.

Job openings as follows:

MANAGER OF INSTALLATION AND SERVICE: Direct a staff of product engineers in providing full support of all broadcast product lines. Formulate procedures to ensure that all installations are carried out according to spec and provide technical guidance to see that field people are properly trained and equipped to maintain the product with a high degree of efficiency. Candidate should possess an EE degree, have proven ability to manage a technical group and have several years of direct involvement in servicing broadcast customers.

Location—N. Y. C. area

VTR PRODUCT ENGINEERS: Assume complete product-support responsibility for specialized video tape recorders. Evaluate field problems, prepare service literature in rough for engineering change notices, field modifications and service bulletins. Train regional engineers to understand and maintain new products. Candidate should possess an EE degree and have thorough technical knowledge of studio-type recorders and maintenance procedures with at least three years of direct maintenance experience.

Location—N. Y. C. area

COLOR-CAMERA PRODUCT ENGINEERS: Assume complete product-support responsibility for state-of-the-art ENG cameras. This includes follow-up on field and application problems, training of field people and the generation of technical support literature such as service/ modification bulletins and engineering change notices. Candidates should possess an EE degree and have in-depth knowledge of modern multiple pickup tube cameras and alignment techniques with a minimum of three years experience in direct maintenance.

Location—N. Y. C. area

VIDEO ENGINEERS: Work with customers to service video equipment at customers' location and on the bench in regional service labs. Provide on-site training for customer technicians. Candidates should possess an associate degree of equivalent, have an in-depth knowledge of video and VTR systems, and have a minimum of three years direct maintenance experience.

Location—N. Y. C., Los Angeles, Chicago, Dallas, Atlanta

All positions offer excellent salaries and growth potential. Employment benefits are fully paid by the company and include family-coverage hospitalization, pension plan, profit sharing, life insurance and tuition refund. This may be your opportunity to join a technically-oriented team in which the opportunities to move forward professionally are better than can be found in most areas of the profession today.

Send your resume in complete confidence to Mr. Jerry McGinty, Sony Corporation of America, 47-47 Van Dam Street, Long Island City, New York 11101, an equal opportunity employer m/j

SONY

SEPTEMBER 1977

279
FORTUNE CORPORATION

COMMUNICATIONS AND
INFORMATION HANDLING
An Equal Opportunity Employer M/F

VIDEO SALES
ENGINEER

Choice Eastern Region Locations
(Washington, D.C., Dayton, Ohio, New York)

Tektronix, Inc., a Fortune 500 Corporation and a world leader in the manufacturing of electronic video test and processing equipment, has several challenging and rewarding opportunities available. These positions require a very strong technical background in broadcast TV, EE degree or equivalent experience, plus successful prior sales experience in a professional broadcast engineering environment.

This position will also require an aggressive, self-motivated personality as you will be operating with a high degree of independence. We offer excellent salary, commensurate with your experience, bonus incentives, commissions and company car.

FOR IMMEDIATE ATTENTION, PLEASE DIRECT YOUR RESUME WITH EXPERIENCE AND EDUCATIONAL INFORMATION TO: AUSTIN BASSO-EASTERN REGION SALES MANAGER

Tektronix
2 Research Court, Rockville, Maryland 20850
ALL REPLIES WILL BE HELD IN STRICT CONFIDENCE
An Equal Opportunity Employer M/F

HELP WANTED (Cont.)

FULL-TIME CHIEF ENGINEER: requirements include First Class Radiotelephone License and experience in the areas of directional antenna operation, solid state devices, remote control systems, VHF, microwave and radar equipment. Full company benefits and excellent location. Send resume to: Chester Grubbs, Director of Engineering, KTXK Radio, Box 1000, Oklahoma City, Ok 73101.

TELEVISION ENGINEER: Community College needs TV Engineer. Competent in areas of systems design, installation, maintenance, technical production and training. BA degree in Broadcasting with FCC license preferred. Minimum of three years experience. Send resume to Personnel Department, St. Louis Community College, 9001 Wilson. St. Louis, MO 63110. An Affirmative Action/Equal Opportunity Employer.

TELEVISION ENGINEER with electronic editing experience. 1st Class FCC. Computer training desirable. Must be familiar with Ampex Quad VTR's. Salary negotiable. Contact: Jim Masten, Net Televison, Inc., 2715 Packard Road, Ann Arbor, Mi. 48104. E.O.E.

TELEVISION CHIEF ENGINEER: Outstanding opportunity for Chief Engineer highly qualified in both technical and managerial skills. Must have an excellent track record in management and be able to assume full responsibility for a metropolitan market TV station. Experience in planning, budgeting and effectively managing a technical staff is important. This is a unique job opening in one of the most exciting locations imaginable. It offers a tremendous professional challenge with excellent total compensation package. To be considered, please send a brief employment history to Dept. 388, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. All replies will be held confidential. An Equal Opportunity Employer, M/F.

BROADCAST PRODUCTION, post-production facility in San Francisco area seeks chief engineer, maintenance engineer, video technicians and CMX editors. Send resume to Dept. 389, Broadcast Engineering, Box 12901, Overland Park, KS 66212.


REPS WANTED. Major manufacturer of Broadcast Audio Products is establishing exclusive Rep sales force. All territories open: Send company resume and line list to: Dept. 390, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.

CHIEF TELEVISION ENGINEER: The King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia, immediately opening for qualified individual with B.S. in Electronic Engineering or closely related field of study, eight years of related experience in design and maintenance of CCTV systems, and at least two years experience in a supervisory capacity. The setting is a new, modern, 250-bed, acute-care hospital and research center located in the capital city of Saudi Arabia. The Hospital and Department of Audio Visual Services are developing and expanding rapidly. Salary and benefits are exceptional. The 25-month contract includes housing, transportation and a 30-day vacation. Interested, qualified candidates should submit a resume with current salary to: Pershing P. Stahlman, Hospital Corporation International, One Park Plaza, Nashville, Tennessee 37203. 1-800-251-2561. An Equal Opportunity Employer.

REMOTE TV ENGINEER. For studio and remote operations. FCC license required. Must have technical and operating background. Send resume and salary requirements to: Chief Engineer, WTCG-TV, 1018 West Peachtree St., Atlanta, Georgia 30309.

280

BROADCAST ENGINEERING
SS 8500 stereo package

The McCurdy package approach to the engineering of a system allows the user to easily determine the best selection of standard components to fulfill each requirement.

All aspects of the broadcast function from news booth to master control can be met with the maximum of flexibility between units.

A full range of modular enclosures allow for the integration of each component of the system into the most convenient working package.
The VIX-114-A Series Switcher brings an end to the horsepower race for more features in a manually operated switcher.

- Multiple key on each mix/effects unit.
- 10 buses on the VIX-114-4A. 8 buses for the VIX-1142A. Independent key bus.
- Pulse processing. No horizontal picture shift at the end of transition even when your plant is not timed properly.
- Digital quad split with wipe or dissolve in each quadrant.
- Digital automatic transition timed in frames.
- Dissolve or cut between three chroma key scenes each with different background and different title keys.
- Wipe or dissolve or cut between two chroma key scenes each with different background and different title keys.
- Guards against obsolescence. Just plug in the PSAS and/or Squeezoom—two Vital add-ons.
- Enjoy unique effects—star, heart, binoculars, keyhole, etc. with rotary and new sequence wipes with soft border. Spin the star for added effects.
- Superb reliability—human engineered control panel.
- NTSC or PAL systems.

VITAL INDUSTRIES, INC.
A HIGH TECHNOLOGY COMPANY