'74 Buyer's Guide Section page 45

Magnetic Head Maintenance
Proof Survey Findings
the FS-10
Frame Synchronizer

it's here
(since NAB, in March)

it's proven
(by critical network evaluation in actual operation -- all 4 networks)

it's the most revolutionary broadcast product since the color camera!

In March, NEC introduced the frame synchronizer to U.S. broadcasters. Because the frame synchronizer is a completely new kind of product, it took a little time to find out what its real capabilities are. Since NAB, all four networks have had the unit in their studios for evaluation — the consensus of opinion is that the frame synchronizer is the most revolutionary broadcast product to come along in years.

The FS-10 converts remote non-synchronous signals (satellite transmissions; dedicated video lines; remote vans) to digital bits, stores a digitized frame of video, then reads it out synchronous with your local plant reference. This allows special effects and switching between remote and local video without the usual picture disruption or stability problems.

The FS-10 employs a 3-mega-bit random access MOS memory (not shift registers); uses 8-bit quantizing with proven clean transfer characteristics; and the A to D/D to A converters are of the most recent design.

Because the FS-10 stores a complete "frame" of video, there is no distortion of the vertical blanking width — no loss or exchange of VITs — no inconsistency in output switching.

If you're concerned about spare parts or foreign manufacture, don't be — most components are U.S. made or cross-referenced to other American-made equivalents. NTSC standards were the design criteria.

Want to know more? Contact:
NEC America, Inc.
277 Park Avenue
New York, New York 10017
(212) 758-1666; or
TeleMation, Inc.
P.O. Box 15068
Salt Lake City, Utah 84115
(801) 487-5399

NEC
Nippon Electric Company Limited

For More Details Circle (70) on Reply Card
Amperex announces a new high resolution Plumbicon* tube that increases the modulation depth in your Green Channel by 50%.

In the ten years since we introduced the Plumbicon TV camera tube, we have worked continuously to "improve the breed." The first improvement was the development of the separate-mesh Plumbicon... then, the XQ1025R, an extended red response version that doubled red-channel sensitivity with color response paralleling that of the human eye.

Now we've made still another advance in Plumbicon technology: a green channel version of the XQ1025. With the new XQ1025G, you can expect an improvement in green channel performance that will be instantly apparent to your viewers... and to your advertisers.

As the photographs show, the XQ1025G provides a 50% increase in green channel modulation depth as compared to the XQ1020G you're now using. This increase in modulation depth makes possible a significant improvement in resolution and also greatly reduces the need for electronic signal enhancement in the green channel. The resulting improvement in overall system signal-to-noise ratio now allows the camera to be operated at lower light levels.

The new XQ1025G is physically and electrically interchangeable with the standard XQ1020G. Since it is based on the same design and construction principles as the earlier Plumbicon tubes, it offers the equivalent reliability and long life as the standard versions.

We have prepared a short report on the characteristics of the new tube and on what it means insofar as improvements you can expect from it for your camera. For your free copy, contact: Amperex Electronic Corporation, Electro-Optical Devices Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

*Registered trademark N.V. Philips of the Netherlands.
†Typical measurement: 50%; Range: 40% to 70%
in this issue...

38 Globecasting. BE introduces expanded foreign coverage with this entirely new column. Items featured include technical news and happenings from around the world. Ron Merrell.

45 1974 Buyer's Guide Directory. Directory section continues to grow with this year's version—the most comprehensive ever. Products with red listings refer to ads in other parts of the magazine. The Reader Service Card in this issue is good for one year.

91 Manufacturer's Address Section. Complete addresses of all manufacturers included in the product directory section. We suggest using the ads to locate telephone numbers.

108 Magnetic Tape Head Maintenance. A comprehensive inside story of how heads are produced and how they should be cared for at the station. Frank Zeman.

116 Proof of Performance Survey Results. Author of Survey gives the findings and discusses changes needed in the Rules. Dennis Ciapura.

About The Cover

Our cover picture was taken at Trans-America Video Inc., Hollywood. It shows the CMX 300 computer assisted video tape editing system in use with three quads. Picture courtesy of CMX Systems and Bill McDonough.

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ABP AIA BPA

BROADCAST ENGINEERING is published monthly by Inter tic Publishing Corp., 1014 Wyandotte Street, Kansas City, Missouri 64106. Telephone: 913-988-4684.

BROADCAST ENGINEERING is mailed free to qualified persons engaged in commercial and educational radio and television broadcasting. Non-qualified subscriptions in the U.S. are $6.00 one year, $10.00 two years, $13.00 three years. Outside the USA add $1.00 per year to cover postage. Single copy rate 75 cents. Back issue rate $1.00. Adjustments necessitated by subscription termination at single copy rate.

 Controlled Circulation postage paid at Indianapolis, Indiana.

Robert E. Hertel, Publisher

INTERTEC PUBLISHING CORP.
Subsidary of HOWARD W. SAMS & CO., INC.
APC-2000 AUTOMATION SYSTEMS

Grass Valley Group television automation systems employ a building-block concept. This approach enables a broadcaster to begin automated operation on a modest scale and expand the system as requirements change.

The basic system provides on-air switching, storage for 16 events, automatic logging, and complete control of telecine and VTR machines. Larger systems accommodate up to 2,000 or more events. A wide variety of both hardware and software options is available to meet individual needs.

APC-2000 systems can also be interfaced with other computer systems. By combining these systems, a user can achieve a completely automated facility which encompasses on-air, traffic, sales, and billing/accounting operations as well as management information services. Consult GVG for further information.

THE GRASS VALLEY GROUP, INC. A Tektronix Company

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(516) 487-1011

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(213) 390-5172

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ATLANTA, GA 30329
(404) 634-0521

P.O. Box 482
MABANK, TX 75147
(214) 687-1101

126 80th Pl
ARLINGTON HEIGHTS, IL 60005
(312) 394-1344

September, 1974

For More Details Circle (24) on Reply Card
DIRECT CURRENT FROM D.C.

September, 1974

by Howard T. Head

IEEE Broadcast Symposium

The Annual Fall Symposium of the Broadcast Group of the IEEE will be held at the Washington Hotel in Washington, D.C. on September 19 and 20. Technical sessions will highlight innovations in studio equipment, including a Japanese-developed miniature camera; a new transmitting antenna test range developed by a leading antenna manufacturer; digital recording of TV signals; and problems of reradiation from objects near AM directional antennas.

A special field trip is planned to visit the PBS receiving installation in Washington, D.C. where transmissions from the ATS-6 earth satellite are being received. (See 11/73 D.C.) Luncheon speakers include an address by Ray Spence, FCC Chief Engineer.

Commission Rules on CATV Exclusivity in Poor Reception Area

In a case involving a UHF TV station in Charlottesville, Virginia, just east of the Blue Ridge Mountains, the Commission has ruled that a cable system within the predicted Grade B contour of the TV station is not required to provide network program exclusivity if the actual Grade B contour does not include the cable system community. The cable system is required to carry the signal of the TV station since it is within the specified 35-mile zone, but the Commission's ruling distinguishes between the requirement for carriage and the provision of network program exclusivity.

In this particular case, the facts as to Grade B service were not in dispute, and the Commission's decision provides no guidance as to techniques to be employed in locating the "actual" Grade B contour when it differs from that of the predicted Grade B contour. This problem has been raised in previous cases where there was a dispute as to the facts but has not yet been resolved.

In reaching its decision, the Commission concluded that the TV station would be permitted to demand network program exclusivity if a translator serving the cable system community were installed. Even this presents problems in this special instance, however, since the community is in the "radio quiet zone" where highly directional transmitting antennas are required to protect two sensitive radio telescopes in the West Virginia mountains.

Two Unusual FM Channel Assignments

In two unrelated actions, the Commission has departed from accepted practices in making new FM channels assignments. In a case in Indiana,
It pays to read more than the name on the front.

There's that old saying about judging a book by its cover. The name does not always indicate the quality inside. The same theory holds true for just about any piece of equipment, typewriters, fleetcars or radio broadcast equipment.

To illustrate this point, we have prepared a list of comparisons based on current published data from the five leading manufacturers of stereo audio consoles.

We want you to examine all manufacturers' audio equipment claims. Inquire. Compare. Read the facts, the whole story... carefully. Make up your own mind. We feel that only when you have fully evaluated all equipment claims factually, are your best interests served. And ours.

<table>
<thead>
<tr>
<th>Manufacturer &amp; Model</th>
<th>No. of Std. Program Buses</th>
<th>Stereo 80</th>
<th>CCA 105</th>
<th>COLLINS IC-10</th>
<th>SPOT-MASTER BESL-1000</th>
<th>SPARTA Centurion II</th>
</tr>
</thead>
<tbody>
<tr>
<td>GATES</td>
<td>2</td>
<td>2</td>
<td>25 &amp; Metered Mono</td>
<td>2</td>
<td>35 &amp; Metered Mono</td>
<td></td>
</tr>
</tbody>
</table>

Only the SPARTA CENTURION II gives you three stereo program busses, plus metered monaural output.

<table>
<thead>
<tr>
<th>Manufacturer &amp; Model</th>
<th>No. of Input Mixers</th>
<th>Stereo 80</th>
<th>CCA 105</th>
<th>COLLINS IC-10</th>
<th>SPOT-MASTER BESL-1000</th>
<th>SPARTA Centurion II</th>
</tr>
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<tbody>
<tr>
<td>GATES</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>6-10</td>
<td>8-12</td>
<td></td>
</tr>
</tbody>
</table>

Only the SPARTA CENTURION II gives you eight options for eighteen or twenty-four mixers.

<table>
<thead>
<tr>
<th>Manufacturer &amp; Model</th>
<th>No. of Input Sources</th>
<th>Stereo 80</th>
<th>CCA 105</th>
<th>COLLINS IC-10</th>
<th>SPOT-MASTER BESL-1000</th>
<th>SPARTA Centurion II</th>
</tr>
</thead>
<tbody>
<tr>
<td>GATES</td>
<td>4</td>
<td>20</td>
<td>20</td>
<td>16-20</td>
<td>24 to 36, 54 and 72</td>
<td></td>
</tr>
</tbody>
</table>

Only the SPARTA CENTURION II gives you three inputs per mixer module in every configuration. And every one is switch selectable for high, medium or low level inputs.

<table>
<thead>
<tr>
<th>Manufacturer &amp; Model</th>
<th>Mixer Expanders Available</th>
<th>Stereo 80</th>
<th>CCA 105</th>
<th>COLLINS IC-10</th>
<th>SPOT-MASTER BESL-1000</th>
<th>SPARTA Centurion II</th>
</tr>
</thead>
<tbody>
<tr>
<td>GATES</td>
<td>Yes</td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>16-20</td>
<td></td>
</tr>
</tbody>
</table>

Only the SPARTA CENTURION II gives you the availability of mixer extender options.

Other SPARTA CENTURION II features include: remote turning on/off of all mixers; remote start capability through the mixers; motherboard construction with ground plane PC techniques for elimination of wiring harness; silent operation; audio-follow-video switching; fully interchangeable mixing modules; only three types of amplifiers throughout; optically isolated audio switching; either slide or rotary attenuators as options, at the same price; 25 Watts per channel monitor amplification; five VU meters as standard equipment.

There's much more to the story, theirs and ours, that you should know. We're only too happy to tell you ours. Write or call us collect, today, for all the facts on SPARTA Audio Equipment.

We're in the business of You.

Sparta Electronic Corporation
5681 Florin-Parkins Road, Sacramento, Ca 95828
(916) 385-5353 • Telex 377-486 • Cobe SPARTA
a Subsidiary of Celec Corporation

September, 1974

For More Details Circle (25) on Reply Card
the Commission has assigned Ch. 221A as an educational channel although the educational band runs only through 220. In making the assignment, the Commission turned down a conflicting request for the assignment of the channel to a nearby community on a regular commercial basis. The case also involved a question of interference to a Ch. 6 TV station.

In a Florida case, the Commission substituted Class C Ch. 274 for Class A Ch. 272 at the request of the Ch. 272 licensee. The licensee had complained of interference from a station four channels removed, although the Commission's FM Technical Standards do not recognize interference for a four-channel separation. In making the change, the Commission took the relatively unusual step of permitting the assignment notwithstanding the fact that the channel substitution would preclude future assignments on three other FM channels in the area.

Short Circuits

Veteran FCC Engineer Harry Fine, an internationally recognized expert in propagation and space communications, has been named Deputy Chief Engineer... The Commission has turned down a petition to require that engineering material submitted to the Commission be prepared only by Registered Professional Engineers... The Commission has set for hearing two applications involving mutual interference between two VHF TV translators in Colorado... The Commission's Laboratory Division has released a report analyzing the response of UHF TV receivers to intermodulation and image interference ("taboos")... The Commission has authorized the sharing of UHF TV Channels 14-20 with the land mobile services in three additional metropolitan areas.

NAFMB will open a four-day convention Oct. 10-13 at the Fairmont Hotel in New Orleans. This is switch for NAFMB who usually has opted for one-day meetings before the NAB convention. This one will include workshops and panel discussions across subjects of interest to owners, managers, engineers, and program syndicators. AM broadcasters also are welcome.

Manufacturers wanting information on exhibit space and/or hospitality suites should contact: Trade Associates, Inc., Suite 1025, 5454 Wisconsin Ave., Washington, D.C. 20015. They can be reached at 202-656-5794.

Central Canada Broadcasters Association will hold their annual convention Oct. 20-22 at the Bonaventure Hotel, Montreal. For further information, write to: Mr. Duffield, CCBA Engineering Section, c/o CFPL Television, P.O. Box 2880, London, Ontario N6A 4H9.
an ECONOMICAL Choice!

With the MAXI-

$10,795

or the mini

$8,295

The MAXI features 16 inputs and the mini has 10. All inputs may be composite or non-composite. Four busses are standard but when combined with an "OBQS" (one bus quad split) the capabilities of an 8 bus system is attained. The keyer is down-stream to the effects enabling wipes (or Quads) to be done behind ALL keys including chroma keys. Other STANDARD features are: a program channel processing amplifier, an internal blackburst-color matte generator, a 12 pattern programmable special effects generator, a positioner and a spotlight, a cutbar, program and preview output switching, "split handles" on mix and effects, a 3-input keyer with a rate adjustable "blink" feature. All this plus more, much-much more! Ask any one of over 50 satisfied users of the ADC 556.

OPTIONS?

Not many but there are a few—an RGB chroma keyer, Audio-follow-Video, and OBQS. Pattern modulator, longer control cables.

AMERICAN DATA CORPORATION
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ADC SOUTHEAST 205-837-5180
ADC SOUTHWEST 713-941-7272
ADC MID-ATLANTIC 301-460-1454
ADC NORTHEAST 617-237-2600
ADC WEST 213-387-7756

September, 1974
Mini-conventions Going Strong

Success begets success. At least it does for the Society of Broadcast Engineers (SBE) and their imaginative mini-conventions. To date they have been very successful, and as each one unfolds, the word comes on louder and stronger: SBE mini-conventions are important to engineers and manufacturers. And just as surely, the word spreads.

Next up is the New York Chapter 15 mini-convention to be held October 25-26 at the Tarrytown Hilton in Tarrytown, New York. Best way to get there is to take the New State Thruway to exit 9, take two left turns and you’re at the Tarrytown Hilton.

The mini-convention will feature seminars and papers along with a number of equipment exhibits. For further information, we suggest you call John Lyons at 212-335-1600 or Lyn Snyder, convention chairman, at 212-347-2940.

Broadcast Electronics Adds Video Line

Broadcast Electronics Inc., Silver Spring, Maryland, has acquired the Modtec line of video monitors from the Precision Electrical Manufacturing Division of Circuit Science Inc., Minneapolis, Minnesota.

This acquisition involves all of the assets, including inventory, tooling, equipment and the designs of this product line. These assets will be transferred to the Broadcast Electronics facility in Silver Spring, where manufacture of the line will commence shortly.

The Modtec line is a high quality, high resolution solid state monochrome video monitor line, with CRT sizes ranging from 9 inches to 23 inches, and includes the concept of plug-in modules for each of the circuit areas. Each module is directly accessible from the rear of the monitor chassis and is easily removable for maintenance.

Broadcast Electronics is the manufacturer of the full line of Spotmaster audio cartridge systems as well as other related broadcast and industrial audio equipment. These products will be produced by the Spotmaster Division, while the Modtec video monitor line will be manufactured by the Modtec Division.

Send Your Station News To Broadcast Engineering

Broadcast Engineering
1014 Wyandotte Street
Kansas City, Mo. 64105

For More Details Circle (27) on Reply Card

For More Details Circle (28) on Reply Card

For More Details Circle (29) on Reply Card
Nothing ordinary about this Gates antenna...

Here's a diplex television antenna broadcasting two VHF signals simultaneously. We custom-built it for WTOP-TV and WMAL-TV in Washington, D.C. This Channel 7 and Channel 9 antenna was built and tested on Gates antenna range in Syracuse, New York. During the last five years more than 100 television antennas have been built and tested on this range.

We customize antennas to fit the specific needs of our customers. No matter how complex. And thoroughly test your antenna before delivery.

Call or write for more information on how Gates can custom-design an antenna for your operation.

HARRIS
GATES DIVISION
Quincy, Illinois 62301, U.S.A.
ALL SOLID-STATE AURAL STUDIO-TRANSMITTER LINKS

MONOURAL AND COMPOSITE VERSIONS

OPERATION IN ALL STL BANDS—
- 148-174 MHz
- 200-240 MHz
- 300-340 MHz
- 450-470 MHz
- 890-960 MHz

All solid-state aural STL's to fulfill almost every requirement. Moseley Associates has pioneered many STL concepts — solid-state systems, true direct FM modulation, and composite operation (FM stereo on a single link)...just to name a few. Front-panel metering of all important parameters is included on all Moseley STL transmitters and receivers. Subcarrier capability enables wireless remote control, secondary program service, or intercom service.

TRANSMITTER REMOTE CONTROL SYSTEMS

Analogue
Fifteen telemetry and thirty command functions are provided by the TRC-15A. The Model TRC-15AR, when used in conjunction with a Moseley STL, or other radio link, will provide total wireless operation. The Model TRC-15ASW is for use on leased telephone, or other wired circuits.

Digital
Fully digital remote control of a remotely located transmitter point is provided by the DCS-2 Digital Control System. Multiple transmitter site operation—a standard option. Command, telemetry, and status provided in groups of thirty channels. Automatic parameter logging available. Computer-assisted operation of the DCS-2 is another standard option, and can provide totally automated plant operation. The Model DRS-1 Digital Remote System provides many of the features of the basic DCS-2 at an affordable price. Up to 30 telemetry functions and 24 status channels to a single transmitter site.

REMOTE PICKUP LINKS

Models RPL-3 and PRL-4 Remote Pickup Links provide unsurpassed audio performance for remote broadcasts. Two full-time microphone and high-level line audio inputs are standard. The RPL-3 and RPL-4 Transmitters are only 4 inches high and weigh a mere 16 pounds — complete with audio mixing and AC/DC power supplies.

Other Moseley Products...
- FM SUBCARRIER GENERATORS AND DETECTORS
- STEREO GENERATORS
- STL ACCESSORIES
- REMOTE CONTROL ACCESSORIES

Weather Radar Has Become A Lifesaver

To most home TV viewers, broadcasts of weather radar pictures merely help to explain the weatherman's forecasts. But to many viewers of WAAY-TV in Huntsville, Ala., radar is a lifesaver.

In late spring the WAAY-TV radar detected tornados, and the station switched on live pictures of the dread storm funnels approaching the area. Many watchers at home recall that at first they sat stunned by the scenes. Then, recognizing the imminent danger, they fled for their lives.

But for the spectacular pictures of successive twisters bearing down on their area, many residents would have chosen to sit out the storms, station officials believe. And the heavy toll of 70 lives lost and some 1,500 homes destroyed or badly damaged might have been even greater.

In the storm's wake the station received nearly 5,000 telegrams, telephone calls, cards and letters from people all over the area, thanking the station for the tornado alerts and its storm news coverage.

The WAAY-TV radar is mounted on the station's broadcasting tower and scans in a full circle some 150 miles out to pick up weather patterns. The radar is a type known as the AVQ-10 which was first developed by RCA for aircraft weather detection and is still used in many planes.

On the night of the disastrous tornado strike this spring, Bob Gay, WAAY-TV Chief Engineer, recalls that the radar detected and tracked five of six successive twisters. "We picked up one tornado and tracked it as it moved over mountains and through valleys directly toward Huntsville," Gay said. "We were able to give our viewers at least 45 minutes warning. They could see the tornado coming in themselves, and they didn't need any more urging to get out of its way."

MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK
111 Castilian Drive, Goleta, California 93017
Telephone (805) 968-9621 / Telex 658448 / Cable: MOSELEY

For More Details Circle (29) on Reply Card
FIRST IN MDS ANTENNA SYSTEMS

Andrew is first to offer a complete and proven line of antenna system equipment for the new Multipoint Distribution Service (MDS). We introduced our line of MDS antennas at the first Common Carrier Association for Telecommunications Convention in July, 1972, and are now first to have equipment in service in an actual operating system.

First “on-the-air” MDS station, W0I93 in Washington, D.C., uses two orthogonally polarized Andrew antennas with cardioid patterns, as illustrated. This arrangement provides omni-directional coverage and eliminates blockage of a nearby building.

We are now in a position to ship complete MDS transmitting and receiving antenna systems from stock. For further information, ask your Andrew sales engineer or write for Bulletin 1052B.
fernseh mean...
And television means a lot of people depending on you to be the best you're capable of being. Our best is camera number 1 on your left, and we call it KCU-40. It's the ultimate broadcast-quality color camera with universal application.

Here's why.

We get a true separate luminance system with only three tubes (WRB) in conjunction with a four-channel amplifier.

You get all the benefits of the 4-tube principle, and the operating advantages of a 3-tube camera. That means you also get perfect picture quality down to the lowest light levels, high sensitivity, superior definition, and high signal to noise ratio.

Finally, and equally important, the entire system is modular in construction and engineered for ease of maintenance; and allows your choice of options and automatics with complete interchangeability between cameras. Now. And in the foreseeable future.

KCU-40. It's the best.

And over 500 of the best are proving that Fernseh means television. All over the world.

We'd welcome the opportunity to demonstrate the superior capabilities of Fernseh television equipment. A call to your nearest office will bring any further information you require.

Saddie Brook, Headquarters
(201) 797-7400
Chicago (312) 681-5000
Houston (713) 688-9171
Los Angeles (213) 649-4330

September, 1974

For More Details Circle (31) on Reply Card
WCDB-TV Moves Into Electronic Journalism

WCDB-TV, Channel 2, Charleston, South Carolina, began using portable color video tape exclusively on Monday, July 29th, 1974, according to an announcement made by Carter C. Hardwick, Vice-President and General Manager of the State Telecasting Station. WCDB-TV has been experimenting with the completely electronic system and presently more than 75 percent of all local news coverage is now being accomplished on four AKAI VTS-150 units the station purchased from the R. L. Bryan Company.

Steve Currie, TV-2's Director of Broadcasting, and Walter Nelson, Chief Engineer, developed the system along with engineers from AKAI America, Ltd., Television Microtime, Inc., and the R. L. Bryan Company.

Currie pointed out that WCDB-TV received the production models of the units from Japan in mid-June and has spent a considerable amount of time putting together a total electronic system for on-the-air use.

The VTS-150 weighs only 22 pounds, including camera, recorder and built-in batteries. The helical-scan recorder utilizes 1/2-inch Scotch color video tape manufactured by the 3-M Company. AKAI units feature automatic picture and sound editing inside the recorder itself so that it is possible to obtain clean scene changes and total story composition in the field. The camera also contains a built-in microphone, permitting hands-off "wild sound" on all stories. External microphones can be added.

A Microtime time-base-corrector permits conversion of the helical-scan video to broadcast standards for direct on-air use or dubbing up to quadruplex. Quadruplex dubbing will generally be used for commercial production only.

Adding to a list of other firsts in electronic journalism, this system will make WCDB-TV the first television station in the world to use the AKAI VTS-150 system exclusively for news and commercial production. WCDB-TV will also be the first station ever to use color video tape equipment exclusively; therefore, eliminating all local film production.

The major advantage of the conversion from 16mm film to portable video tape is that video tape eliminates the timely processes of film developing and editing. The new system will allow WCDB-TV to cover news events and present them to viewers within minutes. To prove this point, WCDB-TV's first on-air demonstration of the equipment was taped five minutes after the start of their 6:00 PM "Eyewitness Newscast" and aired at 6:14 PM. The taped demonstration was in the
system and on the air in less than ten minutes.

WCBD-TV is an affiliate of the ABC Television Network and operates on VHF Channel 2 in Charleston, South Carolina. WCBD-TV is owned and operated by State Telecasting Company, Inc., whose President W. Frank Harden stated "completely electronic journalism is the most exciting concept we have ever presented to benefit our viewing audience."

State Telecasting is a subsidiary of the State-Record Company, Columbia, South Carolina, and also operates KCBD-TV, Lubbock, Texas, and KSWS-TV, Roswell, New Mexico.

AFCCE Elects Officers For '74-75

Paul L. Wimmer of Jules Cohen & Associates, Washington, D.C., was recently elected as President of the Association of Federal Communications Consulting Engineers for the 1974-75 year.

The AFCCE, at their annual meeting, also elected the following officers: Ogden L. Preshold of A. D. Ring & Associates, Washington, D.C.—Vice President; Carl E. Smith of Carl E. Smith Consulting Radio engineers, Cleveland, Ohio—Secretary; and Donald G. Everist of Cohen & Dippell, Washington, D.C.—Treasurer.

NAB Asks Relief From Restraints

The National Association of Broadcasters has urged the U. S. Supreme Court to prevent the Federal Communications Commission from "illegally and unconstitutionally tampering with the content of radio and television news broadcasts."

It's brief asked the court to affirm a finding by the Third Circuit Court of Appeals that news broadcasts of winning numbers in state-conducted lotteries the FCC has sought to prohibit are protected by the First Amendment.

NAB's friend-of-the-court brief held that the Third Circuit decision is correct; that the First Amendment bars the FCC from "censorship of news reports" and the imposition of any subsequent sanctions.

It said the FCC ruling "imposes an unconstitutional prior restraint on broadcast news reporting; " substitutes the Commission's news judgment for that of licensees, and ignores "the full, unequivocal protection afforded broadcast news by the First Amendment."

SEND YOUR LETTERS TO THE EDITOR
If you didn’t wait for our color videotape system... we’ll provide a portable color camera to improve yours!

AKAI’s fantastic 5.76-pound lightweight has all the ambitions of a professional heavyweight! Two vidicon tubes for ultra sensitivity—serve controlled iris—built-in microphone—wide angle to telephoto 6X zoom lens—300 line resolution—three-adjustment sensitivity selector—white balance switch for perfect color—electronic viewfinder/instant replay monitor—plus complete compatibility with any VTR system you might have on hand. There’s still more. A slight modification, and you have RS-170 and external drive. Another allows you to use a 12-volt battery. All the versatility to improve any VTR system, AC or DC. We modestly think our CCS-150S is the best portable color camera in the world. That’s why we use it in our own system. If you want to be convinced, see your local AKAI video dealer; or write AKAI America Ltd., 2139 East Del Amo Boulevard, Compton, California 90220. Telephone (213) 537-3880. Video Department.
If you waited for a portable color videotape dream machine...

Here it is! The incredible AKAI VTS-150 color videotape system—only 22 pounds light, yet featuring automatic editing that smacks of magic! Start with our 5.76 pound camera with built-in everything—servo controlled iris, automatic/manual aperture, built-in microphone, wide angle to telephoto 6X zoom lens (F2 to closed), 300 line resolution, white balance switch, electronic viewfinder/playback monitor, and two vidicon tubes for ultra sensitivity. Add our truly portable, battery powered videotape recorder/playback with automatic editing, stop motion, and sound dubbing. Throw in a reel of inexpensive ¼" full-color tape and you're ready to roll. Ordinary playback on TV monitor or regular color TV set—with a time base corrector, commercial telecasts from field to air with incredible speed, and no processing along the way. Put it all together, and you have a color videotape system that lets you tell it like it is, whoever you may be. News, sports, medicine, communications. Now that you know, don't keep it under your hat. Find your nearest AKAI video dealer, or write AKAI America, Ltd., 2139 East Del Amo Boulevard, Compton, California 90220. Phone (213) 537-3880. Video Department.
History In The Making

A milestone in communications history will be established when the four radio networks of the American Broadcasting Company begin using the facilities of the American Satellite Corporation. It will mark the first time that a commercial radio network will have the full time use of a domestic communications satellite for network transmissions within the continental United States.

ABC Radio Information, Entertainment, Contemporary and FM networks will add the satellite link to its existing land line facilities, to achieve higher quality transmission and greater operating flexibility.

The facilities of the American Satellite Corporation will be used initially for two-way program distribution between the networks’ New York master control and its Los Angeles central control. From these points, land lines will carry the network programs to ABC affiliated radio stations for broadcast.

Under the terms of the agreement just signed, American Satellite Corporation will provide the ABC Networks with a high quality 8 KHz satellite communications channel.

“Domestic Satellite services offer unprecedented opportunities for innovation and excellence in communications,” commented American Satellite President Emanuel Filenakis, “and American Satellite Corporation is proud to participate with ABC in establishing another first in communications history.”

American Satellite Corporation will commence operations providing voice, data and wideband satellite
(Continued on page 25)
The secure feeling that you have purchased equipment that will accurately do the job you intended it to do is most comforting. When you buy Belar AM, FM, or TV frequency and modulation monitoring systems, you'll know that feeling. You'll know that you have the right equipment that will give you ease of operation, functional checks and unquestionable ACCURACY. And you'll measure all your program material, including the peaks accurately.

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For More Details Circle (18) for AM, (19) for FM, (20) for TV
Swiss Performance

Electro Sound's new ES-505 series recorder/reproducers have a heritage of classic design and precision performance. They've been engineered specifically for broadcasters, recording studios, and other professional users.

European or American—no other machine has more significant "Operator Engineered" features. Disappearing headgate, built-in audio oscillator, optical motion sensing, continuous bias monitor, differential disc brakes, optional edit third reel, fully lighted controls and much more.

The ES-505 is available in ¼" or ½" versions, with one, two or four channels of electronics in console, portable or unmounted configurations.

Performance specs—we match or beat the best! And at American prices.

We Repeat

Electro Sound builds professional, high speed audio tape duplicating systems. The ES-6000 is our 240 ips version. Long lasting, versatile hardware.

We're noted for sophisticated state-of-the-art designs that produce a finished tape of unquestioned high quality. That's what pays off in operating profits for our customers.

And Electro Sound is the only single source for duplicators, loading racks, QC reproducers, mastering devices, cartridge and cassette winders and splicers.

Whether you duplicate retail music, broadcast syndications, or "spoken word" cassettes, we have a system for you. After all, the giants who pioneered the pre-recorded tape industry, as well as those just joining it, are using Electro Sound systems in 30 countries.

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So you get fast site-to-studio transmission that's just right for on-air production processing or video tape storage.

And all our equipment is backed by 20 years of experience making components and subassemblies that are part of over 3,000 systems in 50 countries.

At Microwave, we're working to help you bring the world closer together.

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SYNC GENERATOR FOR...

FASTER, almost GOOF-PROOF Genlocking
(Helical Color & Phase Lock)

.... even still frame

To a broadcaster, the big news behind Video Aids Model 5000 Sync Generator is it's technology how we managed to build a sync generator with all the EIA RS-170 outputs plus burst flag and color subcarrier at such a low price.

But to the cablecaster who uses a sync generator with genlock (phaselock) by far the best news is how the Model 5000 Option: O1 radically improves genlocking faster than you ever thought possible, and so convenient that you can lock to helical tape recorder outputs that have 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 -100 microsecond skew and high amplitude transition noise.

FOR NEW STANDARDS IN VIDEO AIDS THINK VACC

*List Prices: Model 5000 $1,244.00. Model 5000 Opt:01 $1,619.00 Option 01: provides a third mode of operation (helical)

Now you can convert your Sony Trinitron® to a high quality receiver monitor for only $129.00. **Video Aids Electro Optical Isolator Kit. Model A: Offers: "Light and Portable **Monitor/Receiver Flexibility At The Flick Of A Switch **The A: Features: Loop Thru. BNC Input Connectors/Audio Connector *Isolation From Power Line *Switchable: Video/R.F.

NEW AVAILABLE WINTER 1974

VIDEO LEVEL METER—VACC's model VLM-1 is a small compact unit with red, green and yellow (LED) indicators to show correct video and sync levels. Ideal for schools and other areas where TV waveform monitors are not available, and where TV levels require constant monitoring. Also ideal for monitoring amplitude and sync levels into CATV modulators. Lights indicate when sync and amplitude levels are high (red) normal (green) and too low (yellow). Approximate list price $295.00.

BURST PHASE METER—VACC's model BPM-1 is a small compact unit which compares color burst phase of color cameras, VTR's processing amplifiers and time base correctors. The BPM-1 is an ideal substitute for most sectroscope needs. Approximate list price $355.

CROSS PULSE GENERATOR—VACC's model CPG-1 is a low cost ($350.00 list) crosspulse generator which enables you to use any video monitor to display the cross pulse signal. Ideal aid for checking VTR tension and skew error, observing head switching noise, and line to line jitter. Sync used can be immediately identified for clipping, overshoot, ringing or sync discrepancy in the equalization and retardation sync pulses. External sync option is available ($325 list) to check quadrature playback errors and to verify time base correction when TBC's are in use.

“EDIT AID”™

EDIT-AID AR-1: Low-cost editor-programmer. Unit removes common editing errors that develop unless the video tape recorder operator presses his edit and stop pushbuttons at the exact split second. Can program edit-in and edit-out functions precisely at the same place automatically. With the exception of frame-by-frame editing for animation the edit aid programmer accomplishes most precise editing needs. Can also be used for controlling projectors, recorders or other devices.

$495.00
Helical and Quad
VTR editor-programmers

Party Lines

PARTY LINE PL1 & PLS-1: Intercom amplifier for use with Western Electric or VACC headsets (Low Z) Unit meets the need for audio intercommunication using a two-way head-phone and microphone-type intercon- nect for audio and video engineers, technical directors, camera personnel etc. Model PLS-1 unit has a supply sufficient to handle up to ten single Model PL1 units. Model PL1 can be used without the PLS-1 master unit if 9 to 12 volts DC (negative ground) is available. Normally a party-line sys- tem would consist of one master PLS-1 unit and several single PL1 units. Feature individual volume con- trols.

With Individual Volume Controls $40.00

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BROADCAST ENGINEERING
Little brother to the MX-7000--the MX-5050.

Otari's new Mini-Pro Recorder is everything its name says it is—a compact professional recorder. Most important, it's not a warmed over hi-fi recorder with a few semi-professional features tacked on to wow the audiophile. Instead, it's a true professional recorder scaled down in size but not in performance or features.

Who did we design the Mini-Pro for? A whole host of professional users, like the small recording studio, the A/V facility, or the broadcast station that's really beginning to get into production. Or the large studio that needs a compact recorder for its own small studios or its many outside assignments where no-compromise quality is still a requirement. Or for broadcast automation systems where the calculated MTBF of 2000 hours continuous operation can make the difference between success or failure?

How professional is the MX-5050? Check these features: Synchronous reproduce, front panel edit control and mode, two or four channel versions, IC digital control system with motion sensing, optional DC capstan servo system, 15 and 7 1/2 or 7 1/2 and 3 3/4 ips tape speeds, front adjustable bias, record lockout, built-in test and cue oscillator, head lifters with adjustable-tension cueing feature, plug-in balanced line transformers, built-in mic preamps, Cannon connectors for line input and 600-ohm (+4 dB) output, optional swing-out rack mounting panel, standard reference level calibrate position, and four heads.

Want to know more about this mini with the maxi performance? Or about its MX-7000 big brother, the three-speed machine with built-in test oscillator and some of the best flutter and frequency response specs in the industry? Contact Otari or your nearest Otari Professional Dealer.

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Tel: 01-942 7711
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(Continued from page 18)

services between ASC earth stations near New York, Los Angeles and Dallas. Service to San Francisco and Chicago will be instituted initially by leased terrestrial facilities, and upgraded later to full satellite service with ASC owned and operated earth stations. Other ASC earth stations are planned for Seattle, Atlanta and Washington D.C.

Edward F. McLaughlin, President of the ABC Radio Network, said the addition of the satellite link "marks the beginning of a new era in network radio broadcast communications." He added: "We look forward to expansion of our satellite service in conjunction with ASC."

Thomas O'Brien, Vice President and Director of ABC Radio News said: "This new facility puts ABC news into the 21st Century of space age communications."

American Satellite Corporation, with headquarters in Germantown, Maryland, is a subsidiary of Fairchild Industries, Inc., a diversified aerospace and communications, manufacturing and service company.

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.

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REPLACES MECHANICAL TIMER ON AMPEX AND RCA VTR’S

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www.americanradiohistory.com
Mini-convention Is Hot Prospect

A number of SBE chapters have been planning to hold Mini-ventions, including chapters in the Syracuse, Binghamton, Scranton/Wilkes-Barre, Indianapolis, New York City, Pittsburgh, Chicago, and Milwaukee areas.

One Mini-vention will be held on Friday, October 11th at the Owego Treadway Inn, Owego, N.Y., and will be sponsored by three chapters: Binghamton, Syracuse, and Scranton/Wilkes-Barre. The success of last year's Mini-vention, held at the same location by the same group, has spurred interest in a repeat and has stimulated other SBE chapters.

Many equipment manufacturers, suppliers, and representatives who were present at last year's Owego meeting, reported a favorable reaction to the types of contacts made. They felt that many of those attending were in a position in which they purchased, recommended, or approved the buying of broadcast equipment. The remainder of the engineers attending were only a year or so away from similar responsible positions involving financial decisions.

At the March Annual Meeting of the SBE, President James C. Wulliman appointed Larry Taylor of WENY, Elmira, N.Y., to act as chairman of a committee to coordinate Mini-vention plans by any SBE chapters interested in sponsoring one. Taylor may be contacted at WENY TV for further information on dates for different Mini-ventions, programs, and availability of exhibit space.
SBE
Chapter Reports

Chapter 1: Binghamton, N.Y.
Chairman: Douglas S. Colborn
Horseheads, N.Y. 14845

No summer meetings were scheduled since the June 11th annual outing at Sullivan's Monument, Newton Battlefield, Newtown State Park, where members and their families enjoyed food, refreshments, and various activities for the day. Preparations continued for the 2nd Annual Mini-vention to be held jointly with Chapters 2 and 22 at the Owego Treadway Inn, Owego, N.Y. on Friday, October 11th; exact hours for the one-day event are not available as of press time, but it will probably run from noon to about 10 PM with even more equipment exhibitors on hand than last year.

Chapter 2: Northeastern Pa.
Chairman: Paul Evansky
Pittston, Pa. 18640

The next scheduled meeting for the chapter is September 9th, but no information has been received from the chapter secretary on details. The October meeting will include participation in the regional Mini-vention along with Chapter 1 and 22 on October 11th at the Owego Treadway Inn, Owego, N.Y.

Chapter 9: Phoenix, Az.
Chairman: Leon Anglin
Phoenix, Az. 85001

The July 19th meeting was held at KOOL TV Studios, Phoenix; Bill Montgomery of Tektronix presented a program on Vertical Interval Reference signals which included a VTR presentation and discussion on how the system works. This program was of special interest to those in TV broadcasting. It was arranged by Program Chairman, Earl Mehaffey of KTVK. Chapter Chairman Leon Anglin announced that the Annual Christmas Party will be held on Friday, December 13th at the Singing Canary, 921 West Camelback; guest speaker will be Walter Low, owner of radio station KDJT at Holbrook. Plans and discussion about a possible chapter Mini-vention were also part of the business session of the month's meeting. Potentially scheduled for December 7th, the day after the two-day Arizona Broadcasters Convention, the Mini-vention would include manufacturer equipment exhibits. Jim Wortham of
Upcoming SBE Mini-conventions

The Society of Broadcast Engineers is in the process of developing Mini-conventions for 1974 and 1975. One has already been held, and it was a great success.

Next up is a date to remember—October 11. That’s the date for the next Mini-convention, and it will be held at the Owego Treadway Inn, Owego, N.Y. Owego is just West of Binghamton. Take exit 65 off Rt. 17. To date, about 25 manufacturers plan to exhibit there.

Neal McNaughten, Chief of the Rules and Standards Division of the Broadcast Bureau will be a guest speaker. If you need further information, we suggest you contact Larry Taylor, Chief Engineer, WENY, Mark Twain Hotel, Elmira, N.Y. 14902. You can reach him at 607-739-3636.

The list that follows includes the names of people to contact relative to upcoming SBE Mini-conventions. The Mini-convention is unique, because it not only allows the engineers to get together with engineers, but it also allows the manufacturers to meet with engineers to discuss industry problems and to explain and demonstrate their new equipment.

Seattle
Harry Lewis, NSCC, 9600 College Way; North Seattle, Washington

Milwaukee
Bob Truscott, WITI, 54-55 N. 22nd Street; Milwaukee, Wisconsin

Boston
Mike Goldberg, WGBH, 125 Western Ave.; Boston, Mass. 02134, (November 1-2)

Chicago
Bradley Anderson, University of Illinois; Box 6998, Chicago, Illinois, (312) 996-7912

Pittsburgh
Hank Kaiser, WWSW, 1 Allegheny Square; Pittsburgh, Pa. 15212, (412) 322-5500, (November 1, Mariott Pkwy East)

Woodside, N.Y.
John M. Lyons, WWRL, 41-30 58th Street; Woodside, N.Y. 11377

Chapter Reports

KTVK provided some comments based on his experience in convention planning. Al Hillstrom, who is continuously active in the SBE both on the local and national level, is heading a group giving further consideration to the matter; further information is available from Bob Golder, KTAR, Chapter Secretary/Treasurer.

The June meeting featured Norm Ritter and Jack Shearer of the 3M Company who provided an illustrated talk on video tape noise and how to eliminate it, the most critical factor in dropout evaluation being tip penetration.

Those recently applying for membership include: Don Larson, DeVry Institute; Edmund Kehoe, Barry Flynn, Robert Adams, and Warren

A Prime Training Ground For Broadcast Engineers of the Future Finds a Stanton Cartridge in Every Head

Not many college radio stations are as fortunate as WCWP, C. W. Post College, Brookville, L.I., in possessing such a magnificent building and studios. But, college radio stations all over the nation, in common with WCWP, prefer Stanton cartridges for all their turntables.

WCWP has become a well known source for radio stations in search of Broadcast Engineers, for here the young trainees learn what they must know in order to qualify for that position in a regular commercial station.

William J. Mozer, Director of WCWP, and an engineer at WABC (shown directly above standing in the studio) says:

"We have never used anything but Stanton Cartridges on all of our turntables. Currently, we are outfitted with the 681 EE which meets our needs both in terms of reliability and excellent sound quality in on-the-air playback as well as in our production of transfers. We are looking forward to a future step-up to the new Stanton 681 Triple-E".

Stanton is the choice of a great number of college radio stations, just as it is for the great majority of commercial broadcasters. That is because Stanton cartridges are the Professional Standard and possess outstanding ability to withstand rugged handling without sacrifice of audio quality. Their excellence and reliability assure the highest quality sound with minimum maintenance.

Whether your usage involves Broadcasting or Home entertainment, enjoy professional audio quality with Stanton products.

Write today for further information to Stanton Magnetics, Inc., Terminal Drive, Plainview, N.Y. 11803.
SBE Chapter Reports

Bechnier, all of KTR; Ward Belliston, Thatchers; Hubert Beavers, KRZ; Gregory Ampagoomian; Frank Grabiee, DynaTronics; Wm. Oliver Grieve, KOOL.

Anyone having information of interest to chapter members should submit it to Editor, P.O. Box 615, Phoenix, AZ 85001; news items will be published in the chapter Newsletter.

Chapter 15: New York, N.Y.
Chairman: John M. Lyons
Woodside, N.Y. 11377

The chapter’s Program Chairman, Art Silver, who is also District Manager/Radio Sales for Gates Harris Inter-type, presented the July 11th meeting on Pulse Duration Modulation featuring the new Gates MW-5 AM Transmitter. The meeting, held in the WQXR Presentation Theater, 229 West 43rd St., between 7th and 8th Avenues, was preceded by option-
al dinner in the New York Times cafeteria, 11th floor, same building. Silver’s program included lecture, discussion, and slides, and covered techniques for enhancing both loudness and modulation levels as well as improved presence for AM transmitters of any manufacturer. The August 8th meeting, at the same location, will include a special program by Dean Sargent, an independent consultant from Cherry Hill, N.J. Plans for a chapter Mini-vention are also under consideration. Further information on future meetings may be obtained from Chairman Lyons at WWRL, (215) 335-1600.

Chapter 16: Seattle, Wa.
Chairman: Harry Lewis
N. Seattle, Wa.

No information on chapter activity for the summer months. Usually meetings are on the 2nd Wednesday at the Norslander Restaurant, 300 3rd Avenue, West, Seattle. At the most recent meeting, July 10th, Jim Bjornstad of 3M, Inc. provided slides and demonstrations on an audio mixing console, microphones and audio tape recorders.

Chapter 20: Pittsburgh, Pa.
Chairman: Henry R. Kaiser
Pittsburgh, Pa. 15212

Details on the November 1st Mini-vention being planned by the chapter were not yet available at deadline time. Latest information can be obtained from Hank Kaiser at (414) 322-5000 or from Earlene Rutledge, Engineering Secretary (414) 391-3900, ext. 205.

Chapter 21: Spokane, Wa.
Chairman: T. O. Jorgenson
Spokane, Wa.

The June Monday noontime meetings included discussions on the following topics: Small Color TV Cameras; EXPO '74 World’s Fair Radio and TV Coverage Plans; New Klystrons and the Varian 30 kW; Helical Scan Time-base Correctors; AM Station Cross-Modulation. The Chapter meets every Monday at noon at the Castle Restaurant. Visitors and nonmembers are welcome. Social half hour and lunch precede technical discussions. Contact Chairman “Jorgy” Jorgenson at (509) 328-9048. Mr. Jorgenson is preparing an article for possible publication and SBE endorsement, on Microwave Path and Equipment Testing.
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If you're faced with the specifying or purchasing of coaxial cable, here's a complete single source for just about everything you need. We offer four different constructions, air and foam dielectric, smooth wall aluminum or copper corrugated sheathing, in sizes ranging from .180 inch to 3 inches. Continuous lengths are available up to 5,000 feet. Short custom cut lengths are no problem. We'll also preform coax to your specifications and terminate with connectors of your choice.

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The DAM-1 is a true digital antenna monitor designed specifically for measuring the parameters of broadcast frequency directional antenna systems. Digital data is not obtained by adding an A/D converter to the output of conventional analog circuitry; instead, the latest digital techniques and TTL components are applied to achieve a truly digital approach to phase and current ratio measurements. Data is displayed on front panel seven-segment digital readouts to minimize reading error. A simplified selection system reduces operation of the DAM-1 to a straightforward procedure.

- A true digital antenna monitor specifically designed for broadcast directional antenna systems.
- Complies with FCC monitor and remote reading specifications. DAM-1 has received FCC Type Approved Number 3-218.

TWO WIRE TRANSMISSION REMOTE CONTROL UNITS DAML-1/DAMR-1

The DAML-1 and DAMR-1 provide for long distance remote control and readout of the DAM-1. Digital data is transmitted in both directions by integral FSK modems at 300 BPS.

HARDWIRE REMOTE CONTROL UNIT DAMH-1

The DAMH-1 provides for remote control and readout of the DAM-1 at distances to 1,000 feet.

TWELVE TOWER EXTENSION UNIT DAMX-1

The DAMX-1 permits the DAM-1 to be used for directional antenna systems with up to 12 towers.

TOROIDAL CURRENT TRANSFORMERS TCT

The TCT-1 and TCT-2 are precision toroidal current transformers to provide RF sampling voltages for the DAM-1 or other metering applications.

COMBINED DIGITAL TRANSMITTER REMOTE CONTROL AND MONITORING SYSTEM TMCS-1

The TMCS-1 provides full transmitter control and digital antenna monitoring. Includes integral FSK modems.
SBE Chapter Reports
(Continued from page 30)

Chapter 25: Indianapolis, Ind.
Chairman: Joe Messick
Indianapolis, Ind. 46202

No reports of meetings during the
summer hiatus have been received
from this chapter. A Mini-vention in
the near future is a possibility. In-
formation on future meetings is avail-
able from Mr. Messick at (317) 924-
4381 or Bob Wyckoff, (317) 637-5371.

Chapter 32: Tucson, Az.
Chairman: Hobart J. “Bart”
Paine

Tucson, Az. 85717

The July 24th meeting, held at
KOLD-TV Studios, 115 W. Drachman,
featured Bill Roh of Roh's Inc., and
tv Microtime and their time base
corrector under the direction of
speaker Daniel J. Soltie, Engineer.
The chapter observed its first full
year of operation, a year that saw a
total of 95 members become active in
chapter support. Congratulations are
due Chairman Paine, Vice Chairman
Richard Heatley, Secretary-Treasurer
Charles Glickman, Program Director
Eugene Stough, and Memberships
Chairman, Wm. D. Roh, and the other
key people who worked so hard at
forming Chapter 32.

SBE Fellows

In the short 10-year history of the
Society of Broadcast Engineers, a
number of members have been
elevated to the grade of Fellow. The
Fellow grade is conferred on those
who have rendered conspicuous
service or who have rendered signal

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15X SERIES
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No company can survive four decades without anticipating what the customer needs and giving him what he wants. Over the years EIMAC state-of-the-art advancements have changed the state of the world. Here are some highlights:

1934
EIMAC started with the 150T triode, the first reliable high frequency power tube. A whole family of triodes followed.

1940
EIMAC produces the 304TL multiple triode, the heart of World War II pulsed radar equipment.

1943
EIMAC provides quantity production of the secret Zahl tube (VT-158), the “radar tube that changed the war.”

1942-1945
EIMAC leads the world in mass production of VHF pulsed power tubes for military radar: over 125,000 tubes per month!

1946
EIMAC introduces the 4-250A family of tetrodes for HF and VHF operation.

1948
EIMAC introduces the external anode 4X150A tetrode for HF and VHF service, followed by the 4X150G coaxial-based version for ECM service.

1965
EIMAC produces the first ceramic-metal tetrode, the 4CX3000A, for broadcast and FM service.

1967
EIMAC introduces the 4CX1000A high gain, external anode tetrode for single sideband HF linear amplifier service.

1961
EIMAC produces the 3-400Z and 3-1000Z high-mu triodes for cathode driven linear amplifier service.

1962
EIMAC introduces the first high power family of 30-100 kW tetrodes for broadcast service.

1966
EIMAC develops the 4CX1500B focused tetrode for high linearity service.

1970
EIMAC produces the 8877 external anode VHF triode for cathode driven service.

1973
EIMAC develops the two-megawatt X-2159 tetrode and the X-2176 triode, the world’s most powerful tubes.

1974
EIMAC introduces a new family of 900 MHz high-mu triodes for land mobile communications.

The next 40 years will be even better.
JAMIESON COMPAC Two models conduct the standard ME-4 process: 16/35mm at 20 FPM, 35/16mm at 15 FPM

Jamieson Compac

STILL NO.1 IN TV  STILL ONLY $6980

We introduced the Compac color film processor three years ago, and since then we've shipped more than one a week.

Now the popularity of this and other Jamieson processors is growing so rapidly that we have moved into a new plant, effectively doubling our manufacturing space. Why so popular?

Someone you know owns a Compac. Probably a lot of people you know. Why not ask them about it. That's 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 Compac and give you dozens of references. Just call us or return the coupon.

☐ Please send me your brochure and data sheets on the Compac and other Jamieson processors, along with a list of some users.

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Firm: ___________________________  Phone: ___________________________

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JAMIESON FILM COMPANY

EQUIPMENT DIVISION 6911 Forest Park Road, Dallas, Texas 75235  Phone: (214) 350-1283

September, 1974

For More Details Circle (62) on Reply Card
Scully Shows You How To Be Perfect Without Paying The Price.

As a professional, you want the finest in a professional recorder. The best sound reproduction possible. Simplicity of operation. Reliability coupled with ease of maintenance. And, you don’t want to pay a fortune to get it. In short, you want perfection at a perfect price. You want the new 280-B Recorder/Reproducer.

Unmatched Performance.
By designing the 280-B electronics around the new high-energy tapes. The S/N ratio is perhaps the best available in any recorder at a comparable price. Up to 72 dB on full track .25” tape at master speed. A sharp 68 dB on two-track .25” and four track .50”.

The 280-B also features more head room and an increased record level for maximum signal utilizing the high output tapes. And band widths are a very flat ± 2dB, 30Hz to 18 KHz. It all adds up to greater performance than you’ve ever been used to.

Quick, Simple Operation.
The more sophisticated we’ve made the 280-B, the simpler we’ve made it for you to operate. Our new Optac™ motion sensing system gets a new standard of efficiency in tape motion control. Now you can go from one transport mode to another without touching the Stop button. And enter and leave Record while the transports in Play. Optac™ and the 280-B’s new logic circuitry make the exact moves for you at the right time.

Easy Maintenance.
New solid state circuitry and mother-daughter board architecture give the 280-B a greater reliability factor. They also make testing, repair and replacement easier. All signal electronics are in slide-out drawers. No more bending down and reaching around. Individual channel modules go in and out easily, too.

If the 280-B sounds too good to be true, wait till you hear it. And wait till you find out the price. We’ve made it very easy for you to get the best.

For more detailed information and prices on the 280-B, call or write: Scully/Metrotech, 475 Ellis Street, Mountain View, California 94040. (415) 968-8389. TLX 345524.

Scully/Metrotech
Recording Divisions of Dictaphone

"Scully/Metrotech and Optac are registered trademarks of Dictaphone Corporation, 100 West 40th Street, New York, N.Y. U.S.A."
SBE Fellows

(Continued from page 33)

service to the Society. A member cannot apply for the Fellow grade but must be nominated by other members and be approved by the SBE Board of Directors.

In each of the next several issues of Broadcast Engineering, with the cooperation of the publisher, the qualification and experience of one of the SBE Fellows will be presented. In this issue we have selected Robert W. Flanders, who has served two terms as President, two terms as Vice President, and is in his second term on the SBE Board of Directors.

Robert W. Flanders is Vice President and Director of Engineering for McGraw-Hill Broadcasting Company, Inc., and Director of Engineering for WRTV, Indianapolis. Mr. Flanders joined the staff of WFBM, predecessor of WRTV, in 1942 after serving in the radio-communications section of the Indiana State Police. He became Assistant Chief Engineer of Channel 6 in 1951, Chief Engineer in 1957, and Director of Engineering in 1960. His McGraw-Hill appointment became effective December 1, 1972.

A graduate of the Naval Research Laboratory, Washington, D.C., he served in the United States Navy during World War II aboard the USS Gillette with the rank of Chief Radio Technician. Returning after the war, Flanders developed and built television equipment with.

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Professional Equipment for Broadcasting Professionals

FOR MORE DETAILS CIRCLE (232) ON REPLY CARD

See us at NAFMB, New Orleans, October 10–13.
Independent Radio
In United Kingdom

The growth of independent local radio stations continues to grow in the United Kingdom. Birmingham Broadcasting Ltd. (BRMB Radio) is the newest of the IRL services.

Operating on 1151 kHz at Langley Mill near Sutton Coldfield, BRMB uses a four tower directional array. It’s believed to be the first use of a four tower directional array in the United Kingdom.

On the television side, further expansion of colour facilities of independent Television programme companies includes the modernisation by Anglia Television of its colour outside-broadcast unit.

The number of colour TV receiving licenses in the United Kingdom is now well past the 5-million mark.

Stereo TV Sound
In France

From France we hear that a working party set up by the Acoustics Laboratory of the O.R.T.F. has been experimenting with the adoption of stereophonic sound with television. In fact, this group has been experimenting successfully with this idea since 1971 when a musical programme using stereophonic sound with television was broadcast during the Festival of Sound in Paris.

The Transmission Laboratory of the O.R.T.F. is actively working with the European Broadcasting Union on studies of stereo sound for television.

German Cable Experiment

The Deutsche Bundespost has released details of a plan to build an experimental cable distribution system at Nurnberg. The system is designed to deliver 12 television channels and 12 VHF/FM stereo radio...
services. Initially, it will be tied to 2,200 homes.

The system is similar to many U.S. cable systems already in operation. However, this system will use wideband amplifiers spaced at intervals of 500 to 700 m. Each amplifier will send a pilot signal back upstream to system headquarters, permitting verification of correct operation. In most U.S. systems, outages along the line are brought to the attention of system operators by telephone calls from home viewers.

The Deutsche Bundespost intends to use the system for research into technical and economic aspects of remote utility meter reading, data processing, picture phones, etc.

**Australia Goes To Colour**

The ABC's plan for conversion to colour will be accomplished in a two phase plan. In phase one will be the conversion of telcine and videotape facilities and apparatus in Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart and Canberra. Phase one is scheduled to be completed by March 1, 1975.

Phase two covers the conversion of the remainder of the facilities in other regional centres. The plan should be completely enacted by 1978.

**Jordon in Colour**

Jordon Television is now in the process of going to full colour operation. Television programme transmission were first aired in 1968. Then in April, 1973 Jordanian viewers saw their first colour programme.

All new colour facilities and equipment will be installed outside Amman.

**Television In The People's Republic of China**

Broadcast Engineering Magazine's Video Editor Joe Roizen is on the road again...this time to assist on the technical side of the Iranian Olympic Games September 1 through 17. From time to time you'll see articles about television in different countries in this magazine, and our always-on-the-road editor writes most of these.

Recently, Roizen returned from Peking where he was assisting with a video exposition. His comments here give us some idea of what's happening in the People's Republic of China. A more complete report will be printed at a later date.

"Interest in colour television by the rank and file Chinese visitors to the fair was very high as evidenced by the large groups that jammed the areas where color monitors were displaying pre-recorded tapes of medical, scientific and industrial programs as well as sports shows, documentaries and live pickup from a small color studio. The technical experts came in small groups, and were given private slide presentations on the SEACAM process after which tapes specifically made to illustrate transcoding between SEACAM/PAL/NTSC were shown. There were also SEACAM/50 and SEACAM/60 tapes to show interchangeability between U.S. and European originated color programs."

The Roizen's report that they had to adapt quickly to some very unusual operating conditions while working in the PRC. First, there is the matter of names. No technical visitors gave their names, titles or affiliations even after being handed the Roizen's own specially printed Chinese language business cards and being asked to sign the guestbook. In the 17 days that the stream of experts came through not a single name was written into the book.

The usual response to the question of who they were was that they were the responsible members of the organization concerned. The second anomaly was that even though the Chinese government had requested a closed-circuit color TV exhibit, most of the questions asked by the technical experts who visited the INTERSECAM booth were related to other subjects in the television field. They were less interested in how to use the equipment on display than in how to build it. The inquiries were mainly about the fabrication techniques for shadow mask tubes, trinitron tubes, general color receiver construction, underwater cameras (presumably for oil exploration), and video tape recorders. In particular, the relative cost of manufacturing color sets for the different standards was a subject for continual review.

The Roizen's report that the response to various programs by Chinese general audiences was about the same as in other countries with sports or minimal entertainment tapes attracting more attention than the scientific or medical ones. Chinese authorities thoroughly reviewed the twenty-six hours of programming brought to the exhibition and then asked that only tapes related to the technical theme of the trade fair be shown.

The exception to this rule were the sports tapes of skiing, basketball and football. Tapes of boxing matches were deleted as were the variety and dramatic shows. One technical tape on which Taiwan appeared in a different color than the PRC was also eliminated, although they indicated it could be shown if the map was erased. About 9 hours of varied programming was cleared for display.

The People's Republic of China has not yet officially selected a color television standard, but they are presently conducting tests in Peking on a modified PAL standard with transmission in color for a few hours, three days a week.
Year after Year... Crown equipment pays

Reliable performance and superior audio quality give you years more valuable service, making that higher original investment a real bargain. Every piece of equipment is ruggedly constructed, rigorously tested and guaranteed to meet or exceed printed specifications. All circuits are outstanding for low noise and distortion, wide bandwidth and high frequency response. It's to your credit when you specify the manufacturer with 26 years experience in broadcast and professional studio equipment.

**STUDIO MONITOR AMPLIFIERS**

All models have complete internal protection. IM distortion is better than 0.05% from 0.01 watt to full power. All units mount in a 19-inch rack. Three year warranties cover parts, labor and round trip shipping.

**D150** delivers 75 watts RMS per channel into 8 ohms; height 5⅛ inches.

**DC300A** delivers 150 watts RMS per channel into 8 ohms, or 600 watts output in monaural operation; height 7 inches.

**D60** delivers 30 watts RMS per channel into 8 ohms; height 1¾ inches.

**DISTORTION ANALYZER**

Model IMA tests audio equipment easily, quickly and accurately. Both intermodulation distortion analyzer and internal oscillators are enclosed in one compact unit. Even an inexperienced technician can take ten power level measurements in 5dB steps in just 60 seconds. The ranges are 100, 30, 10, 3, 1, 0.3, and 0.1%.

**ES212 STUDIO TRANSDUCER**

These superior quality speaker systems have advanced design electrostatic elements for midrange and treble, acoustic suspension base woofers, for finest possible reproduction for the professional recording studio.

**MAGNETIC TAPE EQUIPMENT**

All models are designed to work 18 hours a day, 7 days a week for 10 years with three head replacements. Modular construction and plug-in circuit boards mean fast, easy field servicing. These precision instruments will make clean, accurate recordings years after the economical semi-pro decks are retired. All models handle ¾-inch tape and 7-inch and 10½-inch reels. All mount in 19-inch racks. Standard speeds are 15, 7½ and 3½ ips. There are individual record, erase and play heads for 1 to 4 channels. Over 40 standard models are available with numerous professional accessories.

**IN THE PRODUCTION STUDIO**

**CX822 MASTER RECORDER**

computer logic control for safe, rapid tape handling and editing • full remote control optional • TracSync available • each channel has two mixing inputs and individual bias adjust and equalizers • third-head monitor for meters or headphones with A/B switch.

**SP722 STUDIO PLAYER**

simple tape transport system has only 9 moving parts • remote start/stop optional, automatic stop in play mode.

**IN THE CONTROL ROOM**

**SX822 RECORDER/MIXER**

integral mixing facility simplifies setup • same tape transport system and meter monitoring as CX822 • two mic or line inputs per channel.

---

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Name & Title

Company

Address

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BROADCAST ENGINEERING
For computer age timing, counting and measuring.

ES 112 Digital Clock:
A six digit, 12 hour clock. Set to the second. Solid state, MSI components with printed circuit board. No moving parts, silent, seven segment tubes. Built to last a lifetime. Three separate control sets. Fast Advance, Slow Advance, Hold. $130.00
Dimensions: 2½" x 8" wide x 5½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 50/60 Hz 10 W max.
Options: R B B K

ES 124 Digital Clock: Same as ES 112 except 24 hour display. $190.00

ES 500 Combination Six Digit Clock/Timer:
A 12 hour clock or timer. 5 controls: Start, Stop, Reset, Fast Advance, Slow Advance. Runs continuously to 12:59:59. Advances to 0:00:00 and continues as clock until stopped or advanced. Same start, stop, and reset function as ES 400. $150.00
Dimensions: 2½" x 8" wide x 5½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 60 Hz 8 W max.
Options: R B B K

ES 510 Sixty minute timer:
A four digit timer (59:59). Start, stop, reset and stop controls (single pole, momentary, push-button). Runs continuously unless stopped or reset. If stopped, display holds time reading. When restarted continues with last count from last count. Reset sets display to zero. Settings or stopped.
Dimensions: 2½" x 6" wide x 2½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 60 Hz 8 W max.
Options: R B B K

ES 750 thru 759 Programmers:
Combines with standard ESE products on etched aluminum, 19" relay rack mounting panel (12U high). Single pole form A contact closure (1 Amp contact rating) for length of time program may be set. If control function involves count other than timing, programs may be adapted. In most cases we provide interface between count input and event to be displayed.
Thumback Programmer System
ES 750/ES 751 4 digit program $335
ES 752/ES 753 4 digit program 330
ES 754/ES 755 4 digit program 325
ES 756/ES 757 4 digit program 320
ES 758/ES 759 4 digit program 315
ES 755/ES 756 4 digit program 370
ES 757/ES 758 4 digit program 365
ES 753/ES 754 4 digit program 360
ES 751/ES 752 4 digit program 355
ES 759/ES 750 4 digit program 350
ES 750/ES 751 4 digit program 395

ES 770 Programmer/Sequencer
Can be used wherever any sequential programming is required. Has been used for automatic start-up of film projectors and video tape machines, so that proper machine or remote live broadcast comes on exactly at the right time. Front has ten thumbwheel switches, each of which has sixteen positions, and four pushbutton switches for "Start", "Stop", "reset" and "intercept". On the rear are two thumbwheel switches, each having ten positions to provide time delays from zero to ten seconds and a 50 pin connector for all input and output information.
Basic price: $500.00
Priced on options chosen.
Dimensions: 3½" high x 19" wide x 8" deep.
Panel: Etched in clear anodized aluminum.
Electrical: 115 Volts AC, 60 Hz.

ES 900 Series Modular Display Units

Priced from $190.00 to $940.00

Single Digit Modules

<table>
<thead>
<tr>
<th>Connector included</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
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<td>ES 301</td>
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<td>ES 302/3745</td>
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<td>3.75&quot;</td>
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<tr>
<td>ES 303/3749</td>
<td>2&quot;</td>
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<tr>
<td>ES 706/3749</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>3.75&quot;</td>
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Multiple Digit Modules

<table>
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<th>Connector optional</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
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</thead>
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<tr>
<td>ES 4/3742</td>
<td>1½&quot;</td>
<td>1½&quot;</td>
<td>3.75&quot;</td>
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<tr>
<td>ES 4/3745</td>
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<td>1½&quot;</td>
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<tr>
<td>ES 703/3749</td>
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ES 400 Three Digit Ten Minute Timer:
Three controls (Start, Stop, Reset). Runs continuously unless stopped. Displays up to 5:59. If stopped, display will hold time reading. Reset returns display to all zeros. Can be reset while running or stopped. If reset while running, timer will continue to run.
Dimensions: 2½" x 8" wide x 5½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 60 Hz 10 W max.
Options: R B B K

ES 300 One hundred minute up/down timer:
Four digit, one hundred minute timer (00:59) with six momentary push-button controls: Count Up, Count Down, Stop, Minute Advance, Second Advance, Reset. Minutes and Seconds can be advanced simultaneously or independently, to pre-set for a specified countdown. Precise time is automatically held until the timer is started. Counting can be activated up or down from that point or set back to zero. When "Stop" control is depressed, the four digit display is held. Counting direction (up or down) can be changed or time can be reset to zero without stopping the count. Continue to register elapsed time beyond the zero setting unless stopped.
Dimensions: 2½" x 8" wide x 5½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 60 Hz 10 W max.
Options: R B B K

ES 301 Identical to the ES 300, but with cold cathode plumb display. $185.00
ES 305 Identical to the ES 301, except that hundreds of seconds are displayed. Case is 10" wide. All other specifications are the same. $205.00
ES 310 Fastest version of the ES 305. Utilizes lever wheel pre-set. Case is 10" wide. All other specifications are the same. $230.00
ES 315 Fastest version of the ES 305. $250.00

ES 712 thru 718 Thumbwheel Programming Units:
Includes comparator circuitry. User provides BCD information to compare to program. When information agrees with program, a single pole form A relay contact closure occurs (1 Amp contact rating). Contact closure is maintained for length of time external BCD information agrees with program.
Dimensions: 2½" x 8" wide x 5½" deep.
Case: Etched Aluminum
Electrical: 117 VAC 60 Hz - Power requirements vary with number of digits.

ES 712 - 2 Digits $125.00
ES 713 - 3 Digits $135.00
ES 714 - 4 Digits $150.00
ES 715 - 5 Digits $160.00
ES 716 - 6 Digits $180.00

Standard Options:
- A wide range of adaptability from the standard product line.
- When ordering, add these letter designations to the basic part number.
- EXAMPLE: ES 400 R F B

KITS: Our K series kits allow you to build ESE digitals at much less than the cost of an assembled unit. Includes illustrated instructions, parts list, schematic and parts. No special tools needed. Kits can be factory assembled for an additional charge.

Twelve Hour Digital Clock: ES 112K - All features of ES 112, with timer to 12:00. Priced at $175.00.

Twenty Four Hour Digital Clock: ES 124K - Same as the ES 112 except tells time through 23:59:59. $46.95 plus opt. alum. case $7.95


Crystal Time Base: ES 205K - Opt. addition to ES 112K, ES 124K, or ES 500K. Mounts on board. Accuracy .002%. $80.00

Digital Multimeter: ES 210K - Sensitivity, accurate, bipolar. Automatic polarity indicator. Displays ohms, volts or amps in five ranges. 100 Micrometers to 5000 W. 100 Megohms to 1 Meghm. $92.00 plus $12.50 case.

40 MHz Digital Frequency Counters: ES 202K - 5 Digit line freq. time base (1 kHz resolution). $175.00 plus $10.00 case.
ES 221K - 5 Digit crystal time base (100 Hz resolution). Not damaged by high power transmission levels, One cable connection to tester. Pot for sensitivity adjustment. $105.00 plus $10.00 case.

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September, 1974

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SBE Fellows
(Continued from page 37)

which Channel 6 started broadcasting in 1949. Channel 6 has transmitted color since the days of the "flying wheel" and has been a full color station ever since 1955. Robert Flanders served on the 1967 NAB Engineering Conference Committee and was Chairman of the 1969 committee. Mr. Flanders is a charter member of the Society of Broadcast Engineers.

SBE Notice To All Members

If you have not renewed your SBE membership, now is the time to do so. On Sept. 1, SBE third and final billing was sent to the membership.

Of concern is the large amount of invoices being returned to SBE's national office for lack of a forwarding address or incorrect address advice.

Check your membership card. If it has expired and you have not received your dues notice for the current year, please notify the national office.

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units like:
CD28 Audio Controller and Programmer

Program up to 2,000 events and control 12 audio sources with full random access. Expand, as you expand, to 8,000 events and 92 sources. Will interface with all audio sources having full function rematele capability. And the CD28 is virtually mistake proof . . . easily programmed and operated by even the most inexperienced personnel.

CD25G 25Hz Tone Generator

For production studio use to insert the standard 25Hz automation actuating tone. Simple operation.

+ Start button starts tape transport in motion and activates audio muting circuit to eliminate hiss, pops and other tape transport start noises.

+ Tone button applies 25Hz tone and automatically stops the transport at end of tone. This all solid-state unit has been designed to work from all audio sources providing up to 1-volt line level.

CD25S 25Hz Tone Sensor

Provides control functions for sensing the presence of pre-recorded 25Hz tones on audio material. Features a unique built-in fixed tone alarm with 1 second tone activation allowing flexibility in source switching, automatic re-wind of tape and other features including end of tape function.

CD60T Time Announce Control Unit

Designed to add versatility to your automation system. Allows the use of 2 single play cart machines, 2 reel-to-reel transports or a combination of cart and reel-to-reel transport for the announcements. Features a built-in power failure interlock . . . will not fail a time announcement following a power failure until corrected and reset. Internal 1IC integrated circuit included.

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Our new E series audio equipment will improve your sound and cut your costs . . . or your money back!

Advanced audio technology, ten day free evaluation and 2 year guarantee insure your uncompromised satisfaction.

We know that some of you may think our prices and performance a little too good to be true. This is why we're prepared to let you see, hear and test anything you need before committing yourself to buying. You'll find we don't just write good specs, we meet them.

Actual performance exceeds published specs in practically every instance. If we tell you distortion is 0.05%, it normally runs 0.025%. Response specified at ±0.5db will typically check out at ±0.25db. Same for noise, output level, etc.

Quality and reliability? The latest in low noise, wide band integrated circuits, all socket mounted! Capacitors with a known failure rate of about 10 out of 22,100. 8 of these 10 were caught before shipment. Transformers by the world's best manufacturers. 5% tolerance resistors throughout for long term stability.

See the reverse side of this page for more specific product information. Then, whatever your audio requirements, standard, custom, urgent, or in the future, call collect or write today. You'll be money and performance ahead.

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Our new E series audio equipment will improve your sound and cut your costs...or your money back!

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**INSURE YOUR UNCOMPROMISED SATISFACTION**

**TURNABLE PREAMPS**
Preamps costing almost 3 times more will not compare with these units. RIAA/NAB Equalized +1db, 0.5mS sensitivity at 1kHz for +4dbm out, balanced outputs, —75db/s/n at 10mV in, 0.05% distortion, +21dbm out max. Internal power supply.

MP-8E Mono $86
SP-8E Stereo $137

**MIC & LINE AMPLIFIERS**
Dual function and superb performance. Inputs for mic and line, ±0.5db response 10Hz-20kHz, 67db gain on mic channel(s), ±26db gain on line inputs. Balanced input & outputs, +21dbm out max, 0.1% distortion. Internal power supply.

MLA-1E Mono $98
MLA-2E Dual Mono/Stereo $139

**AUDIO DISTRIBUTION AMPLIFIERS**
From 1 in/6 out to 20 in/80 out in one small package. Whatever your distribution requirements we have an answer. All units meet or exceed the following specifications: Balanced bridging/matching inputs, balanced 600ohm outputs, ±0.5db response 10Hz-20kHz, ±10db 50Hz-40kHz, 26db gain, +21dbm out max, capability, ±1% or less distortion, outputs isolated by 80db, hum and noise 90db down referenced to +21dbm out. Internal power supplies.

DA-5/E Table top 1 in/6 out $131
DA-6R/E Rack mount 1 in/6 out $149
DA-6BR/E Rack mount 1 in/6 out Individual level controls for each output $165
DA-6RS/E Rack mount 1 in/6 out stereo or 2 in/12 out mono $229
DA-16S/E Rack mount 1 in/8 out stereo or 2 in/16 out mono Individual output level controls, selectable metering & headphone monitoring $287
DA-200/E Rack mount main frame with protected power supply, metering & headphone monitor. Will accept up to 10 slide in modules. Each module has 2 inputs & 8 outputs. Individual output level controls & selectable meter switch. Up to 20 in/80 out.

DA-200/E Main Frame $150
DA-2080/E Modules 2 in/8 out $135 ea.

**AUDIO CONSOLES & CONTROLLERS**
Our new series 35 audio controller introduces a new concept in audio mixing. Allows separation of controls from the audio functions. Controls can be placed in any convenient location in the studio, while electronics may be mounted anywhere for easy maintenance & hook-up. Remote DC control for completely unaffected audio.

This versatility you a custom designed console at a standard production model cost. Features include: 8 channels, mono, dual channel mono, stereo, dual channel stereo, or combinations; paralleling 2 units for quad, fail safe power supply & plug in interchangeable cards.

Performance specifications are: 0.3% or less distortion, 124db/m equivalent noise on low level channels and approximately 25db power consumption, —70db crosstalk, balanced bridging/matching inputs & response within ±2db 20Hz-20kHz. Series 35 audio controllers start at $1200.

**STUDIO MONITOR AMPLIFIERS**
Exceptional reproduction! Internal mixing, ±2db response from 20Hz-40kHz, 25w music power, 20w RMS into 8 ohms. Hum & noise 65db below rated outputs.

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Safe, transient free means of controlling 110V/AC Turntables, on the air lights, etc.

PR-2 (toggle switch on/off) $39
PR-2B (momentary contact actuation) $54

See other side for additional information. Then call or write for further details or an immediate solution to your needs. Thank you for your interest.

**RAMKO RESEARCH**
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The Buyer’s Guide keeps on growing. That’s because the industry continues to grow and because the new technology opens the door for new and unusual products each year. This is the most complete Guide we’ve ever printed, and next year it will be even larger.

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In each Guide issue, you’ll find equipment categories that include companies listed in red. The red listing indicates that this company has an ad in this issue featuring an item in that category.

For those of you who are in the closed circuit or CATV industry, you’ll find another equipment Guide in the Cable Engineering section. But categories listed there are primarily designed for closed circuit use. So if you can’t find the category you need, try the CCTV Guide.

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Marconi Electronics Inc.

Antennas, Monitor

Delta Electronics Inc. (Va.)
Potomac Instruments, Inc.

Antennas, Receiving FM

Beler Electronics Lab., Inc.

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Antennas, Transmitting VL

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STEP Corporation  
Systems Marketing Corp.  
And Sono-Mag Corp.

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CMX Systems  
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ES Enterprises  
Grass Valley Group, Inc.  
Harris Corporation Broadcast Equip.  
IVM  
Magna-Tech Electronic Co., Inc.  
Mastertone Company  
Mcbbee Laboratory  
Mincop Div., 3M Co.  
Moseley Assoc., Inc.  
Peerless Electronics, Inc.  
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Radio Mfg. Co. (RMC)  
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### Automation, Lighting Control

**Berkeley-Colortran Inc.**  
**Richmond Hill Laboratories Ltd.**  
**Siuppen Lighting Control Corp.**  
**Video Engineering Co., Inc.**  

### Automation, Program Control

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**Central Dynamics Corp.**  
**Control Design Corp.**  
**Dynamics Corp., Inc.**  
**ES Enterprises**  
**Grass Valley Group, Inc.**  
**Harris Corporation**  
**RCA Corporation**  
**Schafer Electronics Corp.**  
**Vital Industries Inc.**

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RCA Corporation Broadcast Systems Div.

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**Harris Corporation**  
**Moseley Assoc., Inc.**

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Ameico Inc.
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Anixter-Pruzan CATV Division
Asaka Corp. of America
Franklyn R. Beemish & Co.
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Cohu, Inc. Electronics Division
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Harvey Radio Pro A/V Div.
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Listec TV Equip. Corp.
O'Connor Eng. Labs., Inc. Photographic Division
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Quick-Set Inc.
Saxo-Johnson
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Victor Duncan, Inc.
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Cohu, Inc. Electronics Division
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Fern seh Group, Robert Bosch Corp.
GBC Closed Circuit TV Corp.
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Matsushita Electric Corp. of America
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Power Optics Inc.
RCA Corporation Broadcast Systems Div.
Sinha-Johnson
Sylvania Comm. Electronic
Telextronix Inc.
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Tele-Matic, Inc.
Tele-Measurements Inc.
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Comquip, Inc.
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Fern seh Group, Robert Bosch Corp.
GBC Closed Circuit TV Corp.
Harvey Radio Pro A/V Div.
International Video Corp.
Matsushita Electric Corp. of America
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Matsushita Electric Corp. of America
Philips Broadcast Equipment Corp. Subs. North America Philips Corp
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Trepak Corp. America
Video Engineering Co., Inc.
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Cameras, Film Chair

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Commercial Elect.
Comquip, Inc.
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International Video Corp.
Matsushita Electric Corp. of America
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Tele-Matic, Inc.
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Video Engineering Co., Inc.
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Matsushita Electric Corp. of America
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Soph Invest. Corp. America VTR Div.
Teledyne Camera Systems
Tele-Matic, Inc.
Tele-Measurements Inc.
Trepak Corp. America
Video Engineering Co., Inc.
Visual Educum Inc. Dage/MTI/Infonics Div

Cameras, TV & B&W Portable Broadcast

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Harvey Radio Pro A/V Div.
Ikegami Electronics Ind., Inc. of N.Y.
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Cameras, Image Motion Compensation

Dynascopes Corp. Video Products Div.
GBC Closed Circuit TV Corp.

Cameras, Surveillance

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September, 1974

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Maze Corporation

Norelco, Philips BSc. Equip. Corp.


Philips Broadcast Equipment Corp.


Sony Corp. of America VTR Div.

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Tele Measurements Inc.

Teltronix, Inc.

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Harris Corporation Broadcast Equip. Div.

Harvey Radio Pro A/V Div.

Ikegami Electronics Ind., Inc. of NY.

Image Devices Incorporated

International Video Corp.

Maze Corporation

Norelco, Philips BSc. Equip. Corp.


Philips Broadcast Equipment Corp.


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Edit Productions

Fernshe Group, Robert Bosch Corp.

Harris Corporation Broadcast Equip. Div.

Harvey Radio Pro A/V Div.

Ikegami Electronics Ind., Inc. of NY.

International Video Corp.

Maze Corporation

Norelco, Philips BSc. Equip. Corp.


Philips Broadcast Equipment Corp.


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Ikegami Electronics Ind., Inc. of NY.

Image Devices Incorporated

Norelco, Philips BSc. Equip. Corp.


RCA Corporation RCA Electronic Components

Sony Corporation

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Tri-Tronics, Inc.

Video Engineering Co., Inc.

Cameras, TV Remote Control Broadcast

Cohu, Inc. Electronics Division

Commercial Elect.

Fernshe Group, Robert Bosch Corp.

Harris Corporation Broadcast Equip. Div.

Harvey Radio Pro A/V Div.

Ikegami Electronics Ind., Inc. of NY.

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International Video Corp.

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Norelco, Philips BSc. Equip. Corp.


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Ikegami Electronics Ind., Inc. of NY.

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TeleMation, Inc.

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Video Engineering Co., Inc.

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FMI International

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RPM Mag. Co. (RMC)

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RCA Corporation Broadcast Systems Div.

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Singapor Products Co., Inc.

Spotmaster Broadcast Electronics Systems Engineering Co., Inc.

Systems Marketing Corp. And

Sono-Mag Corp.

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Contel Mfg. Div. of Continental

Electronic Wholesale Corp.

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Harris Corporation Broadcast Equip. Div.

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International Tapeterscopics Corp.

Lauderdale Electronic Labs

LPP Inc.

MacKenzie Laboratories, Inc.

Masterton Co.

Maze Corporation

McCurdy Radio Ind. Inc.

Pacific Recorders and Engrg. Corp.

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QRK Electronic Prod.

Radio Mag. Co. (RMC)

RAPID-Q Div. of Garron Electronics

RCA Corporation Broadcast Systems Div.

Schafer Electronics Corp.

Singapor Products Co., Inc.

Spotmaster Broadcast Electronics Systems Engineering Co., Inc.

Systems Marketing Corp. And

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Mincom Div. 3M Co.

Computer Equipment

Central Dynamics Corp.

Schaefer Electronics Corp.

Central Dynamics Corp.

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Grass Valley Group, Inc.

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Raytheon Company Raytheon Data Systems Co.

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S&K Corporation

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Television, Inc.

Connectors, Cable

Ameco Inc.

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Amphenol RF Division

Ampco A-Matic

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Beaver Electronics, Ltd.

Blonder-Tongue Labs

Conway Electronic Enterprises Limited

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Hollingsworth Soldierette Terminal Co.

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Peerless Electronics, Inc.

Phelps Dodge Corporation Div.

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RIehorst & Co., Inc.

Swithcraft, Inc.

Systems Marketing Corp. And Soni-Mag Corp.

Tele-Twice, Inc.

Thea-Com

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IGM

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LPB Inc.

Mastertone Company

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Singer Products Co., Inc.

Sparta Electronics Corp.

Spectra Sonics

Sphare Electronics Corp.

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Tele-Mation, Inc.

Tele Measurements Inc.

Tri-Tronics

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United Recording Electronics Industries

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Val Tronics Laboratories

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Wilkinson Electronics, Inc.


AMCO Engineering Co.

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Wilkinson Electronics, Inc.


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Harris Corporation Broadcast Equip.

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McMartin Industries

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Philips Broadcast Equipment Corp.


QRK Electronic Prod.

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Ramko Research

RCA Corporation Broadcast Systems Div.

Robins/Fairchild Sound Equipment Corp.

Rupert Neve Incorporated

Schafer Electronics Corp.


Shure Brothers Inc.

Singer Products Co., Inc.

Sparta Electronics Corp.

Spectra Sonics

Sphare Electronics Corp.
Detectors, Standing Wave

Bind Electronic Corp.
Collins Radio Group Rockwell International
Comark Industries Inc.
General Radio Co.
Hewlett Packard Co.
Electronic Res., Labs., Inc.
Maury Microwave Corp.
Micro Communications, Inc.
Moseley Assoc., Inc.
Mosler Electronic Systems Div.
Narda Microwave Corp., The
Pymotac Instruments, Inc.
PRD Electronics, Inc., Subsidiary of
Harris Corp.
Rohde & Schwarz Sales Co.
Tektronix Corp.
Weinschel Engineering Co.
Wide Band Engineering Co., Inc.

Detectors, Video Presence

Colorado Video Inc.
Comark Industries Inc.
Lenco Inc. Electronics Division
Vicon Industries Inc.
Videk Electronics Inc.
Wide Band Engineering Co., Inc.

Digitizers, Color Video

Biomation Corp.

Diplexers

Japro Antenna Co.
Shively Labs., Inc., Inc.

Display Units, Digital

Amero Inc.
American Data Corp. an AIRPAX Company
AutoMap Corporation
Control Design Corp.
DataLine, Inc.
Time & Frequency Tech., Inc.
Video Accessories Mfg. Co.
Video Data Systems, Inc.

Dividers, Frequency

Hartley Prod. Corp.
Microwave Assoc., Inc.
Total Technology
Video Accessories Mfg. Co.

Dividers, Power

Alford Mfg. Co.
American Electronic Labs., Inc.
Bird Electronic Corp.
Collins Radio Group Rockwell International
Dielectric Communications Div. of Solartron
Entron, Inc.
Harris Corporation Broadcast Equip.
Japro Antenna Co. Div. of Computer Equipment Corp.
Electronic Res., Labs., Inc.
Maury Microwave Corp.
Micro Communications, Inc.
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Multilinc, Inc.
Narda Microwave Corp., The
North American Radio Corp.
Phelps Dodge Communications Co.
RCA Corporation Broadcast Systems Div.
Scott-Burthen Coastcom, Inc.
Shively Laboratories, Inc.
Spar Aerospace Corp.
Tektronix Corp.

Discs, Video

Computer Magnetics Corp.

Chiron Telesystems Of The Computer Exchange, Inc.
Computer Magnetics Corp.
Echo Science Corp., Subsidiary of
Arvin Systems, Inc.
TeleMation, Inc.

Display Equipment, Tiltin

CBS Labs
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Comquip, Inc.
Data Disc Inc.
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Fluke, John, Mfg. Co. Inc.
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Electronic Res., Labs., Inc.
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Datacomics Corp.

American Data Corp., an AIRPAX Company
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CMX Systems
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Behrends, Inc.
Broadcast Electronics
Central Dynamics Corp.
Corporus, Inc.
ELPA Marketing Industries, Inc.
Lauderdale Electronic Labs
Marathon Broadcast Equip.
Nemo Recording Labs
Radio Mfg. Co. (RMC)

Editors, Film

Behrends, Inc.
CMX Systems
Corquip, Inc.
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Rohde & Schwarz Sales Co.
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Mincom Div.

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Fernshe Comm., Robert Bosch Corp.
Harris Corporation Broadcast Equipment Div.
Harvey Radio Pro A/V Div.
Lenco Inc. Electronics Division
Marco Video Systems, Inc.
Marconi Electronics Inc.
Mincom Div., 3M Co.
Philips Test & Measuring Instruments, Inc.
Teletronics, Inc.
Video Engineering Co., Inc.

Encoder, Four Channel Stereo

Audio Designs & Mfg.
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Filters, Sound Effect  
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Generators, Audio Sweep  
Allen Electronics  
AUD Tone  
B & K Instruments Inc.  
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Gatley Electronics  
Rupert Neve, Inc.

Hickok Electr. Instrument Corp.  
Leader Instruments Corp.  
Marcon Instruments  
Philips Test & Measurement Instruments Inc.  
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Sencore Inc.  
Shinncon Co. Inc. Video Products Div.  
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Shinncon Co., Inc.  

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Dynametics Corp. Video Products Div.  
Grass Valley Group, Inc.  
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Panasonic Video Systems Div.  
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Philips Test & Measurement Instruments Inc.  
RCA Corporation Broadcast Systems Div.  
RCA Corporation RCA Electronic Components  
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Shinncon Co., Inc. Video Products Div.  
Thintronics Inc.  
Video Accessories Mfg. Co.  
Video Data Systems, Inc.

Generators, Burst  
Alpha Electronic Services Inc.  
Anamco Inc.  
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Applied Electo Mechanics, Inc.  
B & K Instruments Inc.  
Broadcast Automation Assoc.  
Comark Industries Inc.  
DAQtek Corp.  
ESG Electronics Corp.  
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Data Disc Inc.
Echo Science Corp. Subsidiary of
Arvin Systems, Inc.
FMI/Magnatech Corp. A Subsidiary of
FM International

Ampro Corp.

Ampro Corp.

Antron Corporation
B & K Instruments Inc.

Bell & Howell Audio Visual Div.
B & K Instruments Inc.

Broadcast Automation Assoc.

Broadcast Equip. & Supply Co.

California International, Inc.

Camex Corp.

CCE Electronics Corp.

Cetec Inc. Subs. Computer Equipment Corp.

Cinetic Sound Inc.

Collins Radio Group Rockwell

Communication Media, Inc.

ComCorp, Inc.

Control Corp.

Control Design Corp.

Crown International

Crown International

CTA Marketing Industries, Inc.

FMI/Magnatech Corp. A Subsidiary of
International

Garron Audio Corp.

Garron Audio Corp. Broadband Equip.

Harvey Radio Pro A/V Div.

ICM

Image Devices Incorporated

International Tapetronics Corp.

Lang Electronics Inc.

Lauderdale Electronics Labs

McArdle

Mackenzie Laboratories, Inc.

Mastercom

Maze Corporation

Nemo Recording Labs

Newport, Philips Best, Equip. Corp.

North American Philips Corp.

Orbit Radio and Video

Otten of America, Ltd.

Pentagon Industries, Inc.

Philips Broadcast Equipment Corp.

RCA Corporation Broadband Equip.

Receivers Corporation

Receivers Corporation

Receivers Corporation

Receivers Corporation

Receivers Corporation

Receivers Corporation

Receivers, Program Logging


Broadcast Automation Assoc.

Central Dynamics Corp.
Communication Media, Inc.

Radio Mfg. Co. (RMC)

Schafer Electronics Corp.

Scully/Metrotech Divs. of Tapex Corp.

Sears-Roebuck & Co.


Scully/Metrotech Divs. of Tapex Corp.

Sharp Electronics Corp.

Sharp Electronics Corp.

Singer Products Co., Inc.

Sonderberg Corporation

Spanta Broadcast Electronics

Spectrasonics Corp.

Super Scooper, Inc.

Surround Sound Systems Corp.

Tapex Corporation

Teletalk, Inc.

Teltronics Corp.

Val-Tronics, Inc.

Telex Communications, Inc.

Val-Tronics, Inc.

Wilton Electronics, Inc.

Receivers, Tape Audio Cartridge

Ampro Corp. See Adv. Page
Broadcast Equipment & Supply Co. See Adv. Page
Harron Corporation
Maze Corporation
Rapid-Q
RCA Corporation


Ampro Corp.

Audio Distributor Inc.

Automotronics Corp.

Bell & Howell Audio Visual Div.

Broadcast Automation Assoc.

Broadcast Equipment & Supply Co.

California International, Inc.

Camex Corp.

CCE Electronics Corp.

Cetec Inc. Subs. Computer Equipment Corp.

Collins Radio Group Rockwell

Communication Media, Inc.

Conrac Corporation

Contel Mfg. Div. of Continental

Electronic Wholesale Corp.

Control Design Corp.

Dyna, Engineering, Inc.

FMI/Magnatech Corp. A Subsidiary of

FM International

Franz Vertriebs-gesellschaft b.M.

Garron Electronics, Inc.

Harron Corporation

Harron Corporation

IGM

Image Devices Incorporated

International Tapetronics Corp.

Lang Electronics Inc.

Lauderdale Electronics Labs

MaCarta

Mackenzie Laboratories, Inc.

Mastercom

Maze Corporation

Nemo Recording Labs

Philips Broadcast Equipment Corp.

Subs. North America Philips Corp.

Philips Test & Measuring Instruments, Inc., a North America Philips Co.

Rapid-Q Div. of Garron Electronics

RCA Corporation Broadcast Systems Div.

Records, Tape Audio

Ampro Corp. Audio-Vedio Systems Division

Ampro Corporation

Antron Corporation

B & K Instruments Inc.

Broadcast Automation Assoc.

CCE Electronics Corp.

Collins Radio Group Rockwell

Control Design Corp.

Data Disc Inc.

Echo Science Corp. Subsidiary of

Arvin Systems, Inc.

FMI/Magnatech Corp. A Subsidiary of

FM International

LPI Inc.

Masterstone Company

Maze Corporation

Philips Broadcast Equipment Corp.

Philips Test & Measuring Instruments, Inc., a North America Philips Co.

RCA Corporation Broadcast Systems Div.

Revox Corporation

Schafer Electronics Corp.

Scully/Metrotech Divs. of Tapex Corp.

Singer Products Co., Inc.

Sonderberg Corporation

Spanta Broadcast Electronics

Spectrasonics Corp.

Super Scooper, Inc.

Surround Sound Systems Corp.

Tapex Corporation

Teletalk, Inc.

Teltronics Corp.

Val-Tronics, Inc.

Telex Communications, Inc.

Val-Tronics, Inc.

Wilton Electronics, Inc.

Receivers, Cassette, Video

Teletalk, Inc.

Receivers, Disc Magnetic

Ampro Corp. Audio-Vedio Systems Division

Colorado Video Inc.

Data Disc Inc.

Echo Science Corp. Subsidiary of

Arvin Systems, Inc.

FMI/Magnatech Corp. And

Sono-Mag Corp.

Tape-Athon Corp.

Teletalk, Inc.

Telex Communications, Inc.

VIF International

Receivers, Paper Logging and Graphic

Moseley Associates

Biomation Corp.

Bristol Div. of Acro

Collins Radio Group Rockwell

International

Control Design Corp.

Fluke, John Mfg. Co., Inc.

General Radio Co.


Gulton Industries, Inc. Measurement &

Instrument Systems Div.

Heath Co.

Electronic Res. Labs. Inc.

Moseley Associates, Inc.

Philips Test & Measuring Instruments, Inc. a North America Philips Co.

Prahe & Schwartz Sales Co.

RCA Corporation Broadcast Systems Div.

Tele-One Inc.

Victor Duncan, Inc.

Receivers, Logging Magnetic


Broadcast Automation Assoc.

CCE Electronics Corp.

Control Design Corp.


Harvey Radio Pro A/V Div.

Lang Electronics Inc.

Maze Corporation

Philips Broadcast Equipment Corp.

Subs. North America Philips Corp.

Philips Test & Measuring Instruments, Inc., a North America Philips Co.

Radio Mfg. Co. (RMC)

RCA Corporation Broadcast Systems Div.

Scully/Metrotech Divs. of Tapex Corp.

Sears-Johnson

SoundScorer Corporation

Systems Marketing Corp. And

Sono-Mag Corp.

Tape-Athon Corp.

Teletronics Corp.

VIF International

768B

BROADCAST ENGINEERING
Recorders, Video Kinescope
Corniquip, Inc.
Palmer Films, Inc., W. A.
Philips Broadcast Equipment Corp.
RCA Corporation Broadcast Systems Div.
Teledyne Camera Systems
Televa Measurements, Inc.

Recorders, Videotape Cartridge
Corniquip, Inc.
Harvey Radio Pro A/V Div.
Hi-Tech Shubladen Corp. of America
Image Devices Incorporated
International Video Corp.
RCA Corporation Broadcast Systems Div.
Siem-Johnson
Sony Corp. of America VTR Div.
Tri-Tronics, Inc.
Video Engineering Co., Inc.

Recorders, Videotape Clean Air Hood
Enviscal
Liberty Industries
RCA Corporation Broadcast Systems Div.
Television Equipment Associates

Recorders, Videotape Helical
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Akai America, Ltd. 16-17
International Video Corp.

Akai America, Ltd.
Ampex Corp. Audio-Video Systems
Division
Corniquip, Inc.
Echo Science Corp. Subsidiary of
Arvin Systems, Inc.
Feniseh Group, Robert Bosch Corp.
Hitachi-Shibaden Corp. of America
Ikegami Electronics Ind. Inc. of N.Y.
International Video Corp.
Mace Corporation
Rank Cintel, Electronic Systems Div.
Rank Precision Industries Ltd.
Siem-Johnson
Sony Corp. of America VTR Div.
Tri-Tronics, Inc.
Video Engineering Co., Inc.

Recorders, Videotape Quad
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RCA Corporation 85
Ampex Corp. Audio-Video Systems
Division
Corniquip, Inc.
Mace Corporation
RCA Corporation Broadcast Systems Div.

Recording Services, Audio Tape
Allied Broadcast Equip. Div. of Allied
Adv. Corp.
Alto Communications Inc.
Ampex Corp.
Audio Magnetics Corp.
The CnS Studios
Mastertone Company
Nemo Recording Labs
Orbit Radio and Video
Pentagon Industries, Inc.
Qualtape Inc.
Radio Mfg. Co. (RMC)
Ryder Magnetic Sales Corp.
Schafer Electronics Corp.
Superscope, Inc.
Tape-Atton Corp.
Ultra Audio Products
United Recording Electronics
Industries

Reelis, Video Tape
Audio Magnetics Corp.
Corniquip, Inc.
Harvey Radio Pro A/V Div.
Lauderdale Electronic Labs
Memorox Corporation Audio-Video Group
Pentagon Industries, Inc.
Qualtape Inc.
Rexcord Corporation
Robins/Fairchild Fairchild Sound
Equipment Corp.
Schafer Electronics Corp.
Spectrozone Broadcast Electronics
TEAC Corp. of America
3M Company Magnetic Audio/Video Prod.
Winston Electronics, Inc.

Remote Pickup Systems, Radio
See Adv. Page

Delta Electronics Inc.

(\text{Va.}) 

Moseley Assoc. Inc.

Val-Tronics, Inc.

Allied Broadcast Equip. Div. of Allied
Adv. Corp.
Camex Corp.
CCA Electronics Corp.
Collins Radio Group Rockwell
International
Delta Electronics Inc. (Va.)
M/2M Magnatec Corp A Subsidiary of
FM International
Marl Electronics
Mastertone Company
Maze Corporation
McGowan Industries
Moseley Assoc. Inc.

Reverberation Systems
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MICMIX Audio Products, Inc. 128
Val-Tronics, Inc. 136

AKG Division North Amer. Philips
Corp.
Audio Distributor Inc.
B & K Instruments Inc.
Franz Vertriebs-gesellschaft m.b.H.
Gotham Audio Equipment
Lauderdale Electronics Labs
MICMIX Audio Products, Inc.
Quad-Eight Electronics
Robins/Fairchild Fairchild Sound
Equipment Corp.
Sparks Electronics Corp.
Systems Engineering Co., Inc.
TASCAM
Val-Tronics, Inc.

Rewinders, Film
Behrends, Inc.
Corniquip, Inc.
Image Devices Incorporated
Krautkramer Corp.
Neumade Prod. Corp.
Precision Laboratories Precision Cine
Equipment Corp.
RCA Corporation Broadcast Systems Div.

Rewinders, Tape
Allied Broadcast Equip. Div. of Allied
Adv. Corp.
Broadcast Automation Assoc.
Marathon Broadcast Equip.
Neumade Prod. Corp.
Pentagon Industries, Inc.
Radio Mfg. Co. (RMC)
Rambo Research
RCA Corporation Broadcast Systems Div.
Recorex Corporation
Robins/Fairchild Fairchild Sound
Equipment Corp.
Schafer Electronics Corp.
Singer Products Co., Inc.
Sparks Electronics Corp.
Ultra Audio Products

Safety Devices, Ladder
Air Space Devices Inc.
Anixter-Pruzran CATV Division
Antenna Products Company
Rohr Manufacturing Div. of Unarco
Industries Inc.
Triangles Towers & Antennas

Scramblers, Speech
KRL Electronics, Inc.
Singer Products Co., Inc.

Screens, Projection Front
Behrends, Inc.
Corniquip, Inc.
Eastman Kodak Co.
O.TV Sales & Distributing Corp.
Raven Screen Corp.
Tele Measurements Inc.
Video Engineering Co., Inc.

Screens, Projection Rear
Behrends, Inc.
Raven Screen Corp.
Tele Measurements Inc.
Video Engineering Co., Inc.
Wilson Corp., H.
Semiconductors, IC's

Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Rectifier General

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
Collins Radio Group Rockwell
International
Electronic Devices, Inc.
English Electric Valve North America Ltd.
Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Rectifier Silicon Controlled-SCR

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Electronic Devices, Inc. 131

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
Collins Radio Group Rockwell
International
Electronic Devices, Inc.
English Electric Valve North America Ltd.
Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Thyristor

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
English Electric Valve North America Ltd.
Heintz and Kaufman Ltd.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Transistor AF

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Transistor FET

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.

RCA Corporation RCA Electronic Components
Singer Products Co., Inc.
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Transistor General

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
Heintz and Kaufman Ltd.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Semiconductors, Transistor RF

Amperex Electronic Corp.
A-Tel-A-Matic
Birnbach Co. Inc.
Calvert Electronics Power Tube Div.
English Electric Valve North America Ltd.
Heintz and Kaufman Ltd.
P. R. Mallory & Co., Inc. Mallory Distributor Products Co.
Microwave Assoc. Inc.
Motorola Semiconductors Motorola Inc.
RCA Corporation RCA Electronic Components
Sottron Devices Inc. Semiconductor Div.
Terminal Electronics Corp.
Texas Instruments Components Group
Thor Electronics Corp.

Sensors, Tone

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Control Design Corp. 42

Control Design Corp.

Set-up Trucks

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Storel Corp. 147

Storel Corp.

Shifters, Phase Microwave

American Electronic Labs., Inc.
Heintz and Kaufman Ltd.
Microwave Associates Inc.
Murdy Microwave Corp.
Micro Communications, Inc.
Micronom Associates Inc.
Murdock Micro Corp., The
Raytheon Company Raytheon Data Systems Co.
Systor-Donner
Television Microtime, Inc. Subs.
Andersen Laboratories, Inc.
Weinreich Engineering Co.

Slow Scan TV Systems

ATV Research
Colorado Video Inc.
Gen Electradynamics
Harris Corporation Broadcast Equipment Div.
Harvey Radio Pro A/V Div.
Hughes Aircraft Company Ind. Prod.
Div Image Devices
ITT Aerospace/Optical Div.
Telecommunication Engineering Co.
Telescopor Intermed Corp.
Teltron, Inc.

Sound Effect Systems

Gotham Audio Corp.
Radio Mfg. Co. (RMC)
Total Technology
Universal Research Labs

Sound Systems, Automatic Level Control

Robins/Fairchild Fairchild Sound Equipment Corp.

Sound Systems, Outdoor

Altec Sound Products
Anca Electronics Inc.
Atlas Sound
Bell P/A Prod.
Bogen Division Lear Siegler Inc.
Cotec Inc. Subs. Computer Equipment Corp.
Concept 70, A Div. of Dyma Engineering, Inc.
Electro Voice Inc. Subs. of Fulton Industries, Inc.
Head Sound Inc.
Jensen Sound Laboratories Div.
Pemcor, Inc.
Mazza Corporation
McMartin Industries
Microwave Assoc. Inc.
Nomikon Satellite Equipment Corp.
Subs. North America Philips Corp.
Palo Sound Products Inc.
Philips Broadcast Equipment Corp.
Subs. North America Philips Corp.
Pulse Dynamics Mfg. Corp. (PDMC)
Q TV Sales & Distributing Div.
RCA Corporation Broadcast Systems Div.
Robins/Fairchild Fairchild Sound Equipment Corp.
Shure Brothers Inc.
Sinal-Johnson
Spectra Sonics
Terminal Electronics Corp.
Ultra Audio Products

Sound Systems, Portable

Electro-Voice Inc. 97

Altec Sound Products
Anca Electronics Inc.
Applied Electro Mechanics, Inc.
Atlas Sound
Audio Distributor Inc.
Bell P/A Prod. Corp.
Bogen Division Lear Siegler Inc.
Cohane International, Inc.
CCA Electronics Corp.
Cetec Inc. Subs. Computer Equipment Corp.
Cromepic Inc.
Concept 90, A Div. of Dyma Engineering, Inc.
Custom Craft Designs
Electro Voice Inc. Subs. of Fulton Industries, Inc.
Gately Electronics
Head Sound Inc.
Jensen Sound Laboratories Div.
Pemcor, Inc.
Mazza Corporation
McMartin Industries
Modular Audio Products
Rupert Labs Inc.
Pass Sound Products Inc.
Philips Broadcast Equipment Corp.
Subs. North America Philips Corp.
Pulse Dynamics Mfg. Corp. (PDMC)
Q TV Sales & Distributing Corp.
RCA Corporation Broadcast Systems Div.
Robins/Fairchild Fairchild Sound Equipment Corp.
Rupert Neve incorporated
Sharp Electronics Corp.
Shure Brothers Inc.
Sinnos Johnson
Singamp Electronics Corp., Inc.
Spectra Sonics
Tape-Athon Corp.
Terminal Electronics Corp.
Ultra Audio Products

Sound Systems, Studio

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Electro-Voice Inc. 97
Scientific Systems, Inc. 130

Altec Sound Products
Ampro Corp.
Archana Electronics Inc.
Audio Designs & Mfg.
Behrend Inc.
Cleveland Electronics, Inc.
Concept 70, A Div. of Dyma
Engineering, Inc.
Crown International
Delta Electronics Inc. (N.C.)
Dyma Engineering, Inc.
Electric Voice Inc. Subs. of Gulton Industries Inc.
Gatley Electronics
Gotham Audio Corp.
Jensen Sound Laboratories Div.
Pencore Inc.
Magna-Tech Electronic Co., Inc.
Maze Corporation
McKinney Industries
Rupert Neve, Inc.
Norelc0, Philips Bst. Equip. Corp.
Pano Sound Products Corp.
Phillips Broadcast Equipment Corp.
Pulse Dynamics Mfg. Corp. (FDMC)
Quad-Eight Electronics
RCA Corporation Broadcast Systems Div.
Robins/Fairchild Fairchild Sound Equipment Corp.
Rupert Neve Incorporated
Stere Sonics
Systems Engineering Co., Inc.
Total Technology
Trusonic) ACS Inc.
Video Aids Corp. of Colorado
ward-Beck Systems, Ltd.

Sound Systems, Theater

Altec Sound Products
Archana Electronics Inc.
Atlas Sound
Audio Designs & Mfg.
Audio Distributor Inc.
Behrend Inc.
Bent/P.A. Prod. Corp.
Brow Division, Learing Inc.
Cromag, Inc.
Concept 70, A Div. of Dyma
Engineering, Inc.
Delta Electronics Inc. (N.C.)
Electro Sound, Inc.
Electro-Voice Inc. Subs. of Gulton Industries Inc.
Gatley Electronics
Head Sound, Inc.
Jensen Sound Laboratories Div.
Pencore Inc.
Maze Corporation
Raydio, Inc.
Pano Sound Products Corp.
Phillips Broadcast Equipment Corp.
Q-TV Sales & Distributing Corp.
Quad-Eight Electronics
RCA Corporation Broadcast Systems Div.
Robins/Fairchild Fairchild Sound Equipment Corp.
Rupert Neve Incorporated
Shure Brothers Inc.
Spectra Sonics
Trusonic) ACS Inc.

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RCA Corporation
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Alltec Sound Products
Amperex Electronic Corp.
Archana Electronics Inc.
Atlas Sound
Audio Distributor Inc.
Behrend Inc.
Brow Division, Learing Inc.
Broadcast Electronics
Carnex Corp.
Cleveland Electronics, Inc.
Collins Radio Group Rockwell
Communication Media
Cromag Inc.
Crown International
Electro-Voice Inc. Subs. of Gulton Industries Inc.
Great & Electronics
Gotham Audio Corp.
Harley Prod. Corp.
Heath Co.
Jensen Sound Laboratories Div.
Pencore Inc.
Koss Corp
Lauderdale Electronic Labs
Maze Corporation
Micro-Tek Corporation
Norelec, Philips Bst. Equip. Corp.
Oaktron Industries Inc.
Pano Sound Products Corp.
Philips Broadcast Equipment Corp.
Pulse Dynamics Mfg. Corp. (FDMC)
QRK Electronic Prod.
RCA Corporation Broadcast Systems Div.
Sansui Electronics Corp.
Sinclair Johnson
Singan Products Corp., Inc.
Soundbinder, Inc.
Sparta Electronic Corp.
Superscope, Inc.
Systems Engineering Co., Inc.
TEAC Corp. of America
Tele Measurements Inc.
Terminal Electronics Corp.
Trusonic) ACS Inc.
Victor Dundac Inc.

STL Equipment

See Adv. Page

Harrington Corporation
Microwave Associates Inc.
Moseley Associates Inc.
Nurad Inc.

Acrodyne Industries Inc.
Carnex Corp.
CCa Electronics Corp.
Collins Radio Group Rockwell
International
Dyma Engineering, Inc.
Electromagnetic Sciences, Inc.
Farinon Electric
Farinon Electric of Canada, Ltd.
FMI/Panasonic Mfg. Corp. (FDMC)
GTE Lenkurt Incorporated
Harrington Corporation Broadcast Equipment Div.

Ibagnani Electronics Inc., Inc. of N.Y.
Marti Electronics
Mastertone Company
McKinnon Industries
Microwave Associates Inc.
Moseley Associates Inc.
Nurad, Inc.
Raytheon Company Raytheon Data Systems Co.
RCA Corporation Broadcast Systems Div.
RHI Elect Labs, Inc.
Scott-Buittner Coasstcom, Inc.
Singer Products Co., Inc.
Sparta Electronic Corp.
Trepac Corp. America
Val-Tronics Inc.
Vian Varney Baker Operations
Wilkinson Electronics, Inc.

Studio Scenery

Feller Vacuum Form Studios
Immo Tricentino Associates, Inc.
Janson Industries

Studio Systems, Audio

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LPB Inc. 85

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Carnex Corp.
CCa Electronics Corp.
Collins Radio Group Rockwell
International
Farinon Electric
Farinon Electric of Canada, Ltd.
FMI/Panasonic Mfg. Corp. (FDMC)
GTE Lenkurt Incorporated
Moseley Associates Inc.
Scott-Buittner Coasstcom, Inc.
Sinclair Johnson
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Baldwin Industries Inc.
Brown, A. T. & A. Matic
Beaver Electronics Ltd.
Bred Electronic Corp.
Blind-Tongue Labs.
Carnex Corporation of Rockwell
Comark Industries Inc.
Delta Electronics Inc., Inc.
Dyad Electronic Communications Div. of Sola Basic
Electronic Inst. & Spec.
Engineering, Inc.
General Microwave Corp.
Harris Corporation Broadcast Equip. Div.  
ITT Jennings  
Jampen Antenna Co. Div. of Computer Equipment Corp.  
Kay Eletrodata Corp.  
Electronic Res. Labs. Inc.  
Magnecraft Electric Co.  
Matrix Systems Corp.  
Micro Communications, Inc.  
Microwave Assoc. Inc.  
Narda Microwave Corp., The  
OAK Industries Inc. Communications Group  
Prentiss Inc.  
RCA/Community Telev. Systems Electronic Industrial Engineering  
RCA Corporation Broadcast Systems Div.  
Richmond Hill Laboratories Ltd.  
Rohde & Schwarz Sales Co.  
Shively Laboratories, Inc.  
Singer Products Co., Inc.  
Stapta Electro Corp.  
Systron-Donner  
Telonic Altair  
Terminal Electronics Corp.  
Texscan Corp.  
Trompeter Electronics  
Vieek Electronics Inc.  
Wide Band Engineering Co., Inc.  

Switches, Crossbar  

TeleMotion, Inc.  
Cunningham Corp. Subs. of Gleason Works  
Delta Electronics Inc. (Va.)  
Fernscheid Group, Robert Bosch Corp.  
In-tel. Nuclear Corp.  
Marconi Electronics Inc.  
Matrix Systems Labs.  
RCA Corporation Broadcast Systems Div.  
Richmond Hill Laboratories Ltd.  
Ritt Corp.  
Tape-Atmon Corp.  
TeleMotion, Inc.  
Trompeter Electronics  
Video Engineering Co., Inc.  
Viscount Industries Ltd.  

Switching Systems  

American Data Corp.  
Central Dynamics Corp.  
Communications Technology, Inc.  
Harris Corporation  
Telemation, Inc.  
Viscount Industries Ltd.  

Ajima Engineering Inc.  
American Data Corp. an AIRPAX Company  
Andrew Corp.  
Audio Services, Inc  
Broadcast Automation Assoc. Central Dynamics Corp.  
Cleveland Electronics, Inc.  
CMX Systems  
Cohu, Inc. Electronics Division  
Communications Technology, Inc.  
Concept 70, A Div. of Dyman Engineering, Inc.  
Cunningham Corp. Subs. of Gleason Works  
Datenet Corp.  
Delta Electronics Inc. (Va.)  
Dyman Engineering Inc.  
DYNAIR Electronics, Inc.  
Fernscheid Group, Robert Bosch Corp.  
Grass Valley Orion Corp.  
GTE Lenkurt Incorporated  
Harris Corporation Broadcast Equip. Div.  
Holland Electronics  
IGM  
Industrial Sciences, Inc.  
Interim. Nuclear Corp.  

International Video Corp.  
ITT General Controls  
Javelin Div. of Apollo Lasers  
Miro Video Systems, Inc.  
Marconi Electronics Inc.  
Masterstone Company  
Matrix Systems Corp.  
Maze Corporation  
McCurdy Radio Ind. Inc.  
Mullitek, Inc.  
Nasco Television Systems  
OMNI  
O-TV Sales & Distributing Corp.  
RCA Corporation Broadcast Systems Div.  
Richmond Hill Laboratories Ltd.  
Riker Communications Inc.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
ROH Corporation  
Schaefer Electronics Corp.  
Switchcraft Inc.  
Systems Marketing Corp.  
Sono-Mag Corp.  
Tech Laboratories Inc.  
Telemation, Inc.  
Trepac Corp. America  
Tronempeter Electronics  
Vicon Industries, Inc.  
Video Engineering Co., Inc.  
Viscount Industries Ltd.  
Visual Electronics Laboratories  
Vital Industries Inc.  

Synchronizers, Audio/Video  

Electronic Engineering Co. of California  
Electronic Engineering Co. of California  

Synchronizer, Digital Video  

TeleMotion, Inc.  
Electronic Engineering Co. of California  
Nippon Electric Co., Ltd.  
Telemation, Inc.  

Systems Research and Development  

Amaico, Inc.  
Audio Services, Inc.  
Comquip, Inc.  
Lauderdale Electronic Labs  
OMNI  
Tape, Magnetic Recording Audio  

Pacific Recorders and Engrg. Corp.  

Tapex Corporation  

Agfa-Gevaert Inc.  
Amplex Corp. Audio-Video Systems Division  
Audio Distributor Inc.  
Audio Magazines Corp.  
Behrends, Inc.  
Birmingham Tape Cartridge Co., Inc.  
Broadcast Automation Assoc. Broadcast Electronics  
BSC Incorporated  
Capitol Magnetic Products a Div. of Capitol Records  
CCEA Electronics Corp.  
Collins Radio Group Rockwell  
International Communication Media  

dianer Corporation  
Kemper, Mfg. Div. of Continental  
Electronic Wholesale  
Fidelio Division Telepro Industries, Inc.  
Fujio Photo Film USA, Inc., Video Tape Div.  
Harris Corporation Broadcast Equip. Div.  
IGM  
Irish Magnetic Recording Tape Div.  
Morhan Nati. Sales Co.  
Javelin Div. of Apollo Lasers  
Karex, Inc., Subs. of Rohm and Haas Co.  
Lauderdale Electronic Labs  
P. R. Mallory & Co. Inc. Mallory Distributor Products Co.  
Masterson Company  
Memorex Corporation Audio-Video Group  
Monarch Broadcast Equip.  
Masterson Company  
MEMOREX Corporation Video/Audio Group  
Nemo Recording Labs  

O-TV Sales & Distributing Corp.  
Qualitape Inc.  
RCA Corporation Broadcast Systems Div.  
RCA Corporation RCA Electronic Components  
Recordex Corporation  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Singor Electronics, Inc.  
Singer Products Co., Inc.  
Sparta Electronic Corp.  
Spectromaster Broadcast Electronics  
Supercorp., Inc.  
Systems Engineering Co., Inc.  
Systems Marketing Corp.  
TDK Electronics Corp.  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Audio Cartridge  

Tape, Magnetic Recording Video  

Ampex Corp. Audio-Video Systems Division  
Amater Puzan CATV Division  
Aesthetic Audio Technology, Inc.  
Belvedere Electronics Limited  
Fidellipac Division Telepro Industries, Inc.  
G.C. Electronics  
Lauderdale Electronic Labs  
Masterstone Company  
Nortronics Co., Inc. Recorder Care Div.  
RCA Corporation Broadcast Systems Div.  
Systems Marketing Corp.  
Tape-Atmon Corp.  
Tape-Atmon Corp.  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Test  

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Tape, Magnetic Recording Video  

Ampex Corp. Audio-Video Systems Division  
Amater Puzan CATV Division  
Aesthetic Audio Technology, Inc.  
Belvedere Electronics Limited  
Fidellipac Division Telepro Industries, Inc.  
G.C. Electronics  
Lauderdale Electronic Labs  
Masterstone Company  
Nortronics Co., Inc. Recorder Care Div.  
RCA Corporation Broadcast Systems Div.  
Systems Marketing Corp.  
Tape-Atmon Corp.  
Tape-Atmon Corp.  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Test  

See Adv. Page  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Video  

Ampex Corp. Audio-Video Systems Division  
Amater Puzan CATV Division  
Aesthetic Audio Technology, Inc.  
Belvedere Electronics Limited  
Fidellipac Division Telepro Industries, Inc.  
G.C. Electronics  
Lauderdale Electronic Labs  
Masterstone Company  
Nortronics Co., Inc. Recorder Care Div.  
RCA Corporation Broadcast Systems Div.  
Systems Marketing Corp.  
Tape-Atmon Corp.  
Tape-Atmon Corp.  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Test  

See Adv. Page  

Tape, Magnetic Recording Computer  

Asaca Corp. of America  
Memorex Corporation Audio-Video Group  
RCA Corporation Broadcast Systems Div.  
Robins/Fairchild Fairchild Sound Equipment Corp.  
Systems Marketing Corp.  

Tape, Magnetic Recording Video  

Ampex Corp. Audio-Video Systems Division  
Amater Puzan CATV Division  
Aesthetic Audio Technology, Inc.  
Belvedere Electronics Limited  
Fidellipac Division Telepro Industries, Inc.  
G.C. Electronics  
Lauderdale Electronic Labs  
Masterstone Company  
Nortronics Co., Inc. Recorder Care Div.  
RCA Corporation Broadcast Systems Div.  
Systems Marketing Corp.  
Tape-Atmon Corp.  
Tape-Atmon Corp.
Tape, Recording Logging
Broadcast Automation Assoc.
Capitol Magnetic Products Div. of Capitol Records
Cine Sonic Sound Inc.
Lauderdale Electronic Labs
Maze Corporation
Memorex Corporation Audio-Video Group
Philips Broadcast Equipment Corp.
Qualitone Inc.
RCA Corporation Broadcast Systems Div.
Singer Products Co., Inc.
Soundscorer Corporation
Sparta Electronic Corp.
Systems Marketing Corp. And Sono Maj Corp.
Telecrosy Systems Corp.
Video Sentry System
Tape, Time Announced
See Adv. Page
Tapex Corporation
See Adv. Page
Tapex Corporation
See Adv. Page
Tape Cart Loaders
See Adv. Page
Electro Sound, Inc.
Ramko Research
See Adv. Page
Birmingham Tape Cartridge Co., Inc.
Broadcast Electronics
Communication Media
Electro Sound, Inc.
Lauderdale Electronic Labs
Marathon Broadcast Equip.
Maze Corporation
Qualitone Inc.
Ramko Research
Spotmaster Broadcast Electronics
Ultra Audio Products
Tape Cassette
Audio Magnetics Corp.
Capitol Magnetic Products A Div. of Capitol Records
Fuji Photo Film USA, Inc., Video Tape Div.
Image Devices Incorporates
Irish Magnetic Recording Tape Div.
Morhan Natl. Sales Co., Inc.
Karex, Inc. Subs. of Rohm and Haas Co.
Master Tone Company
Minneapolis, Magnetics, Inc.
Normark, Philips Best, Equip. Corp.
Qualitone Inc.
RCA Corporation RCA Electronic Components
Robins/Fairchild Fairchild Sound Equipment Corp.
Sinal-Johnson
Systems Engineering Co., Inc.
Video Engineering Co., Inc.

Tape Cleaners
Audio Magnetics Corp.
Lauderdale Electronic Labs
Lipsizer-Smith Corp.
Miller-Smith/Donland Chemical Co.
Nortonics, Inc., Recorder Care Div.
Recortec Inc.
Robins/Fairchild Fairchild Sound Equipment Corp.
TEAC Corp. of America
Television Equipment Associates
Ultra Audio Products

Tape Conditioners, Video
Recortec Inc. 26
Recortec Inc.

Tape Deck and Turntable Speed Control
See Adv. Page

Pacific Records and Engrg. Corp.
See Adv. Page
Lauderdale Electronic Labs
Orbit Radio and Video
Pacific Recorders and Engrg. Corp.
D-478
QNK Electronic Prod.
Val-Tronic Inc.

Tape Decks, Magnetic -- See also Cartridge Machine Listings
Ampro Corp.
Crown International
ELPA Marketing
Industries, Inc.
Tapex Corporation
Ampro Corp.
Broadcast Automation Assoc.
Broadcast Electronics
BSC Incorporated
Calitone International, Inc.
CCA Electronics Corp.
Cetec Inc. Subs. Computer Equipment Corp.
Cine Sonic Sound Inc.
Collins Radio Group Rockwell
International
Communication Media
Corqz Inc.
Concor Corporation Cramer Division
Control Division Corp.
Crown International
ELPA Marketing Industries, Inc.
FMI/Magnetics Corp. A Subsidiary of FMI International
Garron Electronics, Inc.
Glenburn Corp., Consumer Products Div.
Gothen Audio Corp.
Harris Corporation Broadcast Equip. Div.
IGM
International Tapetronics Corp.
Lang Electronics Inc.
Lauderdale Electronic Labs
Masterton Company
Minnesota Magnetics, Inc.
Otarri of America Ltd.
Phillips Broadcast Equipment Corp.
Q TV Sales & Distributing Corp.
Radio Mfg. Co. (RMC)
RAPID Q Div. of Garron Electronics
RCA Corporation Broadcast Systems Div.
Recorder Corporation
Sansui Electronics Corp.
Shaffer Electronics Corp.
Scull/Metrotech Div. of Dictaphone Corp.
Sharp Electronics Corp.
Singer Products Co., Inc.
Sounidkorer Corporation

Sparta Electronic Corp.
Spotmaster Broadcast Electronics
Superscope, Inc.
Systems Marketing Corp. And Sono Maj Corp.
Tapex Corporation
TASCAM
TEAC Corp. of America
Telecock Systems Corp.
Telex Communications, Inc.
VIF International

Tape Duplication
See Adv. Page

Electro Sound, Inc.
Ampex Corp. Audio-Video Systems Division
Audio Distributor Inc.
Breyer, Inc.
Broadcast Automation Association
Cetec Inc. Subs. Computer Equipment Corp.
Electro Sound, Inc.
Grosner Electronics
Lang Electronics Inc.
Master Tone Company
Maze Corporation
Minneapolis Magnetics, Inc.
Normark, Philips Best, Equip. Corp.
North American Philips Corporation
Orbit Radio and Video
Pentagon Industries, Inc.
Philips Broadcast Equipment Corp.
Recorder Corporation
Recortec Inc.
SC Electronics, Inc. Subs. of Audiotronics Corp.
Synclavier Systesm Corp.
Telcrosy Systems Corp.
Telefection Inc.
Telex Communications, Inc.
Visual Educum Inc. Dage/M1/Intronics Div

Tape Evaluators, Video
Recortec Inc. 27
Recortec Inc.

Tape Mastering Devices
Electro Sound, Inc.
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Tape Meters
Electro Sound, Inc.

Tape Radios, Cartridge
See Adv. Page

Tapex Corporation
Audio Distributor Inc.
Ampex Corporation
Broadcast Automation Association
Broadcast Electronics
CCA Electronics Corp.
Colins Radio Group Rockwell
International
Communication Media

Concept 70, A Div of Dynma Engineering, Inc.
Dyma Engineering, Inc.
Electro Sound, Inc.
Eidolop Division TelePro Industries, Inc.
Harris Corporation Broadcast Equip. Div.
Joel Cartridge Service
Lauderdale Electronic Labs
Masterton Company
Micro-Trak Corporation
Neumatec Prod. Corp.
Professional Audio Service
QRK Electronic Prod.
RMS Electronics, Inc.
Robins/Fairchild Fairchild Sound Equipment Corp.
Sparta Electronic Corp.
Spotmaster Broadcast Electronics
Storel Corp.
Systems Engineering Co., Inc.
Tapex Corporation
Tele Measurements inc.
Val-Tronics, Inc.

Tape Recording Accessories
See Adv. Page

Electro Sound, Inc.
Professional Audio Service
Tapex Corporation
Ampex Corp. Audio-Video Systems Division
Broadcast Automation Association
Broadcast Electronics
Capitol Magnetic Products A Div. of Capitol Records
Conop, Inc.
Control Design Corp.
Electro Sound, Inc.
Electro-Voice Inc. Subs. of Qulton Industries, Inc.
ELPA Marketing Industries, Inc.
Fidelac Division TelePro Industries, Inc.
Garron Electronics, Inc.
G.C. Electronics
Lauderdale Electronic Labs
Masterton Company
Micro-Trak Corporation
Norbonics, Inc., Recorder Care Div.
Pacific Recorders and Engrg. Corp.
D-478
Professional Audio Service
Qualitone Inc.
Ramko Research
RCA Corporation Broadcast Systems Div.
Recortec Inc.
Revon Corporation
Robins/Fairchild Fairchild Sound Equipment Corp.
Scull/Metrotech Div. of Dictaphone Corp.
Sparta Electronic Corp.
Spotmaster Broadcast Electronics
Tapex Corporation
Telecrosy Systems Corp.
Tri-Tronics, Inc.
Videofax Corp.
VIF International

Tape Splice Finders
See Adv. Page

Technical Division
Broadcast Automation Association
Broadcast Electronics
Communication Media
Recortec Inc.
Sonstern Division UMC Electronics Co.
Spotmaster Broadcast Electronics
Tapecrosy TCM, Inc.

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Triangle Towers & Antennas
Utility Tower Co.

Tower Guys - See Antenna and Tower Guys

Philadelphia Resins Corp. - See Adv. Page

Philadelphia Resins Corp.

Tower Installation and Services - See Antenna and Tower Installation and Services

Tower Light Indicator Panels - See Adv. Page

Dielectric Communications
Hughy & Phillips Inc. - See Adv. Page

Advance Industries
CICA Electronic Corp.
Collins Radio Group Rockwell
International

Dielectric Communications Div. of Sola Basic
Hughy & Phillips Inc.
Masterton Company

Tower Lighting Isolation Transformers - See Adv. Page

Austin Insulator Div. - See Adv. Page

Hughy & Phillips Inc. - See Adv. Page

Jampro Antenna Co. - See Adv. Page

Jampro Antenna Div. - Decca Radar Canada (1967) Ltd.
Collins Radio Group Rockwell
International

Hughy & Phillips Inc.
Jampro Antenna Co. Div. of Computer Equipment Corp.
Masterton Company
North American Radio Corp.

Tower Lights, High Intensity Obstruction - See Adv. Page

Dielectric Communications Div. of Sola Basic
Laundalele Electronic Labs
RCA Corporation Broadcast Systems Div.
Triangle Towers & Antennas

Towers, Antenna - See Adv. Page

Allied Broadcast Equip. - See Adv. Page

Harris Corporation - See Adv. Page

Jampro Antenna Co. - See Adv. Page

Advance Industries
Allied Tower Company, Inc.
Ameco Inc.
Andrews Tower Inc.
Antenna Products Company
Collins Radio Group Rockwell International
Dyna Engineering, Inc.
E Z Way Prod. Inc.
FMI/Magnatech Corp A Subsidiary of FM International
Fort Worth Tower Co., Inc.
G C. Electronics
Harris Corporation Broadcast Equip. Div.
Jampro Antenna Co. Div. of Computer Equipment Corp.
Kline Iron & Steel Co. Tower Division Masterton Company
RCA Corporation Broadcast Systems Div.
Royal Manufacturing Div. of Universal Industry Inc.
Singer Products Co. Inc.
Sparkle Electronic Corp.
Stainless, Incorporated
Swagler Tower Corp.
Tilter Communications Service, Inc.
Triangle Towers & Antennas
Up Right Scaffolds
Utility Tower Co.

Towers, Antenna Transmitting AM - See Adv. Page

Harris Corporation - See Adv. Page

Val-Tronis, Inc. - See Adv. Page

Advance Industries
Allied Tower Company, Inc.
Andrews Tower Inc.
Antenna Products Company
CICA Electronic Corp.
Collins Radio Group Rockwell International
E Z Way Prod. Inc.
FMI/Magnatech Corp A Subsidiary of FM International
Fort Worth Tower Co., Inc.
Harris Corporation Broadcast Equip. Div.
Jampro Antenna Co. Div. of Computer Equipment Corp.
Kline Iron & Steel Co. Tower Division Masterton Company
RCA Corporation Broadcast Systems Div.
Royal Manufacturing Div. of Universal Industry Inc.
Singer Products Co. Inc.
Sparkle Electronic Corp.
Stainless, Incorporated
Swagler Tower Corp.
Tilter Communications Service, Inc.
Triangle Towers & Antennas
Tri-Ex Tower Corp.
Up Right Scaffolds
Utility Tower Co.

Transformers, Audio - See Adv. Page

Modular Audio Products
Sescom, Inc. - See Adv. Page

Alltec Sound Products
Electro-Voice Inc., Subs. of Gulton Industries Inc.
Gotham Audio Corp.
Modu-Audio Products
Sixcom, Inc.

Transformers, RF Sampling - See Adv. Page

Delta Electronics Inc.

Transistor Repair Parts - See Adv. Page

Television Technology Corp.

Teletron Corporation

Transmission Sets - See Adv. Page

Delta Electronics Inc.

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### Transmitters, FM 50 Watt

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>1 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>1 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>1 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>1 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>1 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>1 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>1 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>1 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>1 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>1 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>1 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>1 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>1 kW</td>
</tr>
</tbody>
</table>

### Transmitters, FM 100 Watt

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>2.5 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>2.5 kW</td>
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</tbody>
</table>

### Transmitters, FM 250 Watt

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>5 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>5 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>5 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>5 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>5 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>5 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>5 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>5 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>5 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>5 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>5 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>5 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>5 kW</td>
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</tbody>
</table>

### Transmitters, FM 500 Watt

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>10 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>10 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>10 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>10 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>10 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>10 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>10 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>10 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>10 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>10 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>10 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>10 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>10 kW</td>
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</tbody>
</table>

### Transmitters, FM 7.5 kW

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>15 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>15 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>15 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>15 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>15 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>15 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>15 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>15 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>15 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>15 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>15 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>15 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>15 kW</td>
</tr>
</tbody>
</table>

### Transmitters, FM 20 kW

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris Corporation</td>
<td>25 kW</td>
</tr>
<tr>
<td>RCA Corporation</td>
<td>25 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>25 kW</td>
</tr>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>25 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>25 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>25 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>25 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>25 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>25 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>25 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>25 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>25 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>25 kW</td>
</tr>
</tbody>
</table>

### Transmitters, FM to order

<table>
<thead>
<tr>
<th>Company</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Electronic Labs, Inc.</td>
<td>50 kW</td>
</tr>
<tr>
<td>CCA Electronics Corp.</td>
<td>50 kW</td>
</tr>
<tr>
<td>Collins Radio Group Rockwell International</td>
<td>50 kW</td>
</tr>
<tr>
<td>FMI/Magnatech Corp A Subsidiary of FM International</td>
<td>50 kW</td>
</tr>
<tr>
<td>Mastertone Company</td>
<td>50 kW</td>
</tr>
<tr>
<td>North American Radio Corp.</td>
<td>50 kW</td>
</tr>
<tr>
<td>RCA Corporation Broadcast Systems Div.</td>
<td>50 kW</td>
</tr>
<tr>
<td>Singer Products Co., Inc.</td>
<td>50 kW</td>
</tr>
<tr>
<td>Sparta Electronic Corp.</td>
<td>50 kW</td>
</tr>
<tr>
<td>Wilkinson Electronics, Inc.</td>
<td>50 kW</td>
</tr>
</tbody>
</table>

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September, 1974
Transmitters, TV
Acrodyn Industries Inc.
CCA Electronics Corp.
CCA RF Industries, Inc.
DYNAR Electronics, Inc.
Harris Corporation Broadcast Equip. Div.
Jagami Electronics Ind., Inc. of N.Y.
Marconi Electronics Inc.
RCA Corporation Broadcast Systems Div.
Television Technology Corp.
Varian Beverly Operations

Transmitters, TV Microwave

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Terraco

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Transmitters, TV 1 Watt
Acrodyn Industries Inc.
CCA Electronics Corp.
EMCEE Broadcast Products Div. of Electronics, Missiles & Communications, Inc.
Feng Engineering Inc.
GE Lenkurt Incorporated
Harris Corporation Broadcast Equip. Div.
Orbit Radio and Video
RCA Corporation Broadcast Systems Div.
Rhode & Schwartz Sales Co.
Television Technology Corp.
Varian Beverly Operations

Transmitters, TV 10 Watt
Acrodyn Industries Inc.
Airline Sales Corp.
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Television Technology Corp.
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Transmitters, TV 20 Watt
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Rodelco Corp.
Television Technology Corp.
Varian Beverly Operations

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Teltron, Inc.

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English Electric Valve North America

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American Radio History
High Blood Pressure Is a Joke.

...a bad joke. High blood pressure—doctors call it hypertension—is a silent, mysterious disease. It cripples and kills without warning. One in seven adult Americans has it, and half don't know it. There are no special symptoms, but when your blood pressure goes up and stays up, it's no laughing matter. Untreated, it can lead to heart attack, stroke and kidney failure. This year alone, 900,000 will die from these diseases. Your doctor can detect hypertension, and can usually control it. So get a checkup. And follow your doctor's orders. No one else can do it for you.

Right? Meanwhile, the Heart Association is working hard to learn what causes hypertension and how it can be cured...to find people with high blood pressure and get them under treatment. We're doing it through research, education and community programs. Your contribution to the Heart Fund will keep us working. No joke.

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It's a special way to celebrate our first twenty years.

People start pollution. People can stop it.
Sarnoff Calls
For Satellite Sharing

RCA Chairman Robert W. Sarnoff called for greater sharing of satellites by government and commercial users and better planning of all satellite developments to avoid growing confusion and needless duplication of effort in space.

He told the Armed Forces Communications and Electronics Association that new technology is adding many new capabilities to individual spacecraft and opening the way to multipurpose systems for functions that now require many separate vehicles and costly launchings. He added that systems dedicated to a single function or user soon will be unjustifiable and wasteful, except for a few highly specialized defense requirements.

"A change of this order will represent a quantum leap forward in space technology," said Sarnoff.

"It will open a broad range of opportunities that can be properly exploited only if we have in advance a clear idea of what we wish to achieve."

The RCA executive, who received AFCEA's Distinguished Service Gold Medal, stated that the speed of change underscores the need for a far more organized approach to the use of new communications and electronics technology.

He reiterated his call for the establishment by Congress of a new independent agency—a Science and Technology Board—to coordinate the diverse research and development activities of the government and maintain close ties with the general scientific and engineering community.

"Within its broad policy context, this agency would, of course, concern itself with the disarray that now obscures the future of our communications and electronics technology," he said. "All users of communications—military, commercial, and private—would benefit from the more orderly flow of development and application that would result."

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Data sheets are available. And our reps will be delighted to arrange a demo. Call or write Biomation, 10411 Bubb Road, Cupertino, CA 95014. Phone: (408) 255-9500. TWX 910 338 0226.
Sarnoff cited the prospect of new public and private ventures to apply the latest technology to new satellites for communications, weather surveillance, resource studies, navigation, national security, and even direct broadcasting. He called for the establishment of a relationship among all of these activities, pointing as an example to the question of satellites in geostationary orbit.

"Space may seem unlimited, but desirable locations are not," he said.

He explained that geostationary satellites must be spaced about 100 miles apart to avoid colliding, and that communications satellites operating in the same frequency range—as they do now—must be kept from 1,200 to 2,000 miles apart to prevent mutual interference. This provides room for only eight to thirteen in the orbital segment covering North America and Hawaii.

The use of higher frequencies could reduce these distances and make possible perhaps 20 or more satellites, he said.

"New technology promises to open higher frequency ranges in the near future," he added. "It may then be possible to reduce the distance between such satellites by as much as half. The resulting population of perhaps twenty or more satellites might seem to be more than enough for any of our communications needs. But is anyone today prepared to say with certainty that our future demands will not exceed even this capacity?"

Sarnoff said that space is just one aspect of the broader problem, but it is characteristic of the way the United States uses all of its scientific resources and technological skills.

"Even now—three decades after the first nuclear chain reaction, 26 years after the dawn of the solid state revolution, 16 years into the Space Age—the United States is without a coherent long-range policy and program in science and technology," he added.
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Eureka! A complete remote and studio production console for a fraction of what you'd expect to pay for a console with comparable features and performance! Simply purchase a new Shure M675 Broadcast Master and the extremely popular Shure M67 Professional Microphone Mixer. By combining these two units, you get inputs to handle microphones, turntables, phone lines and tape machines—*with cuing provision on line and magnetic phono inputs*. Result? A versatile low-noise, low-distortion broadcast production console for in-studio, remote, and standby assignments; a complete CATV console; a studio production console. For complete technical data, write:

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Onan ELECTRIC GENERATOR SETS • LOAD TRANSFER CONTROLS • INDUSTRIAL ENGINES
Magnetic tape head maintenance considerations

By Frank Zeman
President, Minneapolis Magnetics

Photos by Gene Borman
Line Drawings by Robert Homer

The use of magnetic tape as the preferred medium for audio work in broadcasting is continually increasing. Today, many stations are approaching total automation of program material, ... an innovation made possible by some highly creative ideas which have been coupled with standard approaches, ... but all of it is based around magnetic tape.

Despite this tremendous dependence on tape, there is a great deal of misinformation, confusion and downright fear on the part of many technicians when it comes to the rather small, touchy component which makes it all possible. ...the magnetic tape head. Stalwart types who wouldn’t bat an eyelash about digging into the innards of a bewildering array of highly complex and sophisticated gear will start twitching and dive into the nearest storm cellar before getting involved in any way with the heads on their tape equipment.

How It Came To Be

Why should this be so? How did it come about, and what can be done to correct it? A little history might be of help in understanding how it happened.

When professional tape recording equipment first appeared on the market (and for a good many years thereafter), the head assembly was assigned a mystique which it has held ever since. Heads were strictly a no-no, insofar as poking and probing were concerned. They were usually housed in a formidable protective enclosure, shielded as much from wandering fingers as stray hum fields. A careful check of the operating and service manual supplied with the equipment would furnish practically no information about the heads themselves. Other than indicating the single screw or nut to turn for azimuthing the head gap, the manuals were almost useless. The mere thought of the owner trying to replace his own heads was severely frowned upon and this added to the mystery of just what went on inside that head housing.

As time marched on, manufacturers of professional tape equipment tended to make it more and more imperative that head replacement was strictly a job for the factory and should not be attempted in the field. Fortunately for all of us, this trend has been sharply reversed in recent years. While it is still difficult to get precise information about the heads used in a given machine, the situation is improving and shows promise of continuing in that direction.

Trading Secrets

Just to complicate matters further, those of us who are in the business of producing magnetic tape heads for use on professional equipment haven’t exactly bared our souls either. It is hard for me to think of a single head manufacturer who has ever disclosed any of the processes he uses to get his product together. It’s true that many things are proprietary and closely held “trade secrets”, but it is no excuse for our failure to outline the basic procedures used. Making magnetic tape heads is an art, not a science, and this should be kept in mind.

Another thing which we believe has helped to perpetuate this shroud of secrecy is the fact that a well-made, professional tape head will give excellent performance over an extended period of time. So little trouble is encountered with such heads (until they near the end of their useful life), they are almost always the very last thing to be looked at in attempting to correct performance problems. I have personally seen recording and reproducing amplifiers checked to a fare-thee-well in a frantic search for a defective part when the whole
in this issue

Industry News ........ CE-4
CCTV Product Guide .......... CE-8B
Manufacturers Address List .......... CE-13
Cover up

The Davis Mini-Sneaker® goes all the way to plant service lines without a telltale trail!

Without question the Davis Mini-Sneaker is the finest machine for planting housespots in the industry! It moves in—even beyond yard gates—to plant telephone lines, CATV cable, even sprinkler systems, then is gone without leaving a telltale trail! Its oscillating knife action slices through the ground with vibration isolated from the top chute to protect delicate lines. Its patented suspension system also isolates vibration from the machine. Hydraulic down-pressure assures that lines are buried at a constant depth while patented skid shoes hold both sides of the cut in place minimizing turf damage for the perfect cover up. And there are no exposed drive lines to catch on loose clothing or objects. It buries to depths of 18" at infinitely variable speeds to 200 fps! The exclusive Mono-Stick puts complete command of speed, steering, directional travel and braking in one hand. Hydra-Static drive, limited-slip differentials and hydraulic articulation provide exceptional stability and maneuverability around any obstacle, even in restricted and confined areas. As on all Davis machines, the Mini-Sneaker is covered by the 6-months parts and labor warranty—finest in the industry. In Davis Country, we don't just talk about quality. We're doing something about it! See your Davis dealer, or write Davis Manufacturing and go all the way with the Mini-Sneaker.
NEW

Meet the LDH-20
second-generation low-cost
Norelco color camera.

It's everything...and then some!

When we introduced the Norelco LDH-1, we called it the Everything Camera. Stable, versatile—and above all, it produced the famous Norelco 3-Plumbicon® tube color picture at a price that met stringent budget requirements. The LDH-1 is the leader in its class.

Improve on that and what do you have? The low-cost everything plus camera: the new Norelco LDH-20. Even greater stability; operational simplicity; greater flexibility than ever before; and, of course, the patented Norelco sealed-prism beam-splitter.

Part of the new-generation family, built around the LDH-20, is the LDH-16 Compact Color Telecine System.

Make no mistake, Norelco remains the magic word in color television cameras. Call or write today.
The Federal Communications Commission should prohibit the transfers of cable television franchises from one company to another when construction of the cable system has not begun, according to comments filed independently by four staff members of the Cable Television Information Center.

W. Bowman Cutter, the center's executive director, and staff members Edwin A. Deagle, Jr., Velories A. Figures and John C. McGuire filed the comments in response to the FCC's notice relative to an inquiry on the need for new regulations in the area of transfers of control of cable television franchises (Docket 20023).

The group told the commission "To sell such franchises is profit without any justification from governmental largesse. Such sales represent trafficking...for which we can conceive of no excuse. They should be flatly prohibited by the Commission, again in the interest of promoting and protecting a reasoned local selection process."

The four urged the FCC to adopt a rule requiring all cable TV franchises to contain a provision requiring the local franchise authority to pass on transfers of control. "To require franchising authorities to undertake a fairly elaborate franchise selection process and then to permit the entire process to be subverted by not preventing the franchisee from selling out to the highest bidder is to ignore the national interest that prompted adoption of the original franchise selection rules," they stated. "Long ago, the United States Supreme Court characterized a franchise as a right, privilege or power of public concern, which ought not to be exercised by private individuals at their mere will and pleasure."

Under such a rule, transfers of control would be broadly defined by the commission and would be presumed when an acquisition or accumulation of 10 per cent of the voting shares of the franchisee by a person or a group of persons occurred. Narrower definitions by franchising authorities would be permitted. And once the presumption is raised, it could be rebutted at the local level.

The filing noted that large cable companies "may be extremely displeased with the prospect of being screened by several hundred city councils," but that this measure is "justified by each local government's interest in having a (continued on page CE-8)
We've been talking a lot lately about the Ditch Witch Modularmatic concept and what it means to the underground construction industry. The Modularmatic series does provide a tremendous range of job functions; all designed and developed around the basic soundness of design and historic success of the Ditch Witch trencher series. We're mighty proud of it and what it offers, but we realize there are times when the many capabilities of the Modularmatics are not needed. That's why we manufacture our standard line of trenchers.

DON'T FORGET OUR TRENCHERS!

Ditch Witch designed and built the world's first service-line trencher more than 20 years ago. We've continued to build the world's best trenchers ever since. If your job requirements are strictly trenching, there's a model in the Ditch Witch trencher series that suits your needs exactly.

For example, we offer two economical handlebar models, the C and M. Both are self-propelled with power plants ranging from 7- to 12½ horsepower.

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Should you need a larger trencher, one of our Modularmatic models, equipped as a trencher, gives you the best machine in its class — plus the option of adding other capabilities later.

Whatever your underground construction needs, look first to Ditch Witch and "Don't forget our trenchers!"
Getting the word straight

Telling it like it is sometimes means admitting a mistake. We hope this extra information on automation will eliminate any misconceptions that might have come from the July automation article. Ed.

We want to report a mix-up...

In Ken Lawson’s article entitled, “Automatic Programming for Cable: A Model for the ’70’s,” appearing in the July issue of Cable Engineering, we featured some historic museum pieces which were mechanical forerunners of the electronic automated program devices of today. While we are proud of these pioneering efforts (the original TeleMation Weather Channel and News Channel), readers might have surmised from the picture caption that these are the products of the day. Nothing could be further from the truth!

These devices only represent the beginning of automated services programming for Cable TV.

Today’s automatic programming equipment is highly sophisticated and offers multiple service capabilities. Systems like the TeleMation Programatic 3000 can display many channels simultaneously with a vast amount of information all sorted, scheduled and presented automatically by a computer—the heart of the system.

Today’s “Weather Channel” is a combination aerospace-design weather station and electronic character generator. Today’s “News Channel” can be captured from the broadcast newswire services, sorted for locale, by subject, and displayed on several channels specifically designated to present single-topic information—again via character generation equipment and computer.

There’s a big difference in automated systems of yesterday and today’s electronic entries—we’ve come a long way in developing automatic program origination equipment!

This multiple-channel program origination and control system—the Programatic 3000—is computer-controlled and offers cable operators an opportunity to present their subscribers with a broad spectrum of information services and local-interest programming—automatically.

Programatic 3000 computer rack

TCG-1432 Character Generator
THE WINEGARD CABLEMATE TV SIGNAL SELECTOR HELPS SWITCH CATV PROSPECTS INTO SUBSCRIBERS.

Winegard introduces an exclusive new switch with a unique circuitry designed to help turn CATV prospects into CATV subscribers. We call it the Cablemate TV Signal Selector.

And that's exactly what it does. Helps your customer select the signal he wants. Cable when he wants cable. Antenna when he wants antenna.

Which means you get extra help in converting a prospect into a subscriber. Especially all those prospects who want the many advantages of cable TV but aren't ready to give up their TV antennas.

Cablemate is also helpful in the event of a possible outage. So no matter how infrequent or how brief the interruption, your subscriber keeps his temper. And you keep your subscriber.

Cablemate, of course, is not an ordinary switch. It has specially designed circuitry with 58db isolation to prevent interference between cable and antenna signals.

And best of all, everything that Cablemate does, it does reasonably. Because Winegard has kept costs in line and produced Cablemate at a low price.

Cablemate. It even sounds helpful.

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3000 Kirkwood St., Burlington, Iowa 52601

Please send price and order information,

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Street
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September, 1974
communications service of public concern conveyed to its citizens by responsible persons of its choosing.” It continued, “to allay concerns of this nature, we have suggested that local authorities be required to act with expedition and without caprice.”

The group noted that transfers of control take place in several different ways including sale to a subsidiary, sale of a local company to a national one, mergers and public sales of stock. “The illusion that no change has taken place if the corporate name, stationery, office, etc. remain the same is just that, pure illusion. A company derives its personality and policies from those who control it—be it management or dominant members of the board,” they stressed. They added, “The insult to the local government is compounded when control is transferred to one of the losers in the franchising contest. Such cases do exist; they are not isolated instances.”

The four urged the FCC to amend its rules to read as follows:

The franchise shall contain a provision giving the franchising authority the power to approve or disapprove transfers to control of the franchisee.

Any such transfer which does not have the approval of the franchising authority within six (6) months of the occurrence of the transfer shall, at the option of the franchising authority, render the franchise invalid. The franchising authority shall act in a public proceeding, shall proceed with expedition and shall not arbitrarily withhold approval. A rebuttable presumption that a transfer of control has occurred shall arise upon the acquisition or accumulation by any person or group of persons of 10 per cent of the voting shares of the entity to which the franchise was awarded.

The Cable Television Information Center, a part of The Urban Institute, is a private, nonprofit advisory group which assists local governments in the development of cable television in the public interest.

NCTA Opposes Government Regs

The National Cable Television Association has vigorously opposed governmental restrictions which have denied American consumers the right to a greater choice of television programming and have retarded the growth of both the cable and pay cable television industries.

In a strongly worded resolution, the NCTA Board of Directors meeting in Washington, D.C. unanimously went on record as opposing any governmental restrictions on the exhibition of feature films and series on pay cable television. The association also said that the cable industry should have the right, under the present FCC regulations, to present sporting events which are not being broadcast on television.

The cable industry trade association proposed that during a four year period the industry collect such information about the marketplace experience which the Federal Communications Commission deems necessary to determine whether any restrictions are appropriate on exhibition of feature films and series on pay cable.

With respect to restrictions on sports programming, Foster added that it is not in the public interest to deprive the American consumer of the right to view sports events which are not being broadcast.

INSTANT

The Head-End Building that is installed on site in minutes... BACK IT UP... SLIDE IT OFF... BOLT IT DOWN! These factory fabricated buildings have been engineered and designed as the most modern and economical way to house CATV and micro-wave electronic equipment. Specially constructed to withstand the rigors of all climatic conditions and provide a dust-free and temperature controlled housing for the electronic equipment. Mobilit Head-End Buildings fulfill all requirements with a minimum of time and expense. Many options are available in size, outside finish, wiring and ventilation. There's one exactly suited to your system requirement...

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CE-8

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BROADCAST ENGINEERING
Local Origination Resistance Still A Factor

The Federal Communications Commission should no longer require all cable TV systems with 3,500 or more subscribers to provide locally originated programs and, instead, ought to impose a reasonable requirement on those systems to furnish access facilities, according to comments filed independently by five members of the Cable Television Information Center and the Rand Corporation.

W. Bowman Cutter, executive director of the Cable Television Information Center, Edwin A. Deagle, Jr., the center's director of analysis, and Leland L. Johnson, Walter S. Baer and Henry Geller, all of the Rand Corporation, filed the comments in response to the FCC's notice inviting views on the mandatory origination requirement of its cable TV rules (Section 76.201). Their comments reflect the views of the individuals, and not those of the organizations they represent nor their funding sources.

The group premised its filing by stating that "the key public interest requirement is that the cable system provide a first or additional outlet for public expression—not that the system owner himself present programming fare." They further noted that the present rule requiring cable systems to operate to a significant extent as a local outlet by origination cablecasting, was inconsistent with the public interest for three reasons. First, it may impose higher costs and thus interfere with the system's basic purpose of providing TV service and access. Second, it may not be desirable to draft the system operator to become in effect a broadcaster. Third, it is contrary to the recommendation of the President's Cabinet Committee on Cable Communications that "control of cable distribution facilities should be separated from control of programming and other services provided over the channels on those distribution facilities."

The five said that the rules concerning access for systems in the 100 largest television markets should continue to apply to those systems. For those systems outside the major markets, which presently are not required to furnish access facilities, they suggested rules "without most of the more complex and burdensome requirements imposed on the cable systems in the major markets."

Based upon data furnished in the filing, the group concluded that any system with 3,500 or more subscribers could provide a "minimal access operation" for "well below $10,000 a year." They stressed that the provision of such minimal facilities will, at the least, provide "the opportunity to hear the public official report to the community, or a debate between candidates or partisans on some local issue" where it has heretofore been denied.

Finally, the comments called for "an experiment—namely, the elimination of the fairness and equal opportunities obligations as to all nonbroadcast cable operations, with a report at appropriate periods whether the access channels have been fully effective in meeting such obligations." The group urged the commission not to automatically incorporate "concepts developed for the regulation of the broadcaster as a public trustee on one channel. Cable calls for different regulatory treatment because of its larger number of available channels."

Co-Ownership Plea Submitted to FCC By NAB

The National Association of Broadcasters told the Federal Communications Commission that there is no basis to require divestiture of co-owned newspapers and broadcast properties and urged the Commission to dismiss its proceedings.

At a recent hearing, NAB was represented by special counsel Lee Loewinger, former FCC Commissioner and former head of the Justice Department's Antitrust Division. He was accompanied by John Summers, NAB general counsel, and John Dimling, NAB vice president and director of research.

Loewinger said the presence of Dimling was of particular significance because the evidence presented was based on research rather than just legal arguments. He said legal arguments have been presented to the Commission many times in the past.

The special counsel said the FCC should "decide this matter on the basis of the evidence before it and not simply on the basis of hypotheses or speculation."

Loewinger reviewed seven volumes of exhibits that previously had been filed by NAB:

—A survey of mass communications in the United States as of 1970, which is the first and, as far as is known, the only census of all media in all of the more than 200 television markets.

—An economic analysis of the price effects of cross ownership upon advertising. Loewinger said this analysis destroys the hypotheses by the Justice Department that cross ownership may have some effect in raising advertising prices.

—A study by Dr. Sterling of the School of Communications of Temple University regarding the concentration of ownership of broadcasting stations and newspapers in the top one-hundred markets from 1922 to 1970. This study shows media concentration is at an all-time low.

—A study of the turnover of trafficking in broadcast licenses of pioneer AM and TV stations which shows that media owners were much more stable in holding on to broadcasting licenses than non-media owners.

—A study by NAB's Research Department of transfers of broadcasting stations from 1970 through April 14, 1974, which shows substantial net reduction in cross ownership.

—A content analysis by the Director of the Ohio University Broadcast Research Center of the news coverage of newspapers affiliated with stations in the same market.

September, 1974
CCTV product directory

Amplifiers, Bridging
Ameco, Inc.
Anaconda CATV
Amis-Pruzan
Buckeye Telephone & Supply Co.
C-COR Elect., Inc.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Echo Science Corp.
Elect. Indus. Eng., Inc.
Entron, Inc.
Environmental Comm., Inc.
GTE Sylvania
Jerrold Elect. Corp.
Lindsay Speciality Prods. Ltd.
Magnavox
Maspro Co., Inc.
Rohde & Schwarz Sales Co.
Telenet Central
Telcordia
Winegard Co.

Amplifiers, Distribution
Ameco, Inc.
Ameco, Inc.
Amer. Data Corp.
Anaconda CATV
Amis-Pruzan
AVA Elect. & Machine Corp.
Ball Bros. Research Corp.
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Broadcast Automation Assoc.
Broadcast Elect., Inc.
C-COR Elect., Inc.
Cerro Comm.
Cohu, Inc.
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Davco Elect. Corp.
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Dynasciences Corp.
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Hitachi Shibaden Corp. of Amer.
Magnavox
Radiation Devices Co.
Rohde & Schwarz Sales Co.
Telemation, Inc.
Temtron Elect.
Video Eng. Co., Inc.
Viscount Indus., Ltd.
Visual Edocon Inc.
Vital Indus., Inc.
Winegard Co.

Amplifiers, Broadband
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Ameco, Inc.
Anaconda Elect.
Amis-Pruzan
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B&K Instr., Inc.
Blonder-Tongue Labs., Inc.
Cerro Comm.
C-COR Elect., Inc.
Davco Elect. Corp.
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Elect. Indus. Eng., Inc.
Entron, Inc.
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JFD Systems Div.
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Magnavox
Radiation Devices Co.
RMS Elec., Inc.
Sitco Antenna Co.
Telcordia
Temtron Elect.
Theta-Com of Calif.
Tocom, Inc.
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Amplifiers, Pulse
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Dynair Elect., Inc.
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C-COR Elect., Inc.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Dynasciences Corp.
Magnavox
Telemation, Inc.
Video Eng. Co., Inc.
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Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
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KLM Elect.
Leasing Indus. Corp.
Magnavox
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Ball Bros. Research Corp.
C-COR Elect., Inc.
Davco Elect. Corp.
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Gates Radio
Hy-Gain Elect. Corp.
Jampro Antenna Co.
JFD Systems Div.
KLM Elect.
Lindsay Specialty Prods. Ltd.
Maspro Co., Inc.
Rhode & Schwarz Sales Co.
Scientific-Atlanta, Inc.
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Blonder-Tongue Labs., Inc.
Cablewave Systems Inc.
C-COR Elect., Inc.
Cush Craft Corp.
Davco Elect. Corp.
Gates Radio
Hy-Gain Elect. Corp.
Jampro Antenna Co.
Jerroid Elect. Corp.
JFD Systems Div.
KLM Elect.
Lindsay Specialty Prods. Ltd.
Maspro Co., Inc.
Radiation Devices Co.
RF Systems, Inc.
Riker Video
RMS Elect., inc.
Scala Radio Corp.
Scientific-Atlanta, Inc.
SitoCo Antenna Co.
TACO Div.
TV Cable Supply Co., Inc.
Winegard Co.

Antennas, VHF-UHF
Advance Indust., Inc.
Anixter-Pruzan
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Cablewave Systems Inc.
C-COR Elect., Inc.
Cush Craft Corp.
Davco Elect. Corp.
Gates Radio
Hy-Gain Elect. Corp.
Jampro Antenna Co.
Jerroid Elect. Corp.
JFD Systems Div.
KLM Elect.
Lindsay Specialty Prods. Ltd.
Maspro Co., Inc.
Radiation Devices Co.
RF Systems, Inc.
Riker Video
RMS Elect., inc.
Scala Radio Corp.
Scientific-Atlanta, Inc.
SitoCo Antenna Co.
TACO Div.
TV Cable Supply Co., Inc.
Winegard Co.

Automatic Programming Equipment
Ameco, Inc.
Amer. Data Corp.
Anixter-Pruzan
Broadcast Automation Assoc.
Broadcast Elect., Inc.
Concise Instr. Design Ltd.
Davco Elect. Corp.
Dynasciences Corp.
Gates Radio
Jerroid Elect. Corp.
Phasecom Corp.
Sparta Elect. Corp.
Spectra-Vision Corp.
Tape-Athon Corp.
Techno Prods. Co.
Telemation, Inc.
Television Microtime Inc.
Video Data Systems, Inc.
VIF Internatl.
Vital Indust. Inc.

B&K Instr., Inc.
Broadcast Automation Assoc.
Broadcast Elect., Inc.
CBS Labs.
Coastcom
Comspace Corp.
Davco Elect. Corp.
Electrohome, Ltd.
Electro-Voice, Inc.
Fairchild MOD
F&F/Ceco of Calif., Inc.
Gates Radio
Gothen Audio Corp.
Kay Elemetrics Corp.
McGraw-Edison Co.
Nelson-Hersfield Elect.
Noram Comm., Ltd.
Rhode & Schwarz Sales Co.
Sodadyne Internatl., Inc.
Sparta Elect. Corp.
Tapecaster TCM
Telaudio Centre
Teile-Cine Inc.
Telemation, Inc.
Telenet
Television Equipment Assoc.
Television Microtime Inc.
Ultra Audio Prods.
Video Eng. Co., Inc.
VIF Internatl.
Visual Elect. Labs.
Vital Indust. Inc.

Cable Burial Equipment
Ditch Witch....Page CE-5
Davis............Page CE-2
Anixter-Pruzan
Buckeye Telephone & Supply Co.
Cleveland Trenchers Div.
Davco Elect. Corp.
Davis Mfg.
Ditch Witch
Terra Equipment Co.

Cable Coaxial, Line
Alpha Wire Corp.
Amacord CATV
Anixter-Pruzan
Berkshire Electric Cable Co.
Blonder-Tongue Labs., Inc.
Boston Insulated Wire and Cable Co., Ltd.
Brand-Rex Co.
British Insulated Callender's Cables Ltd.
Broadcast Automation Assoc.
Cerro Comm.
Copperweid Corp.
Davco Elect. Corp.
General Cable Corp.
Noram Comm. Ltd.
Pheps Dodge Comm. Co.
Prodelin Inc.
Saxton Prods., Inc.
Times Wire & Cable Co.

Cable Accessories
Alpha Wire Corp.
Ameco, Inc.
Amer. Technology Co., Inc.
Anixter-Pruzan
Antesco Corp.
AVA Elect. & Machine Corp.
Beaver Elect. Ltd.
Belden Corp.
Boston Insulated Wire & Cable Co., Ltd.
British Insulated Callender's Cables Ltd.

Audio Equipment
Able Comm. & Elect.
Amer. Data Corp.
Anixter-Pruzan

Buckeye Telephone & Supply Co.
Cablewave Systems Inc.
Cerro Comm.
Comm/Scope Corp.
Davco Elect. Corp.
Entron, Inc.
Essex Elect. Systems
General Cable Corp.
Gilbert Eng. Co., Inc.
Jampro Antenna Co.
Jerroid Elect. Corp.
Kay Elemetrics Corp.
LRC Elect., Inc.
Noram Comm. Ltd.
Ponduit Corp.
Preform Line Prods. Co.
Prodelin Inc.
RMS Elect., Inc.
Sigaform Corp.
Soladyne Internatl., Inc.
Southern Telephone Supply Co.
TELSTA/General Cable Apparatus Div.
Temtron Elect.
Theta-Com of Calif.
Tocom, Inc.
TV Cable Supply Co., Inc.
Utility Tool Corp.
Utility Tower Co.
Westcoy Co.
Winegard Co.

Antennas, FM
Advance Indust., Inc.
Anixter-Pruzan
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Broadcast Automation Assoc.
Cablewave Systems, Inc.
Cush Craft Corp.
Davco Elect. Corp.
Ft. Worth Tower Co., Inc.
Gates Radio
Hy-Gain Elect. Corp.
Jampro Antenna Co.
Jerroid Elect. Corp.
KLM Elect.
Lindsay Specialty Prods. Ltd.
Maspro Co., Inc.
RF Systems, Inc.
Riker Video
RMS Elect., Inc.

Background Music Equip.
Tape-Athon Corp.

Cable Coaxial, Drop
Alpha Wire Corp.
Anconda CATV
Anixter-Pruzan
Berkshire Electric Cable Co.
Blonder-Tongue Labs., Inc.
Brand-Rex Co.
British Insulated Callender's Cables Ltd.
Cerro Comm.
Copperweld Corp.
Davco Elect. Corp.
General Cable Corp.
Noram Comm. Ltd.
Saxton Prods., Inc.
Times Wire & Cable Co.

Cable Locators, Underground
Anixter-Pruzan
Davco Elect. Corp.
Scully/Metrotech

Cable, Messenger Wire
Alpha Wire Corp.
Anixter-Pruzan
Belden Corp.
Berkshire Electric Cable Co.
Brand-Rex Co.
Buckeye Telephone & Supply Co.
Cerro Comm.
Copperweld Corp.
Davco Elect. Corp.
General Cable Corp.
Noram Comm. Ltd.
Phelps Dodge Comm. Co.
Southern Telephone Supply Co.
Systems Wire & Cable, Inc.
TV Cable Supply Co., Inc.

Camera Tubes


cameras, B/W
Ameco, Inc.
Ampec Corp.
Anixter-Pruzan
Audiotronics Corp.
Avtel Corp.
Cohu, Inc.
Davco Elect. Corp.
Diamond Power Specialty Corp.
Echo Science Corp.
F&B/Ceco of Calif., Inc.
Gates Radio
GBC Closed Circuit TV Corp.
GPL-TV
Hitachi Shibden Corp.
Int. Video Corp.
Javelin Elect. Co.
Jerrold Elect. Corp.
JFD Systems Div.
K'Son Corp.
Nelson-Hersfield Elect.
Noram Comm. Ltd.
Panasonic VTR/CCTV
Philips Bcst. Equip. Corp.
Sony Corp. of Amer.
Southern Telephone Supply Co.

Television Centre
Telimation, Inc.
Terata Elect.
R. H. Tyler Co.
Video Eng. Co., Inc.
Visual Educom Inc.

Lindsay Specialty Prods. Ltd.
TV Cable Supply Co., Inc.
Winegard Co.

Character Generators
Anixter-Pruzan
Datavision Inc.
Davco Elect. Corp.
GBC Closed Circuit TV Corp.
Interand Corp.
Kansas State Network, Inc.
Laird Telemedia, Inc.
Metrodata Corp.
MSI Television
Systrom-Donner Corp.
Telecomation, Inc.
Telemet
Video Data Systems, Inc.
Video Eng. Co., Inc.
VIF International.

Colorizers
Amer. Data Corp.
Anixter-Pruzan
Dynasciences Corp.
Laird Telemedia, Inc.
Metrodata Corp.
Telecomation, Inc.
Telemet
Television Microtime Inc.
Video Eng. Co., Inc.
Vital Indust. Inc.

Consoles & Accessories
Aima Eng.
Anixter-Pruzan
Avtel Corp.
Boston Elect.
Broadcast Automation Assoc.
Broadcast Elect., Inc.
Cohu, Inc.
Fairchild MOD
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
GPL-TV
Int. Video Corp.
Javelin Elect. Co.
Nelson-Hersfield Elect.
Noram Comm. Ltd.
Panasonic VTR/CCTV
Shintron Co., Inc.
Sparta Elect. Corp.
Telaloo Centre
Teleimation, Inc.
Telecommunication, Inc.
Ultra Audio Prods.
Video Eng., Inc.
Visual Educom Inc.
Vital Indust. Inc.

Channel Preamps
Ameco, Inc.
Anixter-Pruzan
Bever Elect. Ltd.
C-COR Elect., Inc.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Entron, Inc.
Environmental Comm., Inc.
Fung Eng. Co.
Jerrold Elect. Corp.
JFD Systems Div.

Converters
Able Comm. & Elect.
AEL Comm. Corp.
Ameco, Inc.
Anixter-Pruzan
C-COR Elect., Inc.
Comspace Corp.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Elect. Industr. Eng., Inc.

Character Generators
Anixter-Pruzan
Datavision Inc.
Davco Elect. Corp.
GBC Closed Circuit TV Corp.
Interand Corp.
Kansas State Network, Inc.
Laird Telemedia, Inc.
Metrodata Corp.
MSI Television
Systrom-Donner Corp.
Telecomation, Inc.
Telemet
Video Data Systems, Inc.
Video Eng. Co., Inc.
VIF International.

Delay Units
Anixter-Pruzan
Broadcast Automation Assoc.
McGraw-Edison Co.
Television Equipment Assoc.
Television Microtime Inc.

Demodulators
Ameco, Inc.
Anixter-Pruzan
Audiotronics Corp.
Catei
Coastcom
Davco Elect. Corp.
Dynair Elect., Inc.
Elect. Industr. Eng., Inc.
Environmental Comm., Inc.
F&B/Ceco of Calif., Inc.
Fung Eng. Co.
Jerrold Elect. Corp.
JFD Systems Div.
Learning Indust. Corp.
Nelson-Hersfield Elect.
Radiation Devices Co.
Rohde & Schwarz Sales Co.
SC Elec., Inc.
Telemet
Video Eng. Co., Inc.

Directional Couplers
Ameco, Inc.
Amier Technology Co., Inc.
Anconda CATV
Anixter-Pruzan
Antasco, Inc.
AVA Elect. & Machine Corp.
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Buckeye Telephone & Supply Co.
C-COR Elect., Inc.
Cerro Comm.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Dolphin Comm. Corp.
Entron, Inc.
Environmental Comm., Inc.
Jampro Antenna Co.
Jerrold Elect. Corp.
Lindsay Specialty Prods. Ltd.
Magnavox
MFI Co.
RMS Elec., Inc.
Rohde & Schwarz Sales Co.
Southern Telephone Supply Co.
Theta-Com of Calif.
Tocem, Inc.
TV Cable Supply Co., Inc.

Drop Cables
Aberdeen Co.
Alpha Wire Corp.
Anaconda CATV
Anixter-Pruzan
Beiden Corp.
Buckeye Telephone & Supply Co.
Canada Wire & Cable Co., Ltd.
Cerro Comm.
Comm'Scope Corp.
Copperweld Corp.
Davco Elect. Corp.
Essex Elect. Systems
General Cable Corp.
Noram Comm. Ltd.
Southern Telephone Supply Co.
Theta-Com of Calif.
TV Cable Supply Co., Inc.

Encoder, Video
Amer. Data Corp.
Anixter-Pruzan
Cohu, Inc.
Commercial Elect. Inc.
Telemation, Inc.
Video Eng. Co., Inc.

Equalizers
Ameico, Inc.
Anaconda Elect.
Anixter-Pruzan
B & K Instr., Inc.
Broadcast Automation Assoc.
Buckeye Telephone & Supply Co.
C-COR Elect., Inc.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Dynair Elect., Inc.
F & B/Ceco of Calif., Inc.
Jerrol Elect. Corp.
Lindsay Specialty Prods. Ltd.
Magnarox
Telemet
Theta-Com of Calif.
TV Cable Supply Co., Inc.
Video Eng. Co., Inc.

Feeder & Trunk Cables
Alpha Wire Corp.
Anaconda CATV
Anixter-Pruzan
Buckeye Telephone & Supply Co.
Cerro Comm.
Comm'Scope Corp.
Davco Elect. Corp.
Jerrol Elect. Corp.
Noram Comm. Ltd.

Southern Telephone Supply Co.
Theta-Com of Calif.
TV Cable Supply Co., Inc.

Field Strength Meters
Ameico, Inc.
Anixter-Pruzan
B & K Instr., Inc.
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Cascade Elect. Ltd.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Fung Eng. Co.
Jerrol Elect. Corp.
McGraw-Edison Co.
Potomac Instr., Inc.
Radiation Devices Co.
Riker Video
Rohde & Schwarz Sales Co.
Sadelco, Inc.
Sencore Inc.
Temtron Elect.
Vikoa, Inc.

Film Chain Equipment
Anixter-Pruzan
Avco Corp.
Cohu, Inc.
Commercial Elect. Inc.
Comspace Corp.
Davco Elect. Corp.
Eastman Kodak
F & B/Ceco of Calif., Inc.

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September, 1974

CE-9
FM Processing Equipment

Anixter-Pruzan
Catel
CBS Labs.
Davco Elect. Corp.
Environmental Comm., Inc.
Fung Eng. Co.
Jerrold Elect. Corp.

Generators, Carrier

Ameco, Inc.
Anixter-Pruzan
Blonder-Tongue Labs., Inc.
C-COR Elect., Inc.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Fung Eng. Co.
Jerrold Elect. Corp.
McGraw-Edison Co.
Rohde & Schwarz Sales Co.
Southern Telephone Supply Co.
Telemation, Inc.
Telemet
Teleng Inc.
Thea-Co of Calif.

Generators, Character

GBC Closed Circuit TV Corp.

Generators, Special Effects

Amer. Data Corp.
Anixter-Pruzan
Ball Bros. Research Corp.
Dynair Elect., Inc.
Dynasciences Corp.
GBC Closed Circuit TV Corp.
Hitachi Shibaden Corp.
America Interand Corp.
Telemation, Inc.
Telemet
Video Eng. Co., Inc.
Viscount Indust. Ltd.
Visual Educom Inc.
Vital Indust. Inc.

Generators, Sync

Amer. Data Corp.
Anixter-Pruzan
CBS Labs.
Cohu, Inc.
Commercial Elect. Inc.

Comspace Corp.
Davco Elect. Corp.
Dynasciences Corp.
Echo Science Corp.
Entron, Inc.
F&B/Ceco of Calif., Inc.
Hitachi Shibaden Corp.
of Amer.
Panasonic VTR/CCTV
Rohde & Schwarz Sales Co.
Telemation, Inc.
Telemet
Television Microtime Inc.
TV Cable Supply Co., Inc.
Video Aids Corp. of Calo.
Video Eng. Co., Inc.
Visual Educom Inc.
Vital Indust. Inc.

Generators, Test

Ameco, Inc.
Amer. Data Corp.
Anixter-Pruzan
B&K Instr., Inc.
CBS Labs.
Dix Hills Elect., Inc.
Dynasciences Corp.
Kay Elemetrics Corp.
McGraw-Edison Co.
Rohde & Schwarz Sales Co.
Telemet
Theta-Co of Calif.
Video Eng. Co., Inc.

Headend Buildings

Anixter-Pruzan
Beaver Elect. Ltd.
Ft. Worth Tower Co., Inc.
Microwave Systems Co.
Narom Comm. Ltd.
Stelfen, Inc.
Walker-Parkersburg

Headend Controls

Ameco, Inc.
Anixter-Pruzan
Cascades Elect. Ltd.
Davco Elect. Corp.
Elect. Indust. Eng., Inc.
Jerrold Elect. Corp.
Phasecom Corp.
Scientific-Atlanta, Inc.

Headend Systems

Ameco, Inc.
Anixter-Pruzan
Avtel Corp.
Cascade Elect. Ltd.
Davco Elect. Corp.
Dynair Elect., Inc.
Eastman Kodak Co.
Elect. Indust. Eng., Inc.
Entron, Inc.
Fung Eng. Co.
Jerrold Elect. Corp.
Metrodata Corp.
Phasecom Corp.
Scientific-Atlanta, Inc.
TV Cable Supply Co., Inc.

Helical VTR DOC

Mincom ........Page CE-9

Hum Stop Coils

Anixter-Pruzan

Lenses, TV Camera

Angenieux Corp. of Amer.
Anixter-Pruzan
Cohu, Inc.
Cunningham Corp.
Davco Elect. Corp.
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
Int. Video Corp.
Javelin Elect. Co.
Noram Comm. Ltd.
Panasonic VTR/CCTV
Rank Precision Industr. Inc.
RCA Corp.
Southern Telephone Supply Co.
Stereotelecom Television Co.
Tele-Cine Inc.
Video Eng. Co., Inc.

Lights, Studio

Anixter-Pruzan
Berkeley Coloran, Inc.
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
Alan Gordon Enterprises, Inc.
Kliegl Bros. Lighting Co., Inc.
Narom Comm. Ltd.
RCA Corp.
Teledialo Centre
Video Eng. Co., Inc.
Vital Indust. Inc.

Meters, RF Volts

Anixter-Pruzan
B&K Instr., Inc.
Davco Elect. Corp.
Fung Eng. Co.
Radiation Devices Co.
Rohde & Schwarz Sales Co.

Microwave Relay Equip.

Anixter-Pruzan
Buckeye Telephone & Supply Co.
Environmental Comm., Inc.
Ft. Worth Tower Co., Inc.
GTE Sylvania
Innovative Television Equip., Inc.
Microwave Systems Co.
PRD Elect., Inc.
Prodelin Inc.
RCA Corp.
Solodyne Internat., Inc.

Mixers

Ameco, Inc.
Amer. Data Corp.
Anixter-Pruzan
Davco Elect. Corp.
McGraw-Edison Co.
Shure Bros., Inc.

Modulators, Audio

Able Comm. & Elect.
Ameco, Inc.
Anixter-Pruzan
Blonder-Tongue Labs., Inc.
Catel
Coastcom
Davco Elect. Corp.
Dyair Elect., Inc.
Elect. Indust. Eng., Inc.
Fung Eng. Co.
Jerrold Elect. Corp.
Learning Industr. Corp.
Noram Comm. Ltd.
Phasecom Corp.
Video Eng. Co., Inc.

Modulators, Video

Ameco, Inc.
Anixter-Pruzan
Blonder-Tongue Labs., Inc.
Catel
Davco Elect. Corp.
Dyair Elect., Inc.
Elect. Indust. Eng., Inc.
Fung Eng. Co.
Hitachi Shibaden Corp.
of Amer.
Jerrold Elect. Corp.
JFD Systems Div.
Nelson-Hershfield Elec.
Noram Comm. Ltd.
Phasecom Corp.
Rohde & Schwarz Sales Co.
Telemet
Tocm, Inc.
Video Eng. Co., Inc.

Monitor Conversion Kits

(For Receivers)

Anixter-Pruzan

Monitors, Video

Anixter-Pruzan
Audiotronics Corp.
Ball Bros. Research Corp.
Benton Elect., Inc.
Broadcast Elec., Inc.
Comspace Corp.
Conrac Corp.
Davco Elect. Corp.
Electrohome, Ltd.
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
Hitachi Shibaden Corp.
of Amer.
Javelin Elect. Co.
Jerrold Elect. Corp.
Magnavox
The Magnavox Co.
Video Systems
Nelson-Hershfield Elec.
Noram Comm. Ltd.
Panasonic VTR/CCTV
RCA Corp.
SC Elect., Inc.
Shintron Co. Inc.
Southern Telephone Supply Co.
Teledialo Centre

CE10

BROADCAST ENGINEERING
Ultra Audio Prods.
Video Aids Corp. of Colo.
Video Eng. Co., Inc.
Visual Educom Inc.
Vital Indust. Inc.
World Video, Inc.

Monitors, Waveform
Amer. Data Corp.
Anixter-Pruzan
Avtel Corp.
Ball Bros. Research Corp.
Beston Elect. Inc.
B&K Instr., Inc.
Rohde & Schwarz Sales Co.
Telaudio Centre
Ultra Audio Prods.
Video Eng. Co., Inc.
Visual Educom Inc.

Non-Duplications Switchers
Alaun Engineering
Amer. Data Corp.
Anixter-Pruzan
Avtel Corp.
Davco Elect. Corp.
Phasecom Corp.
RCA Corp.
Rich Labs., Inc.
Rust Corp.
Telemation, Inc.

Optical Multiplexer
Anixter-Pruzan
Cohu, Inc.
Eastman Kodak Co.
Int. Video Corp.
Laird Telemedia, Inc.
Telemation, Inc.
Video Eng. Co., Inc.

Pedestals
Quick-Set...... Page CE-9
Aberdeen Co.
Anixter-Pruzan
Buckeye Telephone
& Supply Co.
Davco Elect. Corp.
F&B/Ceco of Calif., Inc.
General Cable Corp.
Jerrod Elect. Corp.
Innovative Television Equipment Inc.
Int. Video Corp.
Noram Comm. Ltd.
RCA Corp.
Southern Telephone Supply Co.
Tele-Cine Inc.
TV Cable Supply Co., Inc.
Video Eng. Co., Inc.

Pole Line Hardware
Aberdeen Co.
Anixter-Pruzan
Buckeye Telephone
& Supply Co.
A. B. Chance Co.

Davco Elect. Corp.
General Cable Corp.
GTE Sylvania
Noram Comm. Ltd.
Preform Line Prods. Co.
Reliable Electric
Southern Telephone Supply Co.
Telesis/Generic Cable
Apparatus Div.
TV Cable Supply Co., Inc.
Utilities Service Co.
Westay Co.

Power Couplers
Ametco, Inc.
Anaconda CATV
Anixter-Pruzan
Beaver Elect. Ltd.
British Insulated Caller's
Cables Ltd.
Entron, Inc.
Jerrod Elect. Corp.
 Theta-Com of Calif.

Power Supplies
Alma Eng.
Ametco, Inc.
Anaconda CATV
Anixter-Pruzan
Beaver Elect. Ltd.
British Insulated Caller's
Cables Ltd.
Buckeye Telephone
& Supply Co.
Cerro Comm.
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.
Dynascan Corp.
Entron, Inc.
GTE Sylvania
Jerrod Elect. Corp.
Magnavox
Maspro Co., Inc.
MSI Television
Sawyer Industr., Inc.
Soladyne Internat., Inc.
Seila Electric
Southern Telephone
Supply Co.
Systron-Donner Corp.
Terado Corp.
Tocom, Inc.
Tomco Comm., Inc.
TV Cable Supply Co., Inc.
Wilmore Elect. Co., Inc.

Scramblers, Unscramblers
Anixter-Pruzan
Techno Prods., Co.

Recorders, Audio
Ampex Corp.
Anixter-Pruzan
Audioelectronics Corp.
B&K Instr., Inc.
Broadcast Automation Assoc.
Broadcast Elect., Inc.
Davco Elect. Corp.
F&B/Ceco of Calif., Inc.
Gotham Audio Corp.
Noram Comm. Ltd.
RCA Corp.
Scully/Metrotech
Sparta Elect. Corp.
Tape-Athon Corp.
Telaudio Centre
Video Eng. Co., Inc.
VIF Internatl.

Recorders, Video Tape
Ampex Corp.
Anixter-Pruzan
Avtel Corp.
Davco Elect. Corp.
Diamond Power Speciality Corp.
Echo Science Corp.
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
Hitachi Shibaden Corp.
of Amer.
Int. Video Corp.
3M Co., Mincom Div.
Noram Comm. Ltd.
Panasonic VTR/CCTV
RCA Corp.
Sony Corp. of America
Southern Telephone
Supply Co.
Telemation, Inc.
R. H. Tyler Co.
Video Eng. Co., Inc.

Scramblers, Unscramblers
Anixter-Pruzan
Techno Prods., Co.

Signal Corrector (Video)
Anixter-Pruzan
Telemet
Television Equip. Assoc.
Video Eng. Co., Inc.
Television Microtime Inc.

Signal Processor
Ameco, Inc.
Anixter-Pruzan
Davco Elect. Corp.
Delta-Benco-Cascade Ltd.

Signal Strength Meter
Ameco, Inc.
Anixter-Pruzan
Beaver Elect. Ltd.
Blonder-Tongue Labs., Inc.
Davco Elect. Corp.
Echo Science Corp.
Fung Eng. Co.

Sweep Systems
Anixter-Pruzan
Avantek, Inc.
Jerrod Elect. Corp.
Kay Elemetrics Corp.
Noram Comm. Ltd.
Rohde & Schwarz Sales Co.
Systron-Donner Corp.
Theta-Com of Calif.

Switchers
Alma Eng.
Amer. Data Corp.
Anixter-Pruzan
Ball Bros. Research Corp.
Beston Elect. Inc.
Cablewave Systems, Inc.
Cohu, Inc.
Cunningham Corp.
Davco Elect. Corp.
Dynair Elect., Inc.
Dynamics Corp.
Echo Science Corp.
F&B/Ceco of Calif., Inc.
GBC Closed Circuit TV Corp.
Jerrod Elect. Corp.
Kay Elemetrics Corp.
Matrix Systems Corp.
Noram Comm. Ltd.
RCA Corp.
Rohde & Schwarz Sales Co.
Rust Corp.
Shintron Co. Inc.
Telemation, Inc.
Telemet
Video Aids Corp. of Colo.
Video Eng. Co., Inc.
Viscount Industr. Ltd.
Vital Indust. Inc.

Systems Research & Development
Ameco, Inc.
Beaver Elect. Ltd.
C-COR Elect., Inc.
Davco Elect. Corp.
Echo Science Corp.
Tape & Film Racks

Television Microtime Inc.
Video Eng. Co., Inc.
VIF Internatl.

Title Edgers
Anixter-Pruzan
Television, Inc.
Video Eng. Co., Inc.
Vital Industr., Inc.

Title Inserters
Amer. Data Corp.
Anixter-Pruzan
Davenision Inc.
Interord Corp.
Kansas State Network, Inc.
Laith Telemedia, Inc.
MSI Television
Telemation, Inc.
Telemet
Video Data Systems, Inc.
Video Eng. Co., Inc.
Vital Industr., Inc.

Two-Way Home Terminal Equip.
Anixter-Pruzan
AVA Elect. & Machine Corp.
Cascate Elec. Ltd.
Cater
Elect. Indust. Eng., Inc.
Jerrold Elec. Corp.
K'9nco
Magnavox
RMS Elec., Inc.
Television Audience Response System Div.
Tocomb, Inc.

Towers & Accessories
Fort Worth
Tower ... Page CE-8

Advance Industr., Inc.
Allied Tower, Inc.
Andrews Tower, Inc.
Anixter-Pruzan
Buckeye Telephone & Supply Co.
C-COR Elec., Inc.
Cerro Comm.
Davco Elec. Corp.
Delta-Benco-Cascade Ltd.
Dolphin Comm. Corp.
Echomo Telemedia
Entron, Inc.
GTE Sylvania
Jerrold Elec. Corp.
JFD Systems Div.
Lindsay Specialty Prod., Ltd.
Magnavox
RMS Elec., Inc.
Southern Telephone Supply Co.
Theta-Com of Calif.
Tocom, Inc.
TV Cable Supply Co., Inc.
Winegar Co.

A. B. Chance Co.
General Cable Corp.
Halline Utility Equip.
McCabe-Powers Body Co.
Telsta/General Cable
Apparatus Div.
Time Mfg. Co.
Utility Body Co.
Van Ladder, Inc.

Video Equip. & Accessories
Amer. Data Corp.
Anixter-Pruzan
Audio-Video Eng. Co.
Axel Corp.
Benton Elec. Corp.
CBS Labs
Cunningham Corp.
Data Disc, Inc.
Davco Elec. Corp.
Diamond Power Specialty Corp.
Dynair Elec., Inc.
Dynasences Corp.
Echo Science Corp.
Electrohome, Ltd.
F&B/Cecof, Calif., Inc.
Gates Radio
GBC Closed Circuit TV Corp.
Hitachi Shibaden Corp.
of Amer.
Int. Video Corp.
3M Co., Magnetic
Audio/Video Prods. Div.
Memorex Corp.
Noram Comm. Ltd.
Telemation, Inc.
Tcomtron Elec.
Video Eng. Co., Inc.

VTR Heads
Ampeco Corp.
Anixter-Pruzan
GBC Closed Circuit TV Corp.
Hitachi Shibaden Corp.
of Amer.
Int. Video Corp.
Noram Comm. Ltd.
Spin Physics, Inc.
Video Eng. Co., Inc.

Weather Units
Ameco, Inc.
Anixter-Pruzan
Avet Corp.
Buckeye Telephone & Supply Co.
Cater
Concise Instr. Design Ltd.
Davco Elec. Corp.
Kansas State Network, Inc.
Laird Telemation, Inc.
MSI Television
Soladayne Internat., Inc.
Teledarstradan Industr., Inc.
Texas Elec., Inc.
Texas Instr., Inc.
R. H. Tyler Co.
Manufacturer's address list

A
Aberdeen Company
P.O. Box 2663
Culver City, Cal. 90230

Able Comm. & Elect.
P.O. Box 236
Palm Harbor, Fla. 33563

Advance Inst., Inc.
Lunar Comm.
2301 Bridgeport Dr.
P.O. Box 1410
Sioux City, Ia. 51102

AEL Comm. Corp.
Subs. of Amer. Elect. Labs.
P.O. Box 507
Lansdale, Pa. 19446

Akai Amer., Ltd.
2139 E. Del Amo Blvd.
Compton, Cal. 90220

Aldrin Engineering
515 South Palm
Alhambra, Cal. 91802

Allied Tower Co., Inc.
P.O. Box 331
809 Kansas St.
S. Houston, Tex. 77587

Alma Engineering
7990 Daggett St.
San Diego, Cal. 92111

Alpha Wire Corp.
711 Ledgerwood Ave.
Elizabeth, N.J. 07207

Ameco, Inc.
2960 Grand Ave.
P.O. Box 13741
Phoenix, Ariz. 85002

Amer. Data Corp.
An Airpax Co.
315 Wynn Dr.
P.O. Box 5228
Huntsville, Ala. 35805

Amer. Technology Co., Inc.
3630 W. Clarendon St.
Phoenix, Ariz. 85019

Ampex Corporation
Audio-Video Systems Div.
401 Broadway
Redwood City, Cal. 94063

Anaconda CATV
7465 Lampson Ave.
Garden Grove, Cal. 92641

Andrew Corp.
10500 W. 153rd St.
Orland Park, Ill. 60462

Andrews Tower, Inc.
1420 Layton Ave.
Ft. Worth, Tex. 76117

Angenieux Corp. of
Amer., Inc.
440 Merrick Rd.
Oceanside, N.Y. 11572

Anixter-Pruzan
1963 1st Ave. South
Seattle, Wash. 98134

Antsco Corporation
Antsco Antenna Access.
17 West Sierra Madre Blvd.
P.O. Box 188
Sierra Madre, Cal. 91024

Audiotronics Corp.
Video Systems Div.
7428 Bellaire Ave.
N. Hollywood, Cal. 91605

Audio-Video Eng. Co.
65 Nancy Blvd.
Merrick, N.Y. 11566

AVA Elect. & Machine Corp.
242 Pembroke Ave.
Lansdowne, Pa. 19050

Avantek, Inc.
3175 Bowers Ave.
Santa Clara, Cal. 95051

Avtel Corp.
44 Railroad Ave.
Glen Head, N.Y. 11545

B
Ball Brothers Research Corp.
Miratel Drive
1633 Terrace Dr.
St. Paul, Minn. 55113

Beaver Elect. Ltd.
70 Ronson Dr.
Rexdale, Ontario
Canada M9W-1B8

Belden Corp.
Richmond, Ind. 47374

Berkley Colortron, Inc.
1015 Chestnut St.
Burbank, Cal. 91502

Berkshire Elect. Cable Co.
River Rd.
Leeds, Mass. 01053

Boston Elect. Inc.
9024 W. 51st Terr.
Shawnee, Kans. 66203

B & K Instruments, Inc.
5111 W. 164th St.
Cleveland, Ohio 44142

Blonder-Tongue Labs., Inc.
One Jake Brown Rd.
Old Bridge, N.J. 08857

Boston Insulated Wire
and Cable Co., Ltd.
9545 Cote De Liesse
Dorval, Quebec
Canada H9P 1A5

Brand-Rex Co.
P.O. Box 498
Willimantic, Conn. 06226

British Insulatea
Callender's Cables Ltd.
P.O. Box 5
21 Bloomsburg St.
London WC1B 3Qn, England

Broadcast Automation Assoc.
5199 N.E. 12th Ave.
Ft. Lauderdale, Fla. 33308

Broadcast Elect., Inc.
8810 Brookville Rd.
Silver Spring, Md. 20910

Buckeye Telephone
& Supply Co.
1250 Kinnead Rd.
Columbus, Ohio 43221

Cablewave Systems Inc.
60 Dodge Ave.
North Haven, Conn. 06473

Cambridge Prods., Corp.
101 Foley St.
Somerville, Mass. 02145

Canada Wire &
Cable Co., Ltd.
147 Laird Dr.
Toronto, Ontario, Canada

Cascade Cable Constr., Inc.
P.O. Box 677
Wenatchee, Wash. 98801

Cascade Elect. Ltd.
1111 C Street
Bellingham, Wash. 98225

Catel
Div. of United Scientific
1030 W. Evelyn
Sunnyvale, Cal. 94086

CBS Laboratories
227 High Ridge Rd.
Stamford, Conn. 06905

C-COR Elect., Inc.
60 Decibel Rd.
State College, Pa. 16801

September, 1974

CE-13
Cerro Comm.  
Div. of Cerro Corp.  
Halls Mill Rd.  
Freehold, N.J. 07728

A. B. Chance Co.  
210 N. Allen St.  
Centralia, Mo. 65240

Cleveland Trencher Div.  
20100 St. Clair Ave.  
Cleveland, Ohio 44117

Coastcom  
2346 Stanwell Dr.  
Concord, Cal. 94520

Cohu, Inc.  
Electronics Div.  
P.O. Box 623  
San Diego, Cal. 92112

Collins Radio Co.  
1200 N. Alma Rd.  
Richardson, Texas 75080

Commercial Elect. Inc.  
880 Maude Ave.  
Mountain View, Cal. 94040

Comm/Scope Corp.  
P.O. Box 2406  
15 N. Center St.  
Hickory, N.C. 28601

Comspace Corp.  
350 Great Neck Rd.  
Farmington, N.Y. 11735

Concise Inst. Design Ltd.  
260 Geary Ave.  
Toronto, 170, Ontario, Canada

Conrac Corp.  
Conrac Div.  
600 N. Rimsdale Ave.  
Covina, Cal. 91722

Consolidated Video Systems  
3300 Edward Ave.  
Santa Clara, Cal. 95050

Copperweld Corp.  
Copperweld Bimetals Div.  
Box 1000  
Glassport, Pa. 15045

Coral  
7700 River Rd.  
North Bergen, N.J. 07047

Cunningham Corp.  
10 Carriage St.  
Honeoye Falls, N.Y. 14472

Cush Craft Corp.  
621 Hayward St.  
Manchester, N.H. 03103

Data Disc, Inc.  
686 W. Maude Ave.  
Sunnyvale, Cal. 94086

Datavision Inc.  
15932 Shady Grove Rd.  
Gaithersburg, Md. 20760

Davco Elect. Corp.  
2150 E. Harrison St.  
Batesville, Ark. 72501

Davis Manufacturing  
1500 S. McLean Blvd.  
P.O. Box 1801  
Wichita, Kans. 67213

Delt-Benco-Cascade Ltd.  
124 Beltfield Rd.  
Rexdale, Ontario, Canada M9W1G1

Diamond Power  
Specialty Corp.  
P.O. Box 415  
East Main Pike  
Lancaster, Ohio 43130

Ditch Witch  
The Charles  
Machine Works, Inc.  
P.O. Box 66  
Perry, Okla. 73077

Dix Hills Elect., Inc.  
25 N. Mall  
Plainview, N.Y. 11803

Dolphin Comm. Corp.  
181 Church St.  
Pughkeepsie, N.Y. 12502

Dynair Elect., Inc.  
6360 Federal Blvd.  
San Diego, Cal. 92114

Dynascorp  
1801 W. Belle Plaine Ave.  
Chicago, Ill. 60613

Dynasciences Corp.  
Scientific Systems Div.  
Township Line Rd.  
Blue Bell, Pa. 19422

E  
Eastman Kodak Co.  
343 State St.  
Rochester, N.Y. 14650

Echo Science Corp.  
An Arvin Systems, Inc. Co.  
485 E. Middlefield Rd.  
Mountain View, Cal. 94040

Electrohome, Ltd.  
809 Wellington North  
Kitchener, Ontario, Canada

Elect. Indus.  
Engineering, Inc.  
A Div. of RCA Corp.  
7355 Fulton Ave.  
N. Hollywood, Cal. 91605

Electro-Voice, Inc.  
Subs. of Gulton Ind. Inc.  
500 Ceci St.  
Buchanan, Mich. 49107

Entron, Inc.  
70-31 84th St.  
Glendale, N.Y. 11227

Environmental Comm., Inc.  
Cable Television  
Components Div.  
2718 S. Grand Ave.  
Santa Ana, Cal. 92705

Essex Elect. Systems  
6235 S. Harlem Ave.  
Chicago, Ill. 60638

Essex Internatl., Inc.  
Comm. and CATV Div.  
6235 S. Harlem Ave.  
Chicago, Ill. 60638

E-Z Way Prods., Inc.  
Commercial Div.  
13155 Nebraska Ave.  
P.O. Box 17196  
Tampa, Fla. 33612

Fairchild MOD  
423 National Ave.  
Mountain View, Cal. 95111

F & B/Ceco of Calif., Inc.  
7051 Santa Monica Blvd.  
Hollywood, Cal. 90038

Ft. Worth Tower Co., Inc.  
5201 Bridge St.  
P.O. Box 8597  
Ft. Worth, Texas 76112

Fung Engineering Co.  
111 Glenn Way  
Belmont, Cal. 94002

Gamco Induct., Inc.  
317 Cox St.  
Roselle, N.J. 07070

Gates Radio  
123 Hampshire Street  
Queincy, Ill. 62301

GBC Closed Circuit TV Corp.  
74 Fifth Ave.  
New York, N.Y. 10011

General Cable Corp.  
500 W. Putnam Ave.  
Greenwich, Conn. 06830

Gilbert Eng., Co., Inc.  
3700 N. 36th Ave.  
Phoenix, Ariz. 85019

Gotham Audio Corp.  
741 Washington Street  
New York, N.Y. 10014

Alan Gordon Enterprises, Inc.  
5362 Cahuenga Blvd.  
N. Hollywood, Cal. 91601

GPL-TV, Link Div.  
The Singer Co.  
Binghamton, N.Y. 13902

Grasis Fabricating Co.  
5601 Gardner Ave.  
Kansas City, Mo. 64120

GTE Sylvania  
CATV Operations  
114 S. Oregon  
El Paso, Tex. 79901

H  
Haline Utility Equip.  
P.O. Box 5854  
St. Louis, Mo. 63134

Hatichi Shibaden  
Corp. of Amer.  
58-25 Brooklyn-Queens Expwy.  
Woodside, N.Y. 11377

Hy-Gain Elect. Corp.  
8601 N.E. Hwy. 6  
Lincoln, Neb. 68507

I  
Innovative Television Equip., Inc.  
P.O. Box 681  
Woodland Hills, Cal. 91634

Interand Corp.  
Telesrator Div.  
450 East Ohio St.  
Chicago, Ill. 60611

Int. Indust., Inc.  
P.O. Box 9882  
Austin, Tex. 78766

Int. Video Corp.  
990 Alamanor Ave.  
Sunnyvale, Cal. 94086

ITT Aerospace/Optical Div.  
3700 E. Pontiac St.  
Ft. Wayne, Inc. 46803

ITT Cannon Electric  
666 E. Dyer Rd.  
Santa Ana, Cal. 92702

J  
Jampco Antenna Co.  
Computer Equip. Corp.  
6939 Power Inn Rd  
Sacramento, Cal. 95828

Javelin Elect. Co.  
Div. of Apollo Lasers, Inc.  
6357 Arizona Circle  
Los Angeles, Cal. 90045

Jerrold Elect. Corp.  
CATV Systems Div.  
200 Wittmer Rd.  
Horsham, Pa. 19044
JFD Systems Div. of Riker Comm. 142 Central Ave. Clark, N.J. 07066

JVC Indust., Inc. 50-36 56th Rd. Maspeth, N.Y. 11378

K
Kalart Victor Corp. Hultenius St. Plainville, Conn. 06062

Kansas State Network, Inc. 833 N. Main P.O. Box 333 Wichita, Kans. 67203

Kay Elemetrics Corp. 12 Maple Ave. Pine Brook, N.J. 07058

Kliegl Bros. Lighting Co., Inc. 32-32 48th Ave. L.I.C., N.Y. 11101

KLM Electronics 1600 Decker Ave. San Martin, Cal. 95046

K'Son Corporation 250 E. Emerson Ave. Orange, Cal. 92665

L
Laird Telemedia, Inc. 2125 S.W. Temple Salt Lake City, Utah 84115

Leaming Indust. Corp. 3740 Campus Dr. Newport Beach, Cal. 92660

Lindsay Specialty Prods. Ltd. 50 Mary W. Lindsay, Ontario, Canada

LRC Elect., Inc. 901 S. Ave. Horseheads, N.Y. 14845

L-W Photo, Inc. 15451 Cabrito Rd. Van Nuys, Cal. 91406

M
Magnavox CATV Div. 100 Fairgrounds Dr. Manlius, N.Y. 13104

The Magnavox Co. Video Systems 1700 Magnavox Way Ft. Wayne, Ind. 46804

Maspro Co., Inc. Asada, Nissin, Nagoya-shigai, Japan

Matrix Systems Corp. 9411 Lurline Ave. Chatsworth, Cal. 91311

McCabe-Power Body Co. 8900 Frost Ave. St. Louis, Mo. 63134

McGraw-Edison Co. Edison Elect. Grenier Field Manchester, N.H. 03103

3M Company Magnetic Audio/Video Prod. Div. 3M Center, Bldg. 224-61 St. Paul, Minn. 55101

3M Company Mincom Div. 300 S. Lewis Rd. Camarillo, Cal. 93010

Memorex Corp. Audio-Video Group 1200 Memorex Dr. Santa Clara, Cal. 95052

Metrodata Corp. 1250 Mercer Seattle, Wash. 98109

Microfect Co., Inc. 9575 25th St., S.E. Salem, Ore.

Microwave Systems Co. 15860 W. 5th Ave. Golden, Colo. 80401

Mid-State Comm., Inc. 40 N. 7th Ave. Beech Grove, Ind. 46107

MPI Company 1524 Frankford Ave. Philadelphia, Pa. 19125

MSI Television 4788 S. State St. Salt Lake City, Utah 84107

N

Nortam Comm. Ltd. 70 Ronson Dr. Rexdale, Ont., Canada M9W 1B8

Oak Indus. Inc. Crystal Lake, Ill. 60014

Operations International 15690 W. 5th Ave. Golden, Colo. 80401

P
Panasonic VTR/CCTV of Matsushita Elect. Corp. of Amer. P.O. Box 3980 Grand Central Station New York, N.Y. 10017

Panduit Corp. 17301 Ridgeland Ave. Tinley Park, Ill. 60477

Path Products Inc. P.O. Box 399 Jacksonville, Tex. 75766

Phasecom Corp. 13130 S. Yukon Ave. Hawthorne, Cal. 90250

Phelps Dodge Comm. Co. 441 Sawmill River Rd. Yonkers, N.Y. 10702

Phillips Best Equip. Corp. One Philips Parkway Montvale, N.J. 07645

Plastoid Corp. 42-61 24th St. L.I.C., N.Y. 11101

Potomac Instr., Inc. 932 Philadelphia Ave. Silver Spring, Md. 20910

PRD Elect., Inc. 1200 Prospect Ave. Westbury L.I., N.Y. 11590

Preform Line Prods. Co. 5349 St. Clair Ave. Cleveland, Ohio 44103

Prodelin Inc P.O. Box 131 Hightstown, N.J. 08520

Pyramid Indus. Inc. 2612 W. Encanto Blvd. Phoenix, Ariz. 85009

Q
Quick-Set Inc. 3650 Woodhead Dr. Northbrook, Ill. 60062

R
Radiation Devices Co. P.O. Box 8450 Baltimore, Md. 21234

Rank Precision Indus. Inc. 260 N. Tr. 303 W. Nyack, N.Y. 10994


Reliable Electric 11333 W. Addison Franklin Pk., III. 60131

RF Systems, Inc. 155 King St. Cohasset, Mass. 02025

Rich Laboratories, Inc. 105 Pasatiempo Dr. Santa Cruz, Cal. 95060

Riker Video 142 Central Ave. Clark, N.J. 07066

RMS Elect., Inc. 50 Antin Place Bronx, N.Y. 10462

Rohde & Schwarz Sales Co. 111 Lexington Ave. Pasaic, N.J. 07055

Rohn Manufacturing Div. of Unarco Indus., Inc. P.O. Box 2000 Peoria, Ill. 61601

Rosner Television Systems, Inc. 250 W. 57 St. New York, N.Y. 10019

Rust Corp. 168 Tremont St. Everett, Mass. 02149

S
Sadelco, Inc. 299 Park Ave. Westhaven, N.J. 07087

Sawyer Indus., Inc. Glentronics Div. 748 E. Alosta Ave. Glendale, Cal. 91240

Saxton Prods., Inc. 215 S. Route 303 Congers, N.Y. 10920

Scala Radio Corp. 1970 Republic Ave. San Leandro, Cal. 94577

SC Elect., Inc. 530 Fifth Ave., N.W. New Brighton, Minn. 55112

Scientific-Atlanta, Inc. Box 13654 Atlanta, Ga. 30324

Scully/Metrotech Div. of Dictaphone Corp. 475 Ellis St. Mountain View, Cal. 94040

Sencore Inc. 3200 Sencore Dr. Sioux Falls, S.D. 57107

Shintron Co., Inc. 144 Rogers St. Cambridge, Mass. 02142

Shure Bros., Inc. 222 Hartney Ave. Evanston, Ill. 60204

Sigmaform Corp. 2401 Walsh Ave. Santa Clara, Cal. 95050

September, 1974

www.americanradiohistory.com
<table>
<thead>
<tr>
<th>Business Name</th>
<th>Address/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitco Antenna Co.</td>
<td>10330 N.E. Marx St.</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 20456</td>
</tr>
<tr>
<td></td>
<td>Portland, Ore. 97220</td>
</tr>
<tr>
<td>Soladyne Internat., Inc.</td>
<td>7455 Convoy St.</td>
</tr>
<tr>
<td></td>
<td>San Diego, Cal. 92111</td>
</tr>
<tr>
<td>Sola Electric</td>
<td>Div. of Sola Basic Indus.</td>
</tr>
<tr>
<td></td>
<td>1717 Busse Rd.</td>
</tr>
<tr>
<td></td>
<td>Elk Grove Village, Ill. 60007</td>
</tr>
<tr>
<td>Sony Corp. of America</td>
<td>474-47 Van Dam St.</td>
</tr>
<tr>
<td></td>
<td>L.I.C., N.Y. 11101</td>
</tr>
<tr>
<td>Southern Telephone Supply Co.</td>
<td>5976 Peachtree Rd., N.E.</td>
</tr>
<tr>
<td></td>
<td>Chamblee, Atlanta, Ga. 30341</td>
</tr>
<tr>
<td>Sparta Elect. Corp.</td>
<td>5851 Florin-Perkins Rd.</td>
</tr>
<tr>
<td></td>
<td>Sacramento, Cal. 95828</td>
</tr>
<tr>
<td>Spectra-Vision Corp.</td>
<td>1528 Belfield Ave.</td>
</tr>
<tr>
<td></td>
<td>Philadelphia, Pa. 19141</td>
</tr>
<tr>
<td>Spindler &amp; Sauppe, Inc.</td>
<td>13024 Saticoy St.</td>
</tr>
<tr>
<td></td>
<td>N. Hollywood, Cal. 91605</td>
</tr>
<tr>
<td>Spin Physics, Inc.</td>
<td>11615 Sorrento Valley Rd.</td>
</tr>
<tr>
<td></td>
<td>San Diego, Cal. 92121</td>
</tr>
<tr>
<td>Stainless, Inc.</td>
<td>Third Street N.</td>
</tr>
<tr>
<td></td>
<td>Wales, Pa. 19454</td>
</tr>
<tr>
<td>Steffen, Inc.</td>
<td>623 W. 7th St.</td>
</tr>
<tr>
<td></td>
<td>Sioux City, Ia. 51103</td>
</tr>
<tr>
<td>Stereoelectronics Television Co.</td>
<td>13720 Riverside Dr.</td>
</tr>
<tr>
<td></td>
<td>Sherman Oaks, Cal. 91403</td>
</tr>
<tr>
<td>Storeel Corp.</td>
<td>4993 New Peachtree Rd.</td>
</tr>
<tr>
<td></td>
<td>Atlanta, Ga. 30341</td>
</tr>
<tr>
<td>Swager Tower Corp.</td>
<td>P.O. Box 656</td>
</tr>
<tr>
<td></td>
<td>Fremont, Ind. 48737</td>
</tr>
<tr>
<td>Syst-a-Matics Inc.</td>
<td>510 N. Sheridan</td>
</tr>
<tr>
<td></td>
<td>Tulsa, Okla. 74115</td>
</tr>
<tr>
<td>Systems Wire &amp; Cable, Inc.</td>
<td>3500 S. 30th St.</td>
</tr>
<tr>
<td></td>
<td>Phoenix, Ariz. 85040</td>
</tr>
<tr>
<td>Systron-Donner Corp.</td>
<td>One Systron Dr.</td>
</tr>
<tr>
<td></td>
<td>Concord, Cal. 94518</td>
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<tr>
<td>T</td>
<td>TACO Div.</td>
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<tr>
<td></td>
<td>1 Taco St.</td>
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<tr>
<td></td>
<td>Sherrurrie, N.Y. 13460</td>
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<tr>
<td>Tape-Athon Corp.</td>
<td>P.O. Box 814</td>
</tr>
<tr>
<td></td>
<td>Inglewood, Cal. 90301</td>
</tr>
<tr>
<td>Tapecaster TCM</td>
<td>P.O. Box 662</td>
</tr>
<tr>
<td></td>
<td>12326 Wilkins Ave.</td>
</tr>
<tr>
<td></td>
<td>Rockville, Md. 20851</td>
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<tr>
<td>Techno Prods. Co.</td>
<td>7405 Greenbush Ave.</td>
</tr>
<tr>
<td></td>
<td>N. Hollywood, Cal. 91605</td>
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<tr>
<td>Teliaudio Centre</td>
<td>634 S. Victory Blvd.</td>
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<tr>
<td></td>
<td>Burbank, Cal. 91502</td>
</tr>
<tr>
<td>Tele-Cine Inc.</td>
<td>294 E. Shore Dr.</td>
</tr>
<tr>
<td></td>
<td>Massapequa, N.Y. 11758</td>
</tr>
<tr>
<td>Telemanet, Inc.</td>
<td>Broadcast Sales</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 15086</td>
</tr>
<tr>
<td></td>
<td>Salt Lake City, Utah 84115</td>
</tr>
<tr>
<td>Telemec</td>
<td>185 Dixon Ave.</td>
</tr>
<tr>
<td></td>
<td>Amityville, N.Y. 11701</td>
</tr>
<tr>
<td>Teleng Inc.</td>
<td>405 Serrano Dr.</td>
</tr>
<tr>
<td></td>
<td>Suite 4E</td>
</tr>
<tr>
<td></td>
<td>San Francisco, Cal. 94132</td>
</tr>
<tr>
<td>Telesync Corp.</td>
<td>20 Inslcy St.</td>
</tr>
<tr>
<td></td>
<td>Demarest, N.J. 07627</td>
</tr>
<tr>
<td>Television Audio Response System Div.</td>
<td>Cable-Television</td>
</tr>
<tr>
<td></td>
<td>Components Div.</td>
</tr>
<tr>
<td></td>
<td>271 S. Grand Ave.</td>
</tr>
<tr>
<td></td>
<td>Santa Ana, Cal. 92705</td>
</tr>
<tr>
<td>Television Equip. Assoc.</td>
<td>P.O. Box 1391</td>
</tr>
<tr>
<td></td>
<td>Bayville, N.Y. 11709</td>
</tr>
<tr>
<td>Television Microtime, Inc.</td>
<td>1280 Blue Hills Ave.</td>
</tr>
<tr>
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<td>Bloomfield, Conn. 06002</td>
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Fig. A Loose laminations

Fig. B Half stack or core

Fig. C Stack with insulation

Fig. D Stack with coil

Fig. E Half section, stereo head

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Fig. F Complete head before finishing

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Fig. G Finished head

Figure 3. Keystone Wear Pattern (Front View)
difficulty centered on a worn-out tape head. In a way, this is a left-handed compliment to the tape head business, but it doesn’t do much to relieve the frustration of spending many hours looking at everything except the tape head!

Before we get into the maintenance considerations, let’s spend a few moments getting acquainted with the item we propose to lavish this maintenance on. To us, a magnetic tape head intended for use in professional audio work must meet certain basic requirements, which, by definition, put it in a professional class. First, it must be designed to perform in accordance with the specifications of the equipment it is intended for. Second, it must be built to deliver that performance over a very lengthy span of time without frequent re-alignment of the electronics. Third, it must not drastically change characteristics during its useful life. And last, it must do all these things and still be competitive in cost. That is quite an order!

Now let’s take a look at what a tape head is made of. Figure A shows a group of loose laminations ready for use in making up a stack or core. These laminations are produced by high precision stamping dies. Various thicknesses are used. These are .006".

The metal is a high permeability alloy called HYMu 80 or HYMu 800. After stamping, each lamination is given a high temperature anneal and is then slowly and gradually cooled. This process gives the material its high permeability. Before annealing, the metal is quite tough...comparable to stainless steel. After annealing, it is very soft and quite strain sensitive. Mis-handling damages the permeability so the laminations must be handled with great care. For this discussion (although not technically accurate), permeability may be defined as that property which enables a material to become highly magnetized when in the presence of a magnetic field, but to lose its magnetism when the field is removed. Were this not the case, it would be impossible to make a high quality recording, because the head (if it remained magnetized after the field were removed) would start erasing the recording just made in much the same way a bar magnet would.

Figure B is a photograph of a finished half stack or core. Each lamination is clearly recognizable and the entire surface of each lam is coated with an oxide which serves as an insulator between it and all the other laminations in the stack. This is done to keep eddy currents at a low level.

Figure C shows a finished half stack with insulation around it. The coil will be wound directly on the insulation, as shown in Figure D.

Figure E is a photograph of a half section. It contains the precision core holder and two half stacks with the coils. A mating half section will be used to complete the head. The entire top surface shown will be lapped to very close tolerances, and then polished. The shields which go above, between and below the two channels of the head are now installed and the mating half section assembled to it.

Figure F shows an assembled head with the gap material protruding at the center. Right now it’s an ugly little thing, but grinding, lapping and polishing will turn it into a thing of beauty. The head is now potted to completely encap-

sulate the interior and ready it for finishing. From this point on, every-
thing will have to be strictly “go” because no corrections or changes are possible. Should any injury or defect show up now, the whole head must be scrapped.

Head Face Contour

The next step is to decide the contour to be used on the head face. Which shall it be, cylindrical or hyperbolic? Both have their merits and disadvantages. A hyperbolic contour is a decided advantage in situations where tape contact with the gap is a problem due to low back tension on the tape. The big disadvantage is that the contact area is quite small and wear of the head is greatly accelerated by concentration of the tape over a relatively small area of the head face. Since most professional tape recorders use a considerable amount of back tension to hold the

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tape firmly against the heads, we use a cylindrical contour on all our heads intended for use with these machines. This greatly reduces the rate of wear. By also leaving .025" depth of metal at the gap, long life is assured.

The classic and humble example in the cylindrical vs. hyperbolic controversy, is the erase head stack used on the old Magnecord PT-6. This machine has an erase head stack approximately 3/4" wide and the tape travels over the entire cylindrical face of this stack. In 17 years, I have never seen one that was worn out! We have relapped a tremendous number of these heads and are still waiting to see the first useless one show up! This is truly remarkable when you also consider that in spite of the manufacturer's instructions to the contrary, the design of the PT-6 was such that most operators constantly ran tape over the erase head in the fast forward and rewind modes! It was more convenient to do this when using the machine.

Figure G shows a completely finished 2-track stereo head, ready for testing and installation in a recorder. Because of the highly polished and reflective surfaces, it is almost impossible to photograph these heads without distortion and "hot spots". None of these photographs have been retouched.

So now we have this finished component available to us for installation. A lot of work has gone into it, because the quality of signal you send out is utterly dependent on it. If you don't get it here, you don't get it.

The head face is particularly vulnerable to scratches, nicks or gouges which will really foul up performance. We suggest that before installing any tape head, you cover the entire head face with a strip of heavy, adhesive-backed plastic tape to protect it during installation handling. With this single exception, a tape head is a fairly husky device. Once the head is installed, the tape should be removed and the head face cleaned prior to making any adjustments.

Installation
Installation of new heads on
nearly all professional tape equipment involves four mechanical adjustments which must be made correctly to assure optimum performance and long service. This is the primary maintenance consideration. After these adjustments are made, the electronics are checked out and aligned in accordance with the instructions in the owner's manual. Nearly all these manuals are quite explicit about electronic alignment and the information given should be followed without deviation if you expect the recorder to meet its specifications. Keep in mind that there is no so-called "standard" for electronic alignment of a tape recorder...not even between two different models from the same manufacturer, so the golden rule here is: check the manual! And that means the manual for the specific model involved!

Before any final adjustments are made on a new head, it should be visually squared up in its mounting after installation to minimize the degree of adjustment required.

The four mechanical adjustments required by new heads are: Height, Zenith, Contact and Azimuth. Since tape travel from the supply to the takeup reels is controlled to close tolerances, it is obvious that these four adjustments are made to align the tape head to the tape. The guides and other tape path controls

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September, 1974

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should never be adjusted so they conform to the head position. The tape path represents the standard. If you alter it in any way, you no longer have a valid reference.

All the line drawings which follow utilize a 2-track stereo head for illustration. Figure 1 shows the correct Height adjustment for a head of this type. The head should be adjusted so the top edge of the stack in Channel 1 and the bottom edge of the stack in Channel 2 are even with the edges of the tape. This is usually accomplished by two small Allen head set screws which are located at the center line of the head mounting plate but are sometimes placed to one side of this plate. If these screws are on one side, the opposite side has wells containing two compression springs to supply the pivot action necessary to azimuth the head gap. Regardless of where these two set screws are located, they serve a dual function. Not only do they adjust the head for height, but they also serve to adjust it for Zenith or tilt.

**Head Alignment**

Figure 2 is an exaggerated view of a head incorrectly aligned for Zenith. The head face should be at a 90° angle to the transport base plate. Any appreciable deviation from this angle will result in marginal tape contact which won’t be so noticeable when the head is new but will show up markedly as wear progresses.

Figure 3 shows the result of incorrect Zenith alignment. In this case, the head was tilted downward toward the transport base plate at the time it was installed. The keystonewear pattern indicates excessive tape contact at the top of the head and insufficient contact at the bottom. Had this head been tilted away from the base plate, the keystone effect would be reversed.

Keep in mind that any adjustment you make to the head Height is likely to also alter the Zenith and vice-versa. These two adjustments are directly inter-related and must be cross-checked against each other until both are correct.

Figure 4 is a top view of the adjustment for Contact. As indicated, using the center line of the head as a reference, the formula for correct Contact is: Angle Alpha = Angle Beta. To say it another way, the tape should contact the head face an equal amount on either side of the gap. Figure 5 is a front view of this same adjustment. Contact alignment is accomplished by rotating the head cup or assembly mounting block until the head face is positioned properly.

Thus far we have covered three of the four essential mechanical adjustments which must be made to any new heads installed in most professional tape equipment. At our plant in Minneapolis, we do a lot of head assembly refurbishing and head installation for our customers, so we have the precision gauges, jigs and fixtures to simplify the work. This is a small consolation to anyone who must or prefers to install their own heads. How can you tell when these adjustments are correctly made (within reason) with nothing more to go on than your eyeballs? Here is one technique that works very well:

Use a black marking pen with a soft felt tip to coat the head face from top to bottom and about 1/4” on either side of the gap. Run some tape through the machine in the Play mode. Five or six feet should be enough. Stop the machine and check the head. The tape will have removed the ink from the head face and this clear area can be used to check for Height, Zenith or Contact. The ink can be removed with a cotton tipped applicator and most head cleaners will dissolve it. If yours won’t, lighter fluid will.

Be sure to clean the head between each adjustment check and don’t coat the face too heavily with the ink. The tape you use to wear off the ink shouldn’t be a prized master, but it mustn’t be worn out or distorted either. The marking pen should be new and the felt tip not contaminated with foreign particles which could scratch the head face.

**Azimuth Adjustment**

Figure 6 shows the final mechanical adjustment required by a new head. . . Azimuth. The Reproduce head gap must be perpendicular to the tape so that all tape equipment conforms to a standard setting, thereby permitting...
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For More Details Circle (96) on Reply Card
Proof of performance survey results

by Dennis Ciapura

The readers who have responded to our Proof Change Survey are enthusiastic about the prospect of clarifying the Proof of Performance rules and many have submitted letters outlining their ideas in great detail.

Before we review the results of the survey, we would like to take a minute to thank all of those who did send in the survey and especially those who took the time to sit down and write a letter expressing their own thoughts on the subject. While the task of evolving our industry in a positive direction is the responsibility of all of us, it is through the energy of the active people that the future standards will be forged.

In the following review of the survey results, we will refer only the percentage of positive responses to each proposal on the survey. The balance of the responses to each question were a combination of negative and "no opinion" responses or in some cases no response at all. We feel that any change would have to be supported by definite "yes" opinions, so let's see which of the proposed changes found the most support.

Only 6.3 percent of those who responded were in favor of eliminating the Proof as outlined in survey question number 1. Obviously, the engineering people in our business who comprise the majority of the responding readers, feel that there is a very definite need for a Proof! It is interesting to note that the engineers could have very easily voted for less pressure and work load but felt that the Proof was necessary and did not hesitate to support retaining the Proof. Some of the engineers who favored dropping the Proof requirement said that they would still do a Proof on their own, but felt that the measurements should be the station's responsibility and not an FCC requirement.

That Questionable Microphone Input

The second survey question pro-
posed applying the input signal for the Proof measurements to the system input used for the majority of the station’s programming rather than requiring that the tests be made through the microphone input as is now the case. Some 65.7 percent were in favor of this change, indicating that most engineers don’t feel that the mic input method is truly relevant to the station’s “air sound” unless, of course, the majority of the stations programming was broadcast over the mic.

Since the mic input usually has more gain and represents the longest audio path through the console, some readers felt that the mic input test was valid because the preamp noise, etc., would be included in the results. Most readers favored testing the route that the listeners hear the most.

The third, fourth and fifth questions dealt with the very controversial matter of what to do with the AGC equipment. Should the AGC be defeated by patching around the limiters, etc.? If left in the circuit should the gain control be switched off for all of the tests or maybe left on for the distortion and/or noise tests?

An almost unanimous 94.4 percent voted for one of the three methods of testing with the AGC units in the circuit (23.1 percent favored leaving the AGC active during all of the tests except the response runs; 23.1 percent favored leaving the AGC active during the distortion tests only; and 48.2 percent thought that the AGC should be defeated for all the tests). In all cases, the AGC and limiter units would remain in the audio chain and any AGC defeating would be done by switching off the control voltage.

Test Signals
Question number six proposed that the test signals be applied via a standard test record or tape rather than from a signal generator. This was another very controversial area and the response to this proposal was almost an even split with 42.6 percent in favor of the test tape record method, and 50.3 percent opposed.

There are two distinct schools of thought in this area. One group feels that the transducer portion of the system should be the exclusive creative domain of the broadcaster and should not be regulated. The other group sees the broadcaster as having a responsibility to the listener to provide an air sound that is as good a replica of the original program material as possible and sees the Proof record and tape method.
as a positive step in that direction. Many readers had questions about which tapes and records might actually be used and some questioned the feasibility of obtaining signal sources that would provide a clean enough input. We promised that if there was enough interest in this method of testing that we would investigate the possibility of actually developing some of the signal sources. With nearly half of the engineers responding in favor of this method and many more interested, we felt that such an investigation was warranted and are currently reviewing some of the existing test records and tapes and generating some of our own as well. The results of this project will be released in a special article within the next 60 days. We can tell you that preliminary findings indicate that signal sources with less than 1 percent distortion are easily obtained.

Frequency Response
The seventh proposal was that the frequency response runs be made only at full modulation instead of at several levels as they now are. There were 62.9 percent in favor of this proposal, agreeing that the present system wastes time and provides redundant information. The eighth question suggested that the harmonic distortion tests might also be made at full modulation only with modulating frequencies of 50, 100, 400, 1000, 5000 and 7500 Hz—60.8 percent favored this proposal.

I.M. Distortion
The ninth proposal was for the addition of an I.M. distortion test, and 55.2 percent were in favor of the extra test. Some readers suggested other test frequencies (our survey suggested 60 and 10,000 Hz) and we would agree that the more standard 60 and 7000 Hz combo would be more appropriate.

There was less positive interest in this question than we expected, and while some readers were worried about the extra test equipment that would be required, others responded with a question mark or said that they were undecided about the proposal. It appears that I.M. testing is not yet a very common practice at broadcast stations and perhaps many engineers don’t have any practical experience in this area to base a decision on.

The tenth question proposed the use of Dolby ‘B’ with a 25 usec. preemphasis curve for those stations that wished to do so. Also, 57.3 percent of the engineers were in favor of this proposal, but after the survey was written the FCC took action on Dolby and stated in a bulletin that any FM station wishing to use the Dolby, whose internal response effectively modifies the preemphasis to 25 usec. may do so. A later bulletin which further clarifies this decision is reprinted here for the benefit of those who haven’t seen it yet.

As you can see, it is no longer necessary to seek a rule change in this area as the Commission has deemed it unnecessary. You will note that this is one piece of equipment that the FCC has clearly stated to remove from the audio chain during Proof measurements.
Stations considering Dolby now have only to decide for themselves whether the overall sound of Dolby/25 usec. material on non-Dolby receivers is acceptably close to the original tonal balance.

The survey was intended to apply to the FM Proof only, but the engineers have asked that the same or similar changes be proposed for the AM Proof as well. We have decided, therefore, to use the results of the survey as the basis for a more refined final version which will include AM changes as well. This version of the survey will be a special direct mail, postage paid large scale sampling of the industry. If you are one of the recipients of this survey questionnaire, please realize that you have received an extremely important piece of mail as not everybody will receive the questionnaire.

The new questionnaire will embody many of the suggestions that responding engineers said that they would like to see before the results are sent to the Commission. The forms will go out to randomly selected engineers and all geographic areas and types of stations will be represented equally. Consulting engineers will also be polled. Persons receiving the questionnaire may base their replies on the combined opinion of all of the engineers on their station staff if, for instance, only one out of three engineers at that particular station receive the form. In other words, the guy who gets the survey is sort of a delegate to our Proof change survey.

We must rely on everyone to respond so that the results that we forward to the Commission will represent the most comprehensive technical opinion poll that the broadcast industry has ever seen.

**FCC Authorizes Use Of Dolby Encoder**

"Under date of May 31, 1974, the Commission sent the following letter to Dolby Laboratories, Inc.

'We have reviewed the question of the employment of the Dolby 324 B-Type Broadcast Encoder by FM broadcast stations licensed by the Commission, and will not object to its use.

'It is our understanding that, in the current model of the 324 encoder circuits designed to reduce the effective degree of preemphasis to 25 microseconds, and those producing Type B encoding operate simultaneously at all times—that it is impossible, without internal changes, to utilize this apparatus in an operating mode where only the preemphasis adjusting circuits are effective. Our concurrence in the use of this encoder is given on the express condition that all units furnished to and installed in FM broadcast stations are arranged to function in this manner.

'When FM broadcast stations conduct transmitter performance measurements pursuant to Section 73.254 of our rules the Dolby 324 B-Type Broadcast Encoder should be removed from the circuit, or effectively by-passed.'

"Some recent publicity concerning this action appears to reflect a misunderstanding of its nature and
effect. Accordingly, we believe a clarification may be helpful.

"First, it should be emphasized that we have not amended §73.317-(a)(2) of our rules, which requires the audio response of an FM broadcast transmitter be shaped in accordance with a 75 microsecond preemphasis curve. We have no present intention of doing so. Existing receivers incorporate complementary 75 microsecond deemphasis circuits. Any substantial reduction in the amount of transmitter preemphasis, alone, would result in a more or less serious "roll off" in the response of these receivers at higher audio frequencies.

"Second, we are permitting, not requiring the use of the Dolby encoder. In this respect our policy is the same as that which has applied heretofore with respect to the use of other kinds of active audio processing equipment, such as the several types of limiters commonly employed by FM stations.

"The Dolby unit which we have indicated as acceptable for use by FM broadcast stations incorporates circuitry which, in effect, cancels a portion of the transmitter preemphasis. However, the unit is so constructed that this circuitry is effective only when Type B encoding is employed. The encoding process raises the level of the higher audio frequencies relative to lower frequencies by an amount which

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September, 1974
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Stainless steel enclosures (optional)

Control and monitor—A solid-state unit containing individual luminaire monitoring. Indicates day, twilight and night modes of operation. MODE is automatically controlled through a dual photo cell system. Manual override, system alarm and reset switches are included.

For full details, write: Dielectric Communications, Division of Sola Basic Industries, Raymond, ME 04071.

For More Details Circle (110) on Reply Card

NEW PRODUCTS

Magnetic Card Memory System

The Video Data Systems Model MC 1100 Magnetic Card Memory System is designed to interface with the Model T-1000 TV Tilting System to provide unlimited storage capability of titles and locally originated data.

Each magnetic card, which is the size of an IBM card, can store 64 pages of data. Each page consists of eight lines of 16 characters. Each card, therefore, can store a total of 8,192 characters and there is no limit to the number of cards that may be used to store date. Twenty five cards are provided as standard equipment.

For More Details Circle (234) on Reply Card

Audio Distribution Amplifiers

SCIENTIFIC SYSTEMS Model SA-200 Audio Distribution Amplifier is one of a complete line of Audio Processing Modules. The DA has six source terminate balanced 600 ohm outputs, providing high output line isolation. Output is a maximum of +24dBm. Input is transformer isolated, and gain is variable 0 to 20dB. All silicon devices are used and are socket mounted for ease of maintenance in the field. The SA-200 card costs $70.00 and is available in various card frame configurations with Power Supplies from SCIENTIFIC SYSTEMS, Inc., 48 Woodymoor Court, Totowa, New Jersey 07550, 201-755-2230.

For More Details Circle (111) on Reply Card

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For More Details Circle (113) on Reply Card
Antenna Accessories

All necessary TV, FM and AM equipment between antennas and transmitters are available from Jampro. Among the many items, in addition to towers and coax we offer...

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A DIVISION OF COMPUTER EQUIPMENT CORPORATION
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For More Details Circle (114) on Reply Card

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For More Details Circle (116) on Reply Card
Cohu TV Van On National Tour

SAN DIEGO, CALIF.—R. J. Schlicht, Vice President of Marketing for Cohu, Inc., Electronics Division, announced that the San Diego based television camera systems and equipment manufacturer has introduced a new 28-foot custom display van, called “TV Display Unit No. 3,” which is now ready to commence nation-wide tours demonstrating Cohu’s broad array of television equipment for Broadcast, ETV, ITV, CATV, and CCTV users.

Operating displays in the van feature the company’s Model 1500 broadcast color film camera, the telecine that has received wide acclaim coast to coast; a Model 1230 viewfinder single tube studio color camera; a single tube color television camera for film/slide use, uniplexed with a slide projector; Cohu’s newest high resolution television cameras; and for the first time in a mobile demonstration by any television manufacturer, a low light level booth demonstrating the sensitivity of various image tubes,

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**RELIABILITY** - advanced state-of-the-art technology, I.C. op-amp circuitry and high quality components throughout.

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For More Details Circle (118) on Reply Card
**Frequency Scaler**

Since the Heath IB-101 Digital Counter has become so common a citizen at broadcast station maintenance shops, many broadcasters may be interested to know that a 175 MHz frequency scaler is available in kit form as the Heath IB-102. As a matter of fact, the scaler can be used to expand the range of any counter that has a Hi Z (1 megohm) input.

We assembled the kit in about eight hours, following the manual to the letter without any shortcuts. Like its sister unit the '101', most of the IB-102 circuitry is on a single p.c. board which greatly speeds assembly. The Heath counter cabinets have to be seen and felt to be appreciated: the completed unit does not look at all like an under $100 instrument. The mechanical components are very well made with all chassis and cabinet parts fitting together the way they are supposed to.

Adjustment after assembly is minimal and no standard frequency source is required as the accuracy of the scaler is keyed to the accuracy of the time base generator in the counter—it is used with and the gate time (see specs). The scaler has one switch position that connects the input straight through to the counter's MS-200 Magnetic Tape Head Cleaner quickly flushes away oxide build-up on heads and capstans. It can even be applied while deck is running.

Gone are the days of the cotton swab and bottle of cleaner. MS-200 with it's "Cobra" brush sprays away your tape head troubles quickly and safely.

Recommended by leading tape recorder manufacturers.

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"Two-Product Trial Unit" includes:

* MS-200 Magnetic Tape Head Cleaner
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**FCC Rule 73.69 + $1660 = AM-19 (204)**

The FCC now says that you must have an approved Antenna Monitor. Since this is an added expense, consider carefully what is required of the monitor versus what it will cost.

At $1660*, the Model AM-19 (204) is the lowest priced, FCC type approved Antenna Monitor available.

Now after several years of use at many stations, it has proven its reliability. And it is compatible with virtually every type of wire or wireless remote control system.

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*Based upon 2 tower, DA-2.

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**Why let oxide dust destroy your tape head?**

For More Details Circle (131) on Reply Card
input, which is a very handy feature since it allows making measurements that are within the range of the counter and below the range of the scaler without disconnecting any cable. The scaler can be left permanently connected to it’s companion counter if desired. We found the unit’s sensitivity great enough to permit picking up a sample from a 10 Watt exciter output tube via a two turn pick-up loop placed on the tube’s glass envelope. The unit has a 50 Ohm input impedance in the divide by 10 and 100 positions which facilitates connection to the more conventional sample sources, but care should be taken to avoid exceeding the 3 Volt input spec. We recommend using a 50 Ohm 20 dB pad when there is any doubt about the magnitude of the voltage at the sample point where the frequency measurement is to be made.

In summary, we found the Heath scaler to be easy to assemble and use and like the Heath counters, an amazing kit value.

For More Details Circle (32) on Reply Card

Intermodulation Analyzer Kit
It’s possible that new FCC Proof requirements will call for I.M. distortion measurements. Even if they don’t, I.M. tests can tell you a lot about your audio quality.

We built the Heath IM-48 intermodulation distortion meter, a unit that sells for under $100. It’s three instruments in one: AC VTVM, wattmeter, and I.M. analyzer. High and low signal sources are built in for I.M. tests.

Non-inductive load impedance of 4, 8, 16, and 600 Ohms are switch-selected. Several of these units already are being used in broadcast stations.

For More Details Circle (214) on Reply Card

NEW PRODUCT

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For More Details Circle (134) on Reply Card

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TASCAM Series 70 recorders/reproducers were designed for people who’ve outgrown high-end consumer audio products but can’t afford full professional studio gear.

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The versatile Series 70 electronics come in two versions, one for direct recording and one for use with a mixing console like our Model 10. Whichever you need, you’ll get uncommon quality and reliability. But this time you can afford it.

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TASCAM CORPORATION

5440 McConnell Avenue
Los Angeles, Calif. 90066

For More Details Circle (135) on Reply Card
Television Lighting Kits

A new series of unusually compact and easily portable location lighting kits has been developed and is now being marketed by Strand Century, Inc.

There are five basic packages offered for television, motion pictures and photography in this new Strand Century Porta-Kit series. Engineered for optimum performance even under extreme conditions, Porta-Kit is designed to meet every location lighting need.

For the first time in any portable set-up, Porta-Kit includes lanebeam open-face units by lanio, the Italian-made lights that are world-famous for extraordinary technical and optical excellence. Among them is the new 650-watt lanebeam spotlight with a fiberglass housing that offers important advantages.

The rapid cooling properties of fiberglass permit instant dismantling, packing and storing after use. It is exceptionally light in weight and yet is practically indestructible, standing up to and functioning with the most rugged handling. This new 650-watt lanebeam, like all lanio lighting equipment, is available in the United States and Central and South America only from Strand Century.

Serviceability and dependability of Porta-Kits are further assured by their specially fitted and constructed lightweight compartmented cases, designed to withstand rough abuse in transit.

In addition, to Porta-Kits, Strand Century markets a complete line of lighting equipment and controls for television, motion picture, theatre, photography and architectural applications.

Specifications and other information on the new Porta-Kit are available from Strand Century Inc., 20 Bushes Lane, Elmwood Park, N.J. 07407.

For More Details Circle (230) on Reply Card

Magnetic Card Memory System

The Video Data Model MC104 Magnetic Card Reader Character Generator system is designed to operate on CATV and closed circuit systems as a fully automated program.

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For More Details Circle (136) on Reply Card

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- Programmable Mute allowing up to four different "scenes" to be setup simultaneously on the console.
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Plus many other features usually found only at much higher prices. Combine these with the traditional Cetec quality and service, and you have the Series 20 LM, Live Media Console.

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For More Details Circle (137) on Reply Card
guide or information presentation channel.

The system consists of two basic parts, the magnetic card reader and the character generator. The character generator portion of the system displays alphanumeric information against color backgrounds on the display TV screen. The display consists of a fixed 32 character title line at the top of the screen, either 8 or 16 lines of 32 characters per line in the center of the screen and a fixed line containing the time of day at the bottom of the screen. The title line and time line are presented against one color, the balance of the screen against the second color. The magnetic card memory portion of the system consists of a transport which operates and controls a magnetic card, similar to an IBM data card, on which all of the alphanumeric information is stored. The magnetic card has the capability of storing 82-8 line pages of information or 16-16 line pages of information.

The information to be stored on the page is prepared by means of the character generator and then written on to the card. Cards can be removed from the system by the operator at any time and stored for future use. In this way, a library of cards can be prepared which contain information for many basic programming functions.

For More Details Circle (117) on Reply Card

Audio-Video Distribution Switchers

TeleMotion has a new switcher series, the TVS-1000/TAS-1000. Their 8-3/4" chassis provide for space-saving system configuration. Single-wire "party-line" control for large audio-

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For More Details Circle (140) on Reply Card

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For More Details Circle (139) on Reply Card
follow video systems. Multiple control options include desk-calculator-size control unit for as many as 100-in by 100-out switcher.

Crosspoint design allows for over 100 crosspoints per single circuit card with crosstalk specs less than 60dB (any crosspoint to any crosspoint-worse case). Switchers also feature selectable control of audio only/video only/audio-follow-video switching; dual video outputs; expandability without obsolescence; internal bussing - no inter-chassis or inter-rack cabling required.

For More Details Circle (216) on Reply Card

Production Switcher

The Central Dynamics VS-10 is an 8 input, 3 bus, compact, self-contained vertical interval solid state switcher with true broadcast quality.

This low cost color switcher belies its capability and applications include CATV, CCTV, Mobile, Educational and Broadcast operations. Dissolves, wipes, keys, matte keys and chroma keying are standard as are: a cut bus and a preview output of the effects bus.

Other features include: illuminated momentary action crosspoint push buttons, true On-Air tally system and inputs can be composite/non-composite signals.

For More Details Circle (217) on Reply Card

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For More Details Circle (141) on Reply Card

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For More Details Circle (193) on Reply Card

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In the interest of maintaining accuracy over long periods of time, all DSC test slides are distributed on a lease basis and are replaced at regular intervals. Other method of distribution eliminates the use of obsolete test objects and every engineer knows that he is using only current test materials produced to the very latest standards. Leasing is more efficient and economical, too. Any broken or damaged slides are replaced at no cost to the user.

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(416) 488-6700

For More Details Circle (143) on Reply Card
An exceptionally light weight head for cameras weighing up to 50 lbs.

The O'Connor 50 weighs only 7 lbs., yet gives positive control over cameras up to 50 lbs. Super-smooth panning (360°) and tilting (45° up or down) with the exclusive O'Connor fluid action. Timken bearings. Infinite drag adjustment. Also heads for 10 lb. to 200 lb. cameras. Send for catalog.

O'Connor Engineering Labs, 100 Kalmus Dr., Costa Mesa, Ca. 92627; (714) 979-3993.

Digital Automatic Program Controller

Dynasiences Video Products, a subsidiary of Whittaker Corporation, has added the DAC-100 Digital Automatic Program Controller to their video product line.

The Dynasiences DAC-100 provides an economical means for remotely controlling as much as 8 hours programming for as many as 6 Video Tape sources. It is currently being used for CATV program origination, educational television, motel and business movie systems and for many other types of closed circuit television installations. The DAC-100 can also program between different types of courses, i.e., VTR off-air, weather.

The user can set up a 10 step sequence consisting of tapes, live video, network feeds and commercials for an entire day's programming, including 'start' and 'stop' times. After the sequence is set up, the DAC-100 takes over and plays the whole schedule just as its been.

The Console Company

Los Angeles (213) 349-4747
Nashville (615) 794-0155

Audio Control Consoles

For More Details Circle (144) on Reply Card

Sphere

Electronics

THE CONSOLE COMPANY

Los Angeles (213) 349-4747
Nashville (615) 794-0155

Audio Control Consoles

For More Details Circle (144) on Reply Card

Audio DISTRIBUTION AMPLIFIER PACKAGE

The SA-200 DA is available in two basic packages. Shown is the wiring side of the 12 card frame which contains a Dual Regulated Power Supply and rear mounted Terminal Boards for ease of installation. Provides 12 inputs and 72 Outputs at a cost of $2,429.00. Other products include: Custom Audio Consoles, Studio Intercom Systems, Studio Monitors, Video and Pulse Distribution Amplifiers, Scientific Systems, Inc., 48 Windjammer Court, Tooms River, New Jersey 08753, 201-255-2730.

For More Details Circle (145) on Reply Card
programmed—automatically.

A unique feature of the DAC-100 is the inaudible 'start' and 'stop' tones which are recorded on either of the audio tracks between each segment. This allows the dual audio channels of a 3/4" video cassette to be used for program content. A digital clock allows the user to set the time desired to 'start' and 'stop' operation.

For More Details Circle (218) on Reply Card

TV Amplifier
Aerodyne Industries, Inc., Montgomeryville, Pennsylvania has announced the introduction of its A-14OU 1 kW single-tube amplifier. The unit is intended for TV transmitter and translator applications and exceeds FCC requirements. Out of band spurious specifications are inherently satisfied by using both RCA tubes and cavity design without need of an output filter.

An important standard feature, unique to the industry, made part of the A-14OU is a "Fault Detection Center." This feature assists the operator in immediately localizing and rectifying any standard operation condition which might occur. The Aerodyne exclusive "Fault Detection Center" is a logic circuit which in case of an overload condition as an example, recycles the amplifier 5 times in an effort to keep the unit on the air. When such recycles occur, the location of the fault is permanently displayed on the "Fault Detection Center" until the condition is rectified and the memory erased.

For More Details Circle (219) on Reply Card

Color Film Camera
TeleMation is now offering the TCF-3000, a color film camera for high performance broadcast operation. Features prism optics; multiple light entry positions for ease in positioning within an existing film island allowing for optimum use of available floor space and convenience of operation; fast attack ND light control; image enhancement; auto black/auto white; color correction.

For More Details Circle (220) on Reply Card

Variable Speed Oscillator
Ampex Corporation has placed on the market the VS-10 variable speed oscillator for professional audio recording applications.

Available with a four-digit electronic display for exact speed accuracy, the VS-10 is specifically designed for use with the Ampex MM-1100 and AG-440 Series of capacitor coupled professional audio recorders.

Charles A. Steinberg, vice president—general manager of the Ampex audio-video systems division, said the VS-10 variable speed oscillator features a range of ±1 full tone in quarter-tone steps and a coarse/fine variable speed adjustment.

"The VS-10 weighs only 2.5 pounds and will drive up to three recorders with unmatched accuracy and portability," Steinberg said. "It is the most compact, reliable and economical system of speed variation available to users of the Ampex AG-440 and MM-1100 Series recorders.

"The Ampex VS-10 offers the user additional variations in broadcast running time, phasing and delay effects, off-speed compensation, controlled double tracking and special effects capabilities—all at an economical price," Steinberg said.

For More Details Circle (221) on Reply Card
People in the News

Rodger W. Cappello has been appointed Vice-President Sales for Plastic Products by TelePro Industries Incorporated....TeleMation announced the appointment of Donald E. Lefebvre as Distributor/Dealer Sales Manager for the eastern United States....Conrac Corporation’s newly created post in its Corporate Communications section: Financial Community Liaison, will be headed by Egon W. Loefel...Conrac Corporation also appointed William G. Glass as operations manager of their Conrac Division.

Don Mereen has been appointed to director of new products and market development, a new position at Telex Communications, Inc....Leo Darrigo has joined Dynair Electronics, Inc. as Eastern Regional Manager....American Data announced the promotion of Dewey Radden to the position of Production Manager....William R. Riester has been named Vice President, Finance, for Commercial Electronic Incorporated.

Jules Kadish elected to vice president of Scientific-Atlanta, Inc. His headquarters will be in London, England, and he will be responsible for the management of all Scientific-Atlanta marketing and industrial activity in Europe, Africa and the Middle East....North American Philips Corporation (NYSE), announced that Kenneth V. Spitzer has been named president of Philips Broadcast Equipment Corp., a wholly-owned subsidiary.

Datametrics
The name for Precision Time Code Data Indexing and Retrieval Products
now announces
SMPTE - TV EDIT TIME CODE GENERATOR AND READERS

Featuring
- Wide Dynamic AGC for amplitude variation and frequency response.
- Error by pass for fail safe operation.
- Drop frame or black and white operation.
- Reader and/or generator models available.
- External or line synchronization.

Our application engineering group is at your prompt service to review your video editing problem and to offer our optimum solution. Request Bulletin SMPTE.
**Attenuator**

A new high-quality, shielded attenuator designed for use in both low-level signal calibration of test equipment and MATV/CATV installation and service applications was announced at the 1974 NEWCOM Show by RCA Electronic Components.

"The RCA WM-542A 75-Ohm Attenuator is a valuable aid in MATV/CATV television installation and service when it is desirable to equalize signal levels at various outputs," according to Robert Lord, Manager, Market Planning—Special Products for the RCA Entertainment Tube Division. "In addition, this attenuator permits accurate adjustment of signal output levels as low as 1 microvolt from suitable signal generating equipment."

This five-step attenuator has step switches arranged in a convenient 3-6-10-20-20 dB sequence, providing a selection of the most-used attenuator values from 3 dB to 59 dB. It can be used to reduce the signal level as required by switching in the proper attenuator value and then substituting a single fixed attenuator pad of the same value.

Attenuation of RF signals with a one dB accuracy up to 250 MHz is provided and unit is usable for signals up to 900 MHz. While the device is designed for signals up through the IF and VHF television spectrum, it can be used to attenuate UHF signals with only a small accuracy loss and increase in VSWR.

An attenuator such as the RCA WM-542A is required in several test equipment applications when it is necessary to have calibrated low-level signals. Such applications include applying low-level RF signals for alignment purposes and providing signals at precise levels for calibration purposes. It is a good supplemental attenuator for existing AF, IF, VF and RF signal and sweep generating test equipment.

For More Details Circle (223) on Reply Card

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**Chroma Insert Keyer**

The new Model 7010 NTSC Chroma Insert Keyer for existing color television broadcasting installations has been announced by the Professional Products Department of CBS Laboratories, a Division of Columbia Broadcasting System, Inc.

The Model 7010 inserts the keyed signal into any composite NTSC background signal. The need for an external keyer is eliminated, and no system re-timing is necessary since through delay is less than 15 nanoseconds. To minimize annoying crawls from the key signal, a unique comb filter is used to separate luminance and chrominance spectrums. Since bandwidth of the Model 7010 key signal is the bandwidth of the color difference signals, the key is quieter than a full bandwidth key typical of RGB keyers.

The CBS Chroma Insert Keyer permits a broad range of applications. It allows a broadcaster to send a signal over a network with a "blue flat" background, and a local scene can be inserted in each city that receives the network signal.

A program can be recorded on video tape, and played back for post-production editing and chroma keying. A single-cable color TV camera can be used to send a composite NTSC signal, with chroma keying done external to the camera control unit.

Portable minicameras can be used to generate a composite NTSC signal, with keying done on a received signal.

For More Details Circle (222) on Reply Card

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**Spotmaster**

**FULL FEATURE 4-CHANNEL CONSOLE**

The only full feature 4-channel console on the market. It has 8 inputs selectable (at installation) for high or low levels. Also features long life sealed mixer pots; internal cue, phone and monitor amps; plug-in muting relay. A rack mounting version is available.

**100 SERIES STEREO CONSOLES**

All inputs are switchable for mono or stereo sources and high or low level. Features modular plug-in electronics; muting on any channel and quiet FET audio switching. Can be used in remote control applications. Optional matrix available for separate composite mono from stereo output.

**100 SERIES MONO CONSOLES**

Switch selectable high and low level inputs. Identical program and audio transformer outputs; 5 or 8 mixers. Muting on any channel; quiet FET audio switching; monitor, phone and cue amps standard. Can be used in remote control applications.

For More Details Circle (152) on Reply Card
Video Processing Amplifier

A video processing amplifier is available from TeleMation. Ideal for professional broadcast use. Handles color and monochrome signals; operates with either quad or helical scan VTR's.

Features include programmable, digital sync generator with genlock, differential amplifier input for over 60 dB common mode hum rejection; separate sync, luminance, chrominance and burst phasing; full 360° sub-carrier phasing; full remote control; and mechanical bypass.

For More Details Circle (224) on Reply Card

Audio Console

GRANDSON, Model 110, is a new expandable, completely modular professional recording/remixing/on-air audio control console from Auditech, Inc. Designed to accommodate up to 16 track recording and on-air applications, the free standing unit is expandable to 18 mixing positions—only 36" width. It offers complete metering, two echo send/receive channels, talkback communications, separate control room and studio monitoring, test oscillator, and a full line of matching accessories including a plug-in patch bay.

A unique second generation, full capacity system at a moderate price, GRANDSON, fills the gap between conventional broadcast consoles and sophisticated recording consoles. The most recently integrated circuit designs as proven in the widely accepted Model 501, SON OF 36 GRAND, are utilized.

For More Details Circle (225) on Reply Card

Velocity Error Corrector

The MICROTIME 700 Series VEILCOR velocity error correctors are standalone products that work with both quad and direct record helical VTR's. The 700 Series, formerly the Delta T, has achieved acceptance through performance, adaptability and cost. Two models are offered: one for quad and segmented helical VTRs, the other for one head per field helical VTRs and VDRs. They eliminate color disturbances (hue shifts) in the visible picture which are caused by oscillations of the rotating video head around its specified velocity, and dynamic changes in tape length or tape path.

For More Details Circle (260) on Reply Card

Audio Sentry

Belar Electronics Laboratory has announced the availability of its "Audio Sentry." Intended to be used with station's AM, FM, SCA, or TV Modulation Monitor, the Audio Sentry will, within a preset interval from 3 to 90 seconds, visually and aurally alert station personnel of the loss of aural transmission.

The operator has three alternate methods of installation. First, the alarms may be held in a muted mode until the transmitter is ready. An external contact closure activated by the transmitter plate on control circuit, will set the alarms.

Second, the audio sentry's alarms may be activated immediately upon application of primary power by installing a jumper between the unit's remote terminals.

Lastly, if neither of the two installation methods are chosen then the unit will automatically be armed upon...
the application of audio, and any loss of audio that exceeds the preset dropout time will initiate the alarm functions.

For More Details Circle (227) on Reply Card

Digital Remote Control

McBee Laboratories introduced a digital remote control. It's a simple, stable transmitter control system incorporating state-of-the-art C-MOS circuitry.

Called the D-144, this system is designed for immunity to interference, noise, and transients. Its power supply is capable of minimizing power line variations. But what is truly interesting is that the required calibration can be accomplished by one person at the transmitter location.

The D-144 uses an autoranging digital voltmeter that the company says is accurate to within .001 percent. LED character displays are used to provide wide angle visibility and long distance viewing.

The transmitter is protected by a fail-safe system that complements the system surveillance approach. What's more, a special TV time protection delay system is available.

For More Details Circle (229) on Reply Card

1,000 Watt Linear TV Amplifier

Acrodyne Industries, Inc. has announced the introduction of its A-140U 1 kW single-tube amplifier. The unit is intended for TV transmitter and translator applications and exceeds FCC requirements. Out of band spurious specifications are inherently satisfied by using a new RCA tube and cavity design without need of an output filter.

An important standard feature, unique to the industry, made part of the A-140U is a “Fault Detection Center.” This feature assists the operator to immediately localize and rectify any substandard operation condition which might occur. The Acrodyne exclusive “Fault Detection Center” is a logic circuit which in case of an overload condition as an example, recycles the amplifier 5 times in an effort to keep the unit on the air.

When such recycles occur, the location of the fault is permanently displayed on the “Fault Detection Center” until the condition is rectified and the memory erased.

For More Details Circle (229) on Reply Card

Portable Color TV Camera

Fernseh Group of Robert Bosch Corporation has introduced a new battery-operated color television camera, that adds a new flexibility to the Fernseh family of professional camera systems.

The KCN camera system is designed for television interviews, and up-to-the-minute spot coverage for breaking news stories.

Fully synchronized NTSC output video signals can be used directly on air, directly tape recorded or both via a portable microwave data link.

Its compact design and light weight results in point for point comparison to film cameras in similar applications, while allowing full broadcast quality reproduction at much lower light levels.

The camera head, weighing approx. 15 pounds, can be separated from its pack pack up to 50 feet. The total portable system weighs under 39 pounds and can cover a one hour program before recharging is necessary.

For More Details Circle (231) on Reply Card

Reel-to-reel... for real

Exciting things are happening in the reel-to-reel market and it's all caused by a new machine called the ITC 850 Series. Here is the result of a long series of consultations with broadcasters to determine what they most desired in a reel-to-reel machine. Then we added a few innovations of our own. Truly, the 850 Series is equipment designed specifically with the professional broadcaster in mind. Some 850 features: motion sensing, multi-function edit mode, super quiet operation, automatic tape lifters, TTL logic circuitry, capability of handling dissimilar size reels... and more too numerous to mention here. If you're in the market for something new and vastly improved in reel-to-reel, a collect call to us will reveal an interesting story that you may have been waiting to hear. Make the real move to reel-to-reel... ITC. Collect number 309-828-1381.

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For More Details Circle (154) on Reply Card
Long Range Funding
For CPB

Clay T. Whitehead, Director of the Office of Telecommunications Policy, has sent to Congress legislation that would, for the first time, provide long-range funding for the Corporation for Public Broadcasting.

He stated that the proposed legislation recognizes the progress and potential of public broadcasting. In letters to the President of the Senate and the Speaker of the House, Whitehead said that many of the concerns expressed in Congress and the Administration for not including a long-range financing plan in the Public Broadcasting Act of 1967 have now been substantially resolved. As examples, Whitehead cited growing diversity and excellence in programming and the assurance that the local radio and television stations will have a significant role along with the CPB in the programming and operational decisions of the public broadcasting system.

Whitehead noted that the President had long considered the availability of substantial Federal subsidies for the production and distribution of television and radio programming as posing the threat of Federal control of program content.
and the possibility of public broadcasting becoming a propaganda vehicle.

The extremely sensitive relationship between Government and a Federally funded mass communications medium calls for some means of insulating that medium from the possible pressures that might result from the annual appropriations and budgeting processes of the Congress and the Executive Branch. The Director of OTP stressed that the needed insulation must be achieved through long-term appropriations and through substantial involvement of local educational stations in the decision-making of the public broadcast system.

Solving The Dilemma
As to long-term appropriations, Whitehead stated that solving the dilemma presented by large-scale Federal financing of a medium of communication called for a departure from the usual funding mechanisms employed by the Federal Government. Rather than

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APPLICATION
- Used with any VTR with an electronic editor for all editing function.
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For More Details Circle (150) on Reply Card

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For More Details Circle (161) on Reply Card
Long Range Funding (Continued from page 137)

annual appropriations, the legislation would provide for a full five-year appropriation. Public broadcasting would be one of the few activities funded by the Federal Government that would not be subject to the annual review of the congressional appropriations committees. Whitehead stated that the Congress should be willing to loosen control of its pursesstrings, as the White House has done in proposing this legislation, in order to insulate programming decisions from governmental intrusion.

Local Role Important

Whitehead also stated that innovative financing mechanisms are not alone sufficient to assure a free and independent public broadcasting system. To achieve this goal, the local educational stations must have a voice and role in the decisions regarding public broadcasting programs and operations. The legislation would accomplish this by requiring that a substantial portion of the Federal appropriation be dis-

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It automatically replaces color dropouts on your quad VTR with the correct color video.

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A COLOR FRAMER THAT REALLY WORKS.

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BE CORRECT, WITH NORMAL LOCKUP EVERY TIME. NO LONGER DO YOU HAVE TO PUT UP WITH COLOR FLASHES ON YOUR EDITS DUE TO IMPROPER COLOR FRAMING OR HORIZONTAL VIDEO SHIFTS ON YOUR PLAYBACKS.
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ALSO ASK ABOUT OUR NEW PLASTIC HEAD COVERS FOR AMPEX VIDEO TAPE MACHINES. THEY ARE MADE OF A SPECIAL PLASTIC, DESIGNED TO SLIP OVER THE HEAD ASSEMBLY.

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COMPLETE KIT $175
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For More Details Circle (165) on Reply Card

tributed directly to the local stations for use at their discretion. In this way, Whitehead stated, the principle of local station autonomy in public broadcasting system will be fostered.

Finally, Whitehead noted that proposed legislation would up-date the 1967 Public Broadcasting Act by making Federal funding available for the development and use of non-broadcast communications technologies for dissemination of educational radio and television programming.

In submitting the legislation, Whitehead pointed out that key Congressional leaders had expressed their interest to move forward with the bill as soon as the Administration submitted it. Given these assurances and the general support the bill has among public broadcasters, the CPB and PBS leadership, Whitehead said that he expects the bill to pass and be signed by the President before the end of this congressional session.

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Fully compatible with your 3- and 4-channel cameras, the 3M Brand Color Video Decoder provides a dependably stable NTSC/EIA output.

A completely digital color bar generator simplifies set-ups and maintains your setting without constant re-adjustment.

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Long Range Funding  
(Continued from page 138)

Highlights

The bill has three principal purposes relating to the Corporation for Public Broadcasting and the system of non-commercial educational radio and television stations.

1. The bill would provide long-term Federal financing for the CPB by means of a 5-year authorization and appropriations. According to CPB figures published in the Long-Range Financing Task Force Report, the entire public broadcasting system's non-Federal, non-duplicated income for FY 1974 was estimated at $200 million. Hence, for the first year under the bill, FY 1976, the CPB would be entitled to the maximum $70 million from the Fund (the Federal match is based on the system's non-Federal income for the second preceding fiscal year).

2. A second major purpose of the bill is to assure that a reasonable portion of Federal funds is distributed directly to local non-commercial educational broadcast stations. 

(Continued on page 146)
Broadcast Tetrode

A new high quality tetrode featuring improved cathode structure is available for broadcast use from the EIMAC Division of Varian. The tube is a premium quality direct replacement for the 4CX250B. The 4CX250BTC/8857 is capable of high emission over an extended period of time, greatly reducing frequency of tube replacement. A modified screen grid structure virtually eliminates the possibility of negative screen current occurring during certain types of operation.

The new tube may be used as a direct replacement for the 4CS250B or may be as ideal selection for new equipment design; in both cases the user will experience reduced transmitter downtime.

Designated the PM 5504, it provides five carefully selected test patterns and a sound output for fast, accurate alignment of any B/W TV set or video recorder, in workshops and in the home.

A unique facility for video modulation also enables the PM 5504 to be used for checking and monitoring monochrome TV cameras. This feature further extends the range of applications to the servicing of closed circuit TV set-ups and small monochrome TV studios.

The PM 5504 covers TV bands I, II, IV and V plus 1F(38-85 MHz, 170-250 MHz and 470-790 MHz). To save servicing time, five most commonly used channels can be electronically preadjusted and pushbutton selected afterwards whenever required. TV band and channel frequency are indicated by two separate meters.

Five most recommended test patterns are conveniently selected by pushbuttons and modulated onto the selected carrier frequency. They allow fast and accurate alignment and checking of all TV demodulation and video circuits.

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Teletelert Teletype Alarm
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AM-FM Studio Switching System
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(automatic parameter corrector and transmitter switch-over system)

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Program Timers
Remote Control Systems
Tone Encoders
Telephone Tone Receivers
Telephone Tone Transmitters

The reason is simple. No two units of any one type have ever been alike enough to provide one set of common specifications. Each of these items is tailored to meet the specific needs of the station for which it is designed. So you don’t pay for features you don’t need. Nor do you have to “make do” with equipment that isn’t really designed to perform the tasks you set out for it. Best of all, ASI quality built custom equipment is priced within your budget. So instead of us sending you information, we’d like you to send us some information. Just write or phone us your specifications for any equipment you may have in mind. In return you’ll get an equipment design proposal and price quote at no obligation. We’re sure both will pleasantly surprise you.

For More Details Circle (201) on Reply Card

For More Details Circle (202) on Reply Card

For More Details Circle (203) on Reply Card

For More Details Circle (204) on Reply Card

For More Details Circle (205) on Reply Card

For More Details Circle (206) on Reply Card
Multi-Function Counter
A new low cost OEM multi-function counter, Model 2319FE, with remote control as standard, is available from Modular Devices, Inc. All functions are remotely or locally controlled by non-critical TTL/DTL signals. Parallel and serial data output is standard. Serial data format is either low or high order bit first, field selectable.

The new unit, designed to mount in a standard 19" rack, provides time interval measurements of pulse width, period, B-A (to 100 nano-second resolution), frequency (0.1, 1.0, 10.0 seconds time base), events period B, events B-A, and frequency ratio E/B. Measurements averaging of ten consecutive readings increases time resolution to 10 nanoseconds.

The counter, which includes an internal 5VDC power supply, is equipped with an eight digit LED decimal display with floating decimal point, providing readout for time or frequency measurement in micro-seconds or cycles respectively.

For More Details Circle (203) on Reply Card

Disk Storage
System Industries is offering 30-day delivery on its low-cost disk system, the Series 3500, which comes ready-to-use with most minicomputers. The field-proven Series 3500 is complete with disk drive, controller and appropriate minicomputer interface circuitry.

Providing a storage capacity of 2.5 million 16-bit words with a single drive, the Series 3500 can store vital station parameters (e.g., time spot availabilities, accounting records, traffic monitoring, etc.) for instantaneous access and processing by minicomputer. Equipped with a removable disk cartridge as well as fixed disk, the Series 3500 allows automated stations to develop a disk cartridge library as storage requirements grow.

Maintenance, when required, is made easy through an extensive diagnostic software package and modular construction.

For More Details Circle (204) on Reply Card

Edit Code Reader
Datametrics, Incorporated announces the availability of the Model SP-425-SMPTe TV edit code reader.

Designed specifically for decoding SMPTE edit tape from video tape, the Model SMPTE features wide band amplitude and frequency response, a digital code demodulator and error bypass for reliable operation. It automatically reads and decodes time code data over a range of 1/8 real time to 40 times real time, in both forward and reverse directions and provides front panel display of time code. It operates with both black and white or color (drop frame) formats.

Standard options include parallel outputs, generator mode of operation and combined reader/generator units.

For More Details Circle (205) on Reply Card

Solid State Logic Probe
A hand held DTL, TTL Logic Probe has been introduced by Tektronix, Inc., of Beaverton, Oregon. The P6401 identifies logic states with red and green indicator lamps in the probe tip.

It detects steady high state, steady low state, intermediate logic levels, excessive positive or negative voltages, pulse trains, open circuits or a
single logic pulse.

When coincidence of logic levels at two points is to be detected, simple connections are made with strobe leads furnished with the probe. In addition to identifying steady or switching logic states, a store mode will indicate that a pulse has or has not occurred. Furthermore, the strobe and store modes can be used simultaneously indicating coincidence or noncoincidence of two pulses.

Designed for fast, accurate circuit testing, the P6401 is well suited for applications in computer mainframes, video games, cash registers, industrial controls, data processing terminals and telephone switching systems.

For More Details Circle (206) on Reply Card

**Solid State Replacement For Vacuum Rectifiers**

Electronic Devices, Inc. of Yonkers, N.Y. has announced a new line of plug-in, solid state tubes that are exact replacements for industrial rectifier tubes.

These new silicon EDI solid-state tubes will replace most regular gaseous and vacuum rectifier tubes with ratings up to 1750 ma. and 60 KV. Higher voltages and currents are available as specials. The new tubes are developed from EDI's TV and communication Solid Tube rectifier line that has shown these proven advantages: No need for filament transformers, these tubes are ideal replacements in equipment where the filament transformer is faulty, solid state reliability, constant output, long life, no heat generation, compact rugged construction, and fast warm up.

For More Details Circle (207) on Reply Card

**Wide Field Zoom For 1-Inch Camera**

The new Canon Model PV 10X15 R2, wide-field 10X one-inch Plumbicon color camera zoom is now available for all color TV cameras.

This lens has a zoom range of 15 mm to 150 mm, f2 and an efficiency of over 80%. It is the smallest, closest focusing f2 zoom presently available for the one-inch market. Special features include: adjusting back focus, "instant change" bayonet mount, "instant change" range extenders, close focusing operation to 3 1/2 feet, and an unconditional one-year warranty.

For More Details Circle (208) on Reply Card

**Video Over Telephone**

A complete video communications system capable of transmitting and receiving still television images over dial-up telephone lines or other voice grade circuits has been announced by **Colorado Video Incorporated**. The system includes a high quality closed circuit TV camera, camera stand, 12" monitor, and the CVI models 260 Video Compressor and 261 Video Expander for full two-way operation. 60 seconds are required to transmit a single medium resolution image, while a magnetic disc is used in the receiver memory to allow indefinite image storage time with good grey scale.

Price of the complete basic system is $9000 with a delivery schedule of 120 days. Components of the system may be purchased separately and options include multiple image storage and frame freezing before transmission.

For More Details Circle (209) on Reply Card

**Shively Laboratories Offers A Complete Line Of RF Components For FM Broadcasting**

Type 6814 Circularly Polarized Antenna 25 kw per bay

Type 2430 Diplexer for Two 20 kw stations

Type 3330-20 Air Cooled Load 20 kw rating

Type 2030-25C Filter-Coupler 25 kw rating

Type 8130 SPDT Switch

Write for Information On:
ANTENNAS
TRANSMISSION LINES
HARMONIC FILTERS
MULTIPLEXERS
RF LOADS
COAXIAL SWITCHES
POWER COMBINERS

For More Details Circle (109) on Reply Card

September, 1974
Pollution Abatement
Wendell Lewis, VP/General Manager of Technology Incorporated, has introduced a new Houston Fearless® unit described as a complete pollution control center for black and white processors.

According to Lewis, the silver pollution control System-100, as it is called, not only recovers valuable silver destined to otherwise go down the drain with used processing chemists, it also prepares the remaining waste for safe discharge into municipal sewage systems.

Existing municipal codes regarding the condition of wastes permitted to enter sewage systems were consulted on a nationwide scale prior to the development of the unit. In addition, EPA and DOD effluent specifications have been met.

The waste, after treatment, is claimed to be non-toxic and biodegradable.

The compact SPC-100, measuring 31 x 36 x 20-inches, features automatic start-up and operation.

Remote Control Systems
Rust Corporation of Everett, Massachusetts announces a new series of "Silent Service" remote control stations for all types of broadcast stations. The series consists of two versions, a low cost, analog metering version, the RC-2600E, priced at $1900, and the Digital Readout metering version, the RC-2600ED. Both systems provide fifty-two (52) control actions and twenty-four (24) positions of metering.

The "Silent Service" is designed to operate in a live studio under microphone "ON" conditions without any audible sound heard by the listener. This is the result of the all new Rust solid state position selection system which utilizes the newest proven electronics to achieve "pushbutton" position selection with digital readout of position location.

Custom Consoles
Dyna Engineering, manufacturer of custom console and studio systems, announces a new feature available in all of its consoles and also available for individual purchase.

This is a program limiter, available on a variety of PC board sizes, and suitable for individual channel limiting. It features a totally new, unique "ducking" feature, whereby an external voltage applied during announce microphone closure permits "ducking" of the channel level by a preset amount.

The unit also features adjustable "knee" on limiting curve: 20:1 limiting ratio, 40 dB limiting dynamic range, and 10 dB nonlimiting gain.

True Dual Beam Portable Scope
True, dual beam operation and 'half-tone' storage, including variable persistence, are the major features of the new compact, portable storage oscilloscope announced by Philips Test & Measuring Instruments, Inc., a subsidiary of North American Philips Corporation. Designated the PM3376, the oscilloscope was developed by N. V. Philips. The technique of true dual-beam operation was first introduced in the generic instrument types PM3322 and PM3323.

True dual-beam operation employs one gun in which two beams are generated; the CRT employs common X-plates, but entirely independent Y-plates. The display of both channels is therefore continuous and uninterrupted, unlike the chop or alternate displays of so-called dual-trace instruments. This technique, combined with the storage facilities, ensures true displays and recordings, including single shot phenomena.

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Tape Heads
(Continued from page 115)

interchangeability of tapes between one recorder and another. Although
Azimuth is adjusted mechanically, it must be done while playing a
standard alignment tape. At a
speed of 7.5 ips, a frequency of at
least 12 kHz should be used, with
15 kHz preferred.

As the head is slowly rocked
from side to side, the output of the
head will increase and will reach its
maximum level when the head gap
is directly lined up with the re-
corded high frequency on the align-
ment tape. This establishes the
Reproduce head as a standard for
setting Azimuth on a Record head
. . . . which is done by removing the
alignment tape, threading a blank
tape on the machine and recording
a 15 kHz tone while monitoring it
with the Reproduce head. The
Record head is slowly rocked from
side to side while recording this
tone until maximum output is
obtained from the Reproduce head
monitoring the recording.

At this point, the gaps of both
Record and Reproduce heads are
properly Azimuthed. The slight
time lag caused by the distance
between these heads should be
taken into account when Azimuth-
ing a Record head.

So now we know something about
how a head is made and how it
should be adjusted when new heads
are installed. What are the symp-
toms or signs of a head nearing the
end of its useful life? What are the
major things to look for?

Electrically, as wear progresses
on a Reproduce head, the induct-
ance of the head drops and the
high end begins to fall off. As you
begin to peak up the high end
response with the equalization
adjust, you will note that beyond a
certain point, boosting the high end
causes a hump in the response
further down the line until you get
such a hump (usually in the 4 to 6
kHz region) the head must be
replaced in order to get smooth
response throughout the audio
spectrum as specified by the re-
corder manufacturer.

In the case of a Record head, as

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wear progresses the inductance also drops and the head requires less and less bias current to peak bias the head. This in turn affects the audio current required and also requires readjustment of the recording equalization. If the heads are not replaced at this point, the process outlined just repeats itself with greater frequency until finally the gap abruptly opens and satisfactory performance is impossible.

**Head life**

In addition to this, there are performance difficulties encountered which are not electrical in nature but show up as electrical malfunctions in the form of drop-outs, erratic output (starting first at the high end and working down the audio range) as the condition worsens), warbling, and a wide assortment of weird sounds caused by variations in tape contact, and wandering of tape due to wear grooves.

Figure 7 shows an exaggerated view of the step effect in a deep wear groove. Originally, the groove was fairly straight as it wore into the head face, but as wear progressed, the edges of the tape (which are not as rigid as the center portion), tend to cup and become rippled. The point at which the edge curls (and firm contact begins) starts another groove. Tape of varying widths can also cause this condition.

Figure 8 shows the flat that is developed in a head face as wear progresses. This flat exists regardless of whether a wear groove is present or not. Some head manufacturers have tried to overcome the wear groove problem by undercutting the head face at the top and bottom edges of the stacks to eliminate the possibility of a wear groove. This technique does indeed eliminate the groove but not the
flat. It has the added requirement of making the height adjustment extremely critical. So critical in fact that an error of only .005" will create a condition where a wear groove will exist in one lamination of the entire head stack and develop into a nice tape slicer as time goes on.

This flat on the head face spreads the tape contact area over a wider and wider space, tending to create poor contact at the gap where everything takes place. The further this flat extends on the head face, the more difficult it will be to ensure good contact with the head gap.

Figure 3 shows the keystone wear pattern caused by improper Zenith adjustment. Once this pattern appears, the head should never be re-adjusted, as erratic contact and output will result. In most cases where professional heads are involved, a head can be relapped and polished. It should then be re-installed and the Zenith error corrected.

Figure 9 is an illustration of a head with a completely open gap. Such a head is fit only for the trash can. While it might be difficult to believe that anyone could use a head until such a condition occurs, we see them frequently.

In summary, the tape head is where the quality of your air signal begins. It would be difficult to overemphasize the importance of correct installation as primary maintenance to keep it in good operating condition at all times. Routine maintenance is not difficult. About all a tape head really requires is regular cleaning, periodic de-magnetization and taking precautions to see it is not subjected to abuse by being hit in the face, scratched with sharp objects or otherwise mishandled.

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Long Range Funding
(Continued from page 140)

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3. The scope of existing law governing public broadcasting would be expanded to include the development and use of non-broadcast communications technologies for the distribution and dissemination of educational radio and television programming. Examples include cable and communications satellites. The bill would permit stations to use the Federal funds distributed to them by the CPB for the development of such technologies and also would authorize the CPB to conduct research, demonstrations or training in their use.

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