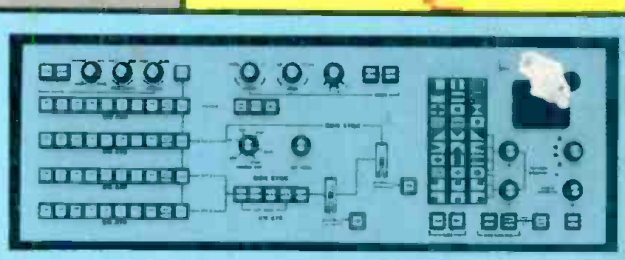
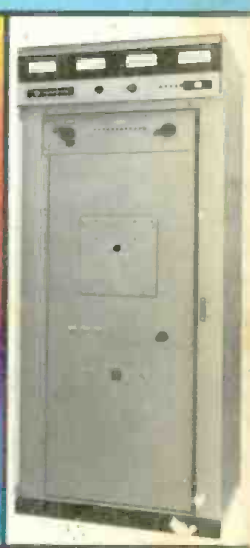
September, 19

BROADCAST ENGINEERIN



1977 Buyers' Guide

Will The NAEB Survive?
Live Via Satellite



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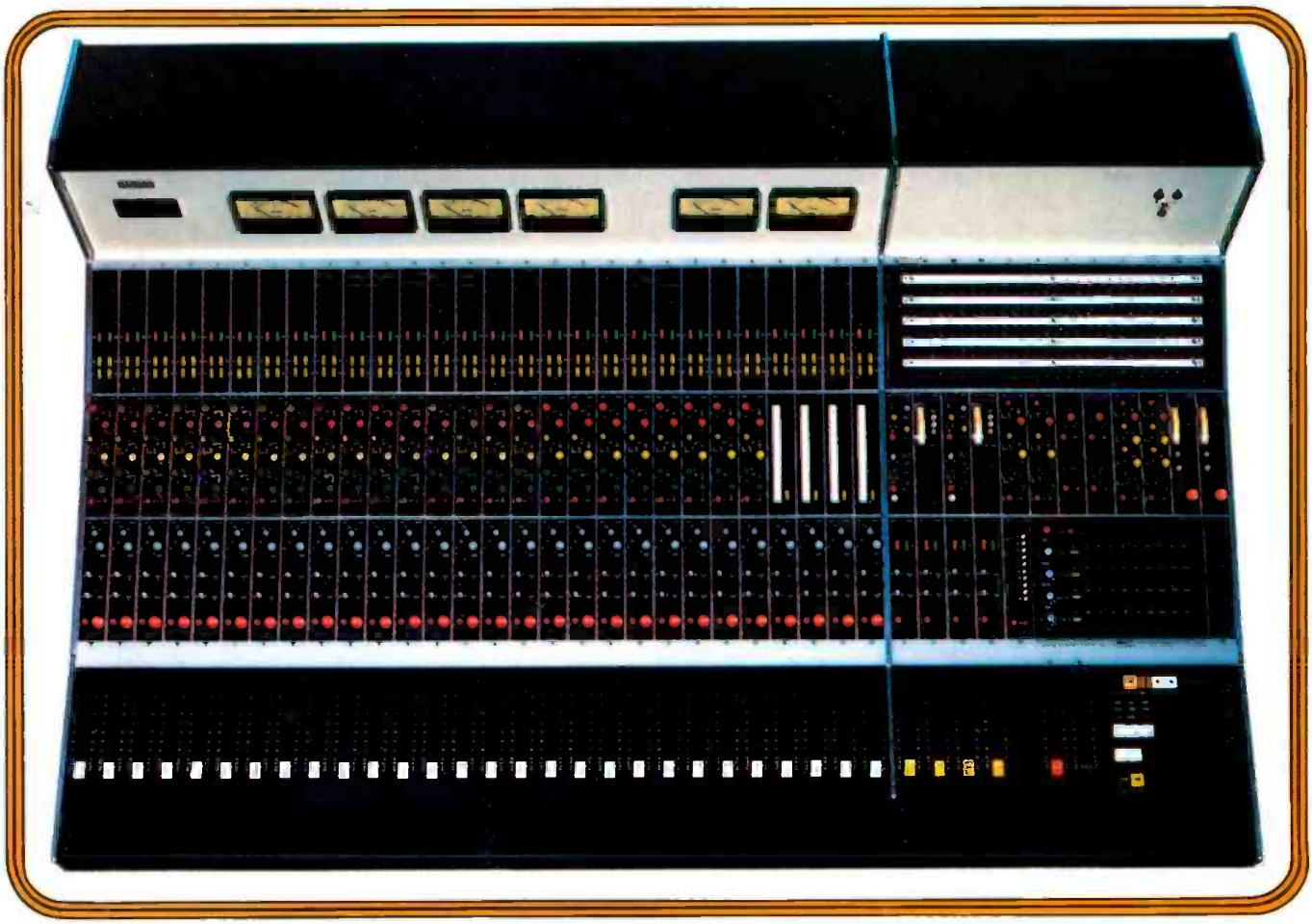

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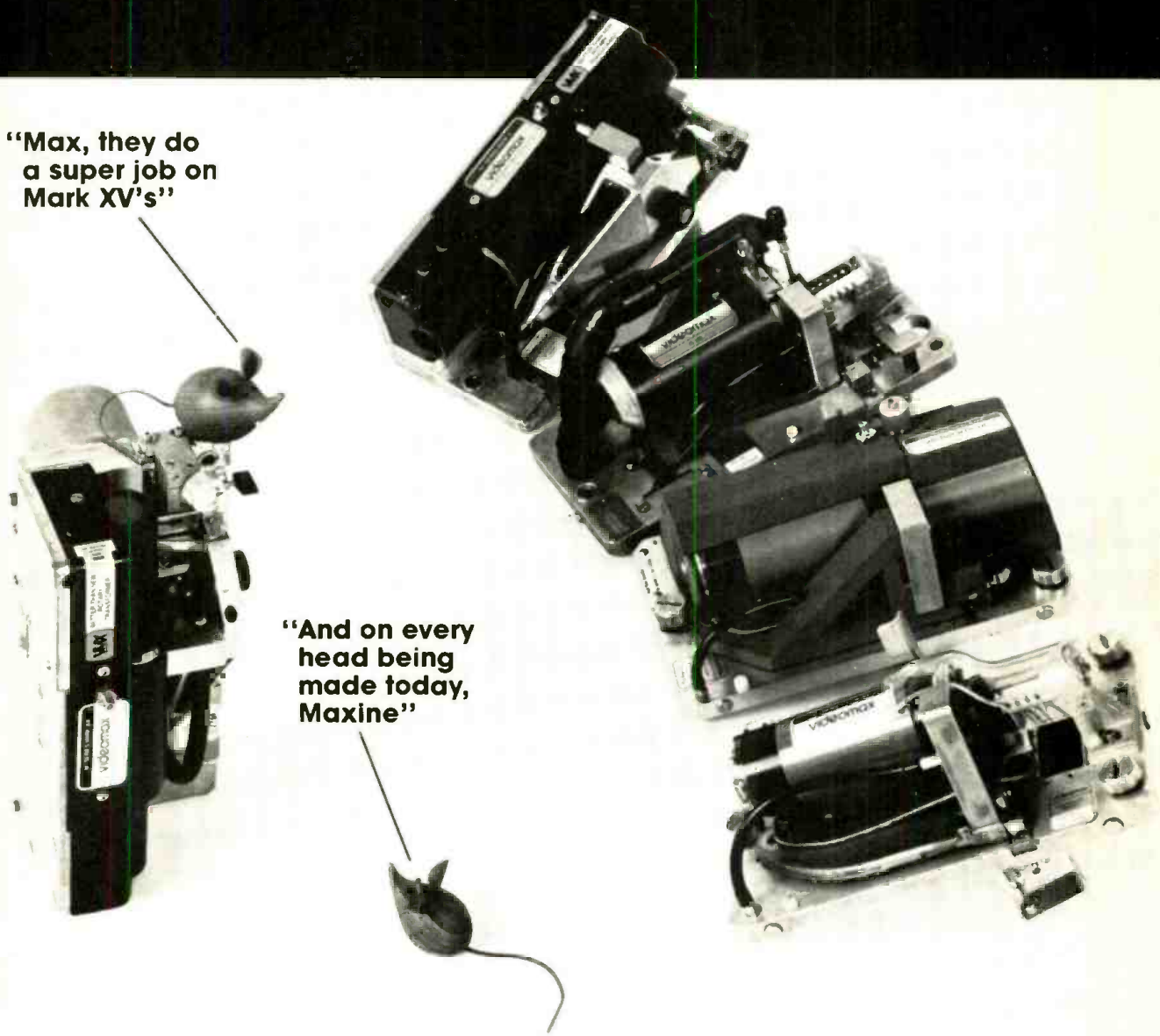

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BROADCAST engineering®

The journal of the broadcast-communications industry

September, 1977 Volume 19, No. 9

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About the cover

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

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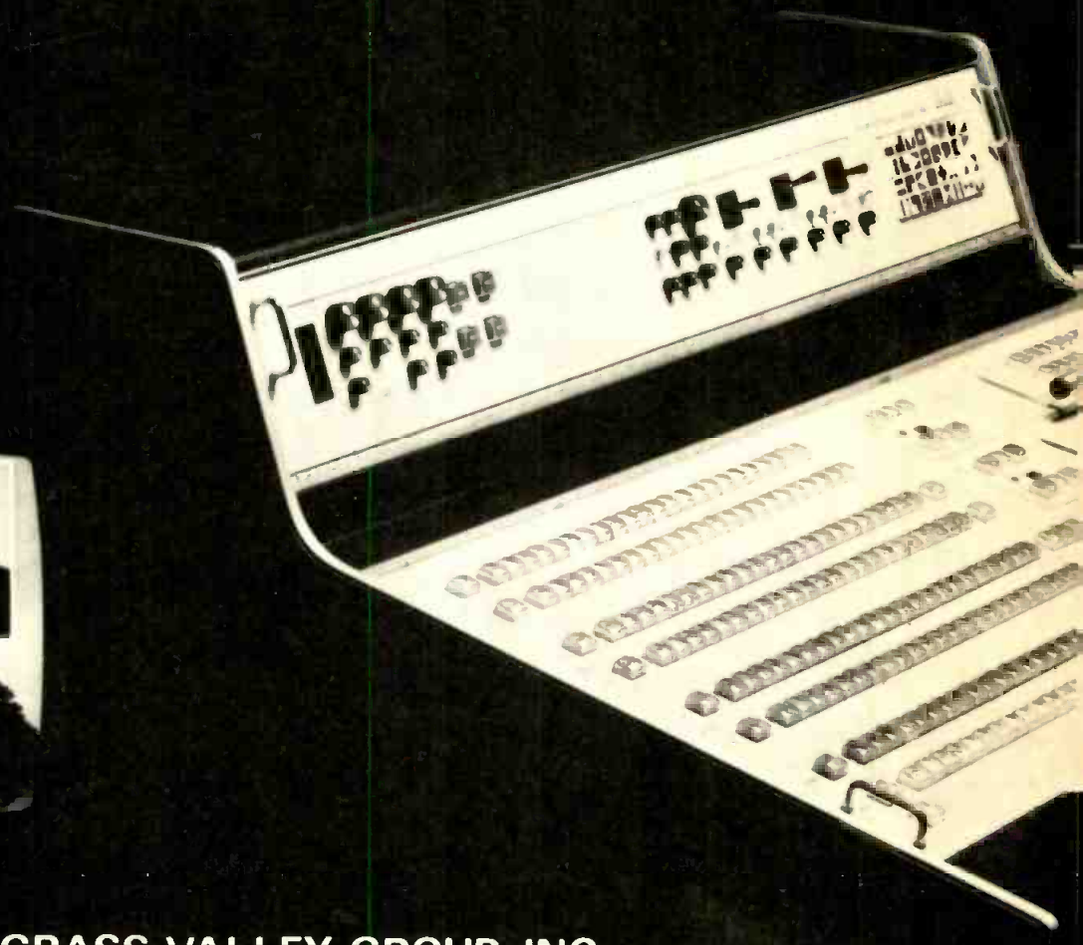

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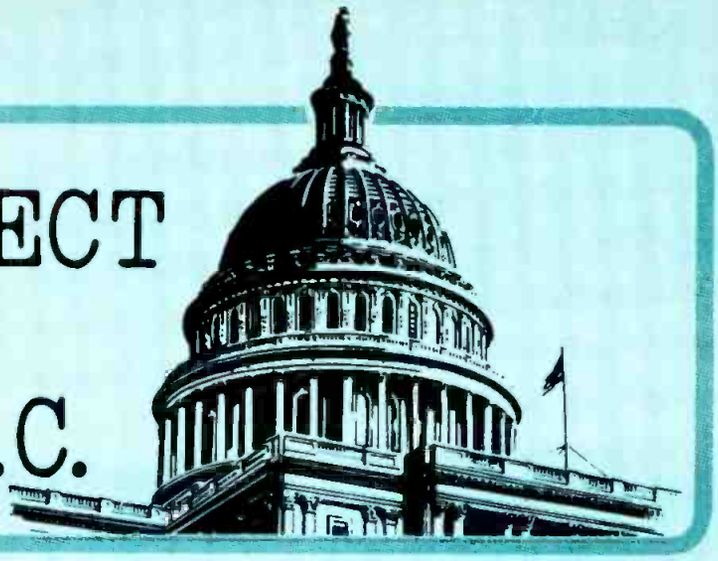

September, 1977/By Howard T. Head & Harold L. Kassens

Changes Proposed in Operator Licensing

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

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

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

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

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

Rules Adopted to Control Interference from Cable System Radiation

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

continued on page 6

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

Problems In Land Mobile Sharing of UHF TV Channels

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

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

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

Short Circuits

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

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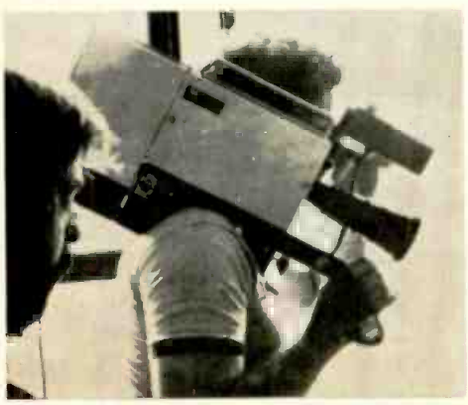

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industry news

FCC announces availability of revised broadcast forms

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

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

The following recently revised forms are now available for use:

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

SMPTE preparing for record crowd

To meet the overwhelming demand for booth space at its upcoming Technical Conference, the SMPTE has increased the exhibit area to accommodate companies in both the motion picture and television industries.

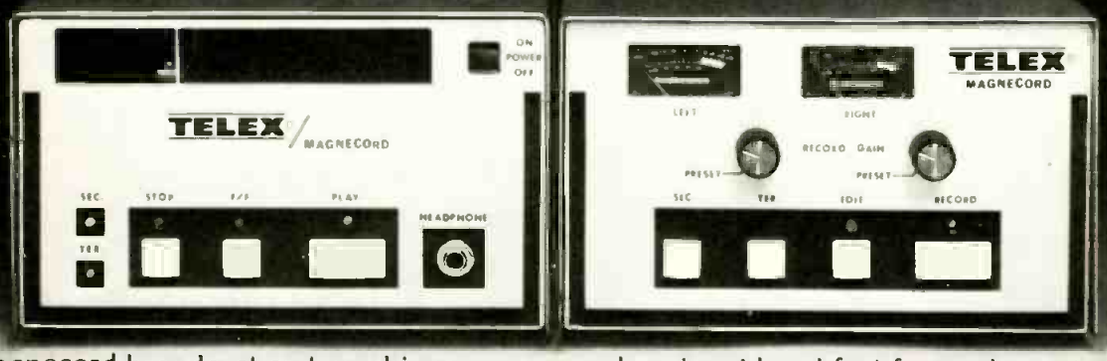
The Conference is set for the Century Plaza Hotel in Los Angeles, October 16-21.

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

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

continued on page 10

At Last, a Cart Machine that Keeps its Cool



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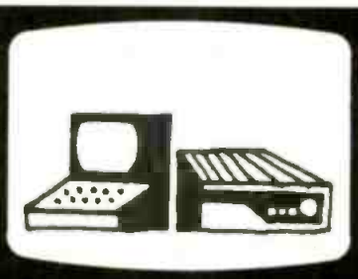
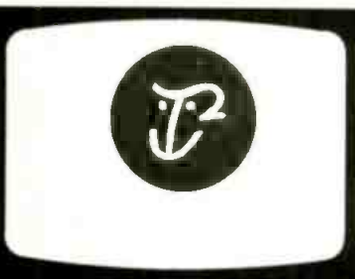


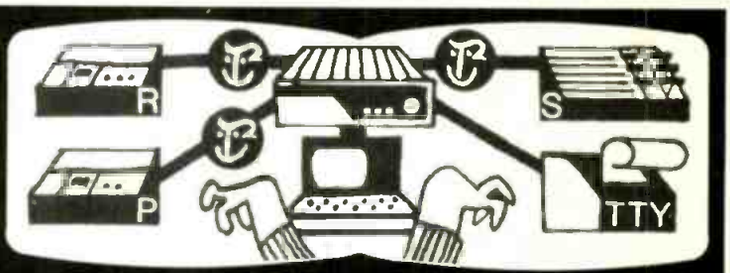
A CMX is a whole system. It's a keyboard, a computer...

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

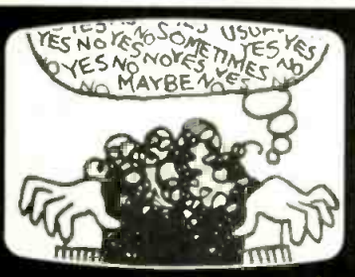


and an Intelligent Interface (I^2)™

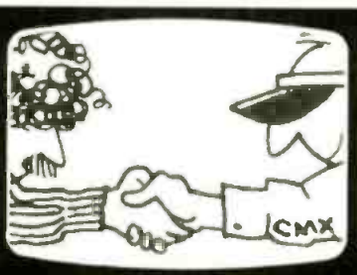
between each and every sound and picture source and the computer, and most importantly, the creative editor.



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



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



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

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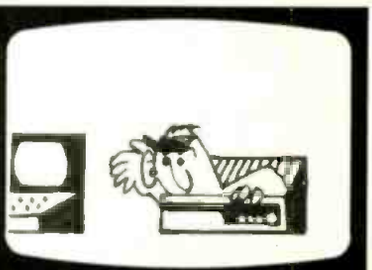
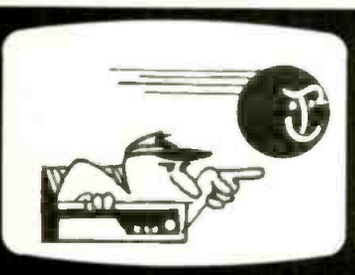
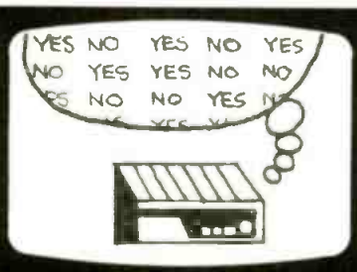


The editor talks to the Supervisor through the keyboard.



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



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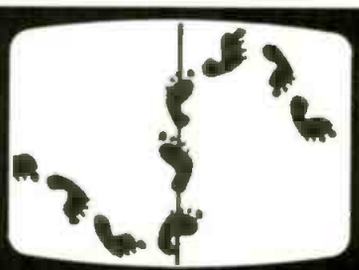

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FCC opens TV inquiry on use of subcarrier frequencies

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

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

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

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

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

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

Technical considerations

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

Some of these considerations include:

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

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

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

continued on page 14

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The BVH-1000. Consider the advantages.

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

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

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

And we've sold a lot of machines.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sony Broadcast

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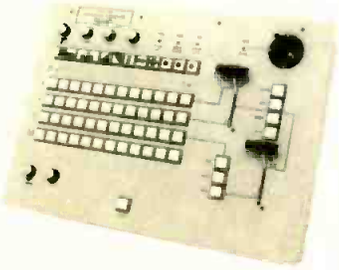
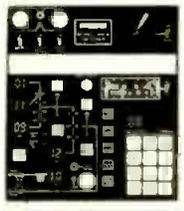


Big board capability at a small board price. A 4-bus, 12-input switcher with 24 wipes, 6 other effects.

Model 7400/A



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

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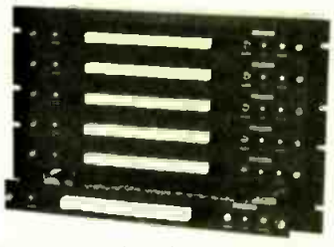

Add modules up to 12 x 12 without additional amplifiers. Available with audio-follow switching, audio amplifiers, sync addition, and clamped outputs.

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industry news

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

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

Foreign language audio

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

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

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

NAB wants NCCB to stay out of FCC fee refund controversy

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

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

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

Krasnow stated that full refund at this point is the most equitable solution because:

- of the amount of time that has passed since 1970 when refunds were first requested;
- of the significant portion of fees paid that would be refundable under even a partial refund formula;

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8½ Good Reasons Why Philips is Setting The Standard in TV Test Equipment

1. PM 5580 Modulator

- Vestigial sideband modulator.
- Used extensively by transmitter manufacturers.
- Synthesized carriers derived from internal 10 MHz oscillator.

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2. PM 5560 Demodulator

- *Synchronous* and *envelope detection.*
- Instantly tunable to *all* VHF and UHF channels.
- Automatic and manual level control.
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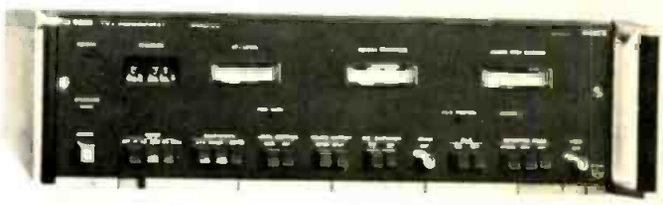

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3. PM 5570 NTSC Test Set

- Generates all signals for aligning and checking TV studios, video paths and transmitters.
- All levels adjustable plus preset positions.
- Integral Sync Generator with Genloc.
- Sweep signal with markers: 100KHz to 10 MHz.
- Remote controllable.

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4. PM 5578 VITS Analyzer

- Automatically measures 21 TV and 3 "house-keeping" signals plus alarm indications.
- 2 sets of VITS lines can be selected.
- Remote monitoring with automatic logging.
- 5 input channels selected manually, remotely, or for automatic sequential scanning.

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5. TV Oscilloscopes

- 0 to 50 MHz, TV triggering, odd/even frame selection.

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6. PM 5529 Monitor Color Analyzer

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7. PM 5576 VITS Generator/Inserter

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industry news

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• the government has had these funds during the intervening period without paying interest;

• cable television operators have already received full fee refunds; and

• of the uncompensated effort and expense to which broadcasters have been put in more than three years since the Supreme Court decision.

First Bahaman TV station will start with color

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

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

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

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

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

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

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

INTELSAT now includes 96 member countries

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

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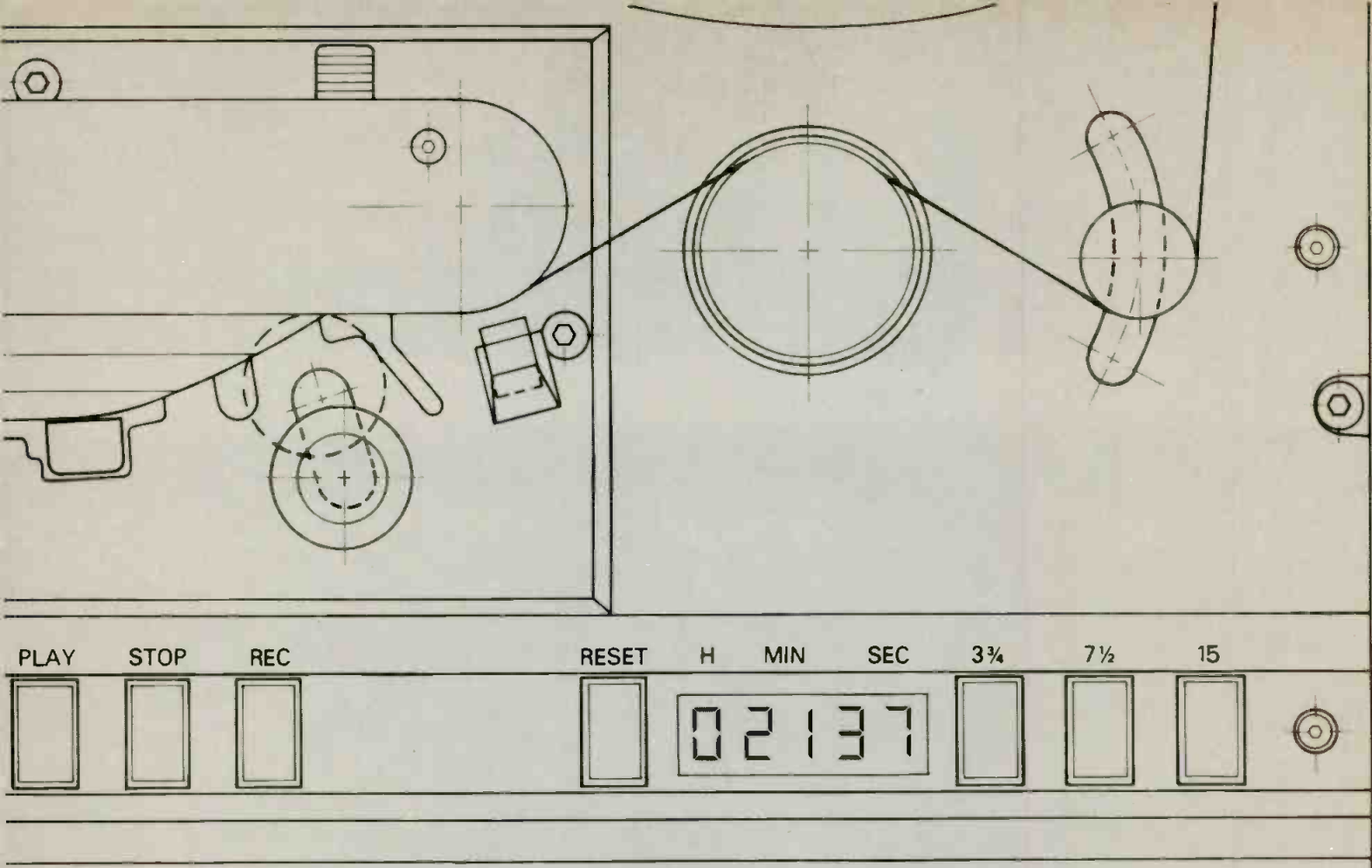

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When you buy the Studer B67 tape recorder/reproducer, you get more than just one of the world's finest tape recorders.

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industry news

continued from page 16

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

CMX Systems and Marconi reach agreement

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

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

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

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

PMPEA seminar will feature Academy-award winners

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

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

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

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

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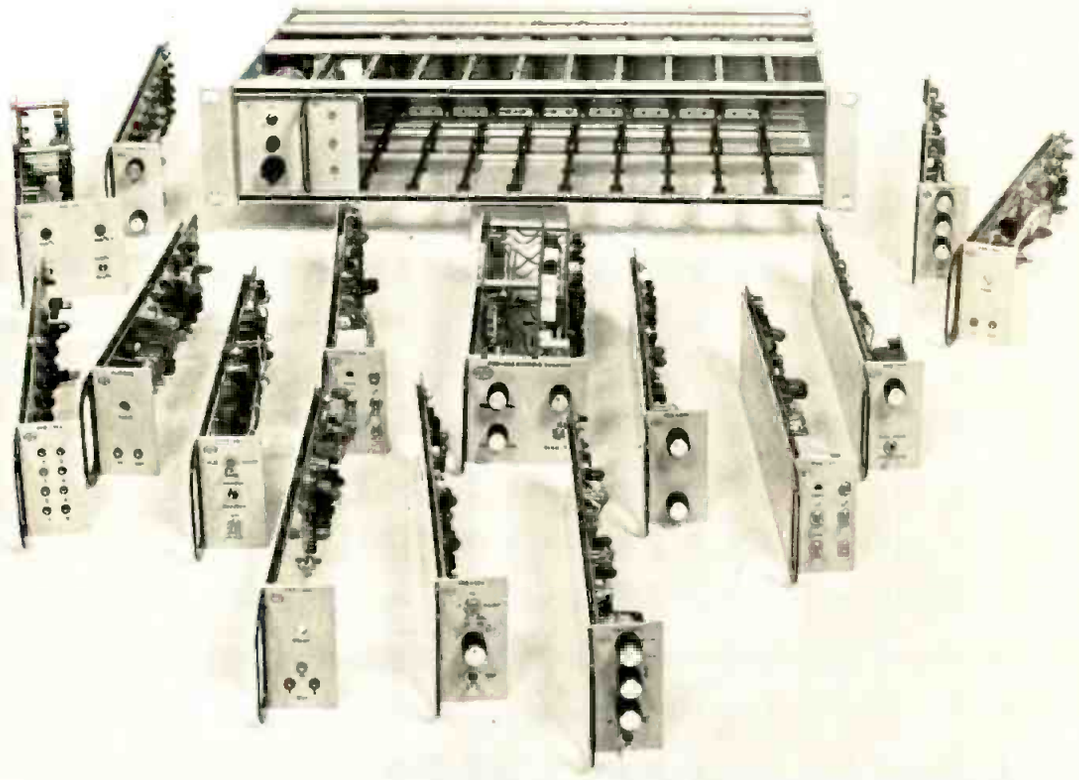
Our PFM-300 Frame is more than just a "holder" of certain pre-selected plug-in units. It does not require "add-on" connector assemblies. It is a unique system concept, engineered to allow YOU to select ANY nine modules, place them in ANY frame position, in almost ANY system configuration, at ANY time,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



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PCO-317 Automatic Sync Generator Changeover
PCB-320 NTSC Color Bar Generator
PBB-321 Black Burst and Color Background Generator
PBD-322 Bar Dot and Visual Reference Generator
PMB-323 Multiburst and 12 MHz Sweep Generator
PSS-324 Stairstep and Ramp Generator
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PPA-346 Pulse Distribution Amplifier
PSA-346 Subcarrier Distribution Amplifier
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PVD-354 Video Delay Amplifier
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industry news

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Telecommunications featured at Southeast Asia Conference

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

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

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

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

Broadcast and cable TV ownership limit affirmed

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

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

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

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

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

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

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

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For those four walls, see a general contractor.

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The small machine for big stations. The big machine for small stations. AVR-2.

Tell us what it has to do. There's an Ampex AVR-2 for every videotape assignment in your station.

If you already have a complete production/editing setup, you probably don't need a lot of accessories for your AVR-2. Order it with basic manual controls, and it's ready to go to work.

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

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

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

AVR-2 is the quad recorder that grows. Every accessory for this machine is available upon initial purchase or at any time in the future when you're ready. Tell us what it has to do, and we'll recommend the model that suits your needs.

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

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

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

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

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

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

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Nobody, but nobody, knows tape like 3M.

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James A. Fellows (right), NAEB president, discusses the 1977 national convention with Mary Lynn Moody, convention director, and Dan Wells, senior vice president for engineering and operations, Public Broadcasting Service. (*Photos by Olga Zabludoff*)

NAEB's 1977 National Convention:

Can the "little NAB" come back?

By Ron Merrell

James A. Fellows, NAEB president, discusses the upcoming convention and NAEB's new efforts to serve non-commercial broadcasting.

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

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

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

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

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

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

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

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

BE: *In what areas are these councils presently involved?*

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

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

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

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

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

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

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

BE: *How can you convince prospective exhibitors and trade press that the numbers and quality of the*

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NAEB

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exhibit area attendees will improve?

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

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

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

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

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

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

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

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

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

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

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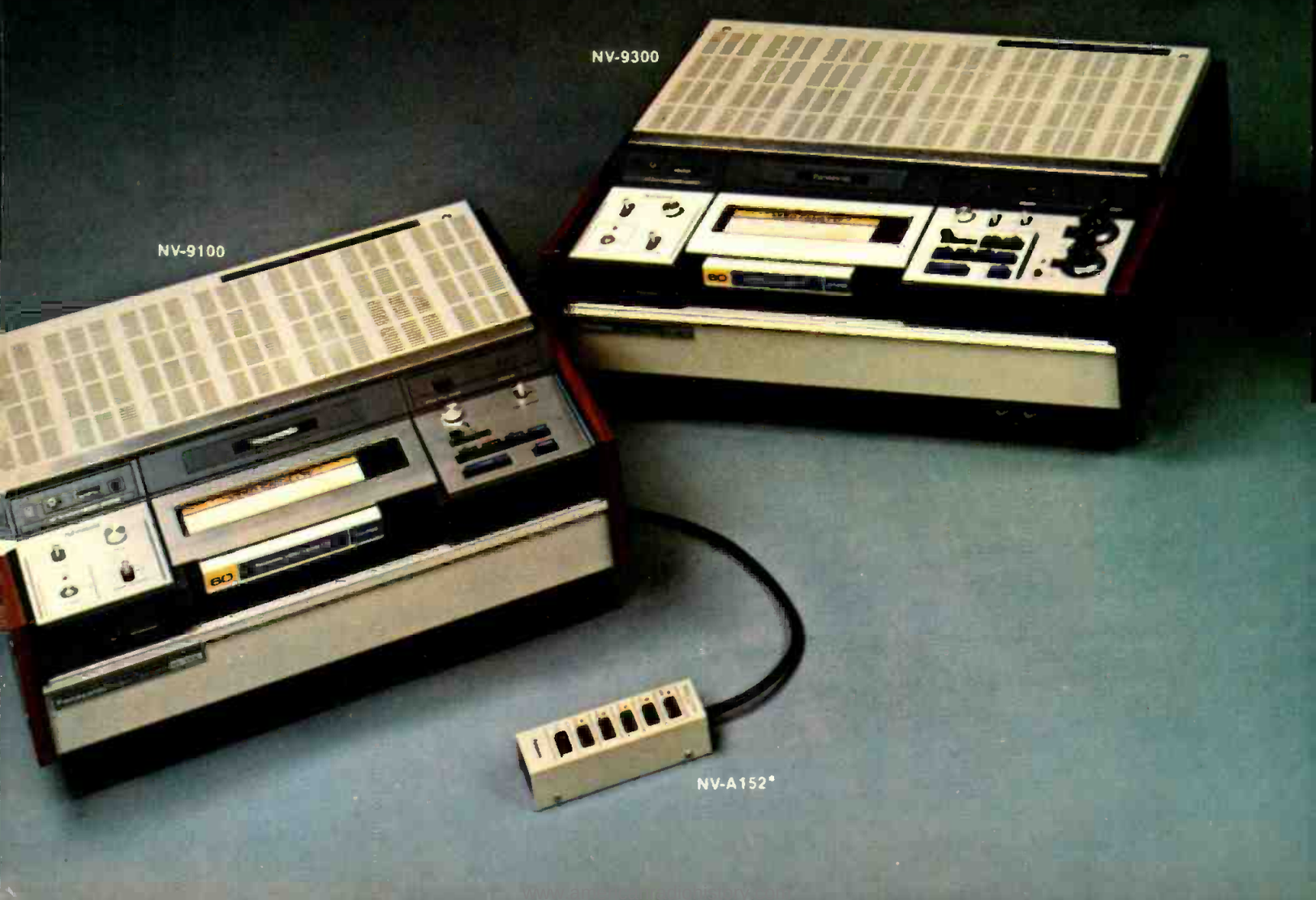

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With the NV-9500 editing recorder, you also get frame-by-frame insert and assembly edits that are crisp and clear. Without tear, roll or loss of chroma information. And with its two independently selectable audio channels, you can also edit audio without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

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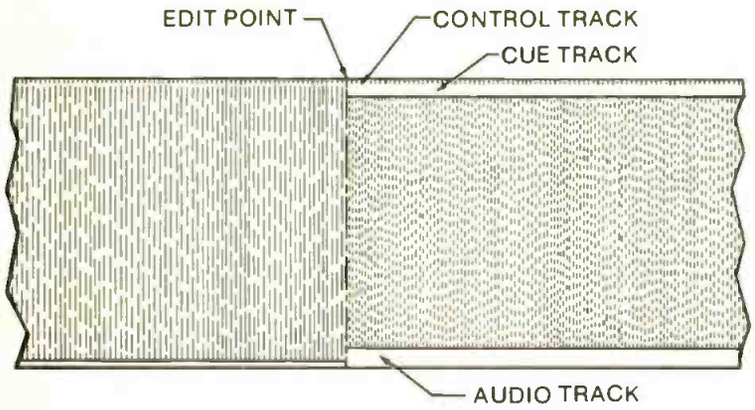

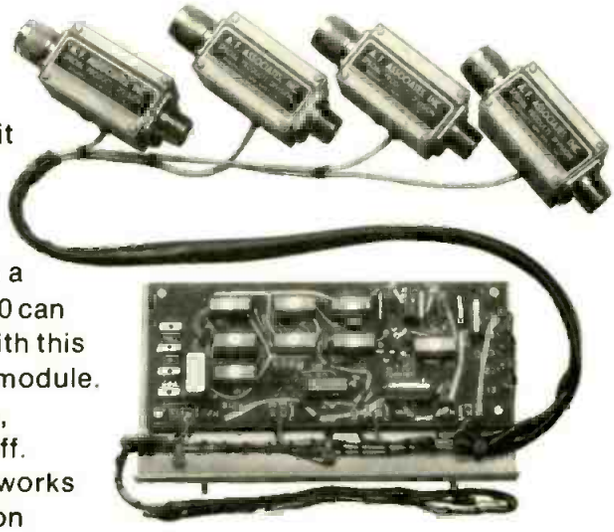

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NAEB

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

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

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

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

In particular. the new policy establishes 8½ hours during the convention when no scheduled program will conflict with the exhibits, as previously mentioned. We are also setting up a food service within the exhibit area; a Monday afternoon reception will be held within the exhibit area; and follow-up sessions from the technical sessions will be held in the exhibit section.

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

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

Radio: Fifteen sessions covering community ascertainment. pro-

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ducers exchange, handling of volunteers, fund raising, non-CPB affiliated stations, station operations, music programming, information exchange on new equipment, copyright, career potential, top-level administrative support for radio, and business meetings.

Instruction: Sessions covering instructional radio production techniques, instructional radio research, the Newark school radio project, CPB and PBS education activities, regional instructional television campaigns, instructional television programming update, the Essential Skills Learning project, technological advances in instructional television delivery systems, television in higher education, instructional radio/television in school emergencies, faculty involvement in school television course utilization, improving reading skills by television, and student involvement in television production.

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

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

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

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

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

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

Looking past the convention:

Will the NAEB survive?

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

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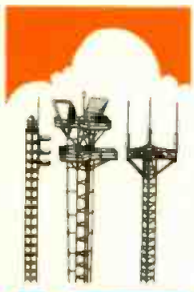

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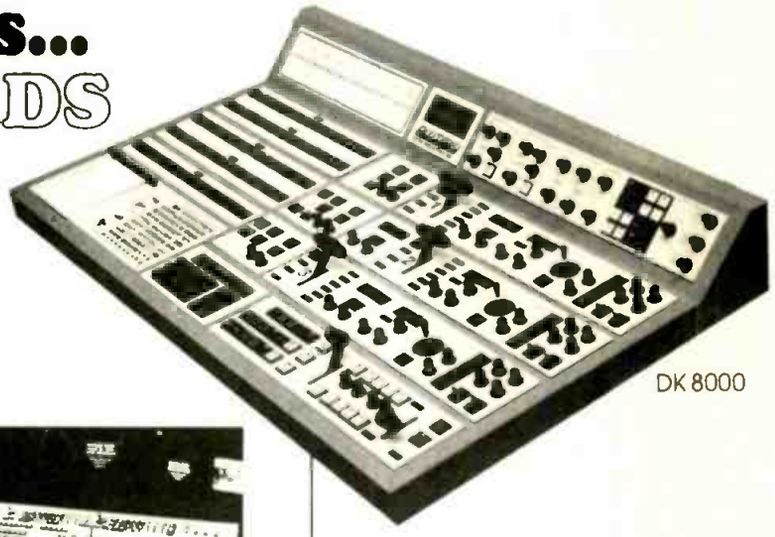

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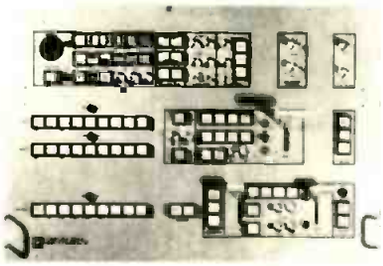

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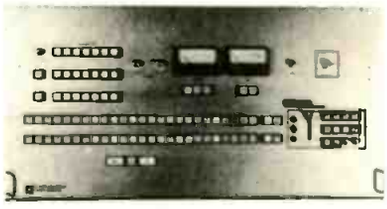

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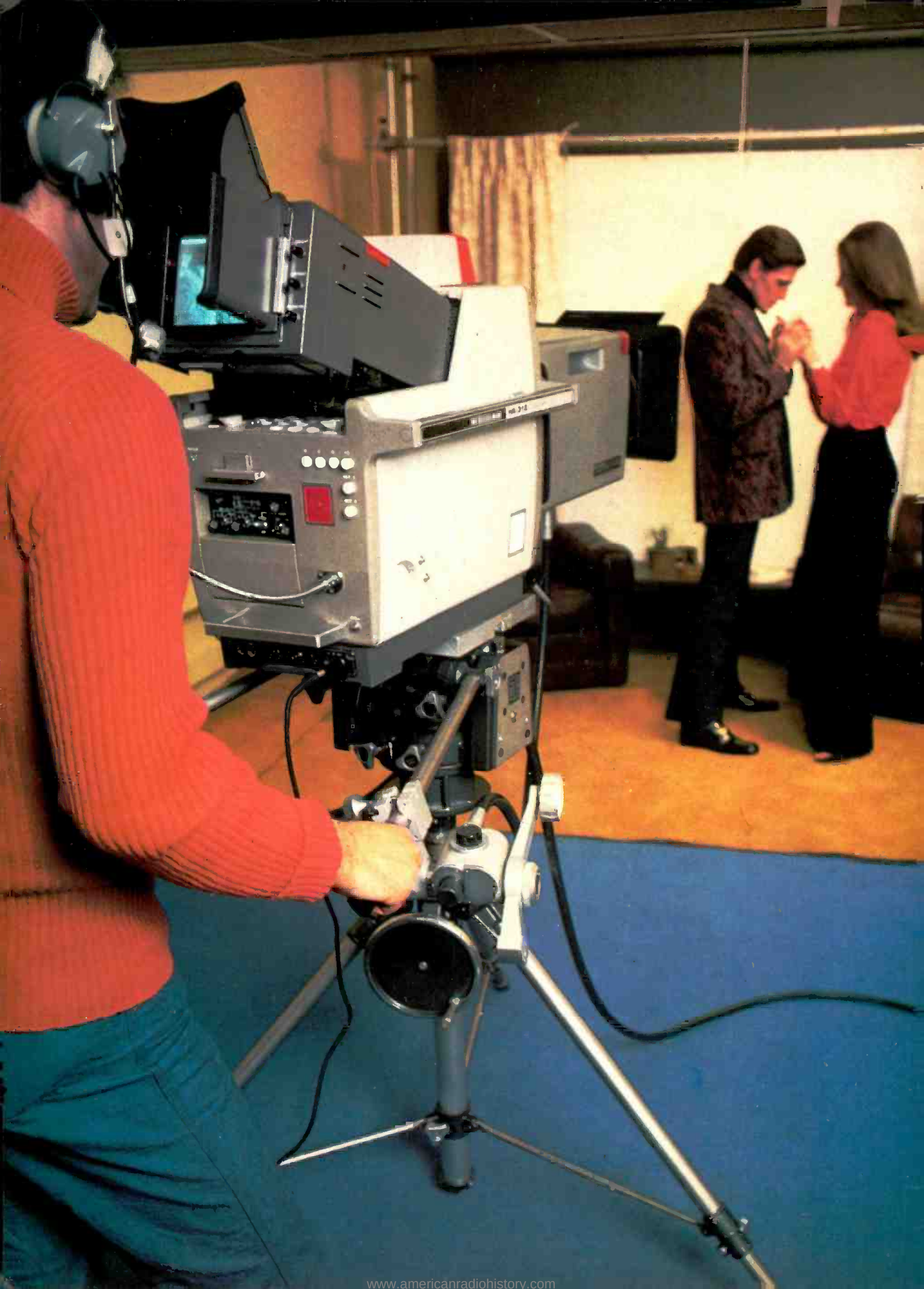

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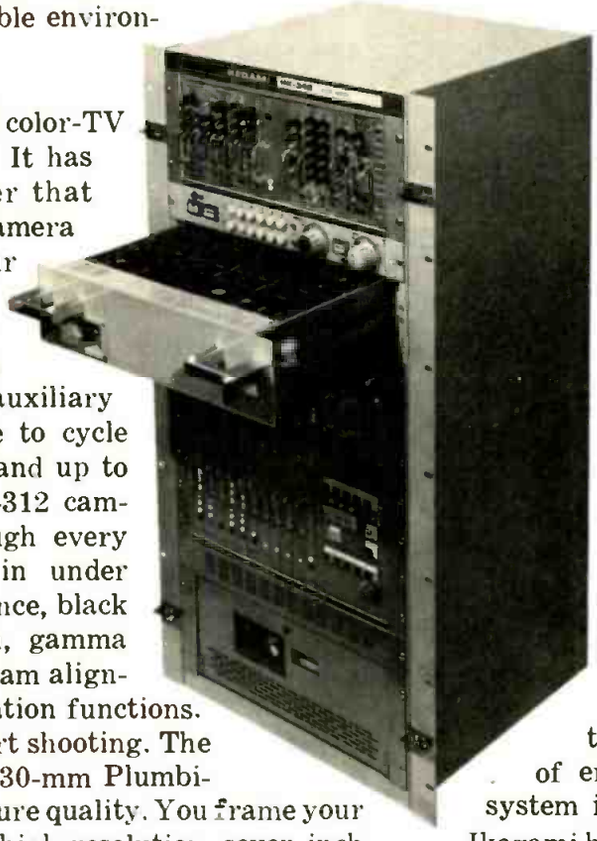

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All this before you start shooting. The HK-312 gives you three 30-mm Plumbicon tubes for highest picture quality. You frame your shot on a high-intensity, high-resolution, seven-inch tiltable viewfinder. Signal-to-noise ratio is better than 54 dB.

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NAEB

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

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

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

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

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

Out of the same mold?

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

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

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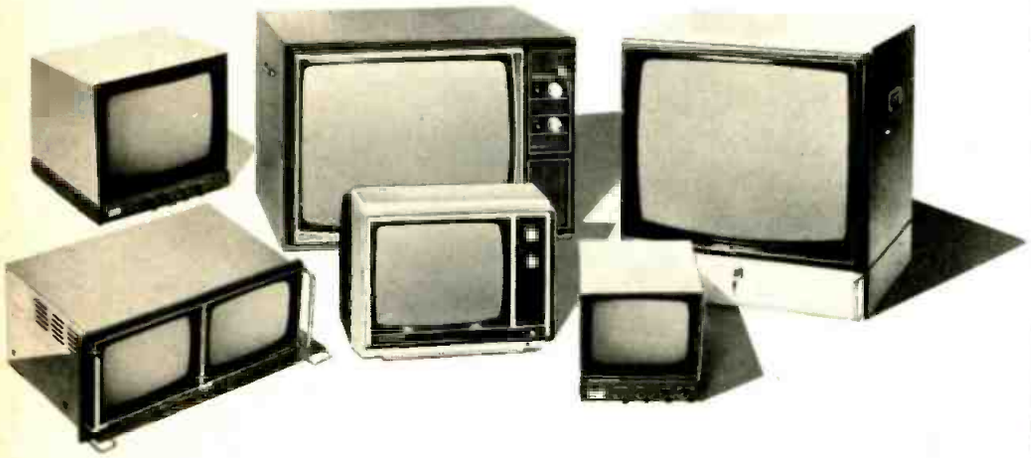

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NAEB

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

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

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

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

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

So what happens next?

It's up to the NAEB now. Their hopes and aspirations might not be fulfilled in Washington this November, but there is every indication that the NAEB is finally headed in the right direction. We'll take a flyer on the 1977 convention, based mostly on interest and need. If the promises are not fulfilled, there will be little hope for future years, and other associations will be forced to pick up the load. □

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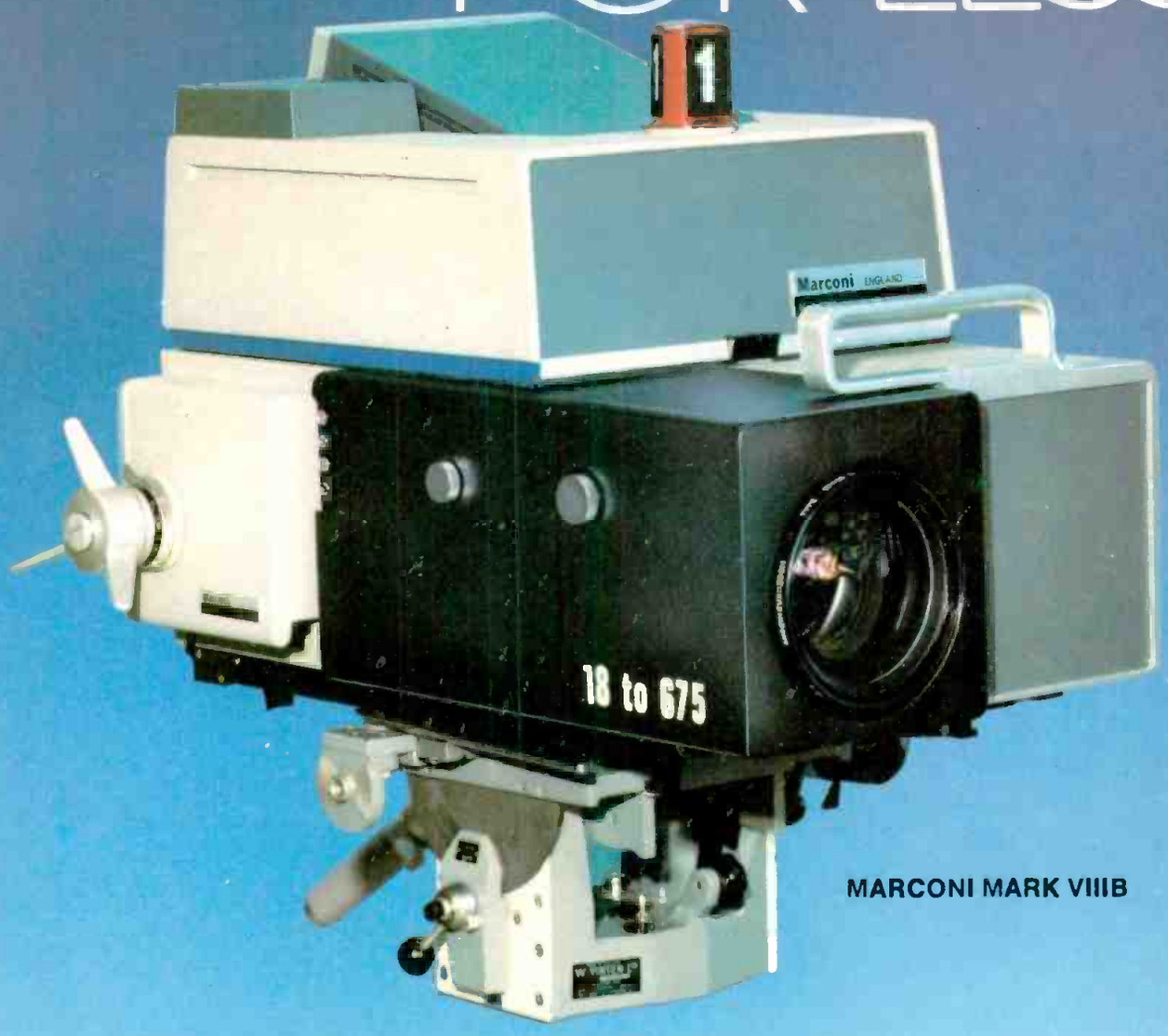

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ENG:
It pays to be committed

By Phil Dean

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

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

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

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

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

***KSTP's ENG** action-cam team is shown here before a pro soccer game at Metropolitan Stadium.*

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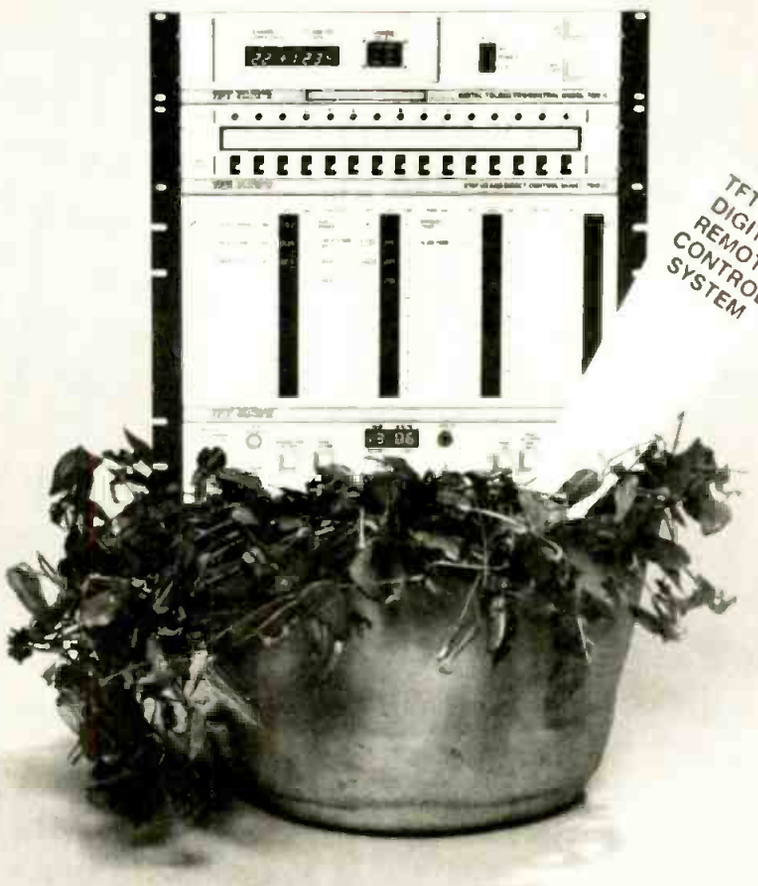

No matter what size your station, or how fast you're growing, TFT has a digital remote control system that can fit your budget and grow right along with you.

It's called the TFT 7600 System.

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

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

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

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

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

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

ENG

continued from page 42

include all ENG news programming, (using both live ENG originations and ENG taped news stories), a ballet produced with ENG equipment, and several special local documentaries.

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

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

continued on page 46

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This is one of KSTP's four editing rooms located along the perimeter of the newsroom.

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

ENG

continued from page 44

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

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

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continued on page 54

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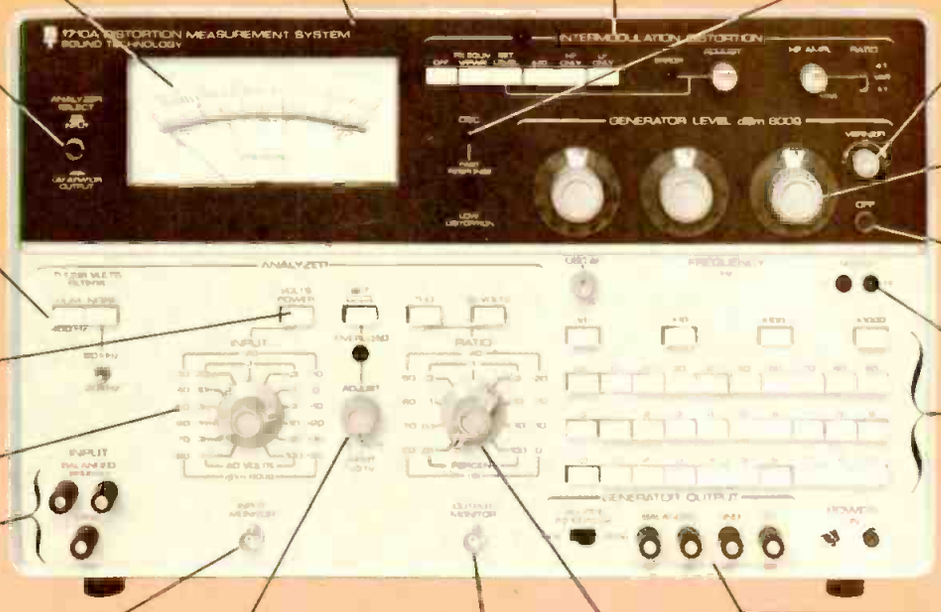

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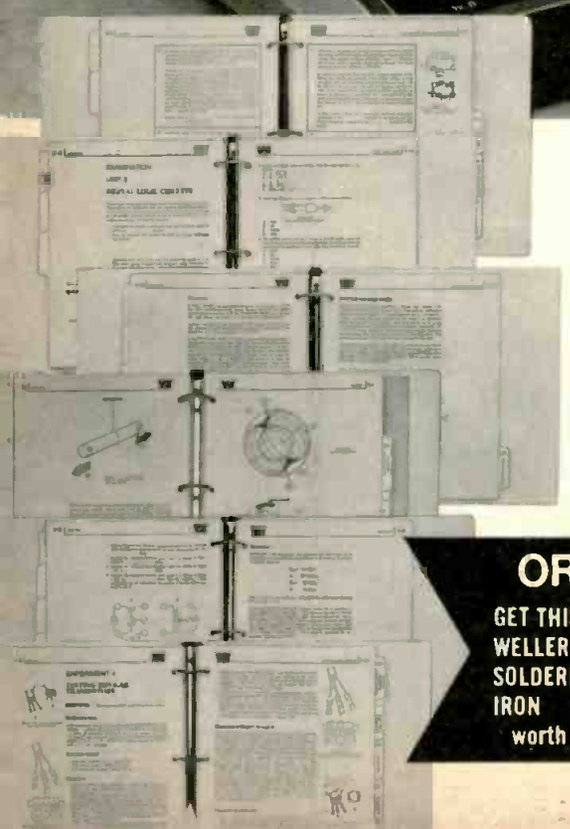

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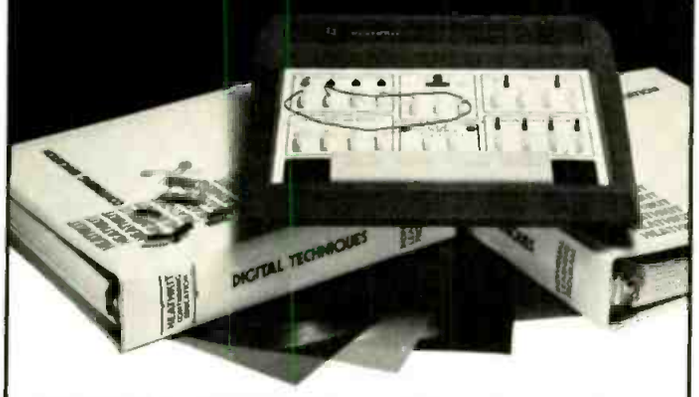

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We took the same high energy oxide videotape you've used for years and fused it to an incredibly strong backing. The result is a videotape that won't twist, tear or jam in the field. An unyielding videotape that won't stretch under the strain of tape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

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

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3M COMPANY

"Scotch" MBU Videocassettes.

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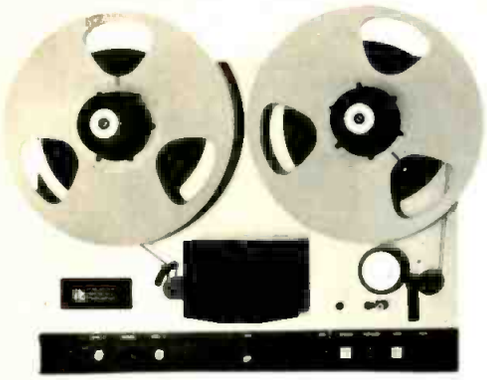

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- Fully serviceable *in* the equipment rack.
- Straight-line tape threading.
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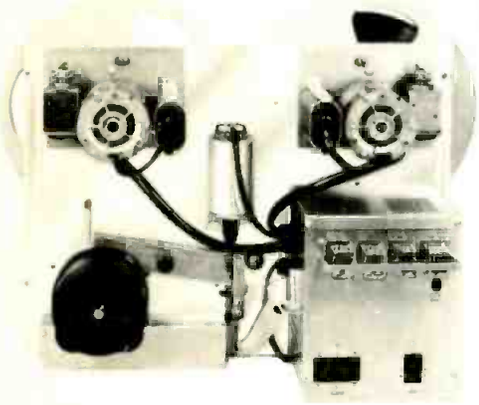

For more information contact your automation company or call ITC collect at 309-828-1381.

INTERNATIONAL TAPETRONICS CORPORATION

2425 S. Main; Bloomington, Illinois

Marketed exclusively in Canada by McCurdy Radio Industries, Ltd., Toronto

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ENG

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one of four editing rooms, located along the side of the city room, for processing and story selection. The editing rooms are equipped with two 2850 Sonys for instant editing via a triple-reel system that is much faster than normal editing systems. Each of the areas has an announce booth with audio that is tied to the overall communications system. The booth is also used for adding on audio portions to the tape.

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

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

Mercedes Mobile Units?

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

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

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

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

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

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

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

Editor's Note:

Effective use of ENG implies a commitment. If stations look upon ENG equipment as effective only for coverage of hot, late-breaking news stories, the image of local news will suffer. Most stations are still running their news right off the news set. This approach boxes-in the news, cutting off the extra dimension film and ENG offer. And it doesn't change the image to get out occasionally. That only tells the viewer that you can do it. Then he wonders why you don't do it more often. Doing it more often makes you different, creating an image of real interest in the local news.

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

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Microtime, the leader in video signal processing, offers a complete family of video correction systems. Time Base Correction, Image Correction, and Automated VTR Programming, All with Microtime's proven reliability.

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PROFANITY is no problem for WTIC

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

WTIC's talk show studio incorporates a custom telephone system for handling incoming calls. The Marc Howard Show, shown in progress, uses a profanity fill setup in the control room.

The WTIC talk show setup includes a delay system in the control room. The system delays all program material for eight seconds, and allows either control room personnel or talent to edit air material.

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

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

From our observations, several criteria arose:

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

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

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

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

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

Telephone system

The concept of our telephone system is based on one developed at WCAU-Philadelphia by Chief Engi-

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Noise	—65 DB or less
Response	±0.5 DB 30-15000 Hz.
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Dual Channel Stereo	$4,160.00
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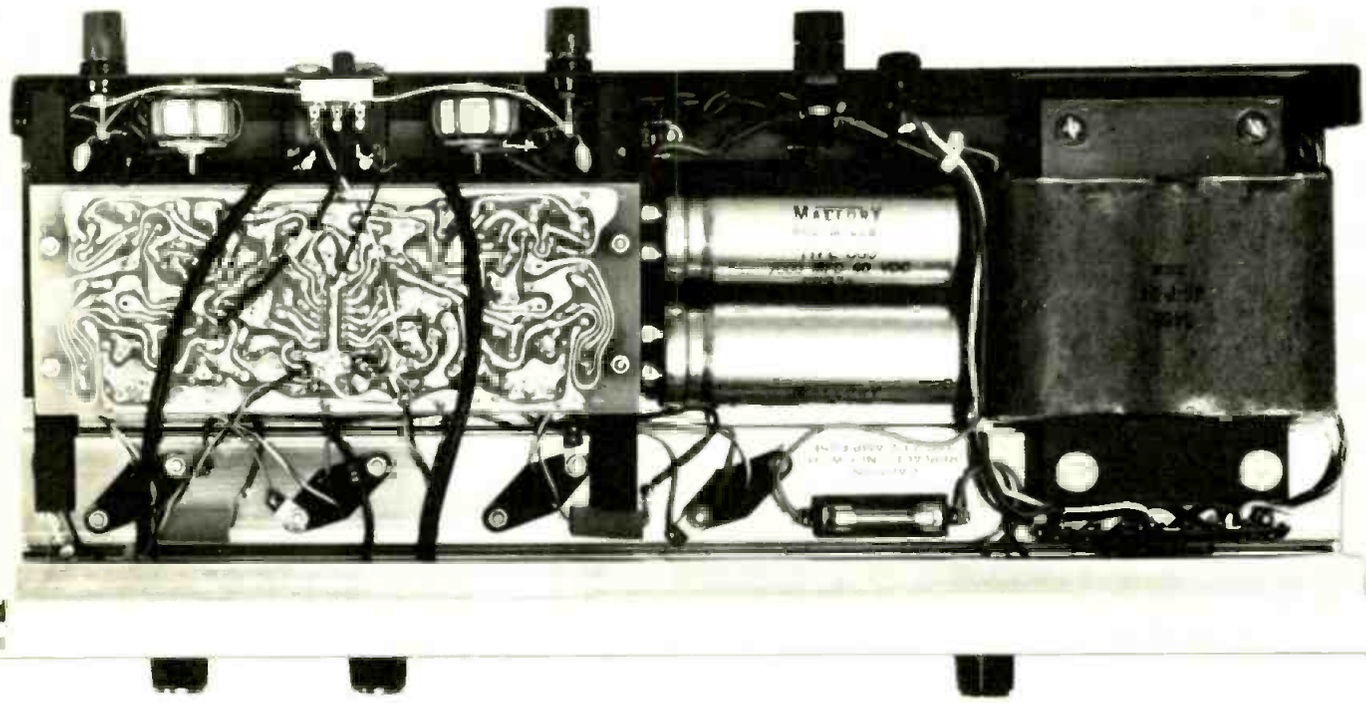

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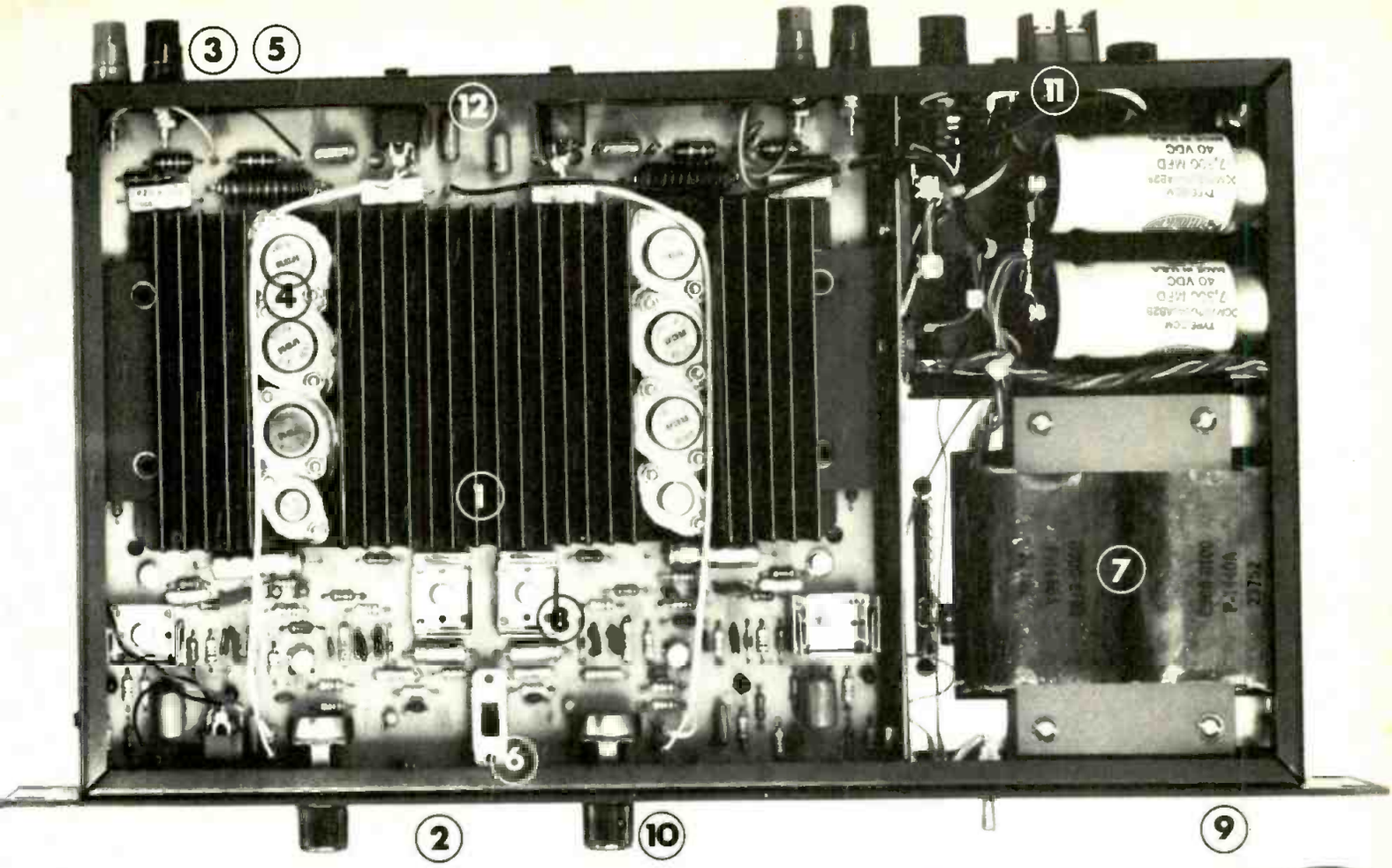

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1. A massive heat sink assembly—330 square inches,—modular.
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7. Fully shielded power supply for noise improvement: Hum and noise level—better than 106dB below rated output into 8 ohms.
8. Teflon insulated harness wiring, modular epoxy glass circuit board for ease of servicing, hermetically sealed metal can transistors in all signal handling circuitry, and 5% tolerance precision resistors.
9. 16 gauge welded steel packaging.
10. Individual channel gain controls.
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12. Professional Cannon-type input connectors and provisions for plug-in input matching transformers available (order option Model 100-01).

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

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

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

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

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

Delay system

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

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

Profanity fill system

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

continued on page 62

Micro-Perfect Film Cleaner/Conditioner
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- Smaller in size
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NEW!

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

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WORLD'S SAFEST SYSTEM

The Lipsner-Smith System In Use By: ABC, WABC—TV, KGO-TV, MCA-TV, NBC, WDXR-TV, WFLA-TV, WOR-TV, WPIX-TV, WXYZ-TV, WTOP-TV, KTTV-TV, WMAR-TV, United Artists TV.

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

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TV 120

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

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

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

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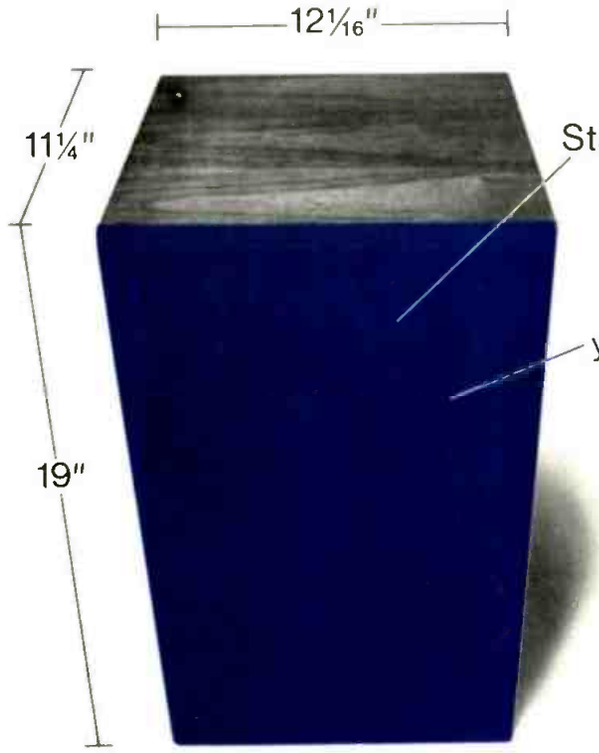
Now there's a JBL monitor specially designed for broadcast studios.



Fits on EIA Standard Rack shelf.

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

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

If you're the station engineer or the jock on duty, why should you be the last to know what sound you're putting out?

Listen to the JBL 4301. It's a compact that delivers wide band sound reproduction accuracy—the kind of accuracy your station is going to need to keep up with the new broadcast standards.

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

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

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I like what I hear so far. Tell me more.

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Cart machines

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

The first function of the "fill cart machine" for each hour is promo fill. This consists of a prerecorded announcement telling listeners to stay tuned for a certain show. This cartridge is encoded with two additional cues. A tertiary cue is used to achieve a cue light and sound a "Sonolert." This lasts about ½ second, signaling the engineer to start the show. There is no guesswork as to how much to "lead" the promo fill, as the promo fill tells you when to go. The tertiary cue is always eight seconds before the end of the audio. The secondary cue is always placed at the end of the fill promo audio. This tone is used to switch the studio output line from the fill machine to the output of the delay machine.

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

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

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

Again, the tertiary and secondary tones come into play. The tertiary cue tone sounds eight seconds before the end of the profanity fill, allowing the announcer time to get rid of the call and compose himself. The secondary cue tone is again used to switch the audio relays from the fill machine back to the delay machine. By using the cue tones, we can use any length of profanity fill.

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

Simplified controls

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

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

1. The studio output lines are put into the delay mode.

2. The delay machine record is "set."

3. The delay machine starts recording.

4. The fill cartridge is started with the audio output going to the studio output lines.

5. The tertiary tone on the fill cart tells when to start the program.

6. The secondary cue tone transfers the audio from the fill cart to the output of the delay machine. Now you are in delay with no loss of air time and a smooth program.

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

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ESE DIGITALS

DIGITAL CLOCK ES 112/124 ($139)

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

Dimensions: 2½" High x 8" Wide x 5-5/8" Deep
Case: Etched Aluminum
Electrical: 117V AC 50/60 Hz 10W max.
Options: B C D J K L P Q R S W

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

DIGITAL CLOCK THERMOMETER ES 142/144 ($241)

ES 142 (12 hr.) and ES 144 (24 hr.) are MOS, solid state digital clock/thermometers. Displays 6 digits of time (hours, minutes, seconds) and 3 digits of temperature (-50°F to +150°F or -45°C to +66°C) in planar, gas discharge displays .55" high. Temperature sensor on 25 ft. cable included; attaches to rear-mounted connector.

ES 240 Digital thermometer is available as separate unit, calibrated for °F or °C.

Dimensions: 2½" High x 10" Wide x 6" Deep
Electrical: 12W max. 117V AC 60 Hz
Options: B C D J K P R S W

SIX DIGIT CLOCK TIMER ES 500 ($160)

ES 500 is a 12 hour clock or timer with 5 front-mounted controls: Start, Stop, Reset, Fast Advance, Slow Advance. Will run continuously to 12:59:59. Advances to 1:00:00 and continues as clock unless stopped or advanced. After use as a timer, time of day must be re-established. Can drive Jumbo Slaves.

Dimensions: 2½" High x 8" Wide x 5-5/8" Deep
Case: Etched Aluminum
Electrical: 117V AC 60 Hz 12W max
Options: B C D J K P Q R S W

CONSOLE MOUNT CLOCKS AND TIMERS, 70 SERIES

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

ES 172 Six Digit, 12 Hour Clock ($134.00): Three setting controls—Fast Advance, Slow Advance, and Hold. Four line multiplexed BCD's present on the rear connector. Options are C, D, J, M and V.

ES 174 Six Digit, 24 Hour Clock ($134.00): Otherwise identical to the ES 172.

ES 370 Four-Digit, One Hundred Minute Up/Down Timer ($171.00): Six controls—Count Up, Count Down, Stop, Minutes Advance, Seconds Advance, Reset. Options are B, C, D, J, M and V.

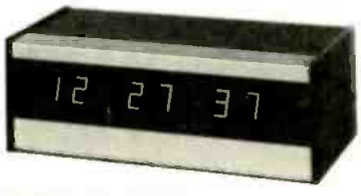
ES 371 Up/Down Timer ($267.00): Similar to the ES 370 except with Leverwheel Preset capability for faster setting of the desired time. Option D is an integral, separately mounted part of this unit. Options are C, J, and V.

ES 570 Four Digit, Sixty or 100 Minute Timer ($134.00): Select 60 or 100 minute mode on rear connector. Start, Stop and Reset controls. Runs continuously unless stopped. Reset will return all displays to zero. Unit will run if reset while running or will stay at zero if reset when stopped. Options are B, C, D, J, M and V.

ES 572 Six Digit, 12 Hour Clock or Timer ($160.00): Five controls—Start, Stop, Reset, Fast Advance, Slow Advance. Will run continuously to 12 59 59. Advances to 1:00:00 and continues as clock unless stopped or advanced. After use as a timer, time of day must be re-established using Fast Advance, Slow Advance and Stop Controls. Options are C, D, J, M and V.

ES 574 ($160.00): A 24 hour version of ES 572.

Dimensions: 2.16" High x 4.5" Wide x 4.13" Deep
Electrical: 117V AC, 60 Hz



JUMBO CLOCKS AND TIMERS, 80 SERIES

Displays are 1" planar gas discharge.

ES 182 Six Digit, 12 Hour Clock ($230.00): Three rear-mounted setting controls—Fast Advance, Slow Advance and Hold. Options are B, C, D, J, P, Q, R, S, and W. When option Q, panel mount, is specified digits will be separated by colons.

ES 184 Six Digit, 24 Hour Clock ($230.00): Otherwise identical to the ES 182.

ES 380 Four Digit, 100 Minute Up/Down Timer ($267.00): Displays minutes and seconds, with rear-mounted connector to allow remote wiring of six momentary SPST controls—Count Up, Count Down, Stop, Minutes Advance, Seconds Advance and Reset. Other features similar to ES 300. Options are B, C, D, J, N, P, Q, S, T, W, Y, and Z.

ES 381 Up/Down Timer ($353.00): Similar to ES 380, except that leverwheel preset is used instead of pushbutton preset. Option D is supplied as part of this unit. Options are B, C, J, N, P, Q, S, T, W, Y, and Z.

ES 580 Four Digit, 60 Minute Timer ($193.00): Displays minutes and seconds. Rear connector allows remote wiring of three momentary SPST controls—Start, Stop and Reset. Runs continuously unless stopped. Reset returns all displays to zero, and timer will continue to run from zero if reset while running. Options are B, C, D, J, P, Q, S, T, and W.

ES 582 Six Digit, 12 Hour Clock or Timer ($267.00): Five control inputs (SPST momentary) brought to rear connector—Start, Stop, Reset, Fast Advance and Slow Advance. After use as a timer, time of day must be re-established using Fast Advance, Slow Advance and Stop controls. Options are B, C, D, J, P, Q, S, and W.

80 Series slaves are also compatible with other ESE clocks and timers: ES 112/124, 300, 301, 302, 400, 510, and 500.

Dimensions: 4.45" High x 10.38" Wide x 6.58" Deep
Electrical: 117V AC, 60 Hz

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

Combination four digit 12 or 24 hour clock and 60 minute timer with memory, allowing the user to set the clock to the correct time of day, switch to timer mode, then switch back to time of day by pushing one button; time of day will be correctly displayed, in hours and minutes.

Electrical: 117V AC, 60 Hz, 8 watts Max.
Mechanical: 8" Wide x 2-3/4" High x 5-5/8" Deep.
Case: Etched Aluminum.
Display: Four digits of .55" Planar Gas Discharge Display.
Options: B, C, D, J, P, Q, R & W.

THREE DIGIT 10 MINUTE TIMER ES 400 ($105)

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

Dimensions: 2½" High x 6" Wide x 5-5/8" Deep
Case: Etched Aluminum
Electrical: 117V AC 60 Hz 8W max.
Options: B D J K P Q R S T W

FOUR DIGIT 60 MINUTE TIMER ES 510 ($134)

ES 510 is a four digit, sixty minute timer (59:59) with Start, Stop and Reset controls (Single pole, momentary, push-button). Runs continuously unless stopped. Reset returns display to all zeros. Can reset while running or stopped. Can drive Jumbo Slaves.

Dimensions: 2½" High x 6" Wide x 5-5/8" Deep
Case: Etched Aluminum
Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P Q R S T W

ES 300 ($180)

ES 301 ($198)

ES 302 ($254)

100 MINUTE UP/DOWN TIMERS

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

Dimensions: 2½" High x 8" Wide x 5-5/8" Deep
Electrical: 117V AC 60 Hz 10W max.
Options: B D J K P Q R S W Y Z

The ES-302 is similar to the ES 300, except that planar gas discharge displays are used in the ES 301-302. Display height is .55".
All the ES 300 features are included in the ES 301. Additionally, with the ES 302, the user can preset times much faster than with the ES 300 or ES 301, because lever-wheel type switches are used for the preset feature. The ES 301-302 can drive Jumbo Slaves.

Dimensions: ES 301: 2½" High x 8" Wide x 6" Deep
ES 302: 2½" High x 10" Wide x 6" Deep
Electrical: 117V AC 60 Hz, 7 W max
Options: 301—B D J K N P Q R S T W Y Z
302—B D J K N P R S T W Y Z

For More Details Circle (62) on Reply Card

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Because we're a full-service Ikegami Dealer.

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

CAMERA MART CUSTOM IKEGAMI PACKAGE

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

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

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

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

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

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

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NAB

SUSTAINING SMPTE MEMBER

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Cart machines

continued from page 62

Sooner or later we'll probably go to all cartridge music on WTIC-FM. We feel that carting the music will give better and tighter control and will eliminate record wear out.

FM is a cluster medium, working in time blocks like an automation system. Commercials, promos, I.D.'s, weather, and so forth, are run in clusters with long, uninterrupted music segments between. Right now we have a six-machine multi-cart installation in our FM studio and, while four machines might have been enough, we wanted to make it as easy for the talent as possible. The Programming Department might, for instance, want a 10-second promo tacked onto a five-second I.D., tacked onto a 30-second commercial. Those extra slots save a lot of scurrying around, which sometimes leads to carts not being recycled. This is also a consideration in AM because all records are not the exact length of the cartridge. If the talent forgets to recycle a cart at the end of the recorded material, he may find himself with 20, 30, or 40 seconds of recue time facing him the next time he uses the cart, and there's nothing more embarrassing than a big silence. The availability of six independently operated slots helps to alleviate that problem. We're working on a six-slot system for our AM studios, too.

We're in the process of developing a small sequencer to help the talent sequence from cart to cart using the Beaucart® secondary and tertiary tones. We'll use the tones much like an automation system to prearrange the breaks between cartridges by going from A to B, B to C, and so forth by pushing one switch. LEDs are used to indicate the presence of the trip tone and when the talent should come in live.

Stereo phasing is everything

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

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

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Perfect Timing

PROGRAMMER/ COMPARATORS 750 SERIES

For flexibility and economy with up to ten events ESE has designed the 750 Series of Programmer/Comparators. Rugged thumbwheel programmers coupled with an ESE clock or timer to provide single pole form A contact closure (1 Amp contact rating) for the length of time program matches display. All this on a 3½" high 19" relay rack mounting panel. Power required: 117V AC 60 Hz; 220V AC 50 Hz may be specified.

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

Thumbwheel Comparator Systems:
ES 750—ES 112 and one 6 Digit Program
ES 751—ES 124 and one 6 Digit Program
ES 752—ES 500 and one 6 Digit Program
ES 753—ES 112 and two 4 Digit Programs
ES 754—ES 124 and two 4 Digit Programs
ES 755—ES 500 and two 4 Digit Programs
ES 756—ES 510 and one 4 Digit Program
ES 757— ES 300 and one 4 Digit Program
ES 758—ES 510 and two 4 Digit Programs
ES 759—ES 300 and two 4 Digit Programs

ES 1296 ($150)

For Off-Air taping, or operating tape recorders when nobody is there, ESE has created **ES 1296**.
ES 1296 is a six digit, twelve hour clock with LED displays and a programmable, 300 watt, 117V AC outlet on the rear.
Once the rear outlet is activated, it will remain on for 66 minutes, unless manually terminated, or an optional Record Duration switch is set to a different time interval. This Record Duration option allows the user to select one of four time intervals for recording. These four time intervals are either 16, 33, 66 and 138 minutes, or 33, 66, 138 and 250 minutes. Price $25.00.

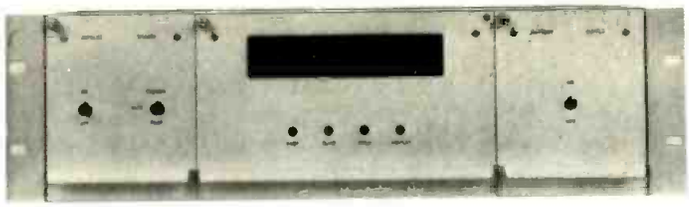
An additional option is Sequential Turn-on, for those machines that require Power, Play, Record in sequence, for proper operation. This option costs $25.00.

ES-251 ($250)

ES 251 SMPTE Time Code Reader ES 251 is a six digit SMPTE Time Code Reader displaying Hours, Minutes and Seconds. Receives the standard SMPTE Time Code through rear mounted BNC connector, converts it into six digits of clock time. Source of the code is normally a SMPTE time code generator but the unit will read the time code directly from a tape machine running at playback speed. This unit produces an extremely accurate time of day display when driven from a time code generator which is locked to a color sub-carrier frequency. The momentary hold switch allows holding of time on display. Releasing hold switch updates display to correct time.

The input code is AC coupled to two stages of amplification and level shifting to obtain a ground reference. The input circuit requires between 1 and 20 volts peak to peak of input signal and presents an input impedance of 50 Kohm. **ES 251** is a CMOS design which operates from a single power supply.
Dimensions: Aluminum Case 2¾" High x 8" Wide x 5-5/8" Deep.
Electrical: 117V AC 50/60 Hz 6W Max.
Options: BJPQW

ES 252 SMPTE Time Code Reader: Exactly like **ES 251**, but displays Minutes, Seconds and Frames.



MASTER CLOCKS

ES 160 ($750.00): Mounted in a 5¼" relay rack panel and chassis, displays six digits of time information on large, easy to read .3" LED displays, in 12 or 24 hour format, as specified. **ES 160** has its own internal timebase, with three second per month accuracy. Its standard output is serial BCD, CMOS compatible, and can drive 20 **ES 161, 166, 168** or **171** Remote Displays without buffering. All inputs and outputs are through rear-mounted connectors.
Dimensions: 5¼" High x 19" Wide x 15" Deep
Electrical: 117V AC 50/60 Hz.
Options: B (CMOS Compatible), J, One PPS Output, Relay Closure on hour and half hour, Battery/Charger (ES 163) Impulse Driver (ES 162), External Timebase-1, 5 or 10 MHz.
ES 160/1 ($900.00): One second per month version of **ES 160**
ES 190 ($900.00): The ultimate in accuracy! A digital clock, similar to **ES 160**, with special circuits for receiving and decoding a 1000 Hz tone at the start of each minute. The decoder output resets the seconds' counters in the clock each minute except the first minute of every hour, when a 1500 Hz tone occurs. These tones are transmitted by Radio Station WWV, with an oscillator accuracy of ±1 part in 10^{11} **ES 190** has an antenna and internal WWV receiver with audio-output. Its crystal timebase is accurate to ±1.7 seconds per day, used when WWV is not received. A battery and charger (ES 163) is available to protect against power interruptions. Displays are .3" red LED's. Serial output drives **ES 161, 166, 168** or **171** Slaves.
Dimensions: 5¼" High x 19" Wide x 15" Deep
Electrical: 117V AC 50/60 Hz
Options: B (CMOS compatible), J, One PPS Output, Relay Closure on hour and ½ hour, Battery/Charger (ES 163)
ES192/194 ($275.00): The most economical Masters. **ES 192** (12 Hr) and **ES 194** (24 Hr) are constructed using **ES 112** or **ES 124** digital clocks and adding the **ES 167** Serial Time Code Generator to provide the output needed to drive Remote Serial Displays **ES 161, ES 166, ES 168** and **ES 171**. 60 Hz timebase is derived from the power line. Displays are .6" incandescent type.
Dimensions: 2½" High x 8" Wide x 5-5/8" Deep.
Electrical: 117V AC 60 Hz
Options: BCDJLPQR, Time Pulse Outputs, Battery and Charger, Impulse Driver. Unit mounted on a 3½" High panel when certain options are specified.
ES 196 ($650.00): Time and Temperature Master—Basically the same as **ES 192**, with gas discharge displays, panel mounting and separate serial BCD outputs for time and temperature. Displays either 12 or 24 hours and °F or °C, as specified.
Dimensions: 3½" High x 19" Wide x 8" Deep
Electrical: 117V AC 60 Hz
Options: BCDJR, Time Pulse Outputs, Battery/Charger.

ACCESSORIES

ES 161 Remote Digital Display ($140.00): Designed to function with any ESE Master Clock, decodes serial time data and displays six digits of clock time on large .55" Gas Discharge Displays, in either 12 or 24 hour format as specified.
Dimensions: 8" Wide x 2½" High x 6" Deep.
Electrical: 117V AC 50/60 Hz.
Options: JPQW.
ES 162 Impulse Driver ($170.00): Plugs into the **ES 160** chassis, can drive 20 Impulse Clocks. Designed so that, if power fails, impulse always comes on with the same polarity when power is restored. Drives minute or second clocks as specified.
ES 163 Battery and Charger ($140.00): Plugs into the **ES 160** or **ES 190** chassis. Fast charge, 12 hours continuous use. When operating on battery, displays are automatically blanked and may be viewed by actuating Display button on the front panel.
ES 164 Remote Digital Impulse Display ($170.00): Similar to the **ES 161** except that the **ES 164** derives its count command from the **ES 162** Impulse Driver, or any impulse clock drive circuits already installed. Choice of 12 or 24 hour display and available either as desk top unit or panel mounted.
Dimensions: 8" Wide x 2½" High x 6" Deep.
Electrical: 117V AC 50/60 Hz.
Options: BJPQW.
ES 166 Jumbo 1" Clock Display ($215.00): Features six digits of one inch high planar gas discharge displays in 12 or 24 hour format as specified. Receives serial time code input from any ESE Master Clock or serial time code generator.
Dimensions: 10½" Wide x 4½" High x 6½" Deep.
Electrical: 117V AC 50/60 Hz.
Options: JPQW. If O is ordered digits are separated by colons.
ES 167 Serial Time Code Generator ($125.00): Offers a low cost answer to a master timing system. An integral part of **ES 160, 190, 192/194** and **196** Master Clocks, this unit can be added to many other ESE products, including **ES 112, 124, 182, 184, 500, 582, 750, 751, 752, 753, 754, 755**, and all 780 Series Time Programmers. The **ES 167** fits inside the case so that no extra space is needed. Drives 20 **ES 161, 166, 168** or **171** Remote Displays. **ES 167** provides CMOS compatible serial BCD output and operates from the logic supply voltage.
ES 168 Remote Electromagnetic Display ($388.00): 4" HEIGHT! Used wherever large size at low cost is essential. Receives the serial time code from any ESE Master Clock, displays the time on four bright, yellow-green digits in 12 or 24 hour format as specified. Designed to mount on wall or ceiling. When time changes, audible "click" is heard.
Dimensions: 6" High x 16½" Wide x 6" Deep.
Electrical: 117V AC 50/60 Hz.
Options: JW
ES 169 Temperature Slave ($125.00): Receives serial BCD temperature code from **ES 196**, displays it on .55" Gas Discharge Displays.
Dimensions: 8" Wide x 2½" High x 6" Deep.
Electrical: 117V AC 50/60 Hz.
Options: JPQW
ES 171 Console Mount Display ($134.00): Newest of the 70 series console mount clocks and timers. **ES 171** receives the serial time code generated by any ESE Master Clock, or any ESE product containing the **ES 167** serial time code generator, and displays it on bright red .3" LED's.
Dimensions: 2¼" High x 4½" Wide x 4" Deep.
Case: High Impact Black Plastic.
Electrical: 117V AC 50/60 Hz.
Options: JW.

RAM TIME PROGRAMMERS 780 SERIES

The ES 780 Series Programmers provide 32 events (expandable to 96) in 5¼ inches of rack space. Ten minutes is all that is required to install, set the clock and program 32 events. Bright .3" LED displays and all controls are on the front panel, outputs and battery test are on the rear. ES 167 Serial Time Code Outputs can be specified as an option. Line frequency time base with backup crystal time base. 72 hour battery/battery charger are standard. External time base can be used. 60 Hz is preferred, others may require additional internal circuitry.

Eight Digits of Programming Capability:
ES 780—10 Days, 10 Outputs, Hours, Minutes, Seconds
ES 781—100 Days, Hours, Minutes, Seconds
ES 782—16 Outputs, Hours, Minutes, Seconds
Six Digits of Programming Capability:
ES 783—Hours, Minutes, Seconds
ES 784—100 Days, Hours, Minutes
ES 785—100 Days, Minutes, Seconds
ES 786—16 Outputs, Hours, Minutes
ES 787—16 Outputs, Minutes, Seconds
Four Digits of Programming Capability:
ES 788—Hours, Minutes
ES 789—Minutes, Seconds

ES 782, 786, and 787 have t6 isolated outputs. Any of the 32 events can be programmed to activate any of the 16 outputs. ES 780 has 10 outputs. The other units have a single output.
ES 784, 786, and 788 have a one minute contact closure. The others have a one second contact closure.
Displays:
REAL TIME: An eight digit display when day selection is required as on the ES 781, 784, 785, seven digits for ES 780, and six digits for the others.
NEXT EVENT: A two digit display of next event number.
NEXT EVENT TIME: An eight digit display when ES 780, 781, or 782 is specified, a six digit display when ES 783, 784, 785, 786, or 787 is specified, and a four digit display when ES 788 or 789 is specified.
Dimensions: 5¼" high x 19" wide x 10" deep.
Weight: Approx. 20 lbs. varying with model number.
Front Panel: Brushed, etched, anodized aluminum.

OPTIONS

Please Note: Some combinations of options are not compatible. Consult factory if in doubt.

B BCD Output
C Crystal Timebase: A ±.002% crystal is employed in an oscillator for those applications requiring independence from the power line frequency. Trimmer included for greater accuracy.
D Remote Connector, 6' Cable and Control Switch Set: This option consists of a rear-mounted connector wired for all control functions, a mating connector, wired to six feet of cable, the other end of which is connected to control switches which are mounted on a 1/8" anodized satin finish aluminum plate suitable for mounting on most surfaces.
L .55" Planar Gas Discharge Display
M Front-mounted pushbutton controls: available on 70 Series except for ES 371.
N Available on ES 301, 302, 380, 381. Provides a change in count direction from down to up at zero when the unit has been counting down from a preset time.
P 19" Front Panel, 3½" high.
Q 9" Front Panel, 3½" high.
R Remote Connector
S Slave/Remote Display: User must specify option B (BCD Output) on master when ordering a slave.
T Tenths of Seconds
V DC Operation (includes crystal timebase)
W Three Wire Cord
Y Relay Closure at Zero: Available on ES 300, 301, 302, 380 and 381 only.
Z Relay Contact Closure and Stop at Zero: Available on ES 300, 301, 302, 380 and 381 only.

ESE
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"Live via satellite"

By Joe Roizen, TELEGEN

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

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

It took the intermittent bleep of the Soviet Union's first orbital space vehicle, Sputnik I, launched just twenty years ago (October 4, 1957),

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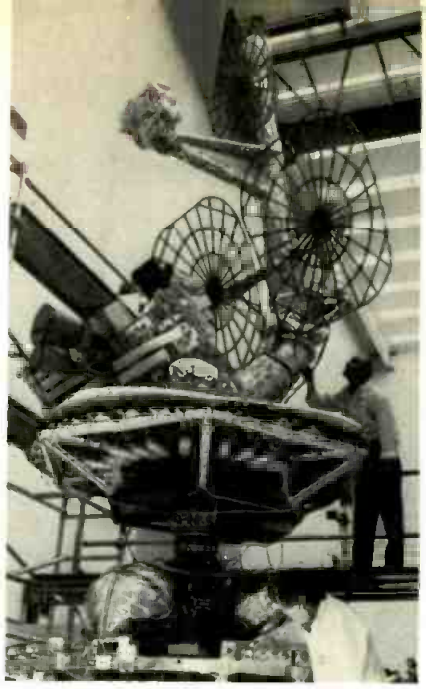
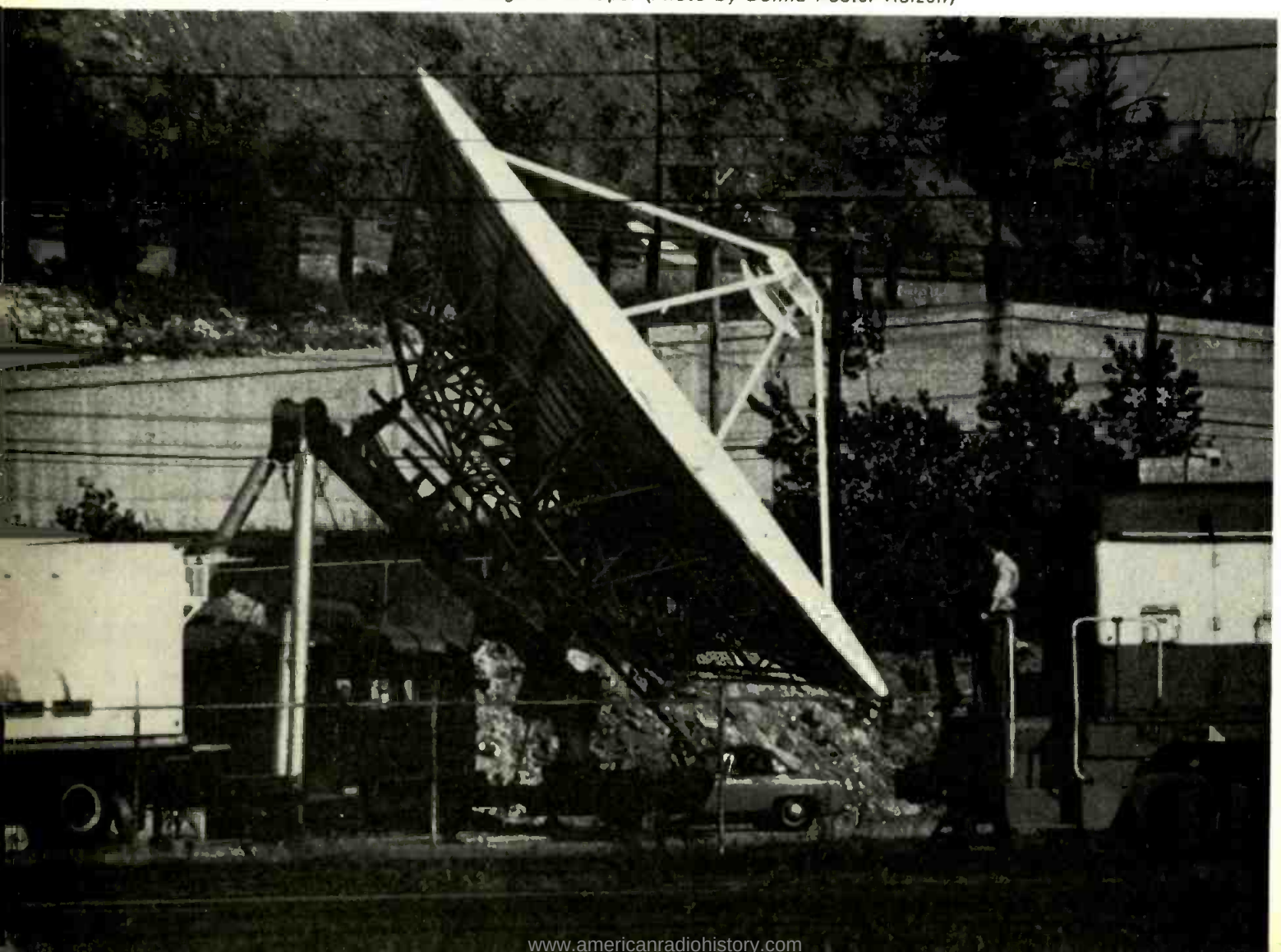


Three antennas atop the Intelsat IV-A communications satellite are designed to give the satellite two-thirds more channel capacity than its sister spacecraft, the Intelsat IV, by using a spot-beam technique. The satellite is being inspected by an engineer of Hughes Aircraft Company, designers of the antenna.

This Westar mobile earth station was used during the 1976 Republican National Convention in Kansas City to relay television coverage to Europe. (*Photo by Donna Foster Roizen*)



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First Hitachi developed the revolutionary Saticon tube. Then Hitachi designed the perfect camera for it...

The new portable

HITACHI SK-80

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

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

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

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

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"Live via satellite"

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

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

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

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

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

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

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

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

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

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

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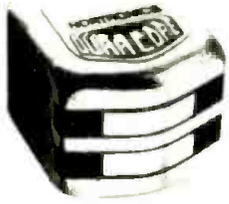
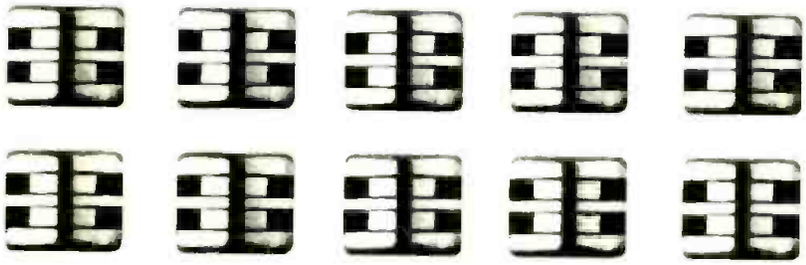


Ten heads are *not* better than one
When the one is Duracore™



New From Nortronics

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

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

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

Recorder Care Division

NORTRONICS

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PCL-505 Transmitter

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

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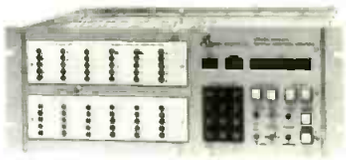

DCS-2A Control Terminal

Fully digital remote control of a remotely located transmitter plant is provided by the **DCS-2A 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-2A is another standard option, and can provide **totally automated plant operation.** With CRT display, thirty telemetry or status channels are displayed simultaneously. Tolerances on all telemetry channels and logging are also provided.

The **Model DRS-1A Digital Remote System** provides telemetry, command and status capability at an affordable price. The system is available for operation over telephone or radio interconnecting facilities. Automatic logging is accommodated by the companion **Model DLS-1 Digital Logging System.**

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TCS-1 Command Terminal

Fully independent command and status reporting capability is provided by the Model **TCS-1 Telecontrol System.** Applications for the TCS-1 include command and status (tally-back) from broadcast transmitters, electronic news-gathering or similar antenna systems, microwave transmitters and receivers, or remotely-located television cameras.

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"Live via satellite"

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beyond our atmosphere. However, for all of its lack of sophistication, Early Bird laid the foundations for the global system of satellites and earth stations that now provide instant television contact among more than 90 countries around the world.

Current Satellites

Most TV communication services are presently supplied by the Intelsat IV and IV A series of satellites over the Atlantic, Pacific and Indian Oceans. Canada has its own satellites (Anik I, II, III), all positioned over the Pacific Ocean. In addition, there are now private satellites launched for RCA (Satcom I, II) and Western Union (Westar) that provide commercial services.

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

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

The Earth Stations

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

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

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

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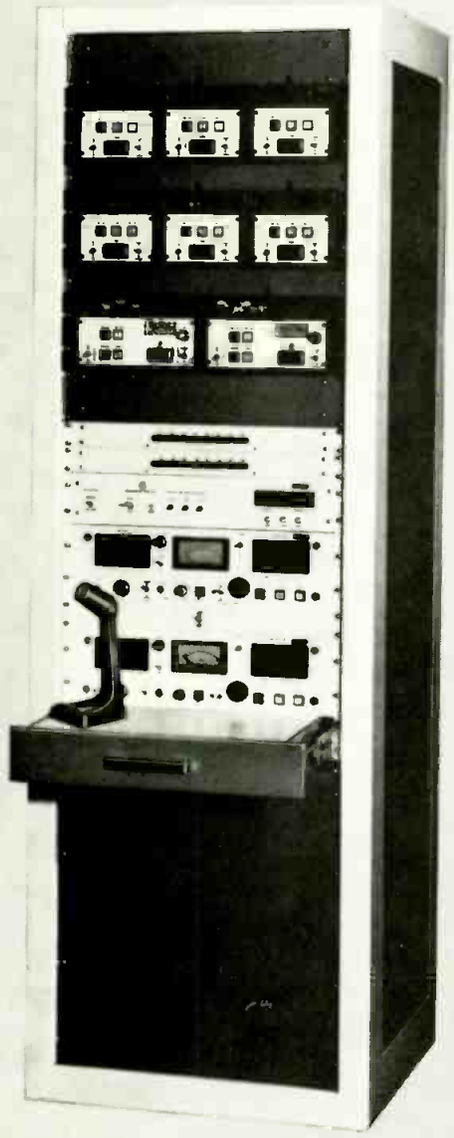

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Today's ever increasing quantity and complexity of Control Room equipment makes the concept of solid engineering and trouble-free performance more important than ever before. AEG-TELEFUNKEN, the developer of the world's first professional tape recorder,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

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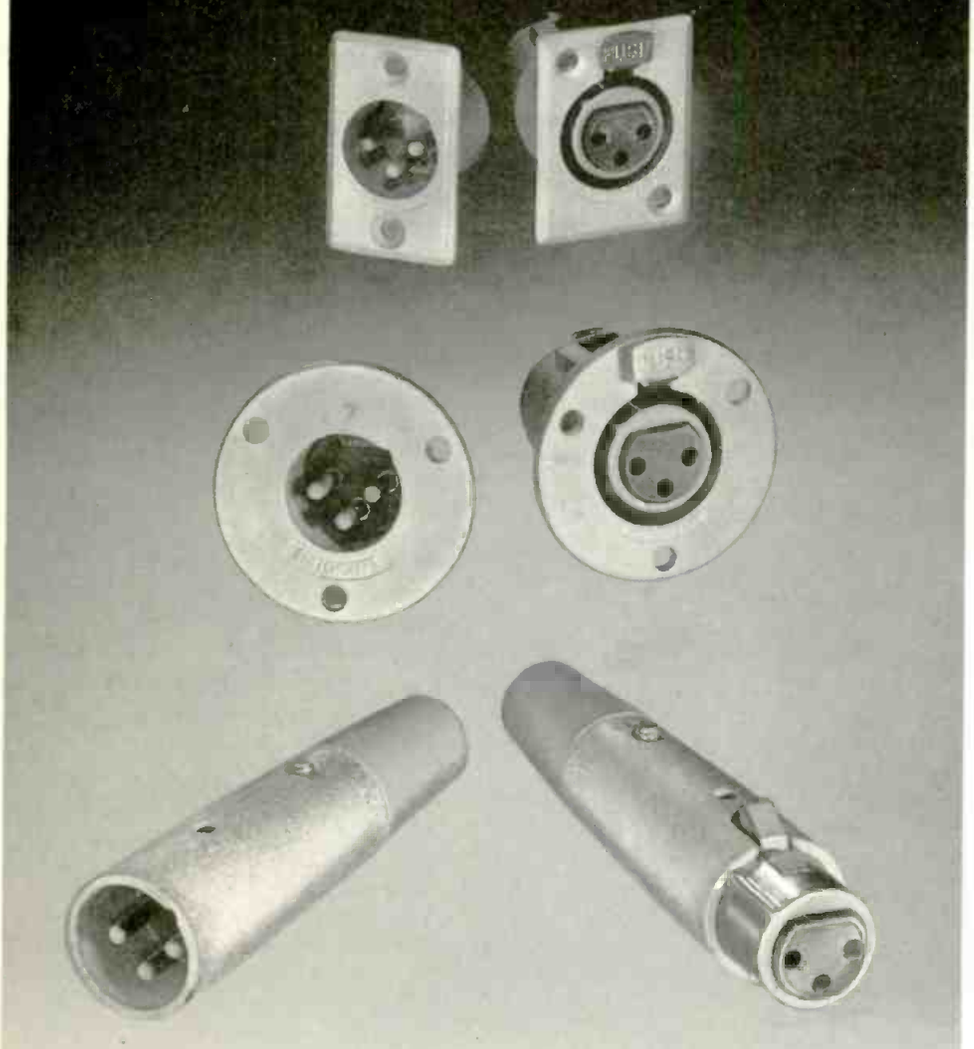

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Captive design insert screw, exclusive ground lug, and bifurcated contacts.

The QGP audio connectors bring a new degree of performance to connectors. The insert is molded of a specially selected thermoplastic for long wear and excellent dielectric properties. The contacts and pins have 50 micro inches gold over 50 micro inches nickel . . . unheard of in any other audio connector. This means more reliable connections, all the time.

All in all, the QGP audio connectors are unlikely to be surpassed in quality of performance or variety of features for some time to come. Of course the Switchcraft Quick-Ground Professionals carry a price tag commensurate with their position at the top.

Think like a professional. Think Switchcraft QGP. Call the Switchcraft distributor near you for data, prices and the model you require. They have them on-the-shelf. Switchcraft, Inc., 5555 N. Elston Avenue, Chicago, Illinois 60630.

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"Live via satellite"

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stratosphere as its hydrazine motors correct its orbital position. This electro mechanical servo works on a self-seeking basis and is capable of maintaining a 1/10 degree pointing accuracy. It is actuated by 1.5 dB signal level drop-limits which are adequate for this type of operation. The result is a compact and relatively low-cost, receive-only earth station that can be used for many localized applications in smaller communities.

The New Satellites

Already in orbit or about to be launched are a whole series of new satellites designed for very specialized applications. Using higher power outputs, narrow-beam antennas, three-axis pointing and better solar energy conversion, these satellites will usher in a new era of television signal availability in even the most remote areas. In addition, the reduced cost factor for earth stations will greatly expand utility of these systems in developing nations or lower budget industrial and educational applications.

The CTS satellite is already on line. From its 116° West longitudinal position on the equator, its footprint (as the coverage area is called) covers most of North America. Since it is a joint Canadian/American venture, its duty cycle will be on an alternate-day basis. CTS works at the newer super-high frequencies: the up link for received signals is between 14-14.3 GHz in two 85 MHz pass bands. The transmit frequency is in the 11.8-12.1 GHz region with similar bandwidths.

CTS is the most powerful satellite in use today. Its 200-watt travelling wave tube (TWT) puts out 40 times the power of the Intelsat series, thus greatly reducing the need for large earth station antennas. The higher power is made possible by a new approach to converting solar energy into usable watts. Unlike the Intelsat series which use spin stabilizing techniques and require the solar cell arrays to be around the circumference of the "bird" (thus having only partial solar access at any given time), the CTS uses extended solar sails which unfurl in accordion fashion once the satellite is properly positioned in its geostationary location. The solar panels, 22 feet long and 51 inches wide, face the sun constantly through a sensing and steering electromechanism. Initial power output of this array is 1260

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The mobile studio tape recorder

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

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

There you have it – a self-contained unit. Practical. Reliable. At a reasonable price.

– The mechanical and electronic components fulfill all studio requirements for quality and reliability.
– The large, well decoupled capstan flywheel provides for the lowest flutter even when used on poorly stabilized power lines.
– The sensitive, though uncomplicated, tension control maintains constant tension with 7 to 27 cm (3" to 10½") diameter reels without the need for switching.
– Vertical or horizontal mounting with perfect performance.
– The amplifiers are easily aligned to every kind of tape made.
– All deck mechanical assemblies are easily accessible and all amplifiers are plug-in.
– Its construction on a robust, die-cast aluminium frame allows the magnetophon 12 to stand up to even the roughest duty without impairment to the quality of the recording.

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

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- The MCI JH-110A series of recorders is now available with a 14" transport.
- Precise electronic editing (new bias and erase timing generators for all three speeds eliminate clicks, gaps and overlaps).
- The tape counter displaying minutes and seconds in real time can be combined with the JH-36 "Return to Zero" Cue-up function (optional).
- The variable profile cabinet equipped with a gas spring tilting mechanism allows optimal positioning of tape transport for all different working modes (from editing to just watching) in seven steps over a range of 22 degrees.
- MONO and STEREO (on ¼" tape) as well as FOUR TRACK configuration (on ½" tape) are available.
- All systems are pre-wired for four-track operation.
- The JH-110A transport can easily be converted for ¼" and ½" tape use.
- All Head assemblies are self-aligning "plug-in" type and provide space for an optional fourth head.
- Independent head adjustments for Height, Zenith, Azimuth and Tape Wrap are non-interacting.

MCI

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"Live via satellite"

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

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

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

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

The Organizations

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

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

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

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

Summary

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

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

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

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

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FEEDBACK

READ SOME LETTERS TO MCI REGARDING THE REMARKABLE JH-110A SERIES OF TAPE RECORDERS

I thought you may be interested in learning of some of the benefits this company has derived since we changed to MCI JH-110 tape recorders.

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

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

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

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

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

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

Yours sincerely,

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

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

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

KBCL RADIO 1220 AM

WNEW

Radio office memo:

WVCG WYOR

was impressed with his recommendations and therefore purchased one.

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

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

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

Very truly yours,

Larry Ryan, General Manager,
KBCL, Shreveport, Louisiana

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

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

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

One of the more remarkable features is the machine's ability to time tape. At present, completed 60-minute shows are timed by running them through a conventional recorder at 15 IPS and the elapsed time doubled for an accurate reading of 7½ IPS programming. This MCI machine actually times the programming while in the fast-forward mode—reducing a 30-minute job to a 3- or 4-minute job and greatly reducing machine tie-up time.

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

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

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

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

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

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

Mike Linder,
WNEW Radio, New York

Professional Recording Equipment

MCI

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STL Operating Techniques

Part 2 of a 2-part series

By John E. Leonard, Jr.*

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

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

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

Quadraphonic stereo

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

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

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

Intercity relay

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

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*Moseley Associates, Inc., Goleta, California

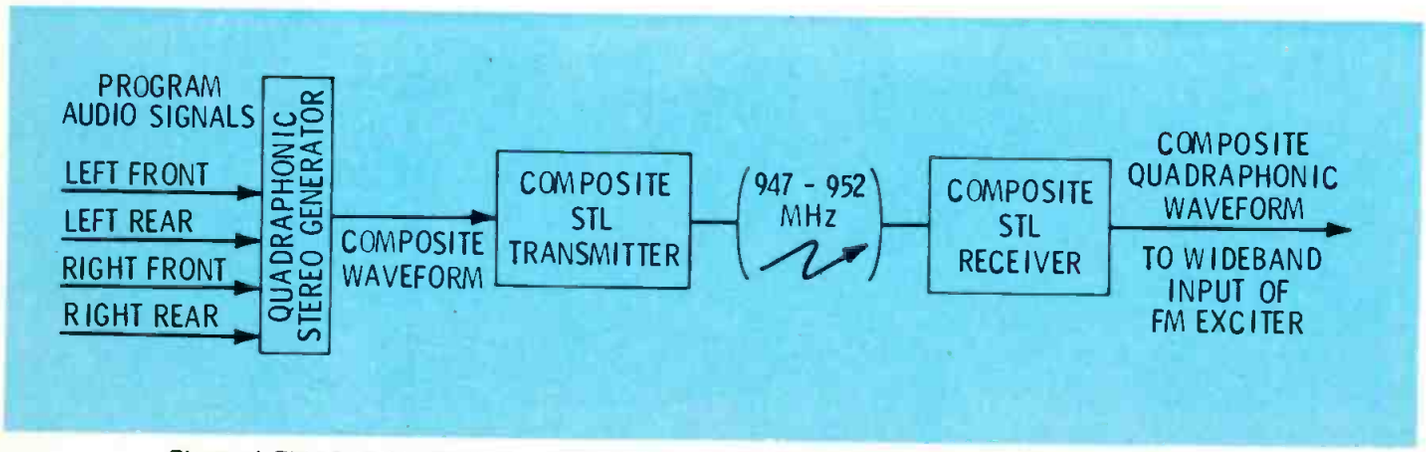

Figure 1 This is a block diagram of a composite STL for quadraphonic stereo applications.

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

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

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☐ an audio level optimizer that combines a compressor, peak limiter, and de-esser in one package.

☐ a multiband audio processor that gives you independent compression adjustments in eight frequency bands.

☐ a single-ended noise suppressor that can also restore program dynamics.

☐ tape record and reproduce electronics that set new standards for features, performance, and reliability.

☐ a tape tension control kit that improves speed accuracy and high-frequency performance.

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

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

New York: Martin A/V;
Dave Bain Associates
Massachusetts: Lebow Labs
New Jersey: Joel Associates
Maryland: Recording Consultants
Kentucky: Sonic Services
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STL Operating Techniques

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

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

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

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

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

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

License applications

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

continued on page 80

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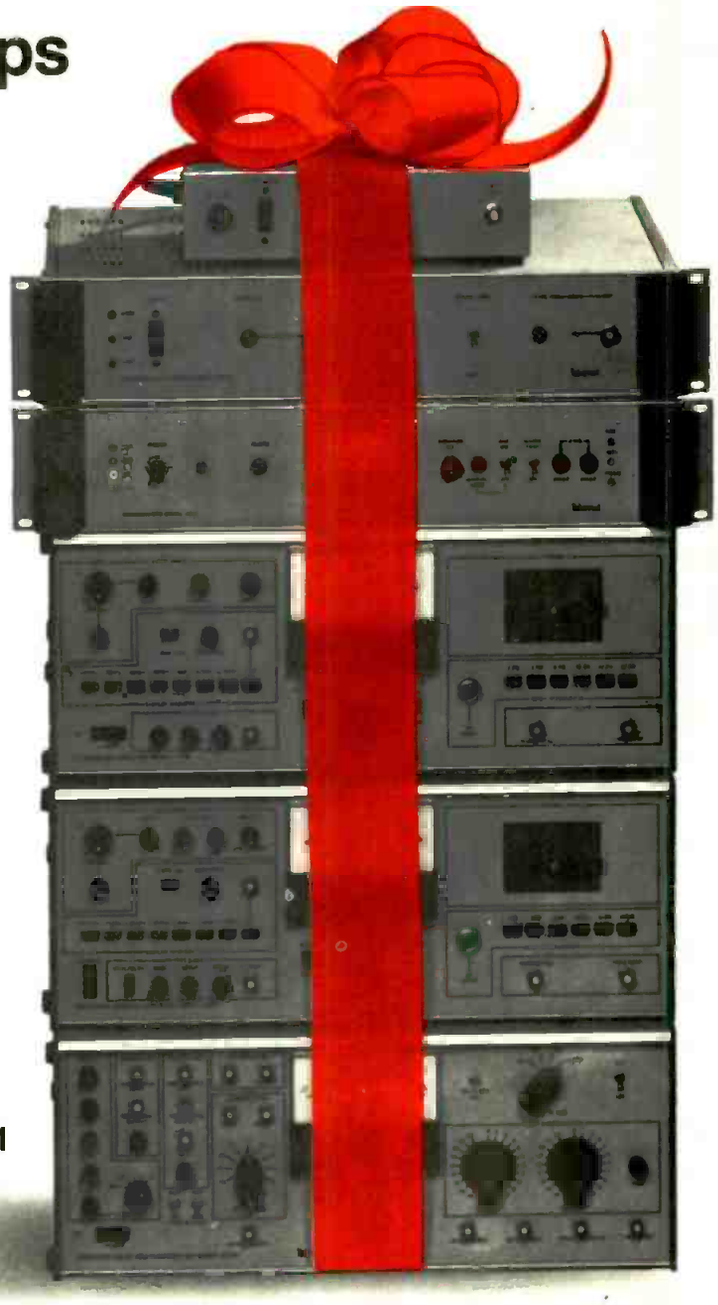

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STL Operating Techniques

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

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

Frequency selection

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

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

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

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

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

Rules and regulations

Some of the existing Rules and Regulations under Part 74, Subpart E deserve special mention. If you are

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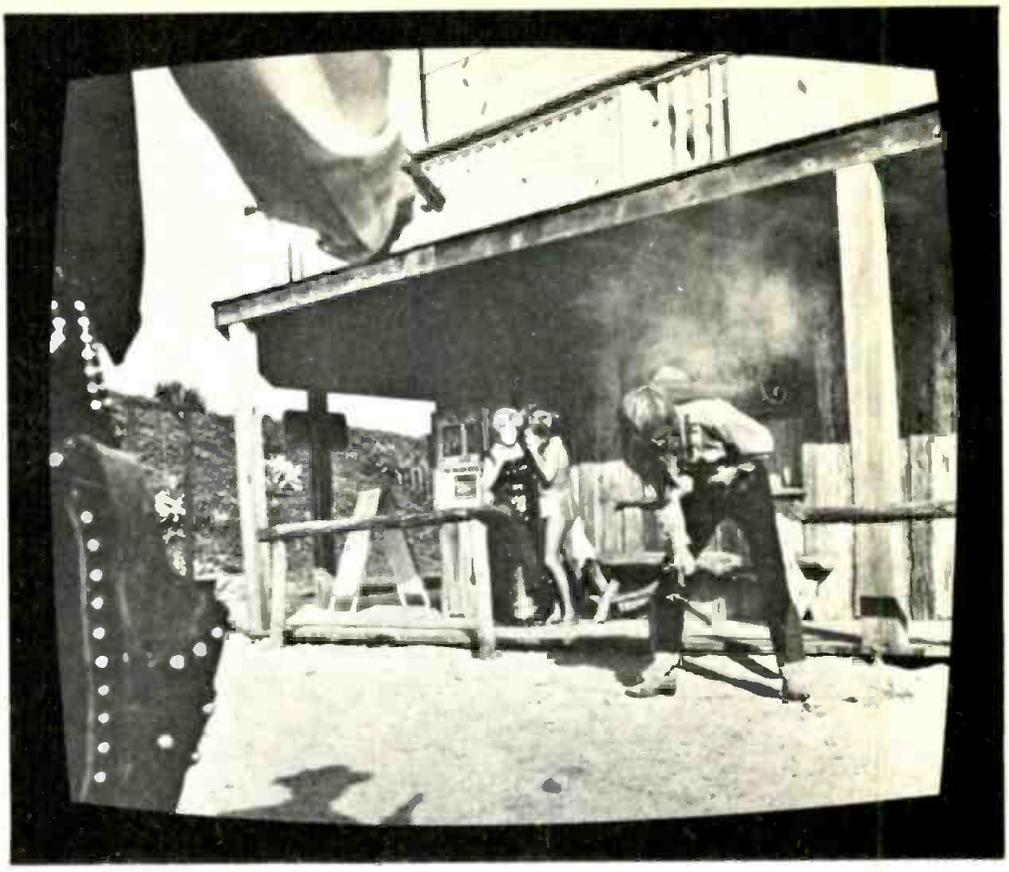

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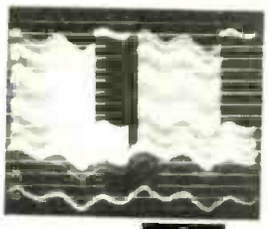

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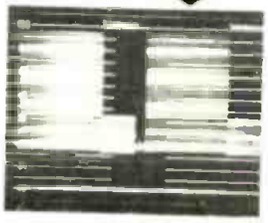

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STL Operating Techniques

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

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

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

Remote control

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

More on the rules

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

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

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

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Microphone:	Sennheiser MD-421-U
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Cart Play:	
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Cart Record:	Ampro CT-RPS 3555B
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100 Sc	1.80	2.40	2.30	3.20
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2.5 Mn	2.00	2.50	2.37	3.25
3.5 Mn	2.10	2.60	2.47	3.30
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radio workshop

A systems concept for audio interface

By Peter Burk

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

Before you stop payment on the check to the magic black box company, let's look more closely at what we're feeding into the machine.

"Hold it," you say. "I just checked everything in the chain... distortion is below one percent everywhere, and response is good to 15 kHz. I even put new stylii in the turntables."

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

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

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

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

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

The compromise

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

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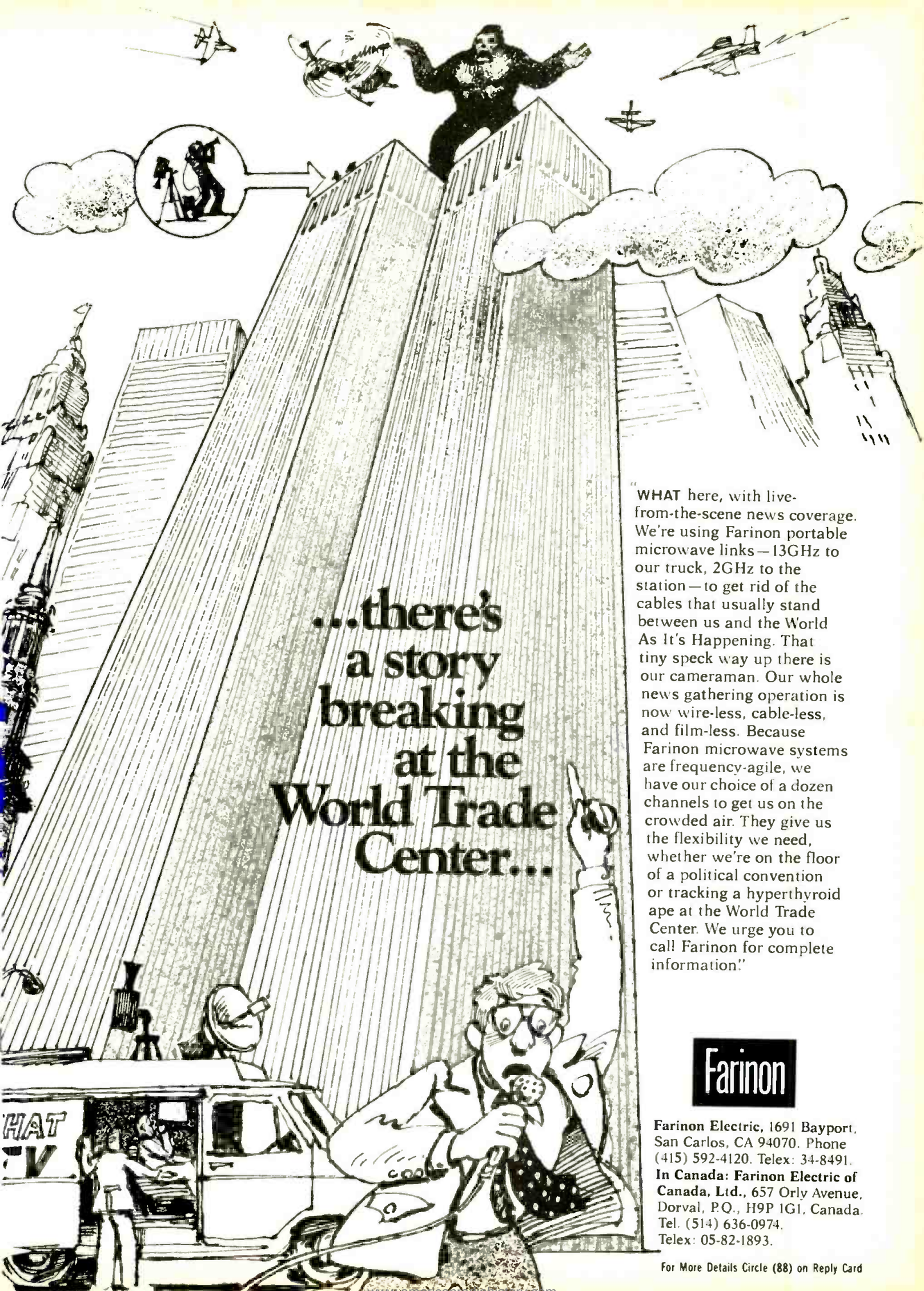

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Determining operating range of adjustable gain amplifiers

1. Define desired minimum signal-to-noise ratio (S/N) in dB.
2. Define desired minimum headroom (HR) in dB.
3. Connect signal generator to amplifier input and AC VTVM and distortion analyzer to output (across appropriate load).
4. Set amplifier gain control near the low end.
5. Increase generator output level until 3% THD occurs.
6. Reduce generator level by amount of headroom desired. (THIS IS MAXIMUM INPUT LEVEL)
7. Increase amplifier gain until 3% THD occurs.
8. Reduce gain by amount of headroom desired. (THIS IS MAXIMUM OUTPUT LEVEL)
9. Reduce gain control to minimum setting.
10. Read output noise (dBm). Add desired S/N to this value. (THIS IS MINIMUM OUTPUT LEVEL)
11. Set generator output to maximum input level determined in step 6.
12. Increase amplifier gain control until maximum output as determined in step 8 is achieved.
13. Read output noise (dBm).
14. Reduce generator output level and repeat steps 12 and 13 until output noise is lower than the maximum output by desired S/N. (THIS IS MINIMUM INPUT LEVEL)

Min. Out (step 10) - Max. In (step 6) = minimum gain

Max. Out (step 8) - Min. In (step 14) = maximum gain

If minimum values exceed maximum values, reduce constraints on headroom or signal-to-noise ratio.

Radio workshop

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

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

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

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

Impedance matching

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

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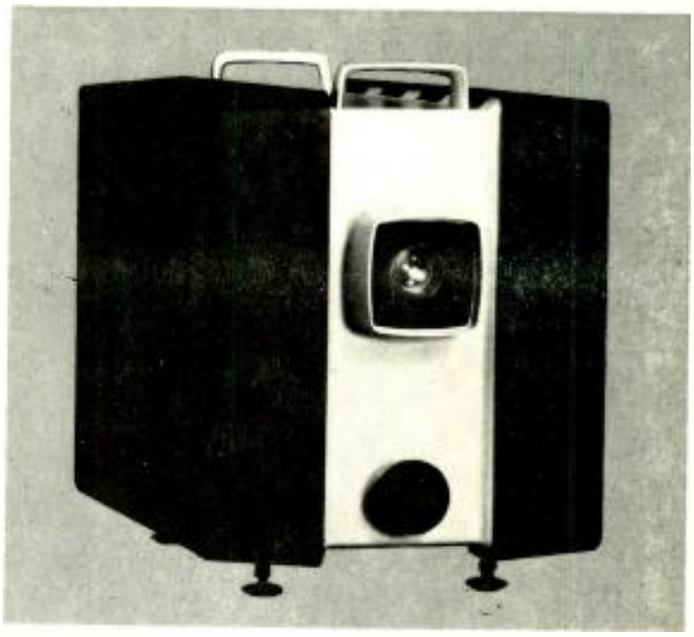

"Thousand" Series Projectors. (PJ500 and PJ700 not shown.)

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GE Large Screen Television Projector Specifications

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

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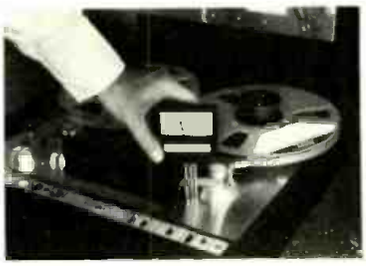

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Radio workshop

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

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

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

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

Gain limitations

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

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

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

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

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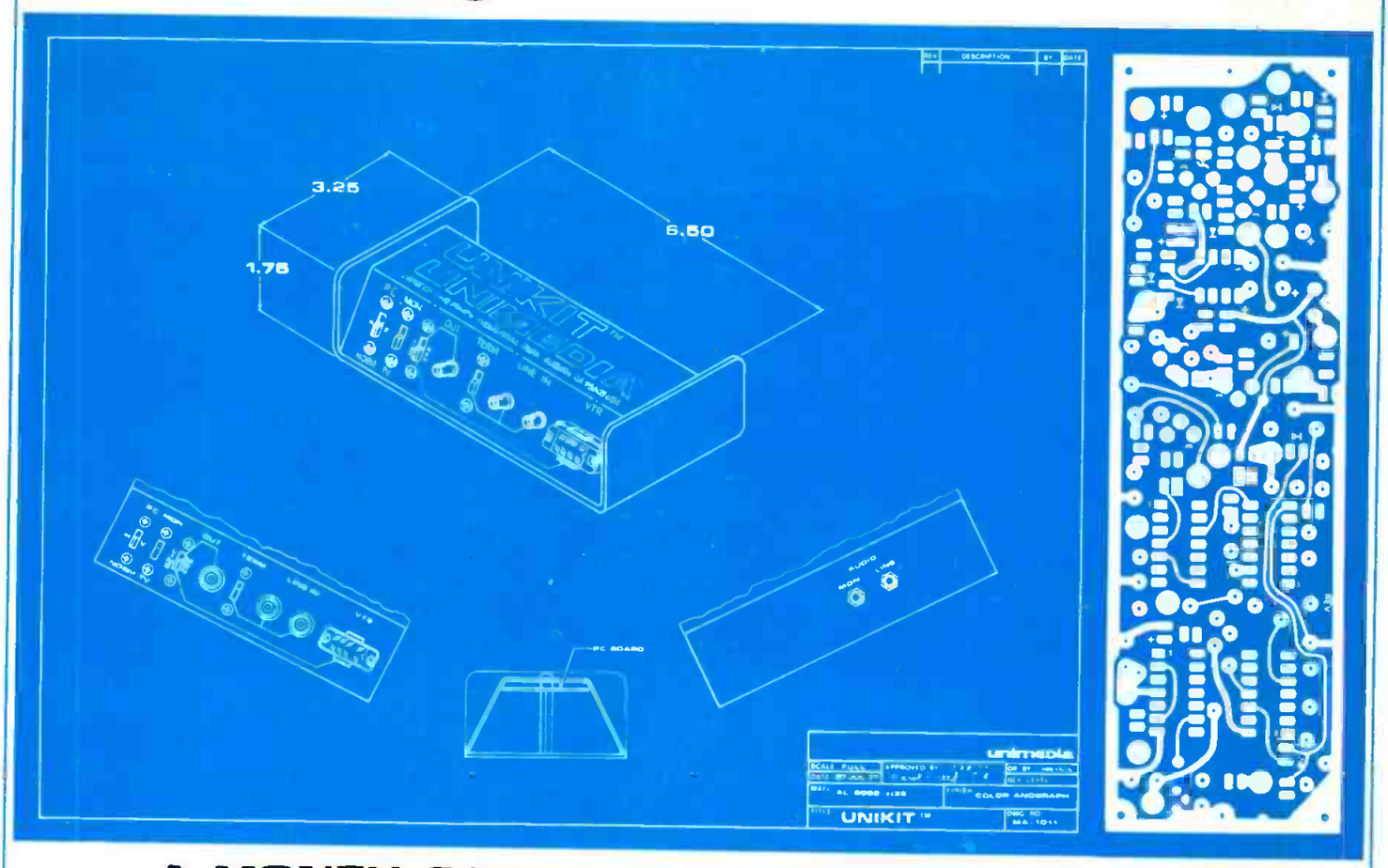

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Radio workshop

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

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

Block it out

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

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

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

Pads and things

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

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

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

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

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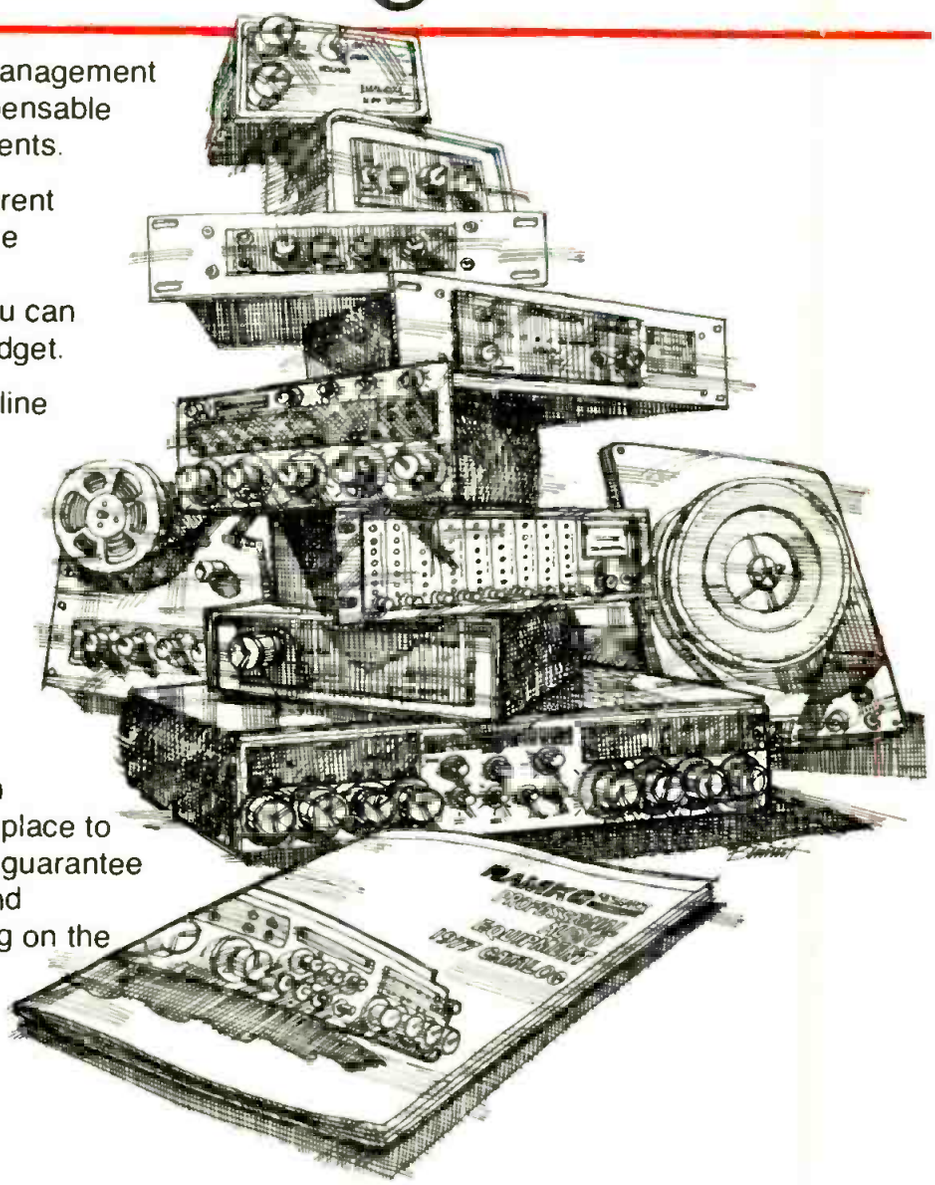

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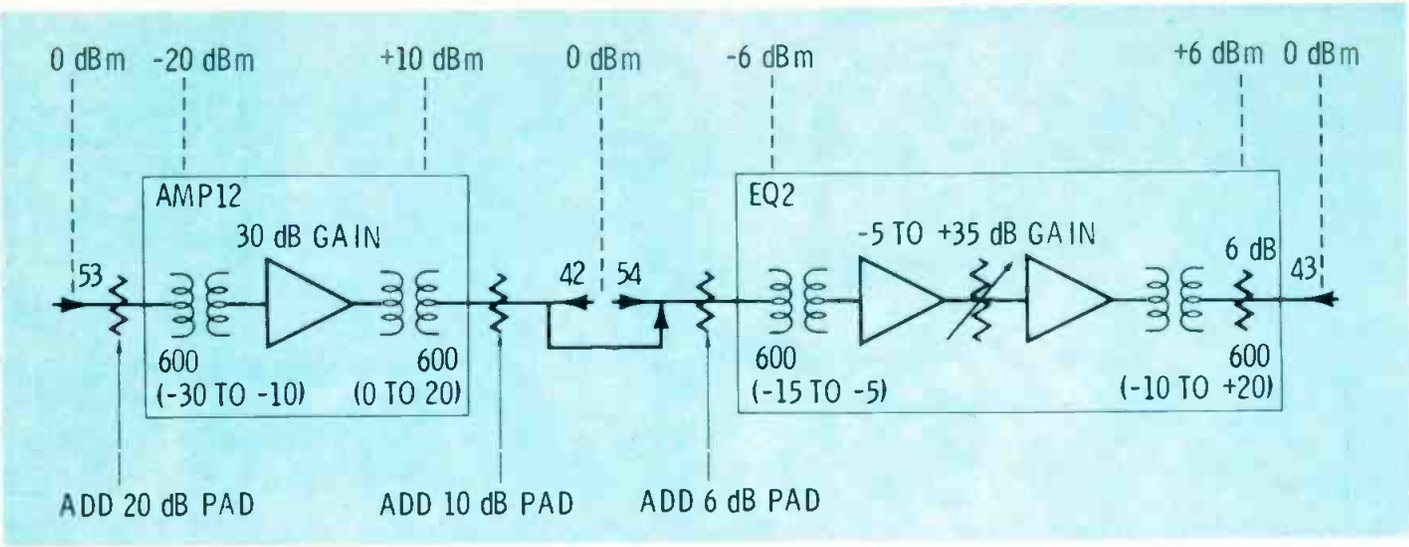

Figure 1 This portion of the block diagram shows levels, impedances and input/output configurations. Pads, transformers, etc. now can be added to complete the system.

Radio workshop

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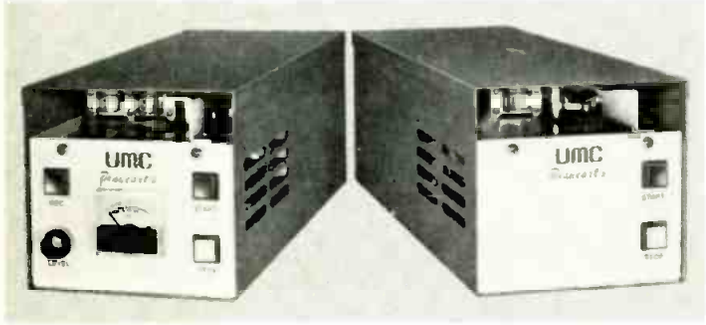
Bridging inputs should be kept separate on the patch panel, or at least marked differently. If less than 20,000 ohm bridges are used, calculate the loading on the line to make sure it isn't excessive. Make sure that a 600 ohm termination appears somewhere on the line.

What have we gained?

The improvements in system performance will vary from subtle to dramatic, depending on the state of the system before you started. In any event, you should see better system signal-to-noise and headroom, easier operation for the jocks because of better consistency, and the joy of being able to patch without making gross level adjustments.

The time that you spend setting up the system will be saved many times over in future troubleshooting. □

The frill is gone.



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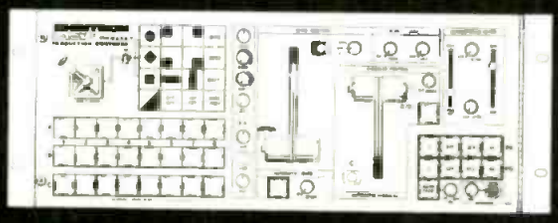

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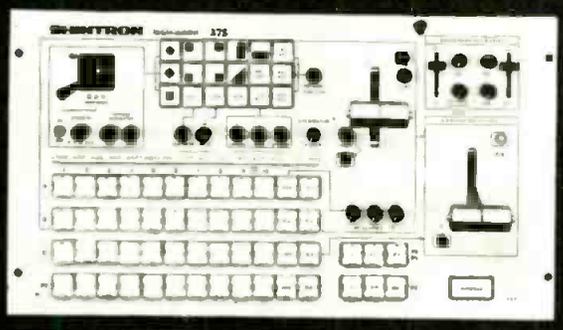

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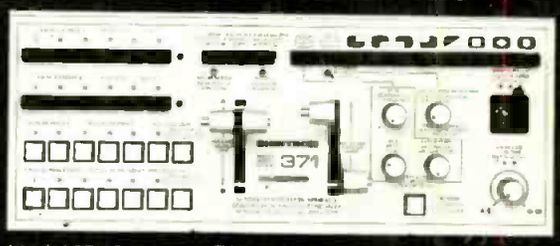

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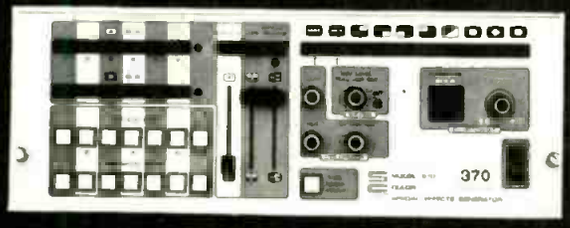

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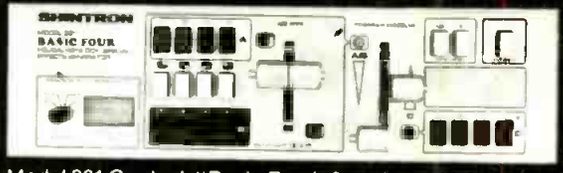

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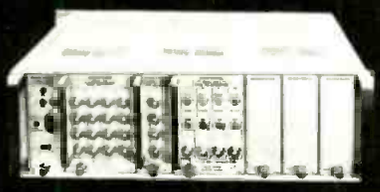

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The UW course consists of 24 lessons. These lessons are taught by use of half-hour videocassettes using the U-matic format, written study guides, text books and lab experiments.

The SBE-UW agreement is in two parts: one applicable to SBE members belonging to chapters; the other for members in areas not included in chapters.

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SBE chapters

1. A special rate will be available to SBE members who enroll through a chapter. The cost per SBE enrollee will be $100 as compared to the normal $480 for the first student and $170 for each additional student. To qualify for this rate, there must be at least five enrollees in the chapter.

2. The University of Wisconsin (UW) will pay the SBE chapter $5 per enrollee to cover expenses associated with publicizing the course and enrolling the members.

3. The participating chapters will be responsible for either procuring a copy of the UW lesson tapes from a source which has them, such as a local PBS outlet, or making a dub from a tape supplied by UW. If UW must supply tapes, the chapters must designate to what person and what station the tapes are to be sent. If a local station provides tape dubbing facilities and desires to enroll employees who are not SBE members, then the $480 initial fee for that station will be waived by UW and the regular $170 enrollment fee will apply.

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continued on page 96

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COLOR GENLOCK SYNC GENERATOR
MODEL 5000 OPT: 01

SPECIFICATIONS MODEL 5000 OPTION: 01 (Helical)

Model 5000 Option 01: Helical tape recorder outputs have typically 1000 or more times the frequency variations of broadcast video. This new mode provides a very wide range genlock that is front panel selected to lock to helical recorder playbacks even with ± 1% speed variations, ± 10 microsecond skew and high amplitude head transition noise.

Price: Model 5000 Opt. 01 - $1895.00

BLACK BURST GENERATOR KIT
MODEL BBG-1

NEW

Low-cost black burst generator for driving new color cameras and for users of video switchers who desire to fade to color black.

Price: $89.00 F.O.B. Loveland, Colorado

VIDEO ACTIVATED POWER SWITCH
MODEL VPS-1

NEW

- Save electrical energy by using monitor only when video is present.
- Reduce color monitor maintenance when no drives are present.
- Eliminate distractions from free-running monitors.
- Eliminate special AC power lines or tall ladders to turn video monitors on and off in special locations.

Price: $65.00

VIDEO D/A
MODELS VDA-1, VDA-1P

NEW

The VACC Model VDA-1 is a video distribution amplifier which can be operated from any +12Vdc power supply capable of delivering 70 mA to the VDA-1.

The Model VDA-1P has its own self-contained 12V power supply. No cabinet is included with the VDA-1 or VDA-1P.

These video amplifiers have been designed in mind to install in TBC's and other equipment where additional video outputs or feeds are required.

Price: VDA-1 - $79.50, VDA-1P - $125.00

PARTY LINE SYSTEM
MODEL PL-1

BENEFITS

- Individual volume control
- Model PLS-1 handles up to 10 headset units
- Low cost
- Small cabinet enables user to mount party line next to camera or to any convenient location.

Price: $50.00

BURST-PHASE & H-PHASE METER
MODELS BPM-1 & BPM-1 OPTION: 02

LIGHTED METER

VACC's BPM-1 Option: 02 Burst-Phase Meter and H-Phase Meter is both a low-cost substitute or replacement for most vectroscope applications where burst-phase errors need to be observed and measured. Likewise, the unit is a low-cost substitute for an oscilloscope where H-Phase errors need to be observed and measured.

Price: BPM-1 (cabinet) $599.00, Option: 02 H-Phase - add $130.00

ELECTRO OPTICAL ISOLATORS
MODELS A-1, A-1A, D-1, D-1A, VL-1

Installing a VACC optical isolator circuit in your 12, 15, 17, 19, or 21 inch Sony Trinitron color receiver converts it for use as a high quality color monitor and/or demodulator while still retaining the receiver function.

Besides low cost, VACC's Video Line Isolator improves overall performance of your video system by providing better power-line isolation (80 dB) than traditional differential amplifiers.

Price: A-1, A-1A, D-1, D-1A, - $171.00; VL-1 - $250.00

VIDEO AIDS corporation of colorado

325 EAST SEVENTH STREET, LOVELAND, COLORADO 80537 Phone (303) 667-3301

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cost and the enrollee may acquire his own lab parts.

6. It is assumed that the following lab equipment is available:

(1) Power supplies ± 15 V at 50 ma
± 5 V at 500 ma
(2) One oscilloscope - dual trace
(3) One signal generator - sine and square wave signals - DC offset would be convenient.

7. One person in each chapter is to be appointed to serve as the direct contact with Willis Long at UW. An instructor's guide will be supplied to this person.

SBE members not in chapters

1. If five or more SBE members who are not members of a chapter can arrange to group together to take the Digital Technology course, they will be entitled to receive the same deal and the same conditions from UW as that given to members who belong to chapters. The only exception will be that UW will not pay $5 per member to the local chapter.

2. Individual SBE members may also take the course at reduced rates. The cost for an individual will be $300 as compared to the regular cost of $480 for the first enrollee. Additional enrollees who are members of the SBE may take the course at a cost of $100 each.

3. The additional cost for individual enrollees is due to the wear and tear on the tape, handling charges and shipping charges.

4. UW agrees to send lesson tapes to groups of SBE members or to individual members. Members then have the option of dubbing the tapes and returning the originals to UW or keeping each cassette for two weeks, then returning it, and receiving the next one upon UW's receipt of the first tape. The last option might eliminate the necessity of dubbing.

5. It is understood that groups of SBE members and individual SBE enrollees must return lesson tapes to UW as directed by them prepaid.

SBE Chapters and members desiring to take advantage of this "Digital Technology for Broadcast Engineers" should contact the University of Wisconsin directly. Send all inquiries to: Willis F. Long, Department of Engineering - UW Extension, 432 North Lake Street, Madison, Wisconsin 53706.

CHAPTER REPORTS

Chapter 22—Central New York

The regional convention equipment show will be held September 30 at the Syracuse Hilton Inn, Syracuse, New York. For more information, write: Charles Mulvey, WNYS-TV, Syracuse, New York 13214.

Chapter 43—Sacramento, California

Chapter 43 met July 26th for a brief business meeting followed by an excellent program given by Jeff Mendenhall, senior FM transmitter engineer from Harris Corp. in Quincy, Illinois. Mendenhall presented his NAB paper on the new MS-15 Exciter and further described actual circuitry and construction of this equipment. He answered all questions and provided a very busy and interesting two and one-half hours. (Bob Venditti, KRAK/KEWT, 3551 William Way, Sacramento, CA 95821, 916/484-7100.) □

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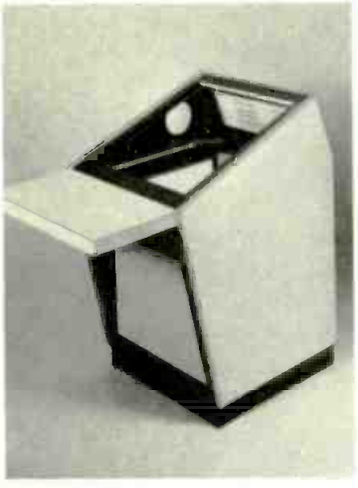

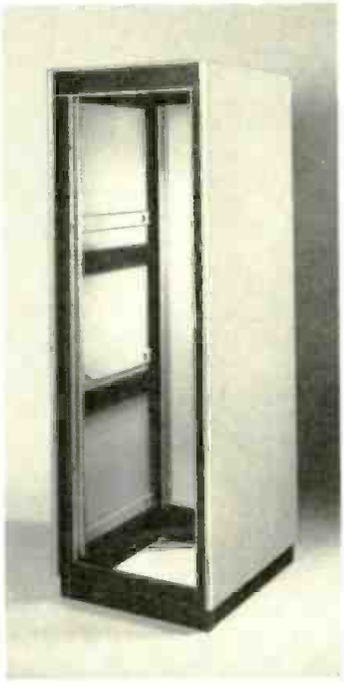

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TeleMation Announces First-Half Earnings

(SALT LAKE CITY, UTAH)—TeleMation, Inc., reported first-half profit of $257,000, or 25 cents per share, on revenues of $4,709,000. This compares to a loss of $536,000, or 52 cents per share, on revenues of $4,754,000 for the first half of 1976.

Results for the three-month period ended June 30, 1977 were a net profit of $213,000, or 21 cents per share, on revenues of $2,414,000 compared to the loss of $314,000, or 30 cents per share, on revenues of $2,339,000 for the three-month period ended June 30, 1976.

The above figures are after extraordinary credits resulting from reduction of taxes by use of a tax loss carry-forward. Profits before the extraordinary credits were $144,000, or 14 cents per share, for the first half and $120,000 or 12 cents per share, for the second quarter.

W. Paul Warnock, president of the video equipment manufacturing and television production company, said that the return to profitability in the first half of 1977 was due to the substantially improved performance of the hardware portion of the company's business. "TeleMation Productions, our television production studio in Chicago, continues profitable as in recent years," he stated.

He attributed the improvement in the company's hardware business to a continuing strong demand for the company's principal products and to extensive action taken at year-end 1976 to bring the company's expense level into line with revenues. Mr. Warnock pointed out that backlog at June 30 was $1.7 million compared to $2.1 million at December 31, 1976. "The return of our hardware business to profitability has been very gratifying to us at TeleMation. The dedicated efforts of all our employees have made it possible," he said.

TeleMation, Inc. A Salt Lake City based manufacturer of professional television equipment, maintains offices in San Francisco; Minneapolis, Danbury, Connecticut; Washington, D.C.; and London. TeleMation also operates a television commercial production division in Chicago.

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TeleMation

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For Literature Only Circle (162) on Reply Card

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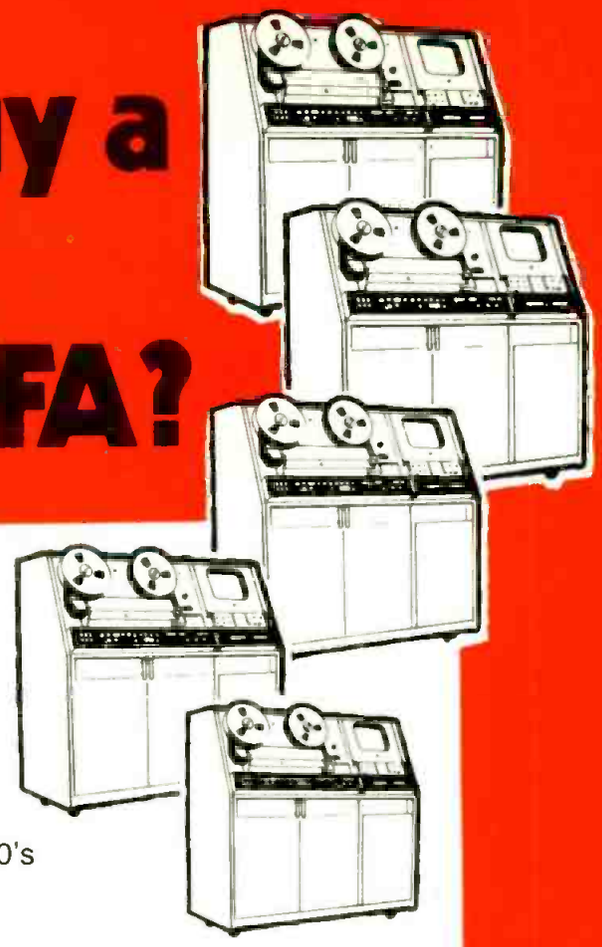
Who would buy a "preowned" 2" VTR from AFA?



TV STATIONS

KDAL-TV Duluth, MN ☐ AMPEX VR-2000
WAST-TV Albany, N.Y. ☐ RCA TR-70C
WHP-TV Harrisburg, PA ☐ AMPEX VR-1200
WAEO-TV Rhinelander, WI ☐ RCA TR-70C
WZTV-TV Nashville, TN ☐ AMPEX VR-2000
WVEC-TV Norfolk, VA ☐ AMPEX VR-2000
KEVN-TV Rapid City, SD ☐ (2) AMPEX VR-1200's
WCIX-TV Miami, FL ☐ (2) AMPEX VR-1200's

PRODUCTION FACILITIES

EUE Screen Gems New York, N.Y. ☐ (3) AMPEX VR-2000's
National Video Center New York, N.Y. ☐ AMPEX HS-100
Dolphin Production New York, N.Y. ☐ AMPEX VR-2000
Innervision Productions St. Louis, MO ☐ AMPEX VR-1200
Media Stream Lake Charles, LA ☐ (2) AMPEX VR-1200's
Upstairs Productions Portland, OR ☐ AMPEX VR-1200
Modern Telecommunications, Inc. New York, N.Y. ☐ AMPEX HS-200

MANUFACTURERS

Consolidated Video Systems, Inc. Santa Clara, CA ☐ AMPEX VR-2000
Recortec Inc. Sunnyvale, CA ☐ (2) AMPEX VR-1200's
Spin Physics, Inc. San Diego, CA ☐ AMPEX VR-1200
Computer Magnetics Corp. Sunnyvale, CA ☐ AMPEX VR-1200

INSTITUTIONS

N.Y. Institute of Technology - Video Center N.Y. ☐ AMPEX VR-2000
Kansas City Baptist Temple Kansas City, MO ☐ AMPEX VR-1200
National Aeronautics & Space Administration ☐ AMPEX VR-1200
Faith Tabernacle Church Baltimore, MD ☐ (2) AMPEX VR-1200's

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1977 BROADCAST BUYERS' GUIDE

This is the largest Buyers' Guide edition of Broadcast Engineering ever published. Moreover, it's the largest single issue of Broadcast Engineering ever published in its 18-year history. Reflective of the current healthy state of this industry, the issue carries over 280 pages, and nearly 250 separate advertisers.

Buyers' Guide is designed as a year-'round reference source, a ready guide to virtually everything that's sold in the broadcast/communications marketplace. Special attention has been focused upon assembling these data in the most logical, legible and easy-to-use format as possible. The fundamentals:

The Product Directory. On the following pages, you'll find more than 800 categories of broadcast equipment, supplies and services. Under each heading is a complete list of every known supplier of that product. More than 725 different firms are listed this year.

Companies with advertising in this issue are listed in red under each appropriate product heading. These Red Listings include the ad page location, to serve as a direct reference to the product information you are seeking.

Each year, Broadcast Engineering mails extensive questionnaire forms to suppliers around the world. They are asked to identify, by special code number, every product they currently market. In the process, scores of new products and companies are added, while lines that have been phased out—and firms that have left the field—are deleted. Once amassed and assembled, these new data are processed through a unique computer operation, programmed to "read" the code numbers and assigned company names and Red Listings to appropriate product headings.

A New Coding System. Dealers or distributors are identified in the Product Directory by the letter "D" after the company name, followed by a numerical code showing the geographical regions (or portion of a region) served. The following chart shows the states included in each region:

1. New England (ME, NH, VT, MA, RI, CT)
2. Middle Atlantic (NY, NJ, PA)
3. East North Central (OH, IN, IL, MI, WI)
4. West North Central (MN, IA, MO, ND, KS, SD, NE)
5. South Atlantic (DE, MD, DC, VA, WV, NC, SC, GA, FL)
6. East South Central (KY, TN, AL, MS)
7. West South Central (AR, LA, OK, TX)
8. Mountain (MT, ID, WY, CO, NM, AZ, UT, NV)
9. Pacific (AK, WA, OR, CA, HI)

The Master Index of Manufacturers and Suppliers. Beginning on page 231 you'll find a complete, alphabetized index of mailing addresses for all of the companies listed in the Product Directory. Additional information appears under the index listing for advertisers in this issue: the name and telephone number of the home office sales manager, followed by, in many cases, a roster of regional sales contacts for that firm.

Reader Service Cards. For your convenience, multiple Reader Service Cards are bound into this edition. Each card is valid for a *full year*. By circling the appropriate numbers on the card, you can secure additional information, directly from the advertiser, through August 1978.

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PRODUCT DIRECTORY

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Hughey & Phillips Inc.
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Sono-Mag Corp.

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Alarm Systems, Burglar

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A-Tel-A-Matic
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G.C. Electronics
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Telatronics
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The Widget Works, Inc.

Alarm Systems, Fire

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Val-Tronics, Inc. D1-9
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Amplifiers, AF Reverberation

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Microwave Assoc. Inc.
Motorola Semiconductor Products, Inc.
Narda Microwave Corp.
National Electrolab Ltd.
North American Radio Corp.
RHG Elect Labs, Inc.
Rodelco Corp.
Rolane Sales Corp.
Singer Instrumentation
Singer Products Co., Inc.
Sound Genesis D8, 9
Television Technology Corp.
Wide Band Engineering Co., Inc.
Wilkinson Electronics, Inc.
Winegard Television Systems

Amplifiers, RF Peak Limiting

Broadcast Communications Devices, Inc. D9
Harris Corp. Broadcast Products Div.
International Microwave Corp.
Lauderdale Electronic Labs
Microwave Assoc. Inc.
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RCA Broadcast Systems
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Collins Radio Rockwell International
Continental Electronics Mfg. Co.
EIMAC Div. of Varian
EMCEE Broadcast Products
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Harris Corp. PRD Electronics Div.
Howe-Yin Research Co. Inc.
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Marconi Communication Systems Ltd.
McMartin Industries, Inc.
Microwave Assoc. Inc.
Moseley Assoc. Inc.
Motorola Semiconductor Products, Inc.
National Electrolab Ltd.
North American Radio Corp.
QEI Corp.
Rohde & Schwarz Sales Co.
Rolane Sales Corp.
Scientific Radio Systems, Inc.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Television Technology Corp.
Townsend Associates, Inc.
Wilkinson Electronics, Inc.
Winegard Television Systems

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Broadcast Equipment Distributors Communication Medias
Mastertone Co., Inc.
Microwave Assoc. Inc.
Moseley Assoc. Inc.
Motorola Semiconductor Products, Inc.

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Dyma Engineering, Inc.
Grass Valley Group, Inc.
International Nuclear Corp.
KVC Video Systems Inc. D 1,2
Lenco Inc. Electronics Div.
Marconi Electronics Inc.
Microwave Assoc. Inc.
Telemet a Geotel Co.

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Ram Audio Systems, Inc.
Robins Broadcast & Sound Equip. Corp.

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BGW Systems Inc.
Broadcast Automation Assoc. D 1,2,5,6
Broadcast Communications Devices, Inc. D9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Electronics, Inc.
Broadcast Equipment Distributors Communication Medias
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Cetec Broadcast Group
Collins Radio Rockwell International
dbx, Inc.
Dyma Engineering, Inc.
Fisher-Burke Broadcast Consultants
Gotham Audio Corp.
Harris Corp. Broadcast Products Div.
Inovonics
LPB Inc.
Landy Associates Inc. D 1,2
Martin Audio/Video D2
Mastertone Co., Inc.
Microwave Assoc. Inc.
Moseley Assoc. Inc.
Rupert Neve, Inc.
The Orange County Electronics Corp. Ltd.
Oregon Sound D 9
QEI Corp.
RCA Broadcast Systems
ROH Corporation
Ramko Research Inc.
Robins Broadcast & Sound Equip. Corp.
Sound Genesis D8, 9
Sparta --see Cetec Broadcast Group
Thomson-CSF Laboratories, Inc.
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Collins Television Services
dbx, Inc.
Dage-MTI, Inc.
Datatek Corp.
Delta Electronics Inc. (N.C.)
Dyma Engineering, Inc.
Dynair Electronics, Inc.
Dynasciences Div. Whitaker Corp.
Fung Engineering Inc.
Grass Valley Group, Inc.
Howe-Yin Research Co. Inc.
Industrial Sciences
International Nuclear Corp.
Javelin Electronics D9
KVC Video Systems Inc. D 1,2
Kay Elemetrics Corp.
Landy Associates Inc. D 1,2
Leitch Video Ltd.
Lenco Inc. Electronics Div.
Marconi Electronics Inc.
Media Concepts, Inc. D 1-9
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Motorola Semiconductor Products, Inc.
Panasonic Video Systems Div.
Peirce-Phelps, Inc. D 2, 5
RCA Broadcast Systems
RCA Community Television Systems
Sigma Electronics, Inc.
Singer Products Co., Inc.
Tektronix Inc.
Telemet a Geotel Co.
Thomson-CSF Laboratories, Inc.
3M Co. Mincom Div.
Vamco Engineering
Video Aids Corp. of Colorado

Amplifiers, Video Sweep

C-COR Electronics, Inc.
KVC Video Systems Inc. D 1,2

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Kay Elemetrics Corp.
Lenco Inc. Electronics Div.
Microwave Assoc. Inc.
Tektronix Inc.

Amplifiers, Zero Studio Delay

Grass Valley Group, Inc.
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Crown International, Inc.
Dyma Engineering, Inc.
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Frequency Devices Inc.
Harris Corp. Broadcast Products Div.
Heath Co.
Ivie Electronics
Leader Instruments Corp.
The London Co.
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Rohde & Schwarz Sales Co.
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B & K Instruments Inc.
Crown International, Inc.
Fisher-Burke Broadcast Consultants
Heath Co.
The London Co.
Marconi Instruments
Potomac Instruments, Inc.
Rohde & Schwarz Sales Co.
Sound Technology
Tektronix Inc.

Analyzers, RF Network

Alford Mfg. Co.
Harris Corp. PRD Electronics Div.
Rohde & Schwarz Sales Co.
Singer Instrumentation
Singer Products Co., Inc.
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Kahn Communications, Inc.
Marconi Instruments
Rohde & Schwarz Sales Co.
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Altec Sound Products
Amber Electro Design, Ltd.
Audio Designs & Mfg.
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Harris Corp. Broadcast Products Div.
Ivie Electronics
Kahn Communications, Inc.
Kay Elemetrics Corp.
Marconi Instruments
Philips Test & Measuring Instruments, Inc.
Ram Audio Systems, Inc.
Rohde & Schwarz Sales Co.
Singer Instrumentation
Singer Products Co., Inc.
Systron-Donner
Tektronix Inc.
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Colorado Video Inc.
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Philips Test & Measuring Instruments, Inc.
Rohde & Schwarz Sales Co.
Sencore Inc.
Tektronix Inc.
Telemet a Geotel Co.

Antenna Alignment Systems, Microwave

Innovative Television Equipment, Inc.
Micro Communications, Inc.
Nurad, Inc.
Scientific-Atlanta, Inc.
Varian/Beverly Micro-Link Products

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Collins Radio Rockwell International
Dyma Engineering, Inc.
G.C. Electronics
Jampro --see Cetec Broadcast Group
Magnum Towers, Inc.
Philadelphia Resins Corp.
Stainless, Inc.
Swager Tower Corp.
Unarco-Rohn Div. of Unarco Ind., Inc.
United Radio Supply Inc. D9

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AEL, Inc.
Broadcast Consultants Corp. D5, 6
Cetec Broadcast Group
Collins Radio Rockwell International
Fisher-Burke Broadcast Consultants
Fort Worth Tower Co., Inc.
Harris Corp. Broadcast Products Div.
Jampro --see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Micro Communications, Inc.
Oldham Tower Systems
Prodelin Inc.
RCA Broadcast Systems
Stainless, Inc.
Swager Tower Corp.
Tiner Communications Service, Inc.
Unarco-Rohn Div. of Unarco Ind., Inc.

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C. S. P. Inc.
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Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Electro Impulse, Inc.
Fisher-Burke Broadcast Consultants
Leader Instruments Corp.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Maury Microwave Corp.
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
RCA Broadcast Systems
Rex Rheostat & Co., Inc.
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Antenna Heater Controls

Cetec Broadcast Group
Collins Radio Rockwell International
Fisher-Burke Broadcast Consultants
Jampro --see Cetec Broadcast Group
Micro-Trak Corp.
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Antenna Ice Warning Systems

Cetec Broadcast Group
Collins Radio Rockwell International
Jampro --see Cetec Broadcast Group
Micro-Trak Corp.
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Cablewave Systems Inc.
Cetec Broadcast Group
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Delta Electronics Inc. (Va.)
Elcom Engineering Co.
Fisher-Burke Broadcast Consultants
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Moseley Assoc. Inc.
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Andrew Corp.
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Bogner Broadcast Equipment Corp.
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Ceco Communications Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Continental Electronics Mfg. Co.
Delta Electronics Inc. (Va.)
Dielectric Communications Div. Sola Basic, Inc.
The Finney Co.
Fisher-Burke Broadcast Consultants
G.C. Electronics
Geleco Electronics Ltd.
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KVC Video Systems Inc. D 1,2
Marco Video Systems, Inc. D 2,5
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
Micro Communications, Inc.
Microwave Assoc. Inc.
Multronics, Inc.
Nurad, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
Prodelin Inc.
RCA Broadcast Systems
RF Systems, Inc.
Rohde & Schwarz Sales Co.
Rolane Sales Corp.
Scala Radio Corp.
Shively Laboratories, Inc.
Singer Products Co., Inc.
Sitco Antenna Co.
Winegard Television Systems

Antenna Tuning Units

CCA Electronics Corp.
CSI Electronics, Inc.
C. S. P. Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Continental Electronics Mfg. Co.

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Dielectric Communications Div. Sola Basic, Inc.
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Elcom Engineering Co.
G.C. Electronics
Geleco Electronics Ltd.
Harris Corp. Broadcast Products Div.
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Continental Electronics Mfg. Co.
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The Finney Co.
Fisher-Burke Broadcast Consultants
Geleco Electronics Ltd.
Harris Corp. Broadcast Products Div.
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Magnum Towers, Inc.
Micro Communications, Inc.
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RF Systems, Inc.
Rohde & Schwarz Sales Co.
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Sitco Antenna Co.
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John Fluke Mfg. Co., Inc.
KVC Video Systems Inc. D 1,2
McKay Dymek Co.
Rohde & Schwarz Sales Co.

Antennas, Receiving MF

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Prodelin Inc.
RF Systems, Inc.
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Prodelin Inc.
RF Systems, Inc.
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Mastertone Co., Inc.
Maury Microwave Corp.
Micro Communications, Inc.
Microwave Assoc. Inc.
Nurad, Inc.
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Cetec Broadcast Group
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Dyma Engineering, Inc.
Farinon Electric
Mastertone Co., Inc.
McMartin Industries, Inc.
Micro Communications, Inc.
Moseley Assoc. Inc.
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McMartin Industries, Inc.
Micro Communications, Inc.
Micro Control Associates, Inc.
Moseley Assoc. Inc.
Nurad, Inc.
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Marconi Communication Systems Ltd.
Mastertone Co., Inc.
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McMartin Industries, Inc.
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
RCA Broadcast Systems
Rohde & Schwarz Sales Co.
Scala Radio Corp.
Shively Laboratories, Inc.
Singer Products Co., Inc.
Sintronic Corp.
Sound Dynamics, Inc. D8, 9
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Wilkinson Electronics, Inc.

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Dielectric Communications Div. Sola Basic, Inc.
Jampro --see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
Stainless, Inc.

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Collins Radio Rockwell International
Continental Electronics Mfg. Co.
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
Jampro --see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
McMartin Industries, Inc.
Pacific Recorders and Engrg. Corp.
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Dyma Engineering, Inc.
EMCEE Broadcast Products
Harris Corp. Broadcast Products Div.
Jampro --see Cetec Broadcast Group
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Micro Communications, Inc.
Nurad, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
Prodelin Inc.
RCA Broadcast Systems

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Rohde & Schwarz Sales Co.
Rolane Sales Corp.
Scala Radio Corp.
Shively Laboratories, Inc.
Sitco Antenna Co.

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Dyma Engineering, Inc.
EMCEE Broadcast Products
Harris Corp. Broadcast Products Div.
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Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Micro Communications, Inc.
Nurad, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
Prodelin Inc.
RCA Broadcast Systems
Rohde & Schwarz Sales Co.
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Mastertone Co., Inc.
Micro Communications, Inc.
Micro Control Associates, Inc.
Microwave Assoc. Inc.
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Rek-O-Kut Inc.
Russco Electronics Mfg. Inc.
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Merill Cable Equipment Corp.
Motorola Semiconductor Products, Inc.
Nagra Magnetic Recorders, Inc.
Opamp Labs, Inc.
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Harris Corp. PRD Electronics Div.
Heath Co.
Lectrotech Inc.
Modular Audio Products Unit of Modular Devices, Inc.
North Hills Electronics, Inc.
Opamp Labs, Inc.
Philips Test & Measuring Instruments, Inc.
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Delta Electronics Inc. (N.C.)
Dyma Engineering, Inc.
Dynair Electronics, Inc.
Elcom Engineering Co.
Electro Sound, Inc.
G.C. Electronics
Harris Corp. Broadcast Products Div.
Heath Co.
Holland Electronics
International Communications & Control Corp.
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Kaitronics Corp.
LPB Inc.
James B. Lansing Sound, Inc.
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Modular Audio Products Unit of Modular Devices, Inc.
Charles Moore
Motorola Semiconductor Products, Inc.
Nagra Magnetic Recorders, Inc.
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The Orange County Electronics Corp. Ltd.
Paso Sound Products Inc.
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Pulse Dynamics Mfg. Corp. (PDMC)
QRK Electronic Products
Quad-Eight Electronics
RCA Broadcast Systems
ROH Corporation
RTS Systems
Ram Audio Systems, Inc.
Ramko Research Inc.
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Kaitronics Corp.
Modular Audio Products Unit of Modular Devices, Inc.
The Orange County Electronics Corp. Ltd.
Quad-Eight Electronics
Ramko Research Inc.
Richmond Sound Design, Ltd.
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Charles Moore
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Ram Audio Systems, Inc.
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Cetec Broadcast Group
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Harris Corp. Broadcast Products Div.
International Communications & Control Corp.
Kaltronics Corp.
LPB Inc.
Logitek Electronic Systems
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Maze Corp D6
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McMartin Industries, Inc.
Micro-Trak Corp.
Modular Audio Products Unit of Modular Devices, Inc.
Charles Moore
Rupert Neve, Inc.
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Professional Audio Service
Pulse Dynamics Mfg. Corp. (PDMC)
QRK Electronic Products
Quad-Eight Electronics
ROH Corporation
Ram Audio Systems, Inc.
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Dielectric Communications Div. Sola Basic, Inc.
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General Cable Corp.
Harris Corp. Broadcast Products Div.
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Phillips Test & Measuring Instruments, Inc.
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Arriflex Co. of America
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GBC Closed Circuit TV Corp.
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L-W International
Laird Telemedia Inc.
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Video Components, Inc.
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Laird Telemedia Inc.
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Fix Tune Solid State Electronics, Inc.
GTE Lenkurt, Inc.
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Image Devices Inc.
Lauderdale Electronic Labs
Marconi Instruments
McMartin Industries, Inc.
Merill Cable Equipment Corp.
Micro Communications, Inc.
Precision Elect. Inc.
RHG Elect Labs, Inc.
Ram Audio Systems, Inc.
Ramko Research Inc.
Rohde & Schwarz Sales Co.
Sansui Electronics Corp.
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Singer Products Co., Inc.
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CCA Electronics Corp.
Cetec Broadcast Group
Collins Radio Rockwell International
Consolidated Electronic Industries
Dyma Engineering, Inc.
Gotham Audio Corp.
International Electro-Magnetics
International Tapetronics Corp.
LPB Inc.
Landy Associates Inc. D 1,2
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MCI, Inc.
Magnasync/Moviola Corp.
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TEAC Corp of America
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Track Audio, Inc. D 1-9
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Val-Tronics, Inc. D1-9
Victor Duncan, Inc.
Video Research Corp.
Wilkinson Electronics, Inc.

Recorders, Camera Tape to Film

AEG-Telefunken Magnetic Tape Recorder Dept.
Comquip, Inc.
Image Devices Inc.
W. A. Palmer Films, Inc.
Teledyne Camera Systems
Victor Duncan, Inc.

Recorders, Film Magnetic

Comquip, Inc.
Image Devices Inc.
Magnasync/Moviola Corp.
Magna-Tech Electronic Co., Inc.
Opamp Labs, Inc.
W. A. Palmer Films, Inc.
Quad-Eight Electronics
RCA Broadcast Systems
Roscor Corp. D3, 4
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Cetec Broadcast Group
Collins Radio Rockwell International
Dyma Engineering, Inc.
Gotham Audio Corp.
Gould Inc. Instrument Systems Div.
Harris Corp. Broadcast Products Div.
IGM Div. of Northwestern Tech.
International Electro-Magnetics
LPB Inc.
Lauderdale Electronic Labs
Magnasync/Moviola Corp.
Mastertone Co., Inc.
Nagra Magnetic Recorders, Inc.
Philips Test & Measuring Instruments, Inc.
Professional Audio Service
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Singer Products Co., Inc.
Sono-Mag Corp.
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Studer Revox America
TEAC Corp of America
Telectro Systems Corp.
Telex Communications, Inc.
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General Electric Co. Tubes/MW Devices
Gould Inc. Instrument Systems Div.
Harris Corp. Broadcast Products Div.
Heath Co.
Moseley Assoc. Inc.
Philips Test & Measuring Instruments, Inc.
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Collins Radio Rockwell International
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
IGM Div. of Northwestern Tech.
LPB Inc.
Lauderdale Electronic Labs
RCA Broadcast Systems
Roscor Corp. D3, 4
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Scully Recording Instruments Div. of Dictaphone Corp.
Stancil-Hoffman Corp.
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Telectro Systems Corp.
VIF International
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Ampex Corp.
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Dyma Engineering, Inc.
KVC Video Systems Inc. D 1,2
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Merlin Engineering Works, Inc.
Microtime, Inc.
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Panasonic Video Systems Div.
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Recortec Inc.
Roscor Corp. D3, 4
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Video Memory Corp. c/o Recortec, Inc.

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Comquip, Inc.
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GBC Closed Circuit TV Corp.
Hitachi Denshi America, Ltd.
Ikegami Electronics (USA) Inc.
JVC Industries, Inc.
Javelin Electronics D9
KVC Video Systems Inc. D 1,2
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Media Concepts, Inc. D 1-9
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RCA Broadcast Systems
Recortec Inc.
Roscor Corp. D3, 4
Sony Corp. of America VTR Div.
TEAC Corp of America
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Martin Audio/Video D2
Merlin Engineering Works, Inc.
RCA Broadcast Systems
Recortec Inc.

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Accurate Sound Co.
Audio Magnetics Corp.
The CnB Studios
Mastertone Co., Inc.
Media Concepts, Inc. D 1-9
W. A. Palmer Films, Inc.
Pentagon Industries, Inc.
Professional Audio Service
Superscope, Inc.
Tape-Athon Corp.
Westlake Audio

Recording Services, Videotape to Film

KVC Video Systems Inc. D 1,2
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Central Dynamics Corp.
Dyma Engineering, Inc.
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Capitol Magnetic Products
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Duotone Co. Inc.
Dyma Engineering, Inc.
Fuji Photo Film USA, Inc. Magnetic Products Dept.
Image Devices Inc.
Irish Magnetic Recording Tape
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Collins Radio Rockwell International
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Comrex Corp.
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Image Magnification, Inc.
Logitek Electronic Systems
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Micro Control Associates, Inc.
Monroe Electronics, Inc.
Moseley Assoc. Inc.
North American Radio Corp.
Nurad, Inc.
Power-Optics Inc.
Pulse Dynamics Mfg. Corp. (PDMC)
Richmond Sound Design, Ltd.
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Safety Devices, Ladder

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P. R. Mallory & Co. Inc.
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Motorola Semiconductor Products, Inc.
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Motorola Semiconductor Products, Inc.
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RCA Solid State Div.
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English Electric Valve North America Ltd.
G.C. Electronics
JSH Electronics, Inc.
C. M. Levit Electronics D 1-9
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Editel Communications
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Hitachi Denshi America, Ltd.
Maury Microwave Corp.
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Microwave Assoc. Inc.
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Crown International, Inc.
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Paso Sound Products Inc.
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Dyma Engineering, Inc.
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Potomac Instruments, Inc.
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Delta Electronics Inc. (N.C.)
Harris Corp. PRD Electronics Div.
Heath Co.
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Allied Tower Co., Inc.
CCA Electronics Corp.
Cetec Broadcast Group
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
E-Z Way Products, Inc.
Fort Worth Tower Co., Inc.
Harris Corp. Broadcast Products Div.
Jampro --see Cetec Broadcast Group
Kline Iron & Steel Co.
Magnum Towers, Inc.
Pacific Recorders and Engrg. Corp.
RCA Broadcast Systems
Singer Products Co., Inc.
Stainless, Inc.
Swager Tower Corp.
Tiner Communications Service, Inc.
Unarco-Rohn Div. of Unarco Ind., Inc.
Up-Right Scaffolds
Val-Tronics, Inc. D1-9

Transformers, Audio

Altec Sound Products
A-Tel-A-Matic
Automated Processes, Inc.
Broadcast Communications Devices, Inc. D9
Dyma Engineering, Inc.
Electro-Voice Inc.
Gotham Audio Corp.
Lauderdale Electronic Labs
Martin Audio/Video D2
Microtran Co., Inc.
Modular Audio Products Unit of Modular Devices, Inc.
Charles Moore
Opamp Labs, Inc.
The Orange County Electronics Corp. Ltd.
Quad-Eight Electronics
Shure Brothers Inc.
Studer Revox America
Westlake Audio
Whirlwind Music

Transformers, Line Level

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Dyma Engineering, Inc.
Lauderdale Electronic Labs
Martin Audio/Video D2
Microtran Co., Inc.
Charles Moore
Opamp Labs, Inc.
Robins Broadcast & Sound Equip. Corp.

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A-Tel-A-Matic
Delta Electronics Inc. (Va.)
Dyma Engineering, Inc.
Harris Corp. Broadcast Products Div.
Multronics, Inc.
North Hills Electronics, Inc.
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Acrodyne Industries Inc.
Television Technology Corp.
Tepco Corp.

Translator Systems, High Power

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Acrodyne Industries Inc.
CCA Electronics Corp.
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
EMCEE Broadcast Products
D. N. Latus & Co., Inc.
Pacific Recorders and Engrg. Corp.
Rolane Sales Corp.
Television Technology Corp.
Tepco Corp.

Translator Systems, Low Power

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Acrodyne Industries Inc.
CCA Electronics Corp.
Contel Mfg.
Dyma Engineering, Inc.
EMCEE Broadcast Products
Harris Corp. Broadcast Products Div.
Ikegami Electronics (USA) Inc.
D. N. Latus & Co., Inc.
Marconi Electronics Inc.
Rodelco Corp.
Rohde & Schwarz Sales Co.
Rolane Sales Corp.
Scientific-Atlanta, Inc.
Singer Products Co., Inc.
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Andrew Corp.
Belden Corp.
Broadcast Automation Assoc. D 1,2,5,6
Broadcast Specialties
CCA Electronics Corp.
Cablewave Systems Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Comark Industries Inc.
Continental Electronics Mfg. Co.
Dielectric Communications Div. Sola Basic, Inc.
Dyma Engineering, Inc.
The Finney Co.
Harris Corp. Broadcast Products Div.
Jampro --see Cetec Broadcast Group
Mastertone Co., Inc.
Maury Microwave Corp.
Maze Corp D6
Micro Communications, Inc.
Pacific Recorders and Engrg. Corp.
Phelps Dodge Communications Co.
RCA Broadcast Systems
Saxton Products Inc.
Shively Laboratories, Inc.
Singer Products Co., Inc.
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmission Sets

Amber Electro Design, Ltd.
Cablewave Systems Inc.
GTE Lenkurt, Inc.
Val-Tronics, Inc. D1-9

Transmission Systems, TV Optical Carrier

American Laser Systems, Inc.

Transmitter Kits

ATV Research
CSI Electronics, Inc.
Harris Corp. Broadcast Products Div.
Heath Co.
McMartin Industries, Inc.

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Delta Electronics Inc. (Va.)

Transmitter Output Controllers, Automatic

Delta Electronics Inc. (Va.)

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Broadcast Component Dist. Communication Medias D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Ceco Communications Inc.
Cetec Broadcast Group
Collins Radio Rockwell International Communications, Ltd.
GTE Lenkurt, Inc.
LPB Inc.
Mastertone Co., Inc.
Maze Corp D6
North American Radio Corp.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Tapex Corp.

Transmitters, AM Low Power

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Broadcast Component Dist. Communication Medias D 1-9
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International Communications, Ltd.
Ikegami Electronics (USA) Inc.
LPB Inc.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
North American Radio Corp.
Singer Products Co., Inc.
Sparta --see Cetec Broadcast Group

Transmitters, AM 250 Watt

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CCA Electronics Corp. .. 99-106
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Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, AM 500 Watt

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CCA Electronics Corp. .. 99-106
McMartin Industries, Inc. 174

AEL, Inc.
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

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Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Contel Mfg.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sound Dynamics, Inc. D8, 9
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, AM 2 kw

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CCA Electronics Corp.

Transmitters, AM 2.5 kw

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Wilkinson Electronics, Inc. 10

Allied Broadcast Equip. D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, AM 3 kw

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CCA Electronics Corp. .. 99-106
McMartin Industries, Inc. 174

Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, AM 5 kw

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CCA Electronics Corp. .. 99-106
Collins Radio 21
Continental Electronics Mfg. Co. 204,271,273
McMartin Industries, Inc. 174
Sintronic Corp. 256
Wilkinson Electronics, Inc. 62

AEL, Inc.
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Contel Mfg.
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

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CCA Electronics Corp. .. 99-106
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Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Contel Mfg.
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

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Sintronic Corp. 256

Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, AM 20 kw

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Wilkinson Electronics, Inc. 62

Wilkinson Electronics, Inc.

Transmitters, AM 25 kw

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CCA Electronics Corp. .. 99-106
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CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Contel Mfg.
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group

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CCA Electronics Corp. .. 99-106
Collins Radio 21
Continental Electronics Mfg. Co. 247,250,269
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Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
C. S. P. Inc.
Collins Radio Rockwell International
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
North American Radio Corp.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

Transmitters, AM over 50 kw

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AEL, Inc.
CCA Electronics Corp.
CSI Electronics, Inc.
C. S. P. Inc.
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.

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Marconi Communication Systems Ltd.
Marconi Electronics Inc.
North American Radio Corp.
RCA Broadcast Systems
Singer Products Co., Inc.

Transmitters, AM to order

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CCA Electronics Corp.
CSI Electronics, Inc.
C. S. P. Inc.
Collins Radio Rockwell International
Continental Electronics Mfg. Co.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Maze Corp D6
North American Radio Corp.
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

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CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
GTE Lenkurt, Inc.
Harris Corp. Broadcast Products Div.
LPB Inc.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
QEI Corp.
RCA Broadcast Systems
Rohde & Schwarz Sales Co.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, FM 40 Watt

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CCA Electronics Corp.

Transmitters, FM 50 Watt

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McMartin Industries, Inc.....174

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Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
Rohde & Schwarz Sales Co.
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

Transmitters, FM 100 Watt

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Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
Scientific Radio Systems, Inc.
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

Transmitters, FM 250 Watt

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McMartin Industries, Inc.....174
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AEL, Inc.
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marti Electronics
Mastertone Co., Inc.
McMartin Industries, Inc.
North American Radio Corp.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, FM 500 Watt

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McMartin Industries, Inc.....174
Wilkinson Electronics, Inc. 62

Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

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Broadcast Consultants Corp. D5, 6
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Fung Engineering Inc.
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Mastertone Co., Inc.
McMartin Industries, Inc.
North American Radio Corp.
RCA Broadcast Systems
Scientific Radio Systems, Inc.
Singer Products Co., Inc.
Sintronic Corp.
Sound Dynamics, Inc. D8, 9
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

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Wilkinson Electronics, Inc.

Transmitters, FM 2 kw

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Wilkinson Electronics, Inc.

Transmitters, FM 2.5 kw

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Broadcast Component Dist. Communication Medias D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
North American Radio Corp.
Singer Products Co., Inc.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, FM 3 kw

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CCA Electronics Corp. .. 99-106
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AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9

Transmitters, FM 3.5 kw

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McMartin Industries, Inc.....174

Allied Broadcast Equip. D 1-9
Broadcast Specialties
CSI Electronics, Inc.
McMartin Industries, Inc.
Sintronic Corp.

Transmitters, FM 4 kw

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CCA Electronics Corp.
Wilkinson Electronics, Inc.

Transmitters, FM 5 kw

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Collins Radio..... 21
McMartin Industries, Inc.....174
Wilkinson Electronics, Inc. 62

AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, FM 7.5 kw

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McMartin Industries, Inc.....174
Wilkinson Electronics, Inc. 62

AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Mastertone Co., Inc.
McMartin Industries, Inc.
Singer Products Co., Inc.
Wilkinson Electronics, Inc.

Transmitters, FM 8 kw

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CCA Electronics Corp.

Transmitters, FM 10 kw

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Broadcast Component Dist. Communication Medias D 1-9
Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Marconi Electronics Inc.
Mastertone Co., Inc.
McMartin Industries, Inc.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, FM 12 kw

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McMartin Industries, Inc. 174
Sintronic Corp. 256

AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
Singer Products Co., Inc.
Sintronic Corp.

Transmitters, FM 15 kw

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McMartin Industries, Inc. 174
Sintronic Corp. 256

Allied Broadcast Equip. D 1-9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Equipment & Supply Co. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
Singer Products Co., Inc.
Sintronic Corp.

Transmitters, FM 20 kw

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McMartin Industries, Inc. 174
Sintronic Corp. 256
Wilkinson Electronics, Inc. 62

Allied Broadcast Equip. D 1-9
Broadcast Consultants Corp. D5, 6
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Mastertone Co., Inc.
McMartin Industries, Inc.
North American Radio Corp.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, FM 22.5 kw

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McMartin Industries, Inc. 174
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Allied Broadcast Equip. D 1-9
CSI Electronics, Inc.
Collins Radio Rockwell International
McMartin Industries, Inc.
Sintronic Corp.

Transmitters, FM 25 kw

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Sintronic Corp. 256
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AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Component Dist. Communication Medias D 1-9
Broadcast Equipment & Supply Co. D 1-9
Broadcast Specialties
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Val-Tronics, Inc. D1-9
Wilkinson Electronics, Inc.

Transmitters, FM 27.5 kw

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CCA Electronics Corp. .. 99-106

CCA Electronics Corp.

Transmitters, FM 35 kw

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CCA Electronics Corp. .. 99-106
McMartin Industries, Inc. 174
Sintronic Corp. 256

Allied Broadcast Equip. D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
McMartin Industries, Inc.
Sintronic Corp.

Transmitters, FM 40 kw

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McMartin Industries, Inc. 174
Sintronic Corp. 256

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Allied Broadcast Equip. D 1-9
Broadcast Component Dist. Communication Medias D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
Mastertone Co., Inc.
McMartin Industries, Inc.
North American Radio Corp.
RCA Broadcast Systems
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

Transmitters, FM 50 kw

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AEL, Inc.
Allied Broadcast Equip. D 1-9
Broadcast Component Dist. Communication Medias D 1-9
CCA Electronics Corp.
CSI Electronics, Inc.
Cetec Broadcast Group
Collins Radio Rockwell International
Harris Corp. Broadcast Products Div.
McMartin Industries, Inc.
North American Radio Corp.
Singer Products Co., Inc.
Sintronic Corp.
Sparta --see Cetec Broadcast Group
Wilkinson Electronics, Inc.

Transmitters, FM 55 kw

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CCA Electronics Corp. .. 99-106

CCA Electronics Corp.

Transmitters, FM 70 kw

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CCA Electronics Corp. .. 99-106

CCA Electronics Corp.

Transmitters, FM 100 kw

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CCA Electronics Corp. .. 99-106

CCA Electronics Corp.
CSI Electronics, Inc.
Harris Corp. Broadcast Products Div.
North American Radio Corp.
Singer Products Co., Inc.

Transmitters, FM to order

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CCA Electronics Corp. .. 99-106
Collins Radio 21

CCA Electronics Corp.
CSI Electronics, Inc.
Collins Radio Rockwell International
Fisher-Burke Broadcast Consultants
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Maze Corp D6
North American Radio Corp.
Rohde & Schwarz Sales Co.
Singer Products Co., Inc.
Sintronic Corp.
Wilkinson Electronics, Inc.

Transmitters, TV Microwave

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International Microwave Corp. 266
Microwave Assoc. Inc. 227
Sound Dynamics, Inc. 226

Acrodyne Industries Inc.
EMCEE Broadcast Products
Farinon Electric
GTE Lenkurt, Inc.
Hughes Microwave Communication Products
International Microwave Corp.
Microwave Assoc. Inc.
RCA Broadcast Systems
Sound Dynamics, Inc. D8, 9
Tepco Corp.
TerraCom
Varian/Beverly Micro-Link Products

Transmitters, TV 1 Watt

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EMCEE Broadcast Products
Fung Engineering Inc.
GTE Lenkurt, Inc.
Harris Corp. Broadcast Products Div.
Howe-Yin Research Co. Inc.
Marconi Communication Systems Ltd.
Rohde & Schwarz Sales Co.
Television Technology Corp.
Townsend Associates, Inc.
Varian/Beverly Micro-Link Products

Transmitters, TV 10 Watt

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Howe-Yin Research Co. Inc. 259

Acrodyne Industries Inc.
EMCEE Broadcast Products
GTE Lenkurt, Inc.
Harris Corp. Broadcast Products Div.
Howe-Yin Research Co. Inc.
Marconi Communication Systems Ltd.
Rodelco Corp.
Rolane Sales Corp.
Television Technology Corp.
Townsend Associates, Inc.
Varian/Beverly Micro-Link Products

Transmitters, TV 20 Watt

Acrodyne Industries Inc.
EMCEE Broadcast Products
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Rodelco Corp.
Rolane Sales Corp.
Television Technology Corp.

Transmitters, TV 60 Watt

Acrodyne Industries Inc.
EMCEE Broadcast Products
Harris Corp. Broadcast Products Div.
Marconi Communication Systems Ltd.
Rodelco Corp.
Rolane Sales Corp.

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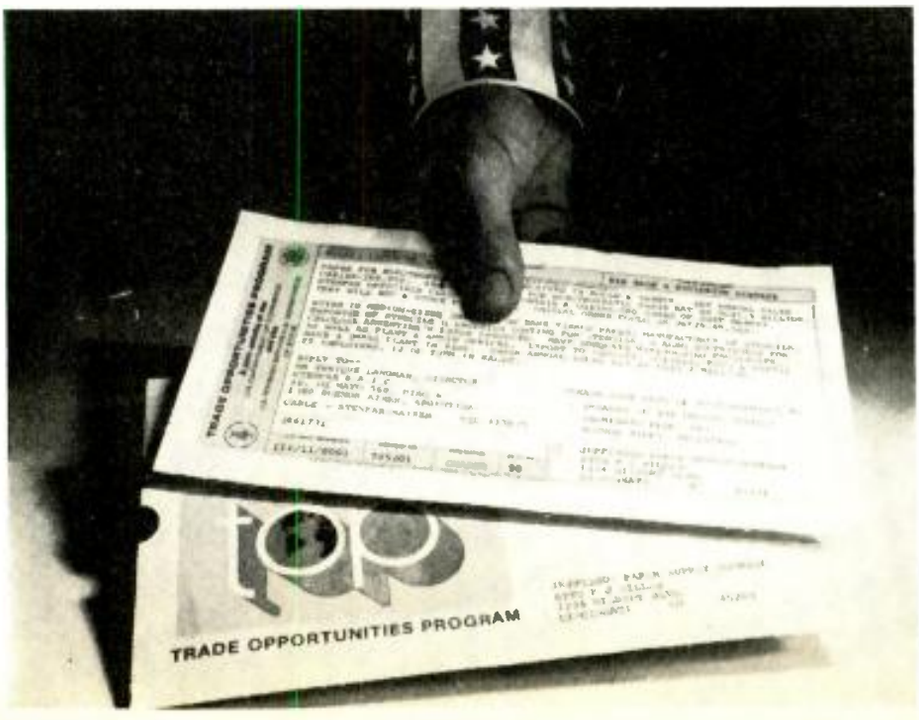

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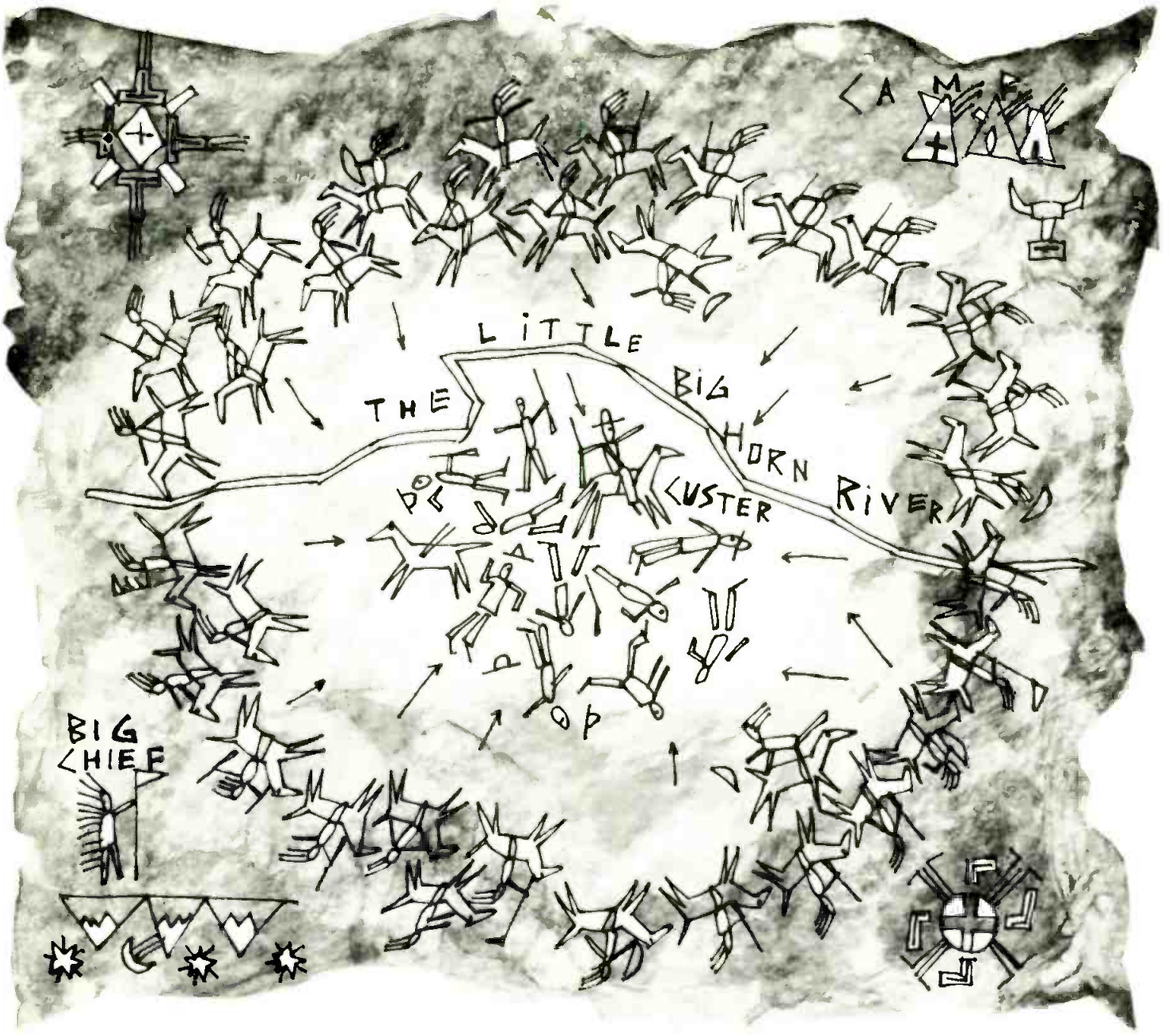

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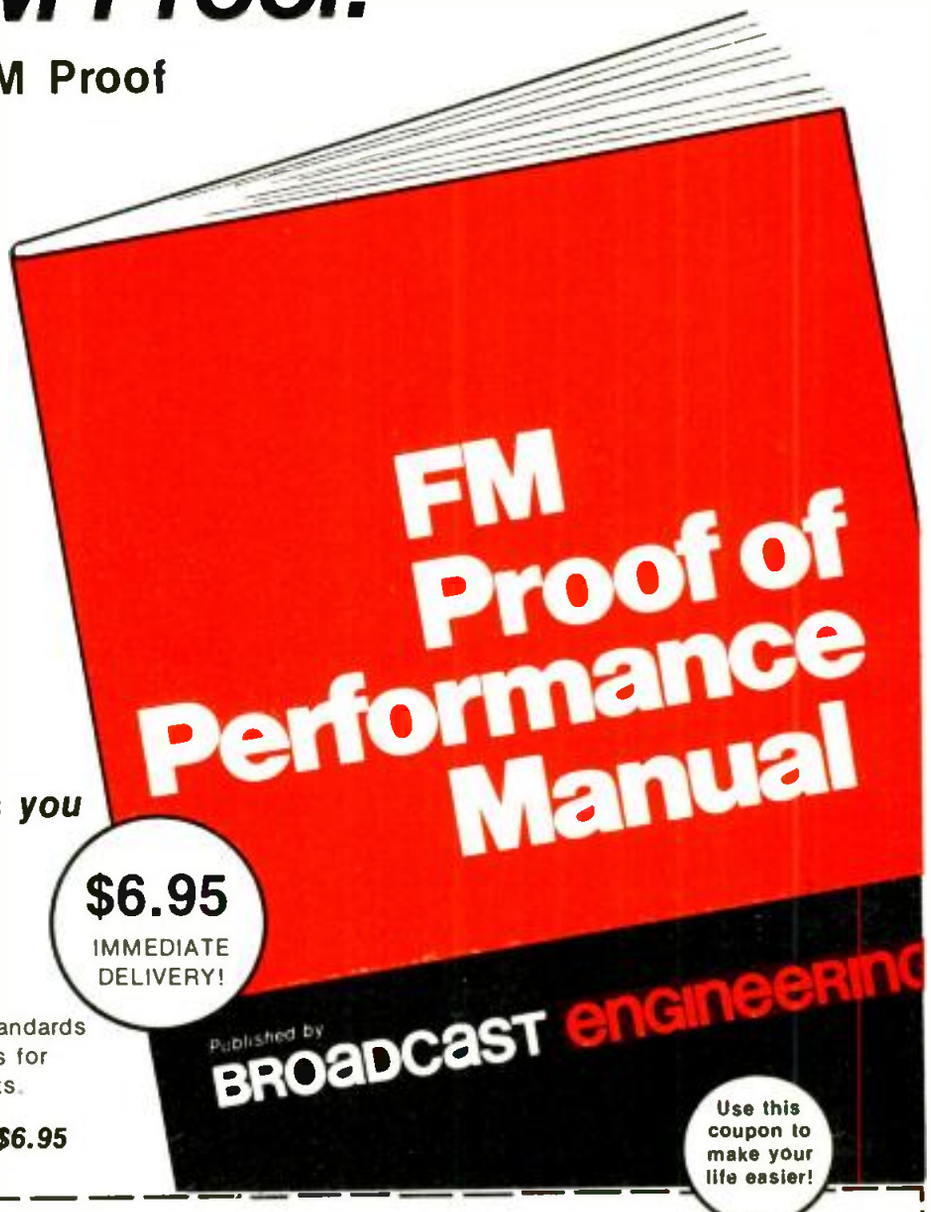

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Up to your pattern in alligators

By Bob Jones & Dennis Ciapura

Don't laugh. It's true. There is one station now in the United States that does have its own alligator farm and believe us this is no laughing matter!

Like many old time stations, WFUN has found it economical to move its transmitter site further away from the metro area. This is because of both the appreciated value of its land and the need to improve its suburban coverage.

So, when you're faced with a decision to move out, and your city of license is Miami, Florida, there is only one place to go—into the Everglades. WFUN has successfully engineered the first radio station ever constructed in the Everglades Swamp.

Physical Problems

The greatest problem is access. There are only two roads now crisscrossing the Everglades. The famous Tamiami Trail and the newer Alligator Alley. Take your pick. The WFUN site we selected is located 21 miles west of Miami along the Tamiami Trail. As an engineer what's the first problem you encounter? The stubborn environmentalists! With 10,000 acres of no good swamp, they want to protect the 10 acres we need. So who really cares? Needless to say the FCC Rules on Environmental Impact are a "piece of cake" compared to the environmentalists of Dade County Florida.

The next problem you encounter is muck. That's right, muck. Like in swamp muck. Before you can install towers, guy anchors, etc., you need to be able to drive to such sites. This requires roads which require removal of the muck. Or as we learned, you need to "demuck."

Step one is to dig out the muck, fill it with rock, and keep on filling until you can get to the place where the towers and anchors are to be erected. Of course the muck will flow, and there is no guarantee on how long you will be able to reach your towers.

The second physical problem is living creatures—like snakes, alligators, scorpions, etc. While I realize other stations have faced similar problems before, I doubt anybody has seen so many so often in one place. It really is hard to work when you keep looking over your shoulder to watch out for what is sneaking up behind you. We, of course, ignore the little creatures like mosquitoes, deer flys, wasps, etc.

Installation

Unlike many new stations, WFUN had to bury all its cables. Not really, but we didn't want some environmentalist to accuse us of tripping an alligator or a swamp deer.

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Doghouses must be elevated to guard against seasonal flooding. There is a wet season and a dry season in the Everglades. Plus of course one must protect against hurricanes. Whether we have elevated our doghouses and tower piers sufficiently, we will never know until the next hurricane comes. But by careful calculation from long time residents of the swamp, we feel confident we have.

Again with adverse weather in mind, we placed our studio-transmitter building up near the Tamiami Trail. This provides for maximum accessibility in bad weather as well as minimizes the length of driveway we have to maintain.

It goes without saying that standby power is a neeessity when constructing in the Everglades Swamp. As with the doghouses and tower piers, the studio transmitter building has been elevated to be above the "high water" mark.

One of the special problems we had was the construction of the doghouses. In the ease of WFUN they have to be tight. Varmint tight we mean. After all nobody wants to run a motel for rattlesnakes or mud-daubers. This means that all excessive holes must be plugged. Stripping must be placed around any warped doorways, etc. Whether chemicals will be required in the future to assist in the control of snakes, bugs, wasps, etc., we just do not know yet, but we presume they will.

Field Intensity Survey

Normally when one sets out to prove a directional pattern he takes readings on foot or by auto. In our case neither of these methods were generally available. As noted we constructed 21 miles out in the Everglades Swamp, and there are only two roads. Even if the water level were not so deep it would be madness to attempt to walk any close-in points. We did find access to a few points we could drive to, in the direction of Miami, Florida.

At one time we considered calling this story by a very bicentennial name: One If By Land, Two If By Sea, and Three If By Air. For this is just what we did. Where we could, we took readings by land on accessible roads, levees or trails. When this failed we took measurements by water. As can be seen this is by air boat. In faet to the best of our knowledge this is the first directional proof ever, where an air boat was used. And when that failed we resorted to the trusty helicopter. Enough has been said about helicopters and helicopter technique, but at this point we believe it may be of general interest to discuss a bit about the use of air boats.

Special Field Techniques

There are really two problems when one sets out to conduct field measurement by air boat. These are knowing the distance and the bearing you are from the towers. This really means you have to stay within visual sight of the towers. Or in flat swamp land about four to five miles. There is no substitute for an Indian guide who knows every blade of grass and can tell you exactly where you are. In our case we used both an experienced guide as well as aerial photos. Ours were on a scale of 600 feet to the inch. We began at the furthest point we desired to take readings and rode the boat into the tower site. The tower will serve as a natural visual compass to keep you on course. By use of a watch, or clock, readings can be obtained at uniform intervals.

Care must be taken that the metal in the air boat does not affect the accuracy of the field intensity meter. This is no different than the precautions one needs to take when making readings in a boat, or helicopter, etc. If the air boat does, and ours did, affect your meter you must correctly determine a calibration factor to be applied to the readings obtained. This is generally in the magnitude of 15-20 percent.

Audio And Transmitting

Now that WFUN had been provided with the best possible R.F. field that a new directional antenna system could provide, it was up to the station's engineering staff to devise the best possible signal to drive the array. A new Harris MW-5, pulse duration modulation transmitter was installed, while the

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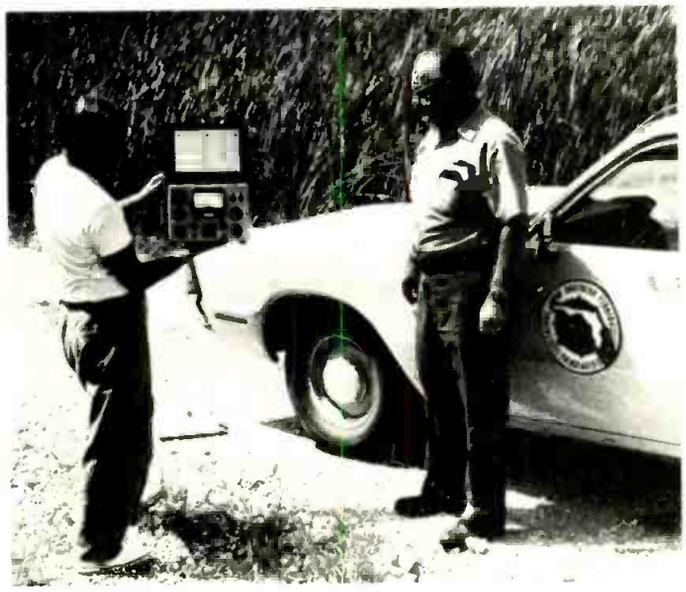

"Sam, the Park Service man," observes test out on levee that runs through the Everglades National Park.

Bob Jones, BE facilities editor, is shown perched in helicopter bubble ready for another run over the Everglades.

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Ed Jurish stands alone against a backdrop of Everglades wilderness. At this stage, underground cables have just gone in.

Bell two-man helicopter, with Bob Jones and field-intensity measuring gear aboard, takes to the air at newly completed antenna farm.

Up to your pattern

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original R.C.A. transmitter was retained as an auxillairy. The MW-5 was selected because the design appeared to be capable of delivery clean positive peak performance and low I.M. distortion, due partly to the absence of high level audio transformers. The R.C.A. was a good choice as a backup transmitter despite its relative age because of its good reliability record and excellent audio performance.

The station's programming is an automated tape format consisting of easy listening music and a very limited number of commercials. While we naturally wanted to obtain the best possible average modulation level for optimum coverage, we also felt that it was imperative that good audio fidelity and dynamic range be maintained, so that listening fatigue due to compression could be minimized.

This balance between average level and fidelity is difficult to arrive at and is different for every radio market, depending upon market size, competition and class of station as well as coverage restrictions due to the directional array. Although the classic approach is to increase audio processing until the signal starts to sound bad and cut back a little, we decided to take a somewhat different approach with WFUN. The processing gear was selected and set up for maximum loudness level first and then the processing parameters were rolled back until a noticeable drop in apparent loudness level was detected. As we had suspected, a little processing in the right places produced nearly the same apparent loudness level as gross processing but with a much more pleasing air sound.

The Audio Chain

The output of the console is fed into a C.B.S. Audimax which has been modified so that the expansion characteristic is limited to about 5 dB. This allows the unit to correct level errors at the board without seriously affecting the dynamic range of the music. The Audimax output is then fed to a Durrough DAP-1 three band audio processor which is set up to compensate for the loss of highs that most AM receivers inflict on their detected audio. The 3 to 5 kHz region is very important to perceived loudness and unfortunately, most AM sets are already down a few dB at 5 kHz. Very low frequencies which most radios won't cleanly reproduce are limited at this point to avoid wasting modulation capability and generating unnecessary distortion at the receiving end, for although it is possible to transmit excellent low distortion, wideband AM audio, most receivers would reproduce this audio diet with a combination of bass indigestion and treble suffocation. Rolling the lowest octave and brightening the highs yields a much cleaner sound in the field.

The Last Step

Finally, the audio is passed on to a C.B.S. AM Volumax for assymetrical peak limiting. Only a few dB of peak limiting was used at WFUN to avoid a compressed sound with the easy listening, soft M.O.R. format. The final result is a very good average level with a very musical open sound and surprisingly good subjective fidelity.

Since the new system has been on the air, WFUN has received reception reports from England, Ireland, Norway and Canada. The fellow in Norway sent a tape along with his reception report, which gave us excellent opportunity to see just how effectively our system was working in keeping the audio above the QRM. Although WFUN does not expect to do very well in radio ratings in northeastern Europe, night interference from Cuba can sometimes be as strong in southern Florida as the interference on the Norwegian tape from across the sea!

All in all, the WFUN project can be described as an interesting blend of modern broadcast technology and the primitive beauty and challenge of one of America's last remaining wildernesses....and from it all comes music, which we hope, as one poet has suggested, "soothes the savage beast" or was it breast?

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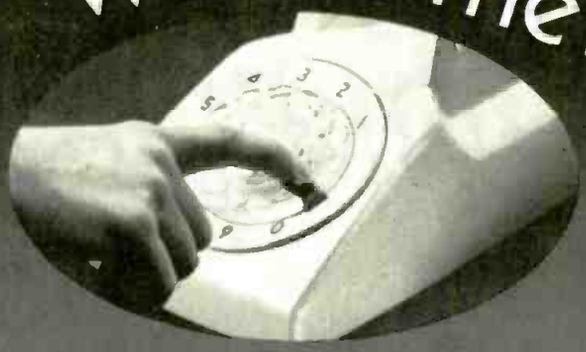

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WTAR-TV/AM combines operation for better news coverage

By Dave Busch

"Combined radio and television news coverage can add up to better and more comprehensive news service for the listening and viewing public," reports James E. Mays, news director of WTAR-TV-AM in Norfolk, Virginia.

"Smaller, separate news staffs for each would duplicate efforts in many cases. The result of a combined staff is that we have more people on the street reporting what is happening," Mays says.

A tightly-run, efficient news operation is especially essential in the Hampton Roads area WTAR serves. Slow news days are a rarity. Mays' biggest problem is deciding what local stories of strictly regional interest to mix in with a host of nationally important stories developing in the area at the same time.

Video news film is used at recommended exposure indexes for most assignments, though they have been "pushed" one, two and three steps when necessary. (*Photo courtesy of Eastman Kodak*)

The radio and television news staff covers a market ranked 50th nationwide, which has more dramatic happenings for any area its size in the country, according to Mays. The bay area consists of seven cities ranging in population from Suffolk's 80,000 to Norfolk's 350,000. It is the seat of the world's largest shipbuilding industry, headquarters for the NATO naval force, and the site of 12 major military bases.

"A lot of our local news affects people all around the world," Mays says. "We pretty much dismiss fender-benders and concentrate on hard news for our radio and television newscasts."

The news director depends heavily on six, two-person news crews, each consisting of a reporter and cameraperson. The reporter audiotapes each interview with newsmakers for radio with a small cassette recorder while the photographer exposes television footage. For fast-breaking stories, the reporter scripts the report at the scene and phones it into the station.

The telephoned report is taped by the radio news editor along with actuality segments fed from the reporter's recorder into the remote telephone. The WTAR radio news editor then puts the pieces together for the next newscast.

"If there is time, of course, we have the reporter come back to the station and record his or her report," Mays says, "but the reporter may have to remain on the scene for further developments."

On the hour, every hour

WTAR's radio newscasts are scheduled for every hour on the half hour. The CBS affiliate carries the network news on the hour. For each newscast, stories are rewritten, with additional taped comments spliced in and lengthened or shortened, depending on the development of the story. This revamping can take place up to 19 times a day with the work done by both the reporter and radio editor.

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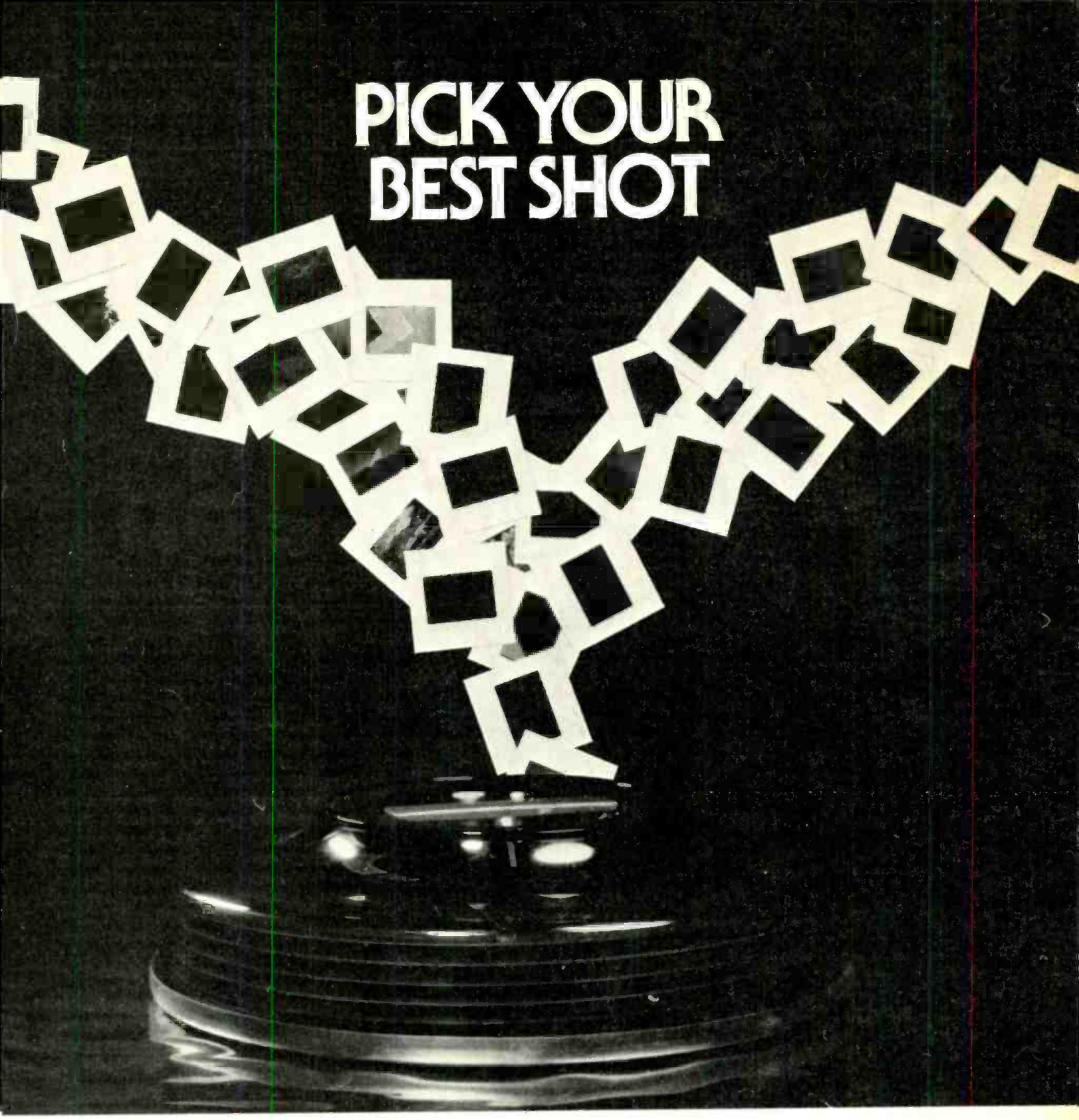

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WTAR news coverage

continued from page 166

Mays adheres to a strict "first in, first out" rule. That is, a new story is carried first either on television or radio depending on which medium has the next scheduled newscast.

WTAR has two daily televised news programs, one at 6 p.m. and another at 11 p.m. Preparation of stories for these shows is only slightly less hectic than radio.

"The reporter is able to take the audiotape he or she prepared for radio and write the television report including cues from that," Mays explains. "This eliminates having to wait for film to be processed. Reporting for both television and radio dovetails very nicely in this respect and in several others."

Mays says that there are obvious differences in radio and television news reporting. For radio, the reporter must emphasize setting more and concentrate on descriptive aspects that are captured on film. But, he points out the key comments from newsmakers provide the "nut" of the story for both television reports and taped radio interviews.

"The reporter audiotapes each interview with newsmakers for radio with a small cassette recorder while the photographer exposes television footage."

"The important thing," he continues, "is hiring people who have worked in one medium or the other. It is relatively easy to teach experienced reporters the requirements of the other medium but difficult to train a neophyte in both from scratch."

The importance of visuals

Mays joined WTAR 10 years ago from the newspaper business. He was both a reporter and a photographer, and so he places a great emphasis on content of words—for radio as well as television—and visuals for the TV screen. Because of the large number of nationally important stories that originate in Hampton Roads, he says that it is essential that new stories be compact but comprehensive. "Good visuals," he says, "are one way of presenting complex stories in an easily understood way.

"For example, we must often explain the city budgets for the seven municipalities we serve," Mays says. "We could display charts showing the figures, but instead, we shoot film of a sewer project and superimpose the costs of that project. This ties the two together."

"The reporter is able to take the audiotape he or she prepared for radio and write the television report including cues from that."

Recently, three cities held city council meetings at the same time. Because six to 10 local stories were going to be used on the half-hour evening news programs, Mays didn't want three of them to focus on city council meetings.

"But these were important discussions," Mays adds. "So, we interviewed the council presidents

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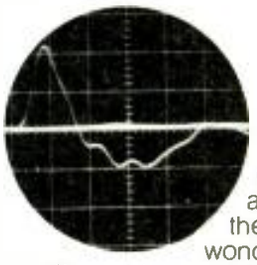

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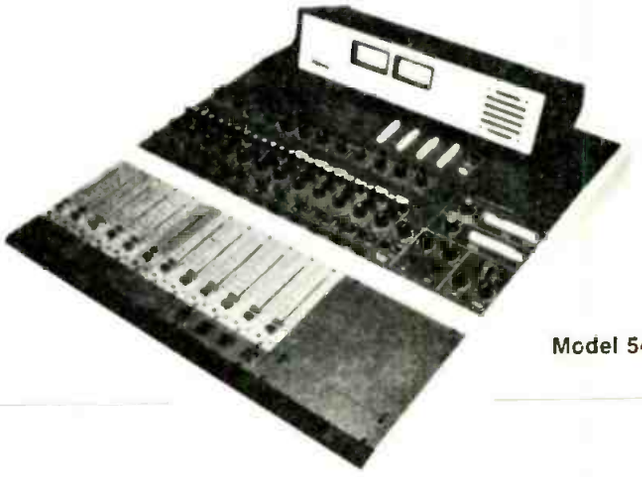

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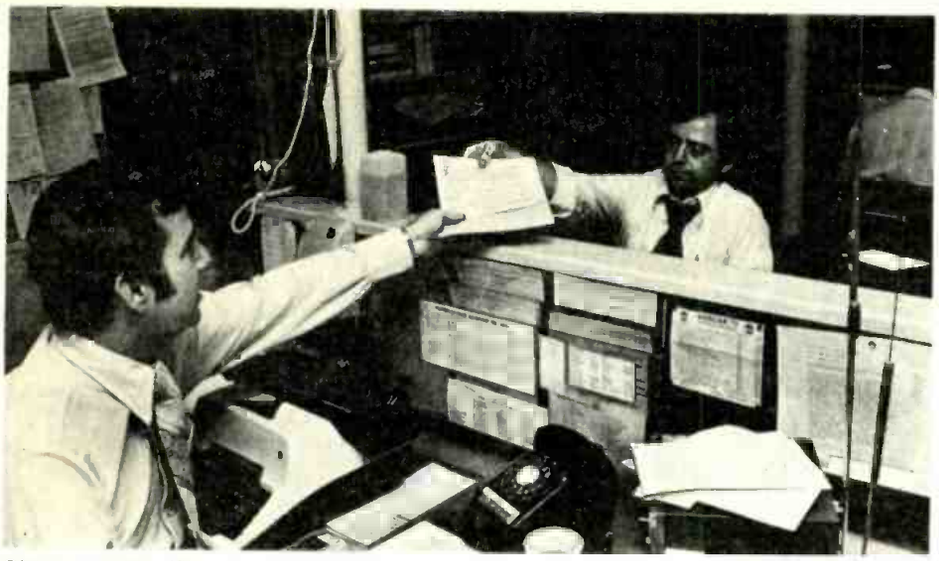

Close cooperation is evident between radio and television news operations at WTAR. Here, the television news producer hands a story list to the radio anchorman. (*Photo courtesy of Eastman Kodak*)

WTAR news coverage

continued from page 168

and various dissident members of council and summed up the actions of all three meetings in three separate stories. Good editing techniques kept the visuals interesting."

Mays believes the ability to add visual highlights and sidebars to breaking stories is often an important difference between radio and television coverage. The added dimension of sight comes at no penalty in maneuverability and flexibility for the reporter. The small CP 16 cameras used by WTAR are lightweight and can be taken anywhere the reporter goes with his recorder.

"Film cameras are the most durable image recording equipment now available," Mays says. "ENG equipment still has a considerable amount of catching up to do. We can send a film crew 600 miles and not have to worry about the equipment working. In addition, because of the portability of the camera we work with smaller crews. This is important to a station our size."

The sturdiness of film cameras was pointed out in the spring of 1977 when a tanker split in two off the coast of Virginia. WTAR-TV commissioned a helicopter, flew a news crew to the deck of one half of the stricken ship, and brought back film coverage amidst rocking waves and billowing spume. By filming at 64 frames per second, the crew produced rock-steady, hand-held footage. The film got back to the station at quarter to five, and led off the six o'clock TV news.

WTAR crews use Eastman Ektachrome video news film 7239 (daylight) and 7240 (tungsten) which allows them to do much of their work by available light. Each pho-

continued on page 172

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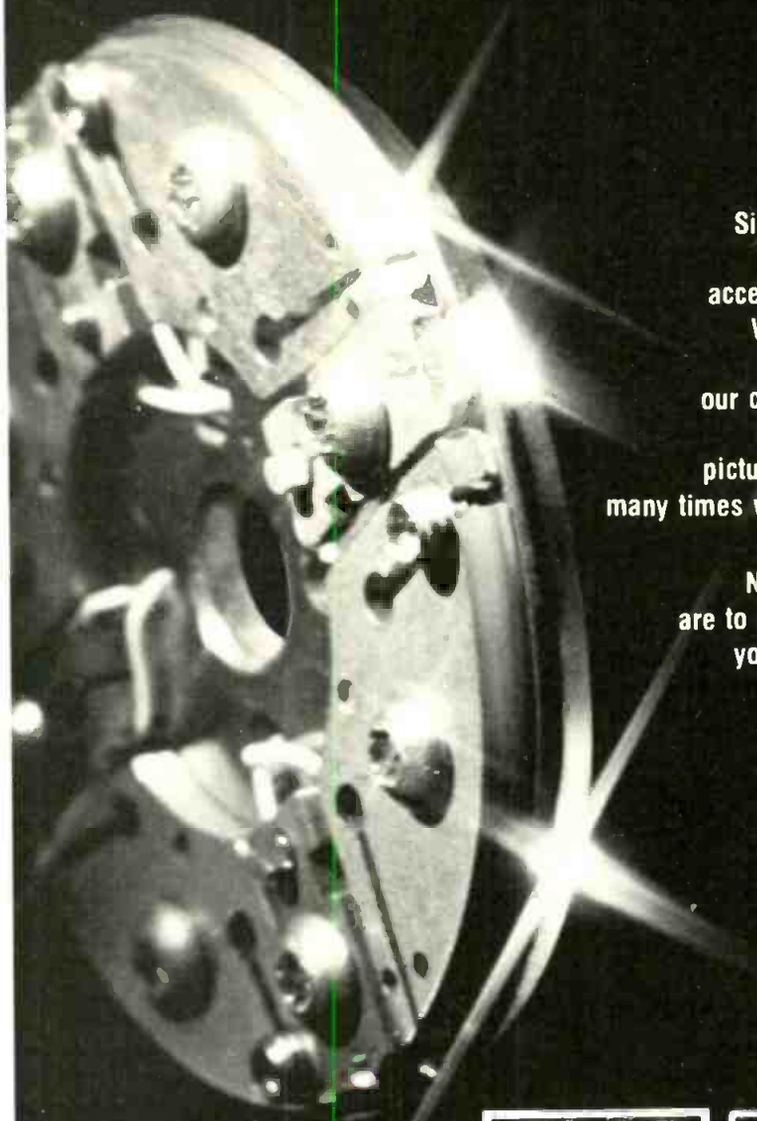

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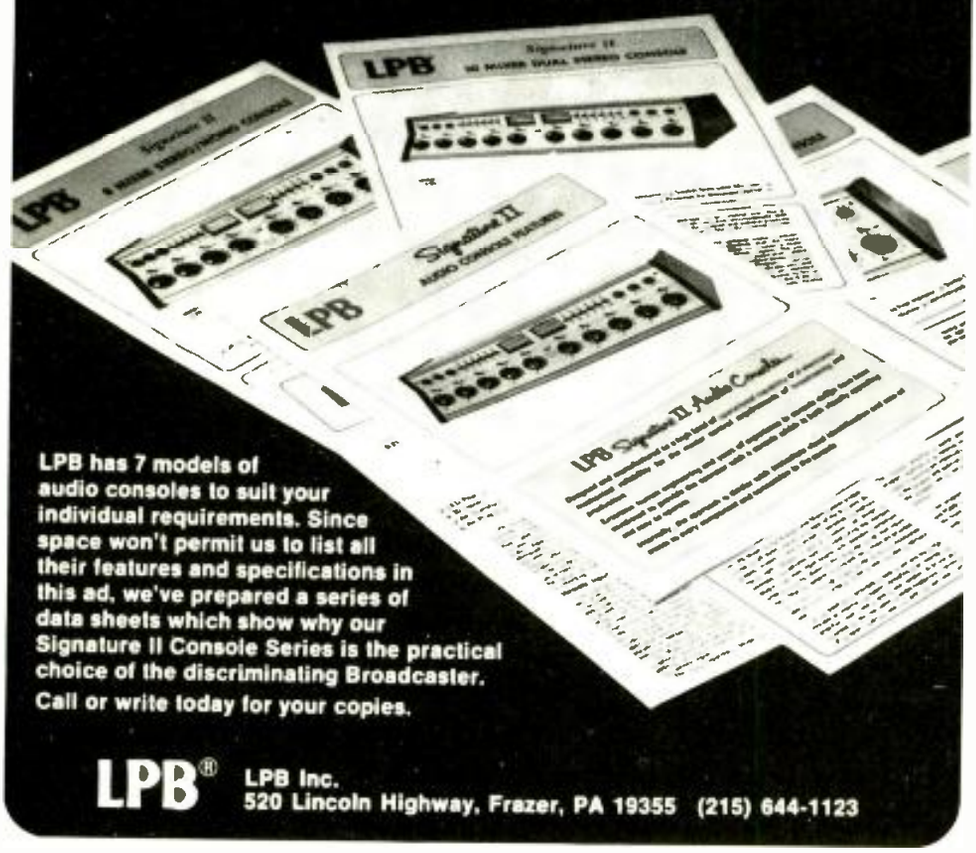

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WTAR news coverage

continued from page 170

tographer carries four lights and a battery unit for extreme low-light conditions. Film processing using Process VNF-1 takes around 30 minutes.

Looking ahead

Mays is pleased with the fast processing and says it helps negate part of ENG's current main advantage: getting to look at visuals immediately. He has been hesitant to make a strong commitment to electronic journalism until technology improves. WTAR has several Akai ¼-inch units, which were bought for one purpose: experience.

"We wanted to gain expertise so that we will be ready when, hopefully, digital technology is available four or five years down the line. Until then, only competitive pressures could force us to make a bigger investment in analog gear," he says.

The electronic cameras and recorders are currently used several times a week under controlled situations such as press conferences. Six news photographers use CP 16 cameras.

WTAR produces eight public affairs documentaries a year—many an hour long—and a weekly half-hour program, *Newsmakers*. The latter is unusual in two aspects: It is presented in prime time and though it originally started out as a studio production, a major segment is now produced on film.

"*Newsmakers* leads into our 11 p.m. news on Sundays," Mays says. "This is a new time slot for the program, but it had captured about 29% of the viewing audience in its old position."

Newsmakers was a talk show until the idea was hatched of using a film background on the topic of the day as an introduction. "It is a very effective way of presenting facts that can't be covered in the studio," Mays says. The film usually consumes 15 to 22 minutes of the half-hour with the studio portion serving more or less as a wrap-up.

Get out of the studio

"We are getting out in the community, looking at urban renewal, solar energy, health care, and other topics that the man on the street cares about," Mays points out. For example, WTAR visited a man who had complained about the noise from low-flying jet planes. The

continued on page 174

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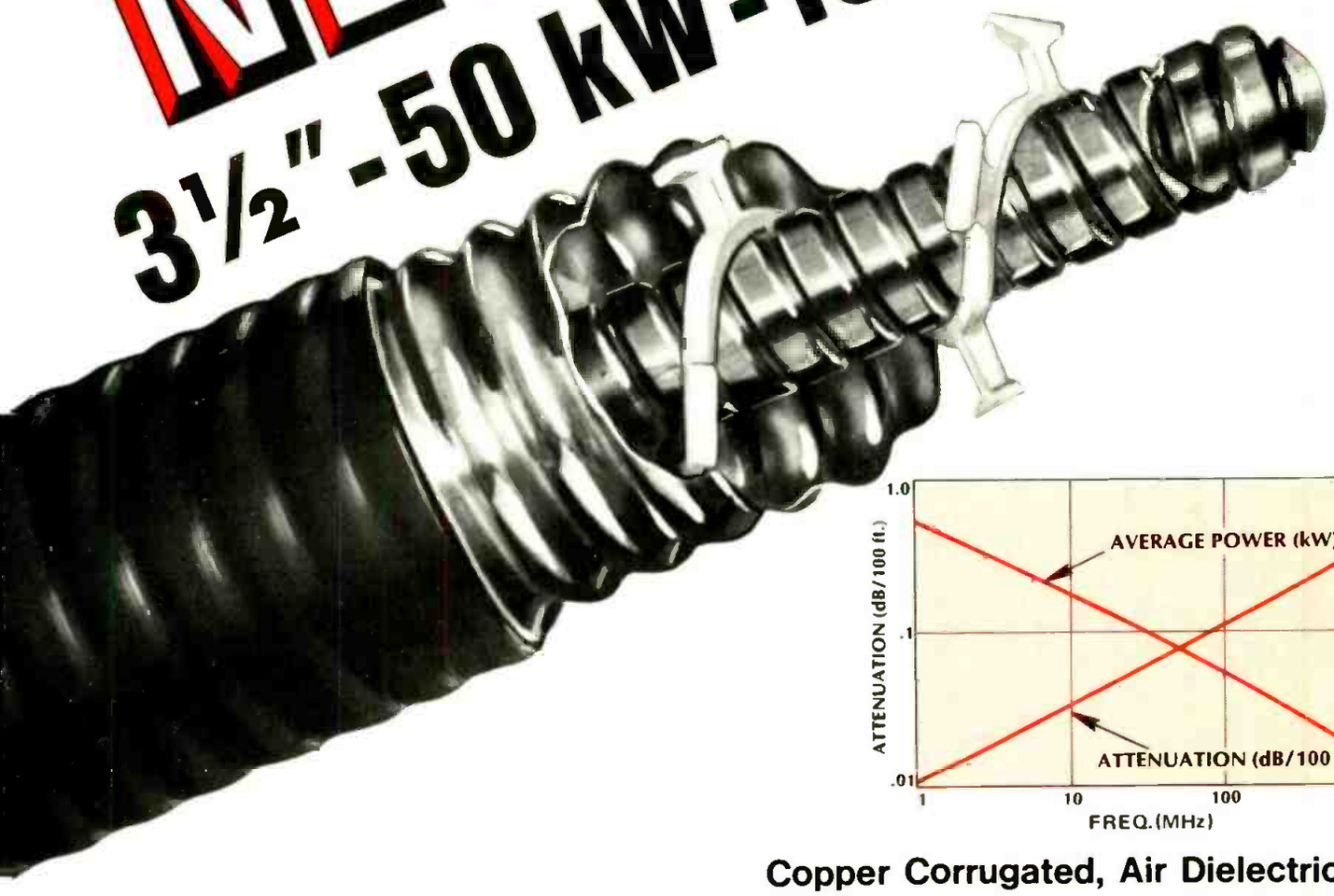
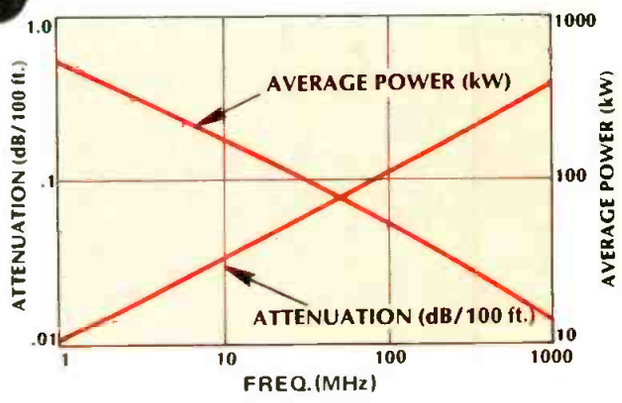
3½" - 50 kW - 100 MHz





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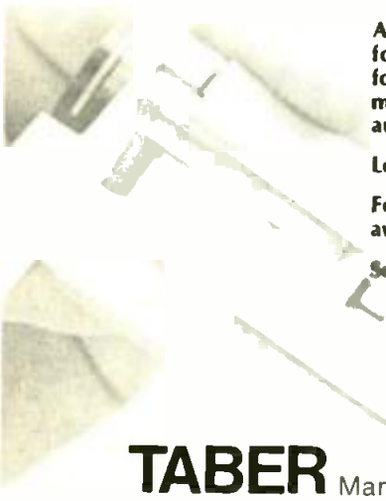

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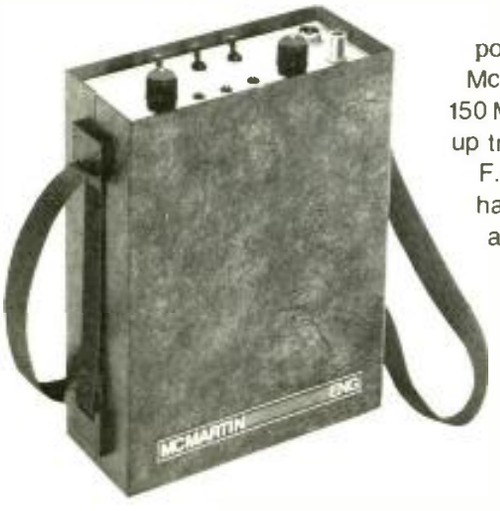

It's 3 watts, six pounds and very portable. Report in first with the new McMartin RPU-1103, a self-contained 150 MHz battery-operated, remote pick-up transmitter. It exceeds all the latest F.C.C. requirements. The RPU-1103 has dual frequency operation and an audio compressor that functions on both line (portable cassettes, etc.) and microphone inputs to allow simple talk over operation. This ENG machine is the latest addition to the McMartin broadcast line.

MCMARTIN

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WTAR news coverage

continued from page 172

station showed, on the air, just how bad the problem was.

Another time, a nearby beach was shown as it is today and as it was many years ago. Then through studio discussion, a picture was developed on how the same area could look with community involvement.

"That was a lot more effective than having an urban renewal spokesperson sit in a chair and tell us all the wonderful things that could be happening. We showed, rather than told," Mays says.

Photographers edit their own film to insure that the person who knows the most about that particular footage does the final assembling. (*Photo courtesy of Eastman Kodak*)

The background function of *Newsmakers* is so important that the show's producer is finding increasing use for WTAR's morgue of black-and-white film and stills. "He mines these," he says, "like a treasure trove of past information."

Mays feels the program epitomizes efficient use of personnel. A producer-reporter and photographer shoot film on Wednesdays. The story is scripted and edited Thursdays, and on Friday evenings the studio portion is taped and interwoven with the film footage.

"It may seem like a hectic schedule, but actually, our news photographers enjoy the assignment. It gives them more time to experiment with angles and editing than they usually have," Mays says.

The documentary

Each photographer also works about once a year on a docu-

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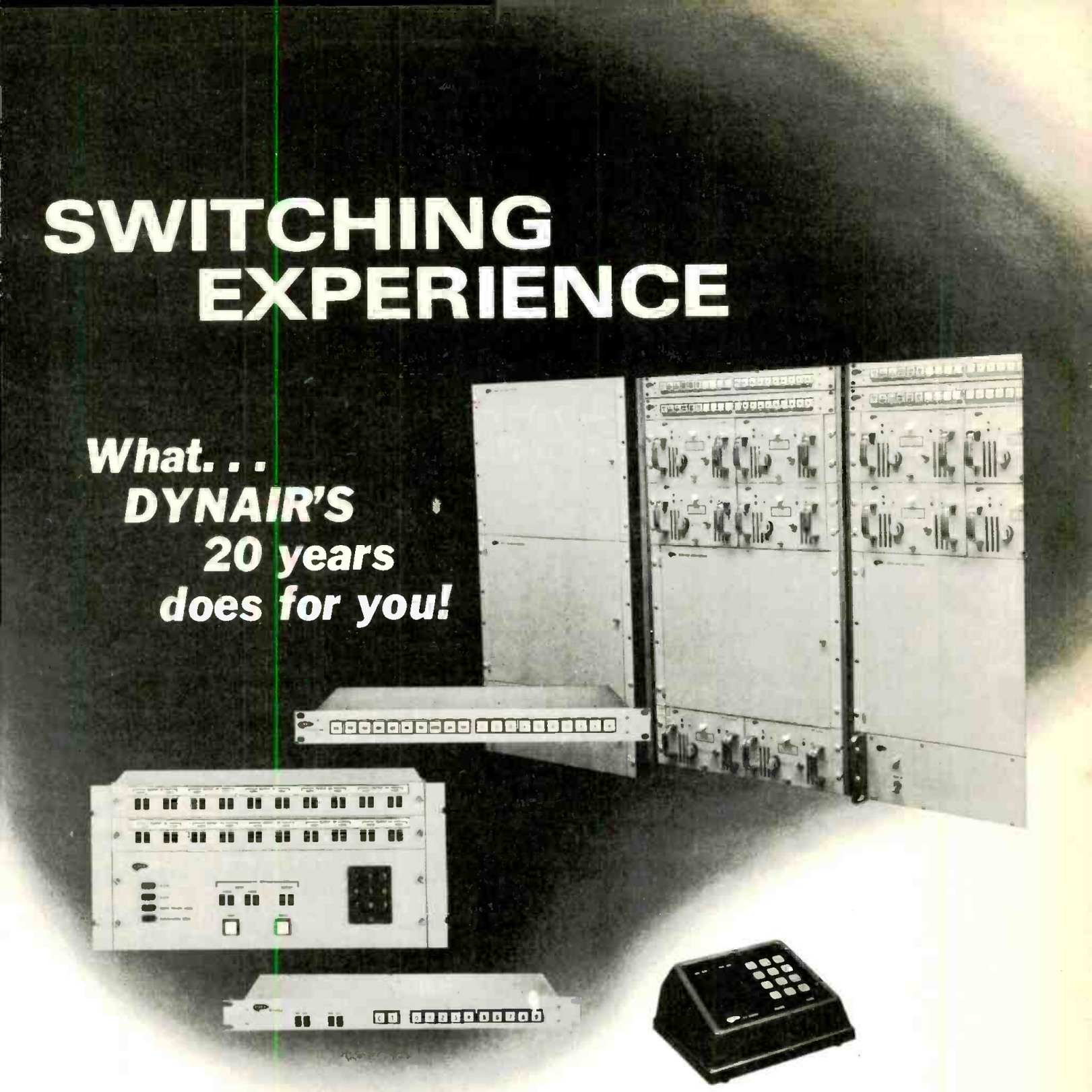
SWITCHING EXPERIENCE



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WTAR news coverage

continued from page 174

mentary. WTAR has a successful series running under the title *Winds of Change*.

"Our working theme is that change is not necessarily bad, but things will change just the same. These are the things that are changing in your area, and here is how they will affect you, our viewers," Mays says.

Frequently, *Winds of Change*'s investigative efforts uncover a whole chain of impending incidents.

"When we looked at medical malpractice, we found that it was just one symptom in a whole series of changes in the health care field—one that was going to affect how we all deal with our doctors," Mays says. "We titled it 'Malpractice-Symptom One,' and looked at some of the other symptoms of change—such as the use of nurse-practitioners instead of doctors for basic health care, changes in family practice and so on."

"Good visuals are one way of presenting complex stories in an easily understood way," reports Mays.

In another in the series, WTAR found that offshore oil well drilling was coming to Virginia. Mays dispatched a crew to the Gulf Coast where offshore drilling has been under way for some time. The resulting documentary gave local viewers an idea of what happens to an area—good and bad—when offshore drilling begins.

The challenge for quality

All these film stories were produced with maximum image quality in mind. One thing Mays insists on is that each photographer edit his or her own film.

"After all, he or she is the one who knows the most about what is on that reel," Mays says. "The photographer won't get lazy if he or she has to edit the material brought back."

"It is difficult boiling down some of these complex issues into a one-minute news story," Mays says. "With so many municipalities, we find ourselves flooded with city-government stories competing with the military news events that spring up both here and in Washington. But it certainly is a challange to all of us." □

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people in the news

Recently elected to the board of directors of Telecommunications Technology, Inc., **Vernon R. Anderson** brings more than 24 years of professional telephony, electronics and mechanical engineering experience to his new position...**Jack M. Ducart**, formerly with Moseley Associates, has joined Ramko Research as general sales and marketing manager...**Leon A. Wortman**, new marketing manager at Otari Corporation, will be responsible for overall management of sales and marketing efforts in the U.S. and Mexico, as well as new product and long-range planning...

Keith Y. Reynolds is the new marketing manager at Unimedia Corporation...**Pat Bohana** has been appointed western regional representative for Scientific-Atlanta...Following the resignation of **William H. Butler** as president of Commercial Electronics, Inc. (CEI), the board of directors elected **William R. Riester** and **Alan K. Jensen** executive vice presidents. Butler continues as a member of the board...

ANDERSON

BOHANA

KITCHEN

Central Dynamics Corp. announces the appointments of **Buddy Naeyaert** as vice president of marketing, **Howard Shephard**, vice president of product planning, and **Vince Lyons**, western regional manager ...**Arnold Taylor** moves from senior product manager to national sales manager for Ampex Corporation's audio-visual systems division...

A. H. Bott joins Broadcast Electronics, Inc. as vice president, engineering...**Herman D. Post**, president of Robins Broadcast & Sound Equipment Corporation, announces the appointment of **Steven N. Friedman** as vice president of the professional products division... As religious broadcasting sales specialist for CCA Electronics Corp., **Bill Kitchen** will maintain close liaison with religious broadcasters both in engineering and sales capacities...

Patricia A. Rooney has been promoted to sales coordinator for the cable communications division of Scientific-Atlanta, Inc....The new director of communication product sales for Time and Frequency Technology is **Robert W. Cochran**, it has been announced by **Joe Wu**, president...**Richard Pass**, president of Pass Associates, will be directing sales in Eastern Pennsylvania, Delaware and Southern New Jersey for Robins Broadcast & Sound Equipment Corporation...**Neville H. "Doc" Bennett** moves from director of program management to acting engineering administrator for TeleMation, Inc....

John Woods has been named vice president, engineering, for Catel, a division of United Scientific Corporation...**Donald Dworkin**, formerly with Manhattan Cable TV, joins Warner Cable Corp. as manager of cable TV engineering...**John K. Major** is the new general manager of WONO(FM), Syracuse, New

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York...**Jerry Bridges** moves from chief financial officer to executive vice president at Taft Broadcasting Corp....Radford Associates announces the appointment of **Ralph L. Hucaby**, former vice president and director of engineering of television station WTVF in Nashville, as an associate of the firm...

ROONEY

LAYN

KEANE

Fred Layn, appointed to the newly created position of eastern regional manager for Studer Revox America, Inc., will handle both sales and service on the Studer line of professional studio recording equipment...**James M. Keane** has been promoted to vice president, engineering, for Systems Resources Corporation...The board of governors of the International Telecommunications Satellite Organization (INTELSAT) has elected **José Martínez-Villarejo** of Spain chairman and **Marcel Perras** of Canada vice chairman...

John J. Sie becomes vice president, marketing and affiliates, for SHOWTIME, Viacom's pay-cable subsidiary...Brigadier General **Harold R. Johnson**, USAF (Ret.) has joined American Satellite Corporation as vice president for marketing...The appointment of **David Orienti** as CCA Electronic Corp.'s area manager for Michigan, Indiana and Ohio has been announced by **Arthur Silver**, vice president-sales...

SIE

BURKHART

WOODWORTH

Paul P. Hoppe, Jr., is the new vice president of engineering for Switchcraft, Inc....New buyer for Radio Shack, **Garrett B. Burkhart**, will be responsible for the primary purchasing of electronic parts and components, alarm systems, wire and cable. North American Media Company has elected **Jack O. Koonce** as president...**David DiManna** has joined the staff of TPC Communications in Pittsburgh as a staff director ...**Tom E. Paro** becomes executive vice president of the Association of Maximum Service Telecasters...

John T. Shafer moves from Foto-Kem Industries to Deluxe Laboratories, where he assumes duties in the marketing department...**Maurice P. Talbot, Jr.** has been named legal assistant to FCC Commissioner Margita E. White...As manager of sales for Studer Revox America, Inc., **James Woodworth** will be

continued on page 180

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people in the news

continued from page 179

responsible for domestic sales of Studer's Revox line of tape recorders, tuners, amplifiers and other consumer audio products...**N. H. Bennett**, new customer service manager at TeleMation, Inc., was formerly service operations manager for Beehive International...

Linda Feldman, a sound engineer who has been involved in equipment testing and consumer education at TEAC Corp. of America, has been named manager of the company's training department...KVC, Inc. has established an international division headed by **Sidney C. (Chuck) Sterchele**, former president of Global Television Associates...New director of technical services at KVC, Inc. is **Joseph F. "Chip" Chiappalone** ...

The promotion of **Bud Yankowski** to manager of engineering has been announced by Edward M. Mullin, president of Ampro Broadcasting...The board of directors of Penril Corp. has elected **Paul Keane** vice president, **Joseph Gregory** corporate secretary, and **Gloria Ehrlich** assistant corporate secretary... **Justin Camerlengo** moves from manager of public relations to public relations director at Panasonic...

Ray Mattinson, chief engineer and account executive at KAPX Radio, San Clemente, Calif., passed away August 2 following a stroke. Mattinson had spent several decades in the field of broadcast engineering prior to coming to KAPX. He was with KOGO Radio in San Diego and KERO TV in Bakersfield, and was chief engineer at KAPX since September 1975. His friendly manner and courageous spirit following the recent discovery of extensive internal cancer will be sorely missed by his friends both at KAPX and in the San Clemente community. He is survived by his wife Lillian of San Juan Capistrano, and four children.

Len Hensel, vice president and general manager, WSM, Nashville, has been elected chairman of the radio board of directors of the National Association of Broadcasters, as **Kathryn F. Borman**, president, Springfield (Mass.) Television Broadcasting Co., becomes chairwoman of NAB's television board of directors...New chairman of the 45-member board of directors of the NAB is **Donald A. Thurston**, president of Berkshire Broadcasting Co., North Adams, Mass.

Richard Estell, general manager of Michigan State University's public radio stations, WKAR AM and FM, has been elected president of the Public Broadcaster's Organization of Michigan (PBOM)...**Raymond Telesky**, recently appointed director of quality control and reliability engineering for computer products at the Computer Products Group, will be responsible for maintaining high standards of quality control...**Leo Mahan** is the new assistant manager, product planning and national manager for product training, for the video products division of Sony Corporation of America...

Lynn Ronan becomes assistant manager of video administration at Sony...

continued on page 182

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people in the news

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Preston Weber moves from product marketing manager for data acquisition system products to national sales manager at the data tech division of Penril Corp....**Michael Marcovsky** has been named general manager of Columbus, Ohio programming for the QUBE division of Warner Cable Corporation...As sales manager, photo tubes, **David Farrar** will be responsible for the marketing function of English Electric Valve Company's photo tubes worldwide...

MARCOVSKY

RAY

HORNER

Don Rhodes, national sales manager for TeleMation, Inc., has announced the appointment of **James Kubit** as field sales engineer for the western region...**Paul C. Gordon** is the new president of Federal Electric Corporation...**John Semenuk**, who has been with GTE Sylvania since 1957, was recently appointed materials manager for the parts division...

Two weeks after rejoining National Semiconductor Corp. as technical director, **Pierre Lamond** was elected a vice president...**Carroll B. Ray, Jr.** will handle corporate development for Radio Shack...**Harvey Schein**, who has been president and chief executive officer at Sony Corp. of America for the past five years, has been promoted to chairman of the board. He will continue as the company's chief executive officer...

Setsutaro Kobayashi, chairman of the board, Fuji Photo Film Co., Ltd., Japan and president of Fuji Photo Film USA, Inc., died August 12, 1977 (Tokyo time). He was 77 years of age. Kobayashi joined the company in 1934 and served in a variety of sales and executive positions. In 1937, he was named a director of the board of Fuji and in 1943, became executive managing director. He was promoted to executive vice president in 1958 and president in 1960.

Warner Cable Corp., a subsidiary of Warner Communications Inc., has announced the appointment of four executives in its QUBE division, set up to introduce the company's new two-way communication service to the Columbus, Ohio area: vice president of marketing, **J. Ronald Castell**, joins Warner Cable from WBNS radio and TV in Columbus, where he was in charge of marketing; vice president of operations is **James L. Fischer**, who will direct overall technical operations; **Dr. Vivian Horner**, vice president of educational and children's programming, was formerly the director of research for *The Electric Company*, a production of Children's Television Workshop; and **Harlan P. Kleiman**, vice president of premium programming, pioneered the first specials in the cable TV industry. □

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AAM-1 ANALOG ANTENNA MONITOR – FCC type approved. Provides accurate true ratio and phase readings. Easy to interface with existing control systems. AAMH-1 provides hardwired remote control of AAM-1.

DAM-1 DIGITAL ANTENNA MONITOR – FCC type approved. Provides digital readout of amplitude, ratio and phase. Also available: DAMA-1 Base Current Adapter for remote digital readout of antenna base currents; DAMX-1 to extend capacity of DAM-1 up to 12 towers.

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TCT-( ) TOROIDAL CURRENT TRANSFORMER – Provides accurate, stable R.F. samples for phase and amplitude measurements. Available in three sensitivities. Also available: TCTR-1 Compensated Rectifier Circuit to provide DC voltage for remote current measurement when used with TCT-( ).

MJ-50 METER JACK – A make-before-break in line jack assembly that permits "hot" insertion of OIB-1 Bridge or Ammeters.

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industry news

continued from page 20

Spurious emissions proposal faces opposition from NAB

Compliance with the FCC's proposal to limit spurious emissions from high-power broadcast transmitters to -90 dB would impose unjustified hardships upon licensees, according to the NAB. The NAB urged that the present tolerance be maintained.

Spurious emissions are those outside authorized channels and the FCC has proposed the new tolerance for submission to the 1979 World Administrative Radio Conference.

The NAB said there is no evidence that nations meeting the present international standard are causing widespread interference across their borders.

The NAB stated that the suggested suppression levels may be beyond practicality because the measurement could be made under ideal conditions such as during the manufacturing process, but would be difficult if not impossible under actual field conditions.

The majority of high-power broadcast transmitters have a normal life span of approximately 20 to 25 years, according to the NAB. Those now in operation unable to meet the new emission requirements by the mandatory compliance date in 1982 would have to be replaced or substantially modified even though their electronic life span was not finished.

First-class FCC licensing course being offered

Designed to prepare students for a career in the communications industry, "Radiotelephone Electronics: 1st Class Licensing Preparation," will be offered September 26 through spring 1978 at the New School for Social Research in New York City.

The 300-hour course covers several diverse areas of electronics and radio-frequency theory, developing basic skills at each level, culminating in the 1st- and 2nd-class exams. The student receives 10 undergraduate credits at the completion of the course.

Some of the topics covered in the program are: the structure of matter, conduction; DC-circuit analysis; batteries; induction; generators; motors; transformers; AC-circuit analysis; resonant circuits; vacuum-tube, gas-tube, solid-state rectification; filter networks; AF and RF amplifiers, multipliers, oscillators; AM and FM modulation, transmission and reception; antenna theory; transmission-line theory; microwave; FCC regulations; television transmission; directional-antenna theory; and op-amp circuits.

The final sessions of the course will feature visits to actual studios for transmitter and student orientation. Resources are available for individual instructional assistance.

Due to the extensive technical material a student must grasp, the course requires a two-semester commitment and intensive study.

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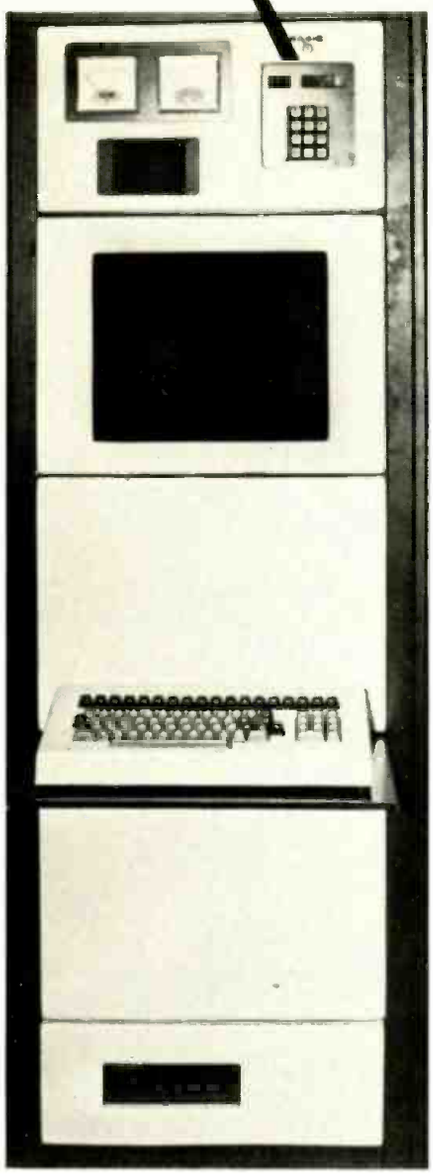
It's BASIC



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We asked broadcasters all over the country what they wanted most in an audio control system. They told us and we built it. We call it BASIC.

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Everybody wants a system that will perform all important functions (not everyone agreed on what was important and what wasn't). Nevertheless, BASIC performs all of the functions all IGM systems ever have . . . and more.

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industry news

continued from page 184

FCC modifies equal time recommendations to Congress

The FCC has voted against recommending that Congress consider an exemption to Section 315 of the political equal-time laws which would apply only to candidates demonstrating substantial support among the electorate. The exemption would apply if they polled 2% of the vote in the last general election or received support by petition from 1% of the electorate.

This modifies the FCC's May 4 recommendations to Congress: exempting Presidential and Vice Presidential candidates from the equal-time opportunities of Section 315; that a "major candidates test" be applied to other partisan races; and review of Section 399 and Section 312(a) (7) with respect to noncommercial broadcast stations.

The recommendations to exempt Presidential and Vice Presidential candidates and to review the public broadcasting sections were upheld.

Under current law, every use of a broadcast station by a candidate triggers an obligation to provide equal time unless the candidate is presented on an exempt newscast, news interview, documentary or in on-the-spot coverage of a bona fide news event.

continued on page 188

The New Reverb Price/Performance Leader:

Introducing the new *dual channel* Orban/Parasound Spring Reverb. The new 111B retains all of the electrical features of its popular single-channel predecessor and augments them with a new bass control and "quasi-parametric" midrange control. The new midrange equalizer permits stepless adjustment of its ±12 dB equalization range, as well as continuously variable center-frequency and *bandwidth*. This equalization flexibility is unparallelled in the low-cost reverb field and effectively complements the simple equalizers usually found on low-cost mixers and consoles.

Included in the new package is our unique "floating threshold limiter" which minimizes "spring twang" and provides absolute protection from overload. And our highly-respected electronics provides a bright, super-clean sound with the best signal-to-noise in the spring reverb field. Most remarkably, the two-channel 111B costs exactly as much as our single channel model. The only thing you give up is the flexibility of our dual-chassis construction—now the spring is mounted with the electronics.

At *$695 for two channels*, the 111B provides the quality alternative to the cheaper, consumer-quality reverbs on the market. With industrial-quality construction, line-level balanced outputs, compact size, and smooth, four-spring (per channel) sound, the 111B is the ideal choice for the user with space and/or budget limitations. And as always, you can count on Orban/Parasound's reliability and prompt service. For more information on the new 111B, see your local Orban/Parasound distributor, or contact

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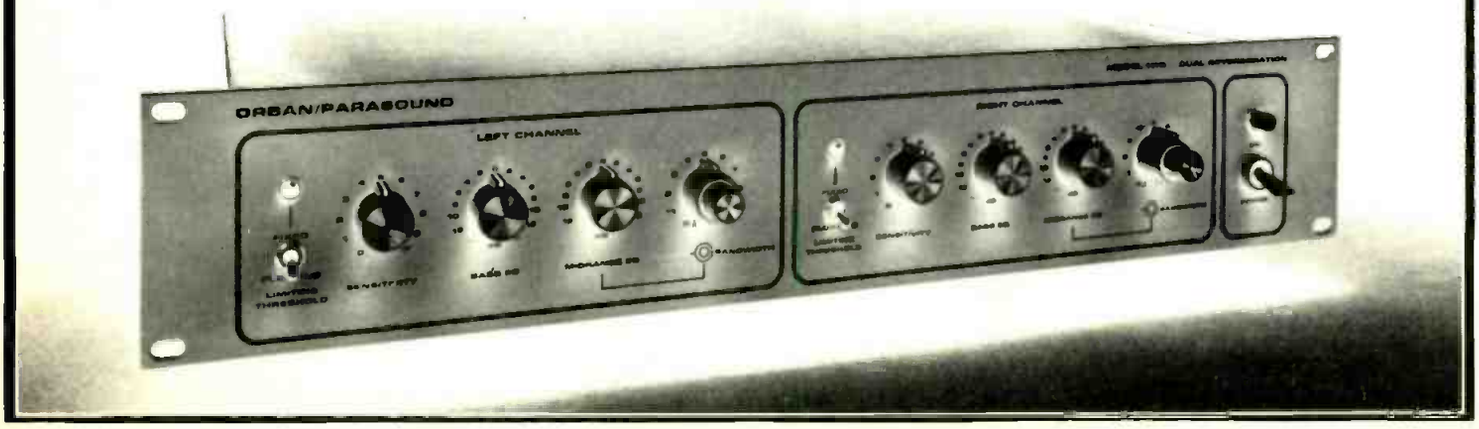

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THE FIRST TRULY MODULAR TIME BASE CORRECTOR IS DEVELOPED

AND MICRO CONSULTANTS IS THERE WITH THE QUANTEL DTC 300.

The same people who brought you the world's most advanced digital framestore synchronizer now bring you the world's most advanced digital time base corrector—the new DTC 300. The DTC is advanced not only in its performance specifications, but also in its modularity.

Now, for the first time in digital video history, you can buy a top-of-the line time base corrector at an attractive price, and broaden its capabilities as your needs broaden. True modularity means that upgrading is simply plugging in new boards. That's all there is to it.

The basic unit handles a variety of VTR's—helical, segmented field, etc. With plug-in options, you can also handle heterodyne and non-capstan servo units. In short, any VTR.

Additional plug-in options are drop-out compensator, look-ahead velocity compensator, sync generator output driver, and jittered subcarrier output to convert heterodyne VTR's to direct color VTR's. They take minutes to install.

With products like the DTC 300, Micro Consultants is creating great moments in digital video history. Shouldn't you be creating your own? Make a start. Call your local Micro Consultants representative. Or write us at P.O. Box 10057, Palo Alto, California 94303.

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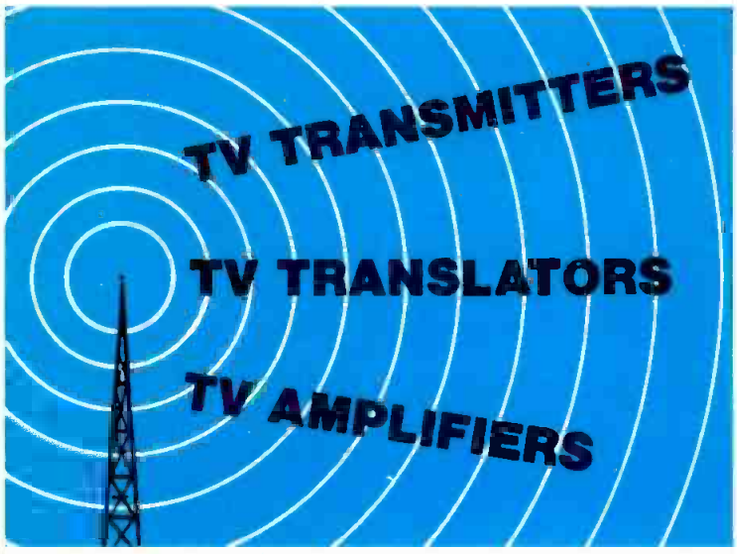

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industry news

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Section 312(a) (7) permits the FCC to revoke any station license or construction permit for willful or repeated failure to allow reasonable access to or to permit purchase of reasonable amounts of broadcast time by a legally qualified candidate for federal office. Section 399 prohibits a noncommercial educational broadcast station from engaging in editorializing, supporting or opposing any candidate for political office.

PMPEA aids recovery of lost or stolen equipment

Notification of lost or stolen equipment can be sent to the Professional Motion Picture Equipment Association. The PMPEA circulates the information to the repair and used equipment departments of its 50 members, including manufacturers and dealers of professional motion picture equipment throughout the U.S. and Canada.

Should any loss of this nature occur, forward a list of the equipment, with serial numbers and other pertinent data to: Lee A. Duncan, PMPEA Secretary-Treasurer, c/o Victor Duncan, Inc., 2659 Fondren Drive, Dallas, TX 75206.

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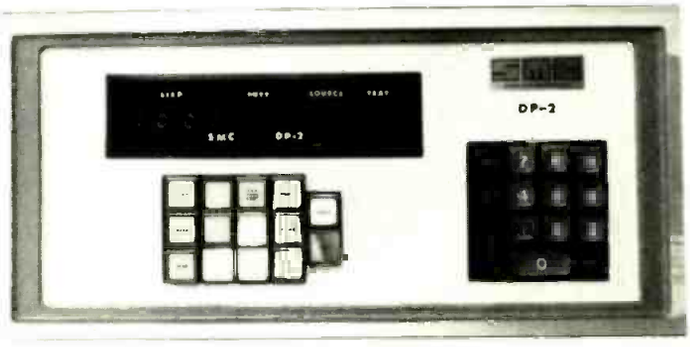
Meet the MILLION DOLLAR Success Story: the SMC DP-2 Digital Programmer



We've sold over one million dollars of DP-2 automation so far in 1977. And that's a success story we want you to investigate. Because the DP-2 is the finest microprocessor automation system available today — out-performing the human functions of action and decision-making. To discover how the DP-2 can work for your station, call:

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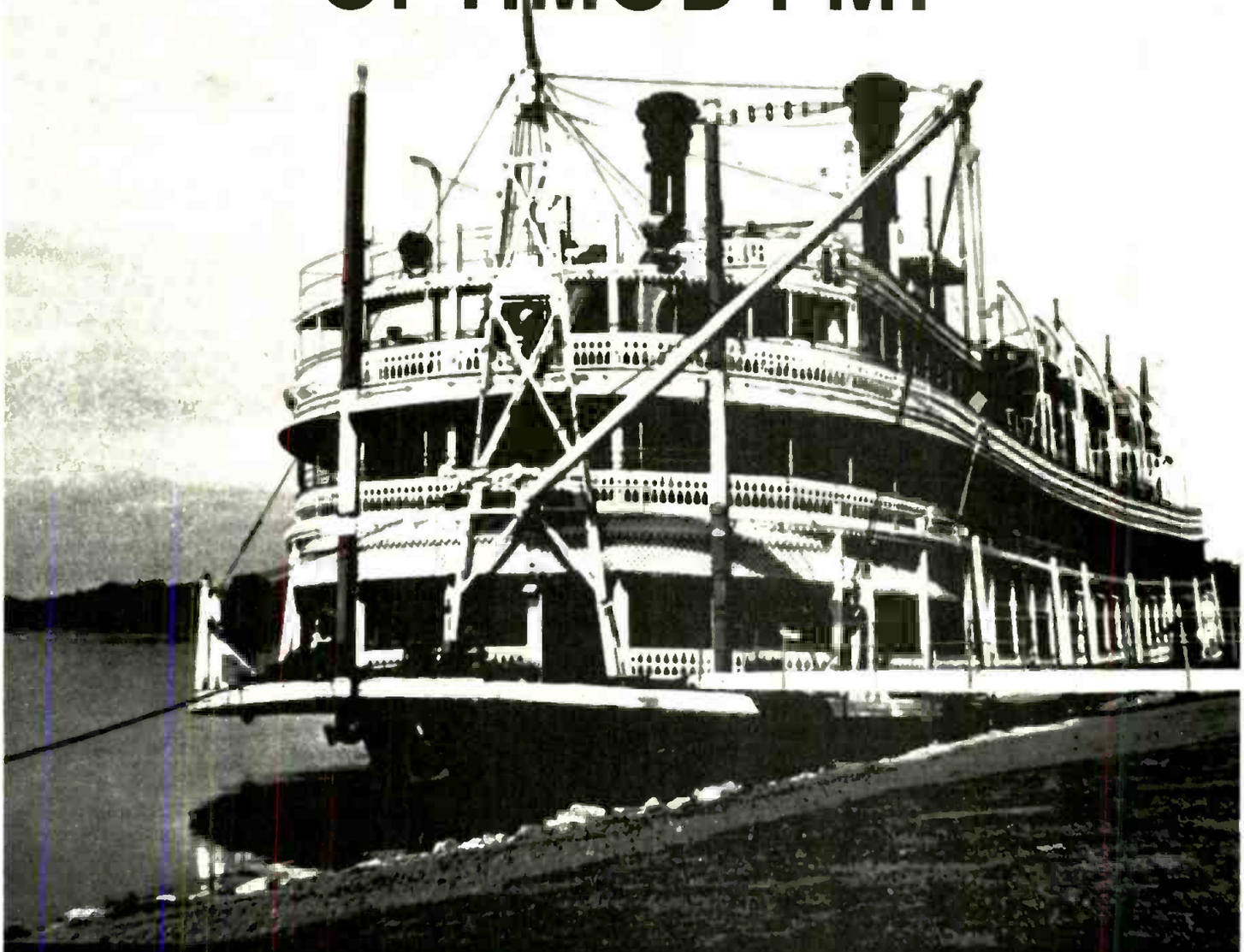
New Orleans Moves Up To OPTIMOD-FM!



In New Orleans the FM dial is dominated by the cleaner, brighter, louder scund of OPTIMOD-FM.

Eight out of nine FM's licensed to New Orleans have purchased OPTIMOD-FM. Like hundreds of other broadcasters, they recognize OPTIMOD-FM as the easy-to-install, cost effective breakthrough to better FM audio.

Call us toll-free (800)227-4068. in California (415) 441-0666, and we'll tell you how to move up to OPTIMOD-FM and put its unique advantages to work for your station.

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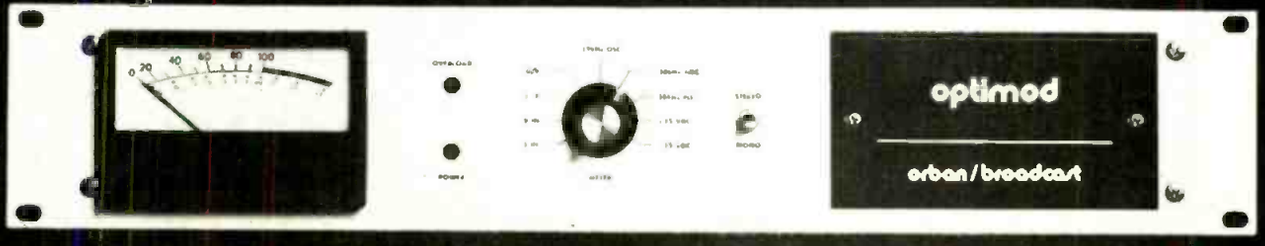

See us at NRBA NEW ORLEANS (Booths 15 and 16) October 9-12 and listen to OPTIMOD-FM.

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industry news

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Changes proposed in radio operator licensing

Persons holding a restricted radiotelephone operator permit may be authorized to operate AM and FM stations if the FCC passes a proposed rules amendment. No examination is required to obtain the permit as opposed to the currently required limited radiotelephone operator permit.

Other changes being considered are:

- A dual-license structure: one series for the routine operation, and one for the technical operation and maintenance of the various classes of radio stations and for the retitling of licenses;
- A new class of operator license for the operation of television broadcast transmitters;
- A strengthening of the current rules regarding operator responsibility by adding requirements that the licensed operator or technician responsible for the maintenance of a transmitter will: (1) ascertain that the station is authorized by the Commission, (2) make no modifications to the transmitter that would void FCC type-acceptance or type-approval, and (3) be responsible for making the required entries in the station records;
- A new requirement that the technician responsible for maintenance, upon completion of his duties, enter a signed statement in the station record that the

continued on page 192

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Maximum Signal Performance In Harris' FM Transmitters with the MS-15 Exciter... for the Sound of the Century!

There's no doubt about it, your listeners will hear the difference with the new Harris 'K' line of FM transmitters featuring the MS-15 solid-state exciter, employing Digitally Synthesized Modulation (DSM)* and overshoot compensation. These advanced design techniques offer higher stereo separation, and increased loudness with no degradation of audio quality.

DSM affords the ultimate in stereo and SCA performance, with 40 dB or better separation, 30 Hz through 15 kHz. Modulation of the 19 kHz pilot and crosstalk into the subchannel are eliminated with this technique.

The new Dynamic Transient Response filter (DTR) allows no greater than 2% overshoot. Thus, a 2 to 6 dB increase in loudness can be achieved while maintaining excellent transient response, high stereo separation, low crosstalk and low intermodulation distortion.

For the clearest, loudest sound around, write for information on the new Harris FM transmitters with the MS-15 exciter to: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

*Patent applied for

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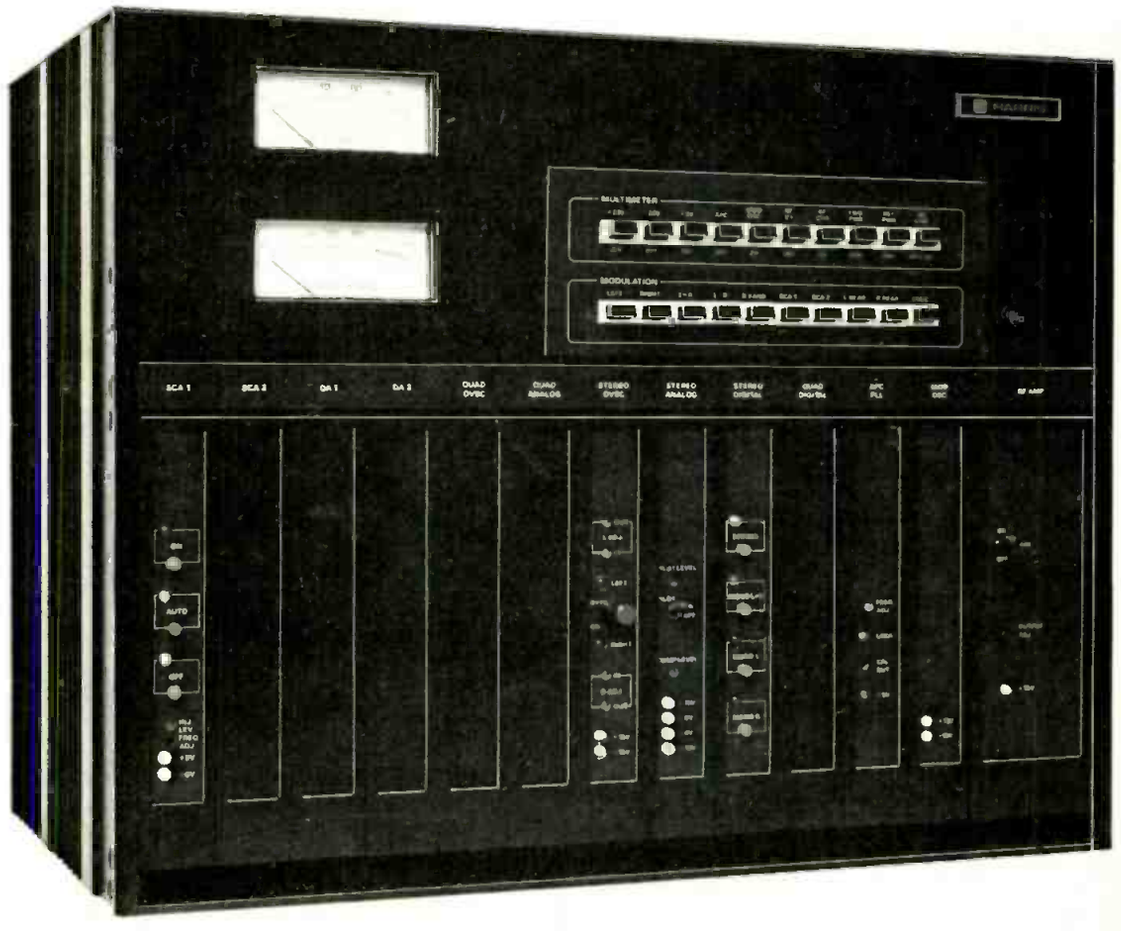
COMMUNICATIONS AND INFORMATION HANDLING



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industry news

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station is operating in compliance with FCC rules and authorization; if the station is in noncompliance, the technician would be required to give the particulars and additionally to notify the licensee in writing;

• A simplified examination for the limited radiotelephone operator permit by combining two examination elements into one.

New FCC office opens

A new FCC field office in Pittsburgh is charged with investigating violations of federal laws and regulations concerning radio communication. It will be staffed with three persons to meet the needs of the growing number of users of radio communications within approximately 200 miles of Pittsburgh.

Since the technical staff will be performing tasks away from the office most of the time, answers to questions frequently asked about radio operator examination schedules, citizens radio license issuance, television interference, etc., will be provided by a recorded telephone message, (412)823-3553. Call (412) 823-3380 for other communications.

Wolfe P. Huber will be engineer in charge. The mailing address is Federal Communications Commission, William Penn Highway, Monroeville, PA 15146.

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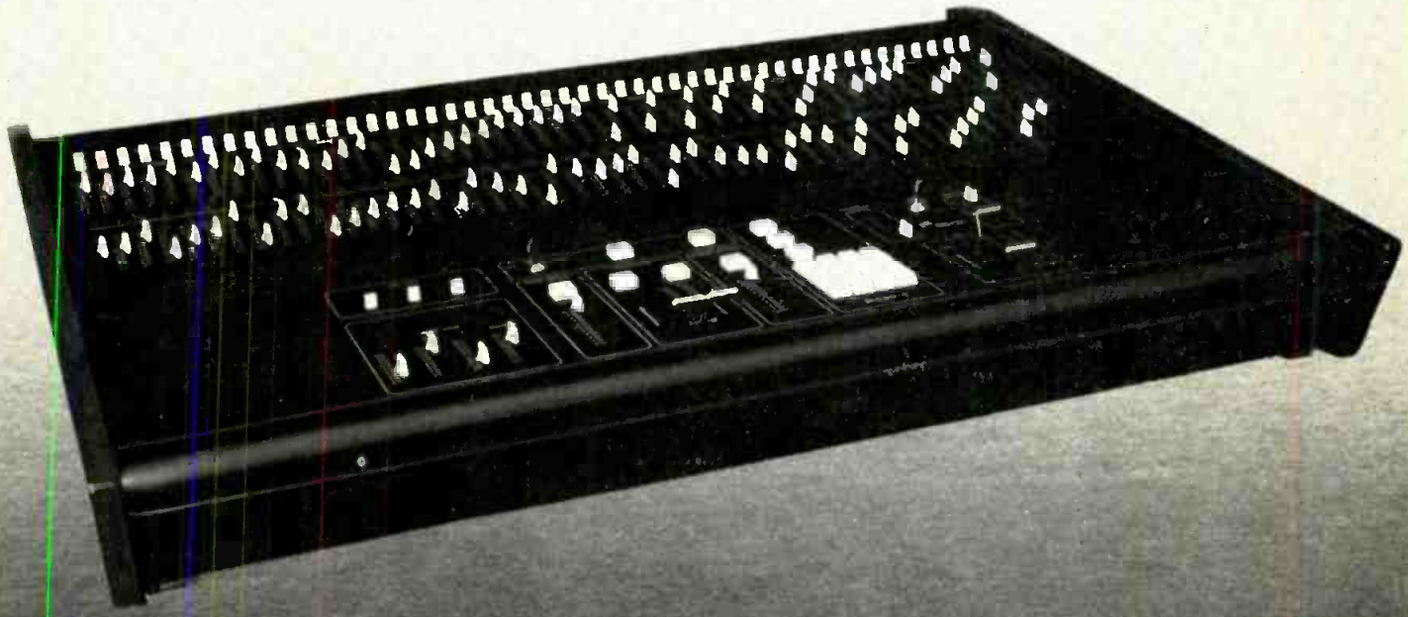
What's new? micro-Q®

A memory lighting control system complete with 2 scene preset capability.



Strand Century's new Micro-Q is economical, compact, portable and designed to grow with you. You can buy Micro-Q with memory or, if your budget doesn't allow for it now, install the memory later by plugging it in. All it takes is a screwdriver. Micro-Q — the new modular 2 scene preset system with Independent Master, Grand Master and split dipless Crossfader, with a 200 preset memory, micro processor controlled. Micro-Q offers timed crossfades, cue insert, preview and submastering. For your newscasts, commercials or more sophisticated production, be creative with your lighting — memorize it the Micro-Q way. Ask for your new Micro-Q brochure.

Strand Century leads in memory lighting control systems for the broadcast industry. At Strand Century we speak your language.

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news briefs

TeleMation reports first half profit

Recovering from a first half loss in 1976 of $536,000, TeleMation, Inc., has reported a first half profit in 1977 of $257,000, or 25 cents per share, on revenues of $4,709,000. For the quarter ending June 30, 1977 TeleMation reported a net profit of $213,000, or 21 cents per share, compared to loss for the same three-month period in 1976 of $134,000, or 30 cents per share. W. Paul Warnock, president, attributed the return to profitability to the improved performance of the hardware portion of the company's business.

Dynatech creates new division

Dynatech Corporation has separated the data division from the laboratory products division. In order to provide a name more closely identified with its primary area of business, the new division has been named Dynatech Data Systems.

Maintenance training seminar slated

Cinema Products Corp. will hold its two-day "CP Maintenance Training Seminar" October 14-15, just prior to the opening of the SMPTE 119th Conference & Equipment Exhibit. The seminar will feature sessions conducted by representatives from several equipment manufacturers who will report on current practices

continued on page 196

Two top-of-the-line broadcast switchers from

COMTEC

From the company with 8 complete lines of routing switchers.

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5 level (video, 2 audio, 2 aux.) matrix
Or 3 level (video, audio, aux.) matrix
20 x 10 or 20 x 20 Mainframes
Each channel separately programmable
Vertical interval switching (optional)
Complete control flexibility
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Emergency and back-up supplies available
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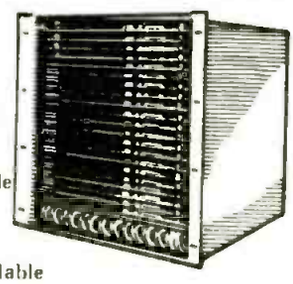

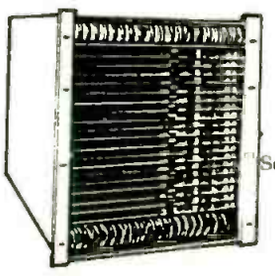

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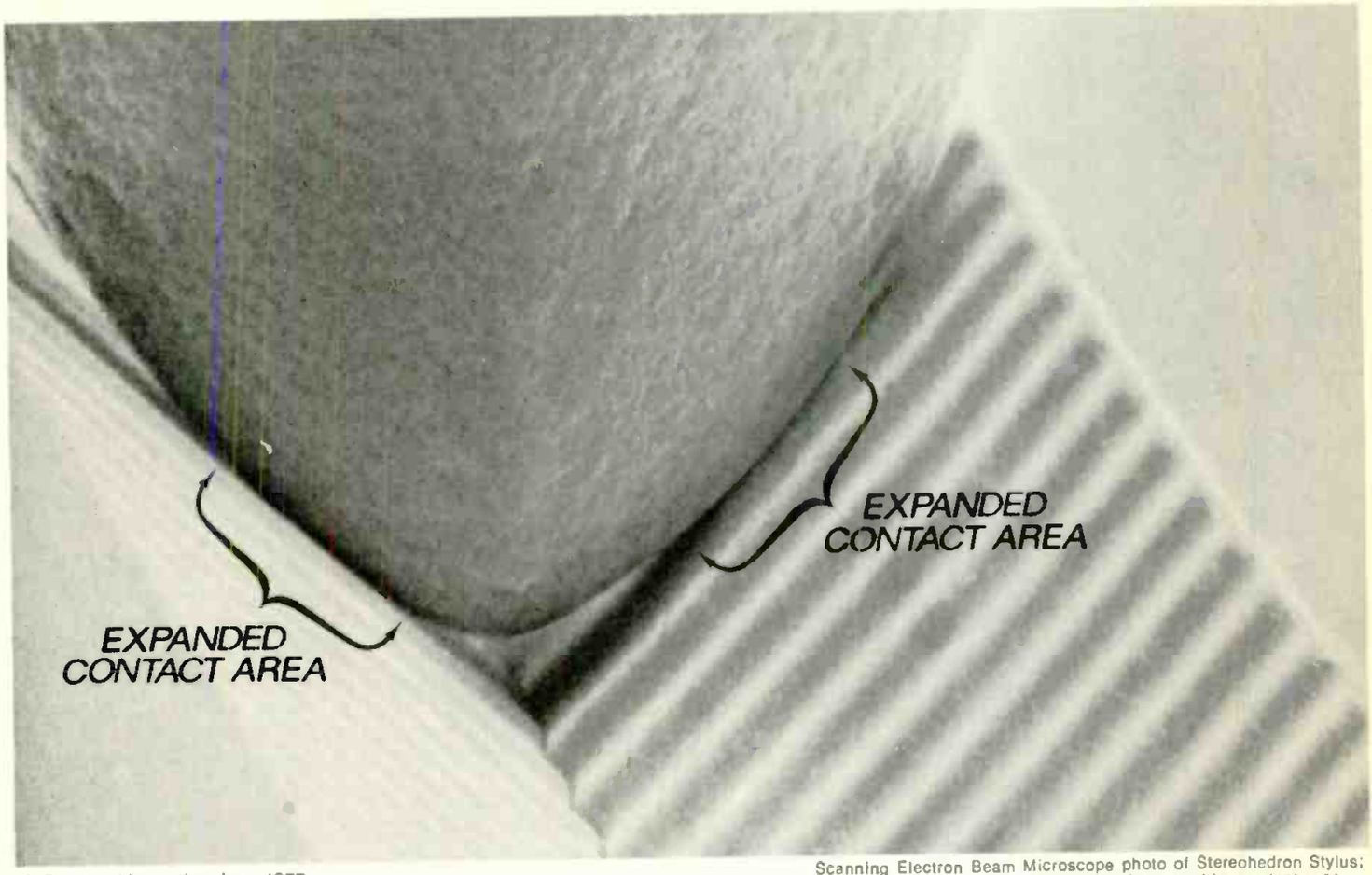
Better stereo records are the result of better playback pick-ups



© Stanton Magnetics, Inc., 1977

Scanning Electron Beam Microscope photo of Stereohedron Stylus; 2000 times magnification. Brackets point out wider contact area.

Enter the New Professional Calibration Standard, Stanton's 881S

Mike Reese of the famous Mastering Lab in Los Angeles says: "While maintaining the Calibration Standard, the 881S sets new levels for tracking and high frequency response. It's an audible improvement. We use the 881S exclusively for calibration and evaluation in our operation."

The recording engineer can only produce a product as good as his ability to analyze it. Such analysis is best accomplished through the use of a playback pick-up. Hence, better records are the result of better playback pick-up. Naturally, a calibrated pick-up is essential.

There is an additional dimension to Stanton's new Professional Calibration Standard cartridges. They are designed for maximum record protection. This requires a brand new tip shape, the Stereohedron®, which was developed for not only better sound characteristics but also the gentlest possible treatment of the record groove. This cartridge possesses a revolutionary new magnet made of an exotic rare earth compound which, because of its enormous power, is far smaller than ordinary magnets.

Stanton guarantees each 881S to meet the specifications within exacting limits. The most meaningful warranty possible, individual calibration test results, come packed with each unit.

Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the STANTON 881S.

STANTON

For further information write to Stanton Magnetics, Terminal Drive, Plainview, New York 11803

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The Optek 7400C Automatic Bulk Tape Degausser

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- ★ Selectable flux pattern
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- ★ Adapters for ACR25/TCR100 and ¾" cassettes

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news briefs

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and the latest developments in their field. These include: John Norris, Eastman Kodak Co., who will present Kodak's new, fast film stock, VNF 7250; Bern Levy, Angenieux Corporation of America, who will demonstrate the proper use and care of both zoom and fixed focal length lenses; and Nat Tiffen, Tiffen Optical Corp., who will discuss special filter applications. Also scheduled is a special session on Cinema Products' STEADICAM ™ , a film/video camera stabilizing system.

IFPA 18th annual conference scheduled

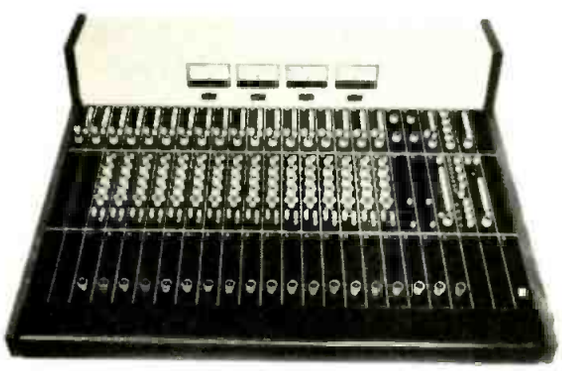
IFPA, Film and Video Communicators will hold its annual meeting, Trade Show and Cindy Awards Festival October 5-8 at Chicago's new Holiday Inn in the Chicago City Centre. Filmmakers, video and filmstrip producers, writers, camerapeople, managers, industrial representatives, representatives from government, education, and a wide range of allied A-V professionals and students are expected to attend.

INTELCOM '77 to include 250 exhibitors

More than 250 communications companies from all over the world will exhibit their products and services at INTELCOM '77, the first International Telecommunications Exposition to be held in the U.S. In

continued on page 198

OKAY, YOU ASKED FOR IT AND GRANDSON HAS IT



"It" is more. That's what broadcasters have been asking for in production consoles. Flexibility. Capability. And totally unique Grandson has it all.

There is nothing else like it anywhere!

Equalization at each input position. Don't laugh. If you don't think it's needed, that's because you haven't tried it. EQ is only the most useful, creative tool in audio. And Grandson's EQ is something special. One major network has bought a bunch. That's special.

Monitoring and foldback flexibility to let you and the talent have separate monitor mixes! And changes of monitor mode at the push of a single button. Here's the key to fast, creative production.

Internal patch point, after mic preamp before fader, brought out to permit inserting special devices. How about plugging in a limiter just ahead of the pot for the screamer, or mic swallower. Think that would be neat? So do we. Grandson will let you do it!

Four reasons Grandson was selected by ABC-TV, Hughes Sports Network and WWL in the Superdome. There are more. None accidental. Because you said it's needed.

Grandson is "it." A totally unique approach. Want more details? Write or phone today.

auditronics, inc.

3750 Old Getwell Road, Memphis, TN 38118, 901-362-1350

The closer you look, the better we look.

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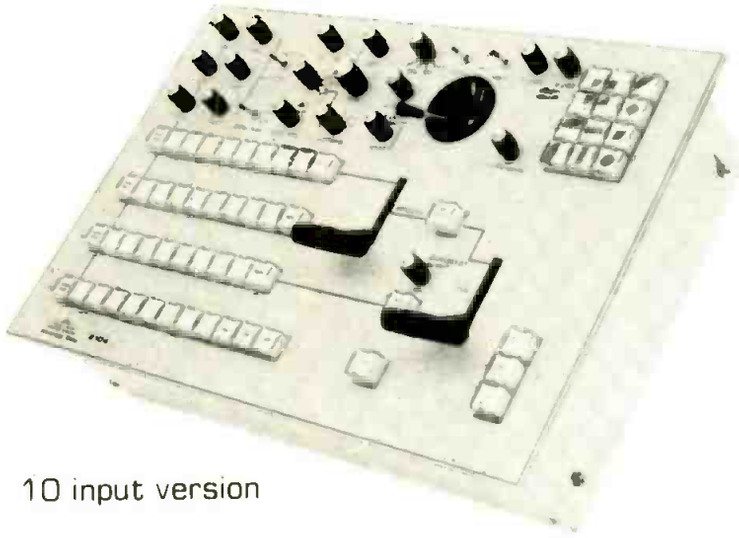
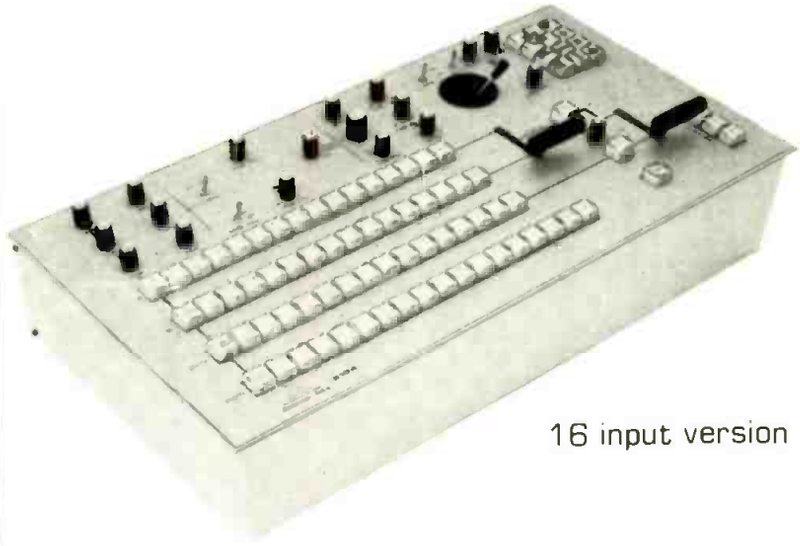
THE **ONLY** THING WE'VE HELD BACK ON.... IS THE **PRICE!**



10 input version



16 input version

MODEL 2104
VIDEO PRODUCTION SWITCHER

Features:

- 3 input linear effects keyer
- Downstream linear mix/keyer
- Color background & black burst generator
- Color matte generator
- Blink and wipe key functions
- Multiple drive modulator
- Pattern preset controls
- Joystick pattern positioner
- 12 wipe patterns
- Programmable diode pattern matrix
- Full-range softness control
- 3 × 1 preview selector
- Cutbar

Uncompromising quality and reliability make the ADC Model 2104 a production tool that is ideal for use in even the most exacting applications.

For more information about the complete line of American Data professional video products, simply call or write the regional sales office nearest you.

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news briefs

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addition, the exposition has scheduled 70 technical sessions covering all aspects of telecommunications, financial seminars, and 19 intensive short courses on computer networks, satellites, digital trends, management of communication systems, marketing and finance. Bjorn Lundvall, chairman of the board of directors, L. M. Ericsson, Sweden, will be a keynote speaker at INTELCOM '77, being held at the Georgia World Congress Center in Atlanta October 9-15. Lundvall will speak on Telecommunications and Economic Development in the Developing Countries.

NAB task force on minority ownership proposed

The executive committee of the National Association of Broadcasters has directed that a task force be established to attempt to foster an increase in minority broadcast ownership. The NAB staff was asked to prepare an organizational plan for the establishment of such a task force for presentation at the next executive committee meeting.

Broadcasters clinic scheduled for October 19-20

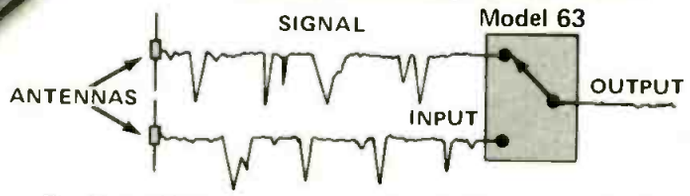
The 23rd Annual Broadcasters Clinic sponsored by the University of Wisconsin-Extension will be held in Madison October 19 and 20. Among the speakers at

continued on page 200

The Ultimate in Wireless Microphone Systems

Vega's new Model 63 Diversity Receiving System virtually eliminates problem noise and signal dropouts that are occasionally encountered when a wireless microphone system is used on a set, in studios, and in theatres. Moreover, because excellent soundtracks can be obtained from fully concealed wireless mics, much of the tedious dialogue looping on taped programs is no longer necessary. When used with any of Vega's fine wireless transmitters, the audio is like a hardwired connection. Of course, Vega's Diversity Receiving System will improve the performance of any brand VHF wireless mic. It's no surprise that the Model 63 Diversity Receiving System is being used by all major network studios. Try one, and see what it can do for you.

How the Diversity Receiving System works



The Model 63 Diversity automatically switches electronically to the strongest signal, i.e. eliminating signal dropouts.

Vega
a division of Cetec Corporation
9900 Baldwin Place, El Monte, CA 91731 • (213) 442-0782 • TWX. 910-587-3539

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New! For heterodyne VTRs

a broadcast quality, digital TBC

It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it comes with features that, before, you'd find only in TBCs costing up to twice as much.

For example, correction of chroma/luminance delay problems, a 3 dB chroma noise reduction, velocity compensation and color dropout compensation are standard.

So is "Gyrocomp," an exclusive, use-proven CVS memory design that easily handles severe gyroscopic distortions—without breakup.

There's also a broadcast stable, gen-lock sync generator, automatic VTR advanced sync and a built-in completely adjustable processing amplifier.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise and significantly improves subjective resolution. And, to tame even the wildest instability, you can add our optional 16 line window.

Simple operation is another plus for the CVS 516. Front panel controls give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

All this, and more, is contained in a package that weighs only 25 pounds, is only 3½ inches high and uses only 175 watts—major advantages with today's increasing emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516. For full details and/or a demonstration, contact your authorized CVS Distributor or CVS. And ask for our new booklet about the basics of digital time base correction. It's free.

CVS **Consolidated Video Systems, inc.**

1255 E. Arques Avenue, Sunnyvale, California 94086 (408) 737-2100 Telex: 35-2028

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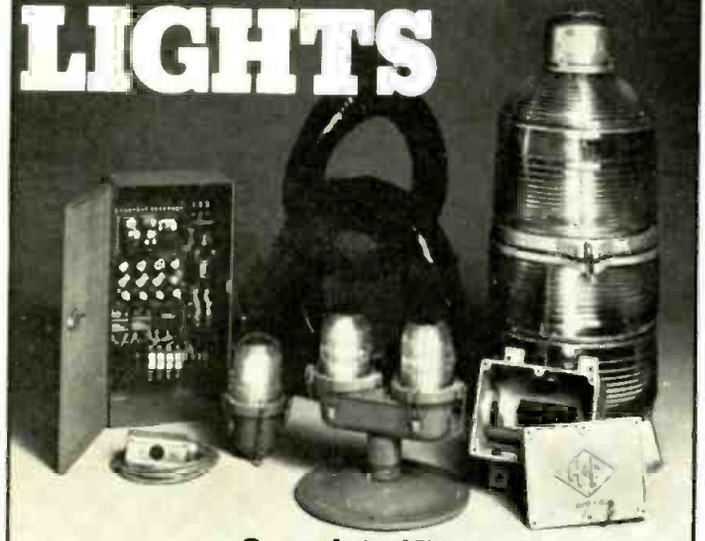
TOWER WARNING LIGHTS



Complete Kits

New/Improved solid state microwave control for easier maintenance. Many special features. 300mm Beacons • Flashers • Obstruction Lights • Photo Controls • Isolation Transformers • Lamp Failure • Alarm Systems • Meets all FCC/FAA Regulations • Technical Support Provided.

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news briefs

continued from page 198

the "Broadcasters Clinic '77" will be Matti Siukola, director of antenna design for RCA, and Howard Shepard, director of advance planning for Central Dynamics. Other companies represented will include Ampex and Harris Corporation.

NAB meetings scheduled

The NAB will conduct three meetings this fall to give the public an opportunity to ask questions about the Radio and Television Codes and broadcast policies. The meetings are scheduled for Cambridge, Mass. (October 18), San Diego (November 11) and Dallas (November 15). Participants will include NAB executives, members of the NAB code boards, representatives from the networks, local radio and television stations, and television writers and producers.

Multi-Image workshop

The Association for Multi-Image (AMI) will sponsor a production workshop at Rhode Island College in Providence, September 29 through October 2. The event is being staged by Hans-Erik Wennberg and will feature multi-image presentations by various practitioners who will explain and discuss related production problems as the presentations proceed. □

Broadcast/Recording Equipment from MICMIX

TIME WARP
Audio Delay/Effects Generator
Wide ranging variable time translation of audio signals for uniqueness in commercials and special programming.

MASTER AUDIO METER
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MASTER-ROOM
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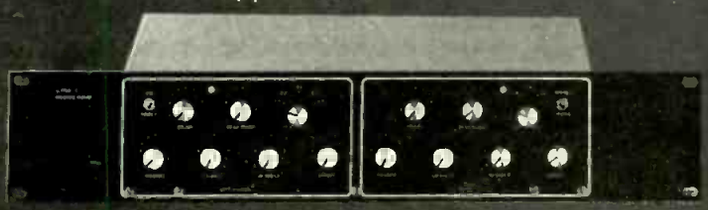
The spring-free sounds of Natural reverberation for quality production work and line application.



MICMIX AUDIO PRODUCTS, INC.
2995 Ladybird Lane, Dallas, Texas 75220 214/352-3811

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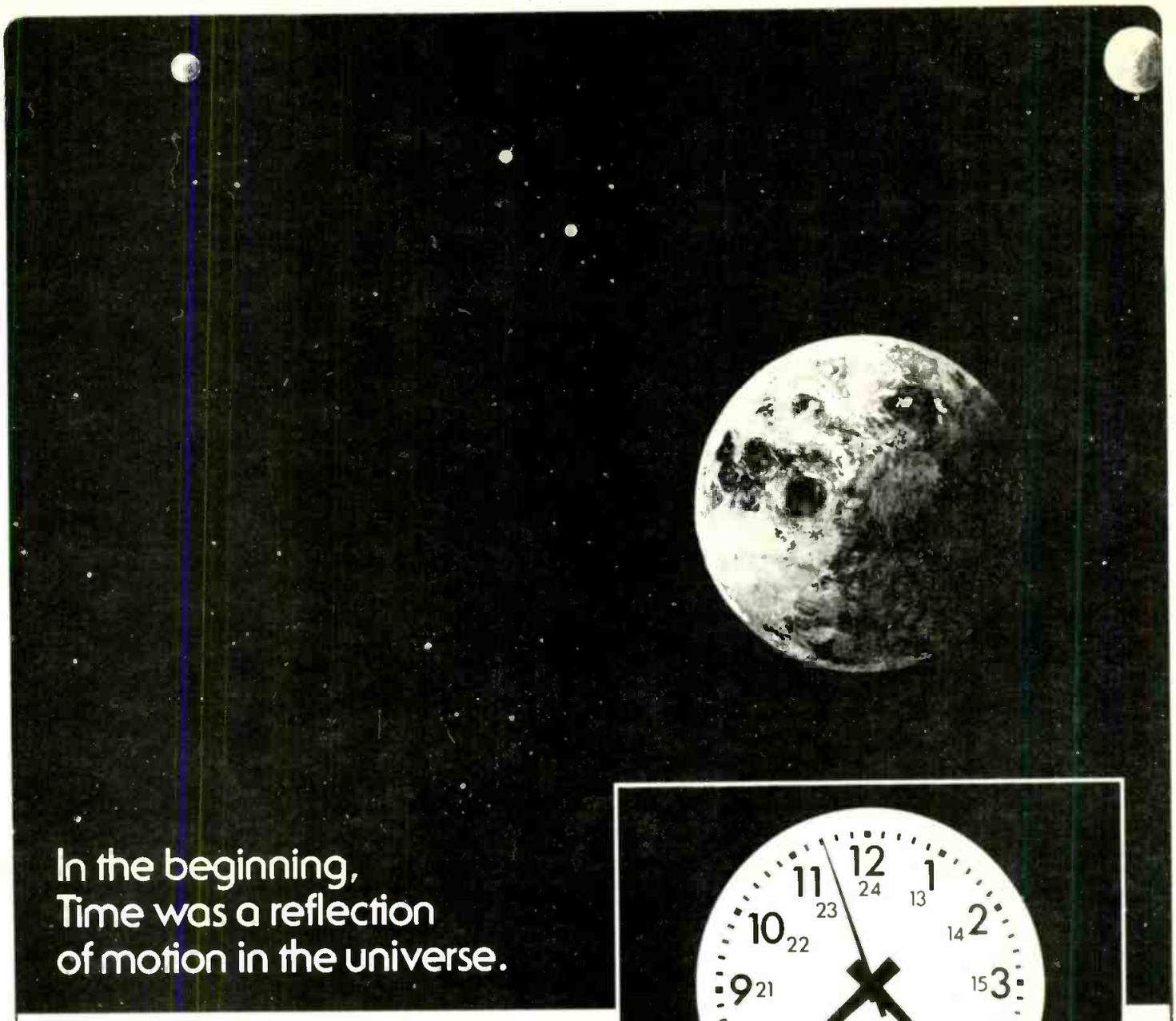
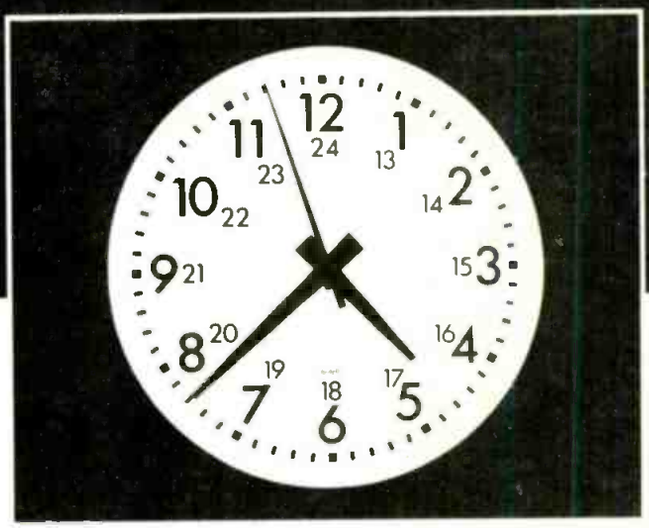


In the beginning, Time was a reflection of motion in the universe.



Today Time is earth-bound, measured precisely by action of the Cesium-133 atom.

With the coming of the twentieth century man has discovered space travel and broadcasting. Both demand micro-second accuracy to a degree never imagined before.

Leitch provides it with the Leitch Precision Impulse Clock. Controlled by impulses accurate to within one nine billionth of a second, Leitch clocks can be fully synchronized to the exact second. Compatibility with other impulse drive systems allows them to be added to existing drivers or to be installed separately as a totally new system.

If Time is important to you, ask Leitch about it.

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MT, TA2 and CB2 have a mid gray (50 IRE) surround to the active area and have the same spectral characteristics as the majority of programming material.

- DM—Depth of Modulation slide.
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The above patterns are available in 3¼" x 4" and 35 mm slide sizes.
All DSC test materials are computer calibrated to an accuracy of ±1 IRE unit.
May be purchased or leased.
DSC also has a complete line of 8" x 10" test slides for studio camera alignment.

Since 1965, DSC has been supplying precision test materials to the television community. For additional information, please telephone or write:

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One (or two) for the road.

Thomson-CSF Laboratories keeps breaking conventional sound barriers (cords and booms) with RF microphone systems that offer reliable transmission with excellent range and true high fidelity.

First, the RM-102 single channel portable system provides one full diversity channel for field and remote broadcast use. Or, if multiple channels are needed, where no AC power is available, the RM-104 solves the problem. Two full diversity channels can capture action dialog on the set or in the field, making it fully usable for filming or taping. 950 MHz diversity reception achieves drop-out free performance, and both systems come with transmitters and antennae so they're complete and completely portable.

Now Portability Plus. Thomson-CSF takes portability a step further with its new ENG 101 single channel miniature, portable diversity microphone system, specifically designed for use with today's miniature ENG cameras.

Model ENG 101 transmitter and receiver.

RM-102 transmitter and receiver.

THOMSON-CSF LABORATORIES, INC.
37 Brownhouse Rd., Stamford, CT 06902
(203) 327-7700/TWX (710) 474-3346

For More Details Circle (188) on Reply Card

from blue bananas to sag tails

Old record books never tell the truth

While working the midnight shift in Armed Forces Radio at Lajes Field, Azores, Portugal, I had what I thought was a great idea to get our listeners involved. I would ask questions on a particular sport. I am not a sports fan, but in our news room I found a book on baseball statistics.

Baseball season was over; the book looked brand new and I was ready to go. I announced that questions on baseball would be asked and that persons with the correct answers would have their names aired along with the acknowledgment of answering correctly.

I aired a question. While a record was playing I received many calls. None were correct. I gave the book's answer, asked another question, played another record. Again, no correct answer. I kept this up for about 20 minutes. My idea worked—I involved quite a few listeners, all of whom were becoming irritated at my answers.

I would have defended that book to no end. So you can imagine my empty feeling and rapid pulse when, after one particular phone call, I read the cover of my reference book. It was one year old! *Anthony Mollica, Santa Monica, Calif.*

Roaring to the rescue

At one of the transmitter sites in the bay area, the chief engineers of the stations at the site would all come in on the same evening for transmitter maintenance. One of the stations had a remote control for an AM transmitter at another site which was a classic home-brew unit twice nominated for kluge of the year. There were no drawings and plenty of clip leads.

One of the chief engineers was a joker. One night he secretly wired a sparkler under the remote control and touched it off with a match to cries of, "Bob, Bob!" Victim Bob entered the room and set the world's record for widest opened mouth with a lit cigarette still dangling from lower lip before roaring to the rescue. *Roy H. Trumbull, Loney College, Ooklond.*□

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Regardless of who made your 2/3-inch Plumbicon* TV camera, or where it was made— Amperex has the exact replacement for the tube that came with the camera.

We know this tube as only its originator *can* know it. You can take our word for it... *there is only one Plumbicon.* And no matter where your Plumbicon camera comes from, whether it's a full-sized studio camera or one of the new hand-held portables . . . Amperex has the replacements for your equipment that will give you equal or better performance compared to any tube that came with the camera.

There *is* this difference. Amperex replacement tubes are immediately available, off-the-shelf, for delivery within 24 hours through local distributors and Amperex factory sales representatives. And Amperex tube distributors (your own local businessmen), are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and on-the-spot customer service.

For more information on Plumbicon TV camera tubes, write or phone: Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

Amperex®

TOMORROW'S THINKING IN TODAY'S PRODUCTS

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QUALITY TALKS FOR

KEYH

Houston, Texas

Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the cleanest sound around. Listen to Continental: quality talks.

Write for brochure: Continental Electronics Mfg. Co. Box 270879 Dallas, Texas 75227 (214) 381-7161

Continental Electronics

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technical data

Allen Avionics, Inc.—Catalog 11V for 1977-78 features video and pulse delay lines, L-C filters and video equalizers. The illustrated catalog describes and gives specifications for this line of video units designed to achieve precise short delays.

Featured in the catalog are pulse and video delay lines, models VP0635, VP1270 and VP0010, which have flat amplitude response to 5.5 MHz, small increments of delay variation, low signal distortion and tight delay tolerance.

Also included in the catalog are models VE300 and AV-535, TV line equalizers; Spiradel® , a fixed delay line; delay equalized NTSC lowpass filters; NTSC reject filters; and an NTSC bandpass filter.

For More Details Circle (300) on Reply Card

Cetec Sparta—New full-color literature describing the latest broadcast (radio and TV) audio consoles is available from Cetec Broadcast Group.

Labeled *Cetec Sporto Audio Equipment/1*, the 12-page booklet is devoted to the Centurian Series and 3000-Series consoles. *Audio Equipment/2*, also a 12-page booklet, is expected soon. It will describe other console lines, studio and remote broadcast furniture, speakers and related studio equipment.

For More Details Circle (301) on Reply Card

Frequency Devices, Inc.—A 36-page catalog has been offered featuring electrical specifications complete with tabulated amplitude, phase data and mechanical dimension drawings of 10-product families.

These help the designer select the correct filter for any specific application in question. The catalog simplifies selection by dividing the filter types into four categories: highpass, lowpass, bandpass and band reject.

A one-page selection guide intro-

continued on page 206

VAN LADDER INTRODUCES THE MODEL 2913 BC BROADCASTING UNIT

Are you plagued with costly interruptions, time consuming searches for clear transmission paths and set-up, and lost shots?

Modern broadcasting demands the finest most reliable equipment available. Signal interruptions and equipment malfunctions are costly in viewer and sponsor satisfaction.

With the VanLadder Broadcast Unit you can extend the reliability of your mobile Electronics News Gathering to your station system. Raising your microwave dish 30 feet allows transmission over trees, buildings, passing traffic and other line-of-sight objects. Increase the range of on-the-spot transmissions to as many as 30 miles.

The VanLadder Model 2913 BC Unit mounts on all styles and sizes of Electronic News Gathering vans with virtually no interior obstructions.

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LOW LOSS CABLE BREAKTHROUGH

New LDF Series HELIAX® Cable

ANDREW

Lower loss, improved moisture barrier, plus all the traditional advantages of HELIAX foam-dielectric cable. New low density foam dielectric reduces attenuation, almost to that of air-dielectric cables. Annular corrugations, in conjunction with connector "O" ring seals, provide a positive longitudinal moisture block.

Connectors have been improved too. New features include self-flaring assembly, superior electrical contact, high resistance to pull-off and twist-off, moisture seals, and low VSWR through cable cut-off frequency.

Two sizes, 1/2" and 7/8" are available now for immediate shipment. For further information contact your Andrew Sales Engineer or ask for Bulletin 1160.

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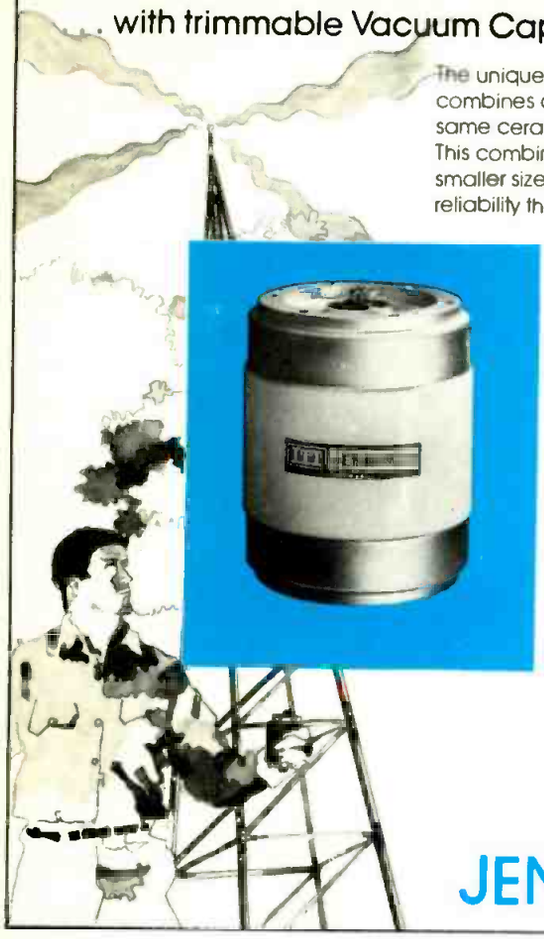
ASSURE PEAK SIGNAL OUTPUT

. . . with trimmable Vacuum Capacitors from ITT Jennings.



The unique construction of these capacitors combines a tunable and a fixed capacitor in the same ceramic envelope with a VACUUM dielectric. This combination offers higher current ratings, smaller size, greater thermal stability, and better reliability than conventional designs. They are ideal for high frequency unattended transmitter operation, or anywhere stable peak signal output is important.

- Current ratings: 200 A. Rms. @ 9 KVAC to 85 A. Rms. @ 50 KVAC.
- Capacitance values available from 20 to 1357 pFd.
- Size: All models are just 4.5" tall by 5.3" in diameter and come with built-in mounting rings for ease of installation.
- Operating Temperature: −55°C. to +125°C.

If you are concerned with antenna phasing or matching, or working with grid bias or tank filter networks, you will want to know more about the Trimmable Vacuum Capacitors from ITT Jennings. For more information contact: ITT Jennings, 970 McLaughlin, San Jose, CA 95122. (408) 292-4025.

JENNINGS ITT

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IMI-3000

PROJECTOR HEAD
WIDE ANGLE VIEWING ON STANDARD SCREENS

FEATURES

- Eliminates inconsistencies of multiple monitor viewing.
- Rear-screen projection either with mirrors or direct (with optional sweep reversal switches).
- No hook or loss of sync from ½", ¾", 1" or 2" videotape inputs.
- Remote control operation.
- Solid-state electronics.
- Priced less than a replacement light value.
- Low cost CRT replacement.
- No projector operator required.
- Stable no-drift operation.
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- Built-in tilt adjustments to 10°.
- Picture sizes 8, 10, 12, 14, 16, 18, 20 foot wide.
- Uses optics tubes and power of the magna image III.

$9,800 Is The Price!
For A $50,000 Picture
BIG-BRIGHT-COLOR PICTURES

RECEIVER/MONITOR
REMOTE CONTROL

IMI

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739 Airway Circle, New Smyrna Beach, Fla. 32069
(904) 427-5294

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Tech Data

continued from page 204

duces each category and presents the following information for each model listed: range of center or cutoff frequencies; number of poles (2, 4, 6 or 8); transfer characteristics (Butterworth, Bessel or Tchebyscheff); tuning characteristics (fixed frequency or resistor, voltage or uP tunable) and case dimension drawing number.

A family of power supplies compatible with the product line is also fully specified.

For More Details Circle (302) on Reply Card

Marconi Instruments Ltd.—One of the many applications possible with the 110-MHz TF2370 Spectrum Analyzer is impedance measurement and matching. This is described in a new Applications Note, No. 18 in the Measuretest Series.

The TF2370 is accepted as an instrument for spectral analysis. Its signal handling and secondary features simplify its operation and enhance its usefulness.

The booklet shows that there are occasions when these secondary features can provide powerful measurement techniques which dominate its primary use as an analyzer of spectra.

For More Details Circle (303) on Reply Card

Sencore, Inc.—Five product-line brochures, describing all 25 Sencore instruments grouped in five product lines have been released. The six-page color "mini-catalogs" feature digital multimeters, communications and CB instruments, oscilloscope and power supplies, transistor and tube testers, and TV and radio service equipment.

Each brochure details applications and uses for each instrument, plus complete specifications for easy reference. Featured in the brochures are Sencore's latest instruments, including the FC45 230-MHz frequency counter and the TF46 Portable Super Cricket Transistor and FET Analyzer, featuring battery-operated automatic "good-bad" testing and complete parameter analyzing.

For More Details Circle (304) on Reply Card

Vector Electronic Company—A new 16-page short-form catalog lists 354 packaging products along with complete part nomenclature, an order form and price list.

continued on page 208

www.americanradiohistory.com

OTARI MX-5050 the original (and still the best) compact professional recorder

Just over two years ago, Otari introduced a unique new product —the first truly professional recorder in a compact package— the MX-5050. Since then, the performance and reliability of this innovative new machine have been tested and proven in over a thousand critical professional applications—by broadcasters, recording studios, A/V departments, musicians, and semipro recordists worldwide. Universal acceptance and repeat orders by these satisfied customers tell this remarkable recorder's success story better than we can.

Bias can be re-optimized in seconds.

As you compare the MX-5050 with other recorders, keep this in mind. The MX-5050 is not a hi-fi machine with a few professional features added later as an afterthought. It was designed from the ground up based on Otari's 10 year experience as Japan's leading manufacturer of professional recorders and high speed duplicators. It is a full professional machine with the performance, features, and field proven reliability that you expect to find only in the larger professional recorders.

Here are some of the key reasons why the MX-5050 is the best compact recorder available today.

Production Features: Creative production is simplified with: Front panel edit to spill tape. Lift-up head cover to mark splices and clean heads. Built-in splicing block on head cover. Adjustable cue to defeat head lifters. Selective reproduce to add new tracks in perfect time synchronization. Two speed operation, 15 and 7½ or 7½ and 3¾ ips (field changeable in dc servo versions).

Performance Features: Headroom is 19 dBm, a full 15 dBm over the switch selectable fixed output of +4 dBm. This standard reference level output can be rear panel switched to −10 dBm to drive a PA system or power amplifier. S/N ratio is NAB weighted 69 dB full track, 68 dB half track, and 65 dB quarter track. Crosstalk is greater than 60 dB half track. Outputs are 600 ohm balanced (standard on half track) or unbalanced. Line input and output connectors are XLR.

Operating Features: Bias is front-panel continuously adjustable (not limited to fixed positions). With built-in test oscillator (not available on other compact professional recorders) bias can be optimized in seconds when changing tape. Record EQ and standard reference level are also front adjustable. Straight-line tape path simplifies threading. Capstan is located on back side of tape for improved tape life. An extra reproduce head is standard on all versions to allow playback of tapes in different formats. For pitch control and freedom from power line variations, an optional dc capstan servo is available with ±10% correction range.

Easy threading; capstan on back side.

Versatility: Available in full-track (with half-track reproduce capability standard), two-track, and quarter-track versions. Walnut case (standard), rugged portable road case, rack mounting adaptor, or floor console. Universal power supply standard. Low impedance input and output transformers and remote control also optional accessories.

See your nearest Otari dealer for the full story or contact Otari. And, if it's multichannel you need, ask about the standard-setting four and eight channel versions of the MX-5050.

OTARI

Otari Corporation
981 Industrial Road
San Carlos, Calif. 94070
(415) 593-1648 TWX: 910-376-4890

Otari Electric Co., Ltd.
4-29-18 Minami Ogikubo
Suginami-ku, Tokyo 167, Japan
(03) 333-9631 Telex: J26604

For More Details Circle (295) on Reply Card

www.americanradiohistory.com

Edit Code Reader And Video Display $1500

BTX 4300 reads time code at play speed down to -15 dBm and generates 7 by 9 dot matrix characters for a full "in video" display.

Use with economical helical editing systems or as an on-line display when recording or playing back video material. May be driven from 1/10 to 80 times play speed by the BTX 4400 Edit Code Decoder.

The BTX 4300, like BTX comparators, readers, decoders, remote digital displays and code generators, is a sensible building block which easily interfaces with, and improves the performance of any editing system at minimum cost. For complete information circle reader service card or contact: The BTX Corporation, 438 Boston Post Road Weston, Massachusetts 02193 • (617) 891-1239

btx

For More Details Circle (189) on Reply Card

NOAA Warning Alarm Receiver

162.40 MHz—162.475 MHz—162.55 MHz

The sole government-operated radio system for communicating attack or disaster warnings directly to the general public!

Use the "institutional grade" receiver most used by NOAA, and designed and built by the same manufacturer as the NOAA WEATHER RADIO transmitters. Under NOAA contract 6-35384 and previous contracts, SRS provides the transmitters, antennas, and receivers for over *300* weather radio stations in the U.S. SRS has also supplied the receivers under separate orders to the Defense Civil Preparedness Agency, radio broadcast stations, Army Corps of Engineers, municipalities, NASA, power companies, etc.

- 162.40, 162.475, 162.55 MHz
- Warning Alarms
  - —Single Tone
  - —Up To Five Dual Tones (Sequential Or Simultaneous)
  - —Relay Contacts For External Alarm
- AC With Internal Rechargeable Battery
- Optional Vox/Monitor Alarm
- Optional Field Strength Meter

SR-401 RECEIVER

SR SYSTEMS

Scientific Radio Systems Inc.

367 ORCHARD ST. ■ ROCHESTER, N.Y. 14606

■ PHONE (716) 458-3733 ■ TELEX 978-368 ■ CABLE SIRAD ■ FTS 716-263-5700

AN EQUAL OPPORTUNITY EMPLOYER

For More Details Circle (130) on Reply Card

Tech Data

continued from page 206

An expanded section on plugboards includes many new microprocessor boards as well as dozens of time-proven cards for DIP and discrete components. Also listed are enclosures and card cages. Particular emphasis is placed on the Vector-Pak enclosure cases with internal structure for efficient mounting of cards and modules.

Other sections include kits, tools, connectors, sockets, terminals and patchboards. Accessories and associated equipment are cross-indexed for convenient reference.

For More Details Circle (305) on Reply Card

Verelco Ltd.—Details covering the audio and power connector range are contained in a new 12-page brochure published by Elco.

The brochure provides details of six main connector ranges which include intermediate, medium and RF bypass power connectors, and audio connectors. All are suitable for applications ranging from headsets to military-specification communications equipment where resistance to moisture, salt, temperature cycling, vibration and quick connecting actions are necessary.

All Elco connectors listed in the brochure are available in the United Kingdom through Varelco Ltd.

For More Details Circle (306) on Reply Card

Jamison Door Company—The *Owner's Guide to Safety Management and Maintenance Scheduling* deals with company's line of cold storage, sound reduction and other specialized doors.

In the forward of the two-color, 12-page guide, Jamison cites the added costs in lost production time, higher energy bills, inefficient performance, and other, sometimes hidden, expenses that can result if doors are not properly and safely used and carefully maintained.

Instructions on ordering recommended safety and maintenance information and equipment, as well as on establishing and keeping a maintenance log are included in the text.

For More Details Circle (307) on Reply Card

TeleMation, Inc.—New literature has been released on the TVS/TAS-1000 Video-Audio Distribution Switching Systems.

The eight-page brochure outlines

continued on page 210

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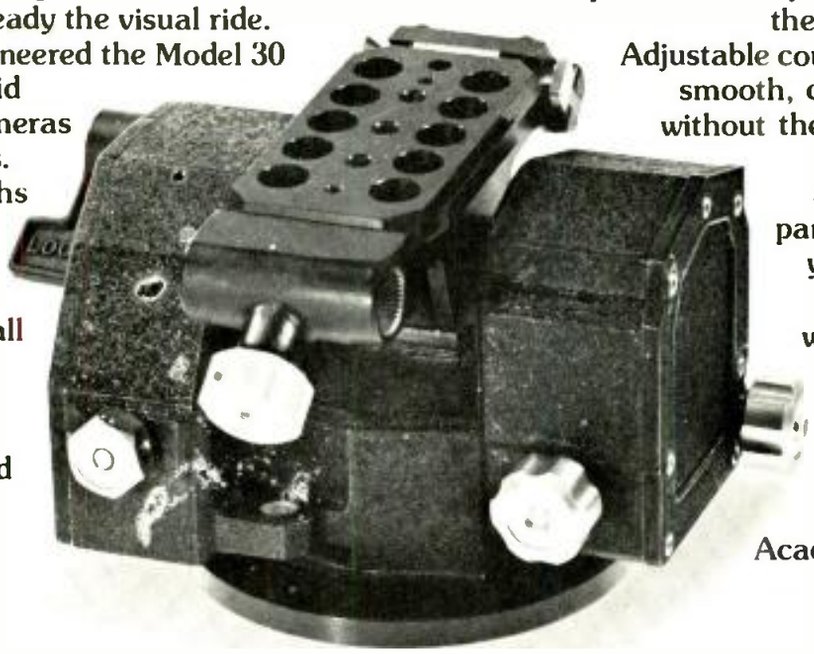
FLUID FOR THOUGHT.

Your new portable camera needs a fluid head more than your heavy camera.

That's right! Just as a light sports car needs good shocks to hold it on the ground and smooth the ride, your light camera needs a good fluid head to steady the visual ride.

O'Connor has engineered the Model 30 to be the ultimate fluid head for portable cameras weighing up to 30 lbs.

It's small and weighs only 5 lbs., yet it has the smooth, steady action and features which are unique to all O'Connor heads. It pans 360° and tilts ±60°. The pan drag, pan lock, tilt drag and tilt lock all operate independently for greater flexibility and control.



The Model 30 has a totally unique counterbalance which is adjustable in the field. One simple tool will adjust the spring to match the weight of the camera. Adjustable counterbalance provides smooth, consistent, fluid action without the distractive influence of camera weight.

So, the next time your panning gets rough, turn your thoughts to fluid. O'Connor fluid... when you demand the very best.

1976 Scientific/Technical Academy Award recipient.

O'connor
FLUID CAMERA HEADS
100 Kalmus Drive, Costa Mesa, CA 92626

Please send more information.

Company _____

Name _____ Title _____

Address _____

City _____ State _____ Zip _____

My camera weighs _____ lbs.

For More Details Circle (154) on Reply Card

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Tech Data

continued from page 208

the features of the TVS/TAS-1000 including solid-state crosspoints with vertical switching, single-coax "party-line" control, plug-in conversion to phone line or computer control, automatic restoration after power failure with refresh memory option, dual video outputs, standard multiple-sourced components, and automatic system testing of all circuit parameters through all possible signal paths.

In addition, design considerations, input circuitry, crosspoint circuitry, output amplifiers, crosstalk considerations, control systems, vertical interval switching, matrix configurations, control configurations and status monitoring are briefly described with appropriate pictures and graphics. Specifications are also included.

For More Details Circle (308) on Reply Card

Hybricon Corp.—A 12-page catalog has been published on a new series of wire-wrap boards and accessories. The problem of mounting integrated circuits with discrete components on a wire-wrap board has been solved, without the use of component carriers.

A new dimension in flexibility is presented involving the efficient mounting of all sizes of ICs and associated discrete components with an I/O arrangement for buss-oriented systems, which is a special interest for microprocessor-based designs. It shows how a user can save up to 40% when boards are not fully loaded with integrated circuits and components.

For More Details Circle (309) on Reply Card

Telecommunications Technology, Inc.—A new, illustrated four-page brochure describes the model 1120 and 1122 transmission test sets, third-generation digital instruments specifically designed for telecommunications. Both models provide full capacity for measuring transmission level, frequency, noise and notch noise.

The models are functionally identical, but the 1120 is portable (detachable rack-mount hardware available) and the 1122 requires a mounting space on a 12-inch or 23-inch equipment rack. Each test set includes its own microprocessor with on-board memory for controlling all measurements and transmit functions as well as a complete self-diagnostic routine which indicates whether all functions are working properly.

The brochure includes specifications, an illustrated demonstration of a typical self-test sequence, and descriptive information on the various features such as dual displays, 2-line dial/transfer/hold, full autoranging on all measurements, portable battery operation (1120 only) and low distortion oscillator.

For More Details Circle (310) on Reply Card

Semiconductor Circuits, Inc—A new 40-page application and selection guide provides a glossary of power supply terminology and presents test procedures. Practices are recommended for the user of both line-operated and DC/DC converter power supplies. Special requirements for safely powering UPs are defined. Ground loop avoidance and DC/DC converter "spike" noise problems also receive coverage.

Complete electrical and mechanical specifications are included for 11 families of line-operated supplies and 10 families of DC/DC converters. Several new families and many new models are described.

continued on page 212

THE SYSTEMS APPROACH

...at last, AGC/Processing and Peak Control in the proper packages.

MULTIMAX–the AGC/Processor with exceptional input headroom, low noise, and low distortion. Multimax is the 3 band processor which employs unique energy based, open-loop compressors as the active gain control elements. A special gated release circuit insures smooth gain control and band tracking performance. Separate cross-over frequencies are designed for AM and FM bandwidths.

MULTILIMITER–the limiter that features an input "gain riding" compressor, a variable compression ratio fast limiter and a ultra fast peak control limiter which provides modulation protection without relying on clippers.

The Multimax, Multilimiter "package" concept puts your processor and limiter where they belong...in separate boxes. Multimax and Multilimiter are available for AM or FM application.

Call, write or telex today...

PACIFIC RECORDERS AND ENGINEERING CORPORATION
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TELEPHONE (714) 453-3255 TELEX 695008

For More Details Circle (155) on Reply Card

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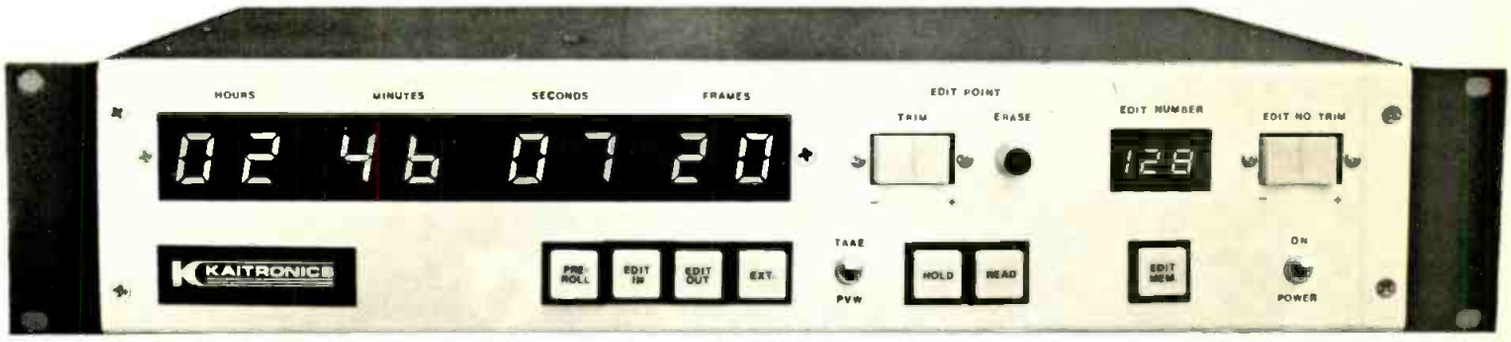
Our Edit Memory Control can .....

Memorize 128 Edit Points,
Control VTR's for Multiple Edits,
..... and is priced under $4,300



Model EMC-100

The EMC-100 can memorize all the edit functions and execute the commands to make them happen for you.

As you watch the monitor, you punch the buttons to register the edit points into the memory, instead of jogging them down on a scratch pad.

The basic model stores up to 128 edit points (512 or more, optional). Four pushbuttons are provided to select control functions for each edit point (additional control functions optional).

In the Edit Memory mode, the edit points can be recalled, previewed, shifted or erased, as often as you like, beofre the final edit is made.

The EMC-100 will operate with both Quad and Helical VTR's. It controls the machine and its editor, via the remote control connections, to perform sequence of edit functions by strobing out commands, converted from the stored edit points, in the form of contact closures or logic level pulses.

The EMC-100 can be programmed for exact prerolls for any type of machine. A.B rolls and double system rolls for different types of machines can be performed with ease.

The EMC-100 is equally versatile for either off-line or on-line applications.

For daily ENG and Field Productions, whether to use edit code or not can be decided later at the studio. While previewing the 'raw footage', you can lay down the edit code and mark all your edit points, simultaneously, on the first pass, with the edit code generator feeding both the VTR and the EMC-100.

Together with an edit code generator, the EMC-100 gives you a new dimension of editing flexibility.

Other Kaitronics SMPTE Edit Code Products:

SMPTE Edit Code Generator
SMPTE Edit Code Reader
Numeric Character Generator
Widespread PreAmps & Accessories

For more information, send for brochures or call:

Paul Tarrodaychik, VP, Marketing
(408) 739-4262

KAITRONICS
870 MAHLER ROAD, BURLINGAME, CA Tel: (415) 697-9102

For More Details Circle (156) on Reply Card

www.americanradiohistory.com

Tech Data

continued from page 210

One hundred forty models of line-operated supplies and DC/DC converters that are available from stock are described in two tables called In-Stock Selection guides.

Available sockets are described by both dimension drawings and a listing of the power supplies with which they will mate. Options are defined and then tabulated relative to product families.

For More Details Circle (311) on Reply Card

Newark Electronics—Over 100,000 electronic devices are listed in catalog number 103.

The catalog features the products of 166 leading electronic component manufacturers, including: Allen-Bradley, Alpha, Amphenol, Belden, Bourns, Bud, Centralab, TRW/Cinch, Cornell-Dubilier, Cutler-Hammer, General Electric, International Rectifire, Mallory, Motorola, Ohmite, Potter & Brumfield, RCA, SPC Technology, Sprague, Switchcraft, Texas Instruments and dozens of others. Several lines not previously stocked have been added.

Descriptions, electrical and physical specifications and illustrations are provided for semiconductors, resistors, capacitors, potentiometers, controls, switches, relays, fuses, circuit breakers, transformers, connectors, sockets, wire, cable, lamps, lights and other related electronics products.

Detailed product indexing and a separate index of manufacturers are designed to assist in product selection.

For More Details Circle (312) on Reply Card

Telex Communications, Inc.—Detailed in a new illustrated brochure is the full line of audio tape components. The brochure includes complete product specifications, descriptions and ordering information.

The catalog features heavy-duty open reel tape transports and tape cartridge transports. Endless loop NAB-type magnetic tape cartridges are also shown. The company's latest solid-state record/play, playback and power amplifiers for single and multi-channel systems are described in detail.

For More Details Circle (313) on Reply Card

Acrodyne Industries, Inc.—A new data and specification sheet on weatherproof enclosure system describes availability for solid-state translator applications up to 10 watts VHF and UHF and other equipment requiring a 19-inch width by a 17-inch maximum panel height.

The data sheet includes information on the new enclosure's features, a chart of available options, complete specifications and photographs illustrating both a close-up and an example of convenient mounting to a tower or pole.

A schematic is also included illustrating position of ventilating fans, prewired AC junction box, front door locking provisions and suggested mounting arrangements.

For More Details Circle (314) on Reply Card

Van Nostrand Reinhold—Covering product/service management, *Product/Service Strategy* provides a framework for making decisions about products and services. The 305-page book by Richard T. Hise shows how product/service decisions fit into the general marketing area. Discussion of material is approached on the premise that there are certain fundamental concepts common to all products and services. These concepts are drawn

continued on page 214

For More Details Circle (157) on Reply Card

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How can we offer digital TBC quality and flexibility – at a price this low?

Simply by designing a better time base corrector.

For example, the single most complex and expensive part of a digital TBC is the analog-to-digital converter. The TBC-110A eliminates the A to D converter through the use of a charge-storage analog memory. By sampling and storing the video signal at 14.318180 MHz, the TBC-110A provides the same sampling speed and video bandwidth as the competition's highest priced model — **without** the expensive A to D converter.

A true time base corrector that does it all.

The TBC-110A will remove all high frequency jitter, waterfall, skew, and geometry error (S banding) from any type of non-segmented helical scan recorder. H lock VTRs can be corrected to house sync and FCC specifications by locking the TBC-110A to EXT sync. Other types of VTRs, such as line lock models, can be locked to the center of the floating window in the INT sync mode.

Fades, wipes, and inserts possible with non H-lock VTR's.

The internal digital sync generator provides a full complement of pulse outputs that are locked to either the internal oven-controlled crystal, or a VCO that is tracking the video input. The tracking mode (floating window) can be used to lock cameras to the sync outputs of the TBC so that fades, wipes, and inserts can be accomplished with non H-lock VTRs.

Complete video processing.

The TBC-110A provides complete video processing, including such features as separate luminance and chrominance processing in all modes, so that negative black spikes below sync are removed without clipping negative chroma. Chroma Gain and Chroma Phase are also adjustable in all modes (het and direct).

Exceptional skew error correction.

The TBC-110A is capable of removing step errors within one line after they occur, thus providing total and almost instantaneous skew error correction.

Truly superior heterodyne processing.

Heterodyne chrominance jitter is minimized because the TBC-110A first demodulates chroma — then removes time base error in parallel luminance and chrominance memories. The result is superior heterodyne processing — minimal color error.

If your studio operates one or more helical scan recorders, a time base corrector is a virtual necessity. The TBC-110A has the credentials to satisfy the most demanding studio requirements, while maintaining a price that is comfortable even for small distribution systems.

The TBC-110A is now available at $4,990.00. Slide rails are an optional extra.

EduTron™

3700-B2 Northeast 53rd Ave.
Gainesville, Florida 32601
(904)377-8276

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Increased Performance for your Mincom

SAKI MAGNETICS INCORPORATED

Think Ferrite 10 Times Life • All Track Formats • 100's in Service • Unconditional Warranty. Ferrite Heads Available for all Professional Recorders.

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For More Details Circle (159) on Reply Card

QUALITY ✓ PRICE ✓ DELIVERY ✓

THE BEST REASONS FOR SWITCHING TO—

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AUTHORIZED DEALERS

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California 92807
Tel. 714-528-9505

Listec Television Equipment Corporation,
35 Cain Dr.
PLAINVIEW
N.Y. 11803
Tel. 516-694-8963

Television Engineering Corporation,
519 Rudder Rd.,
FENTON, Missouri 63026
Tel. 314-343-5605

For More Details Circle (160) on Reply Card

Tech Data

continued from page 212

from the areas of behavioral science, organization theory, economics and quantitative methods.

Emphasis is placed on those current trends affecting product decisions. New product development, life-cycle management and product elimination are treated. Special attention is given to the product elimination decision.

Topics discussed include: introduction to product/service management, marketing consumer and industrial products and services, organizing the product/service function, developing objectives for products and services, developing successful new products and services and life-cycle management for managing products and services.

For More Details Circle (315) on Reply Card

Acrodyne Industries, Inc.—A new data and specifications sheet has been released on the model TT-445 6-kilowatt VHF television transmitter utilizing low-level IF modulation. Carrier modulation, envelope delay and VSB shaping are performed in the low-level solid-state stages to guarantee the best video performance available for FCC and CCIR systems.

The data describes the modulator in depth, as well as detailing solid-state circuitry, required tubes and cavities, logic display, and an exclusive fault memory system.

Complete visual, aural service and mechanical specifications are included for both FCC and CCIR (system "B") operations.

For More Details Circle (316) on Reply Card

Electronic Industries Association—The *1977 Electronic Market Data Book* presents statistics, facts and commentary on the growth and development of the U.S. electronics industry.

The book is a compilation of material that can assist in identifying possible growth areas and following market trends. The information covers: consumer electronics, communications and industrial products, government products, electronic components, world trade and related information such as employment and R&D trends.

For More Details Circle (317) on Reply Card

3M Company—A four-page brochure containing information on two

continued on page 216

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NEC

The Broadcast Equipment Company you'll be hearing a lot more about.

You'll hear about us, because we're making it a practice to listen to you. As the world's second largest maker of broadcast equipment, we're not in a position to dictate; and we won't—even when we're number one.

We have a line of equipment in the U.S., that's well worth your investigation: VTR's, TBC's, frame synchronizers, etc. And we're ready to expand it. When you're ready.

Just let us hear from you.

NEC

NEC America, Inc.

Broadcast Equipment Division
130 Martin Lane
Elk Grove Village, Illinois 60007

(312) 640-3792

For More Details Circle (80) on Reply Card

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Tech Data

continued from page 214

television-related products, model 5110 color insert keyer and model 5120 video outliner, is available from the company's Mincom Division.

The color insert keyer adds color and dimension to graphics produced by a character generator or camera. The video outliner, by offering a choice of five outline possibilities, furnishes new options for the display of alphanumeric characters and other TV graphics.

Also included in the two-color booklet are flow charts showing proper installations of the units in relation to video input and program output. In addition, detailed specifications are given for both pieces of hardware.

For More Details Circle (318) on Reply Card

National Association of Educational Broadcasters—Public broadcasting will be structurally and fundamentally altered within the next 18 months and the two papers that are the basis for this change are in the current *Public Telecommunications Review*.

The persuasive internal Task Force paper that was submitted to Carnegie Corporation calling for a commission on the future of public broadcasting appears in its entirety along with the options paper written by the House Subcommittee on Communication's chief counsel, Harry Shooshan, for this fall's hearings on the "review" of the Broadcasting Act of 1934.

Shooshan has prepared an examination of the obstacles faced by public broadcasting and describes options to consider for their resolution. Public broadcasting is beset with political and financial problems which have barred the system from developing to its full potential. In September, it is these problems that Congress will review.

For More Details Circle (319) on Reply Card

AMP Incorporated—A new 14-page booklet from the Capitron Division is designed to help anyone who buys or builds power supplies. The *Power Supply Specifying Guide* emphasizes high-voltage units. There are sections devoted to the make or buy decision, determining whether a custom or a standard package is needed. The guide also explains how to specify high-voltage power supplies, using oil as a high-voltage insulator and packaging high-voltage circuits.

For More Details Circle (320) on Reply Card

Labgear Ltd—A slim pocket-size product planner which gives details of the company's television distribution, test and teletext equipment is now available.

Preamplifiers and power units, distribution equipment, repeater amplifiers, room aerials, test equipment and associated accessories are included, as well as "Colourtext," a teletext adapter. The planner also includes a dBmV conversion to voltage level chart.

For More Details Circle (321) on Reply Card

National Semiconductor Corporation—A comprehensive data book is being offered on field-effect transistors and analog switches.

The 277-page handbook provides many features helpful in choosing FET products. There are alphanumeric parts lists and cross reference guides. The parts lists serve as an index to an FET selector guide, which includes n-channel, p-chan-

continued from page 218

YOU'RE BEGINNING TO SEE THE LIGHT!

A HIGH INTENSITY LIGHTING SYSTEM offering

Reduced Weight and Windage
Easier, Lower Cost Installations
No High Voltage Conduit Runs
Improved Reliability and Serviceability
Fully FAA Approved

Now, over 125 reliable ElectroFlash Systems are in operation. The FTB-205 systems mark and protect America's NEWEST BROADCAST TOWERS.* Many more [illegible] with ElectroFlash protection are operating in CANADA.*

These numbers do not include the ElectroFlash Systems on Microwave communications towers or the "HOT" tower systems, one on a ½ mega-watt radio navigation radiator and others on combination AM radiator-FM towers in the United States and Canada.*

TIME TO REPAINT YOUR TOWER? TWO of the ElectroFlash Systems soon to be "turned on" will replace surface paint and night lighting on older towers!*

Why the FTB-205 ElectroFlash Beacon System from FTCA? Simple! When you add considerations such as:

- Superior Design
- High Quality Construction
- Lower Installation Cost
- Proven Reliability
- Long Life
- Outstanding Warranty Coverage

to other exclusive features, the results are benefits obtainable only with the FTB-205 ElectroFlash System.

MARK and PROTECT YOUR TOWER with CONFIDENCE!

SPECIFY the FTB-205 ElectroFlash System!

* for system locations and station calls or for additional information on the marking of your tower.

WRITE OR TELEPHONE

FLASH TECHNOLOGY
CORPORATION of AMERICA

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For More Details Circle (163) on Reply Card

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Tune-up, Preset and Change Scenes. In Real Time.

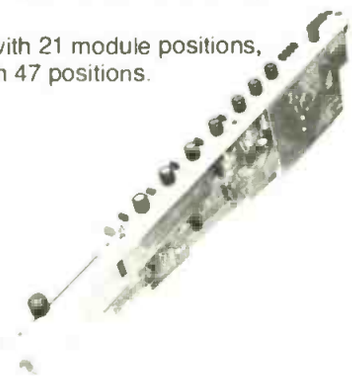
The Series 20A offers great flexibility in theatre sound mixing, television production, and concert sound reproduction.

The Series 20A is totally modular. That means you can have custom convenience at off-the-shelf prices. Because modularity lets you purchase only the modules you need. As your needs expand, you simply plug in more modules.

And you can customize the arrangement for a particular show. Just plug the modules into any position on the chassis. No tools required.

The Series 20A simplifies your real time operation by allowing you to predetermine program content and distribution. Designed with human engineering in mind, the following features are provided.

- 4 chassis/enclosure sizes: 2½′ with 21 module positions, 4′ with 31, 5′ with 39, and 6′ with 47 positions.
- Up to 37 input channels, each switch selectable for mic and line level signals. Optional switching modules for selection of up to 48 additional remote inputs.
- Presettable (mute) circuit for each of four independent pre-sets. Any input can be assigned to any combination of the four muting circuits. Allows instantaneous changeover from one "scene" to another.
- Two complete foldback buses having level and switching controls at each input, with sub master controls.
- 3-Knob equalization on every input channel—with boost or cut.
- Unique datacable and roadmap configuration to interconnect Cetec's all solid-state printed circuits. Straightforward design provides simple plug-in module positioning.



Cētec audio
For the educated ear.

For further information, contact Cetec Audio

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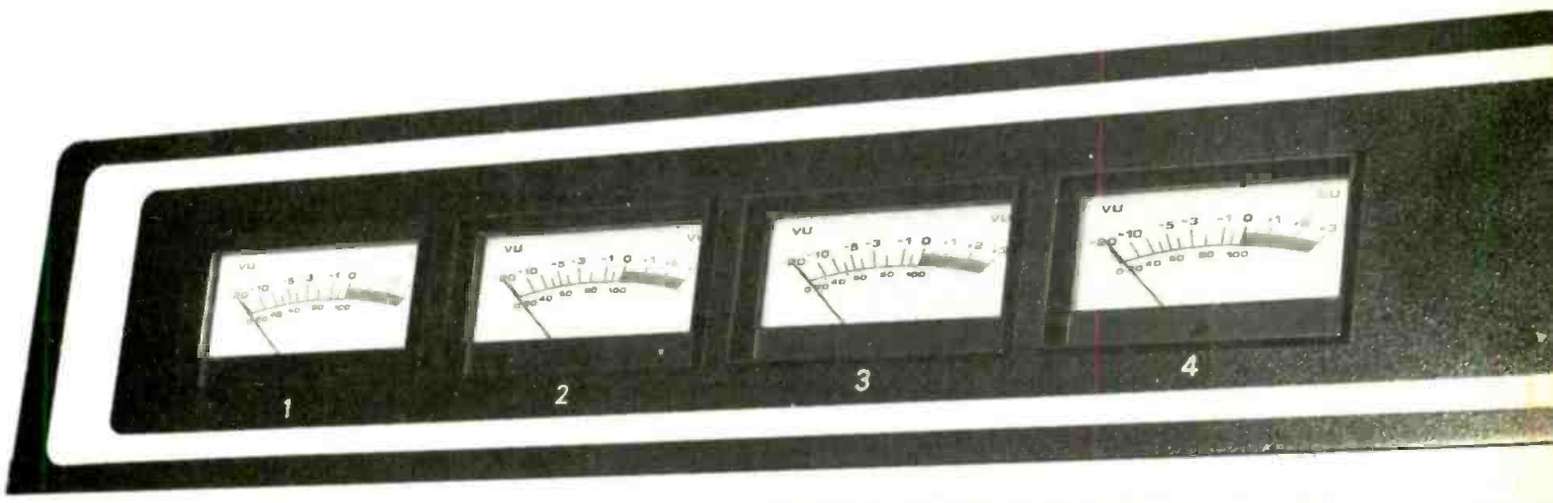
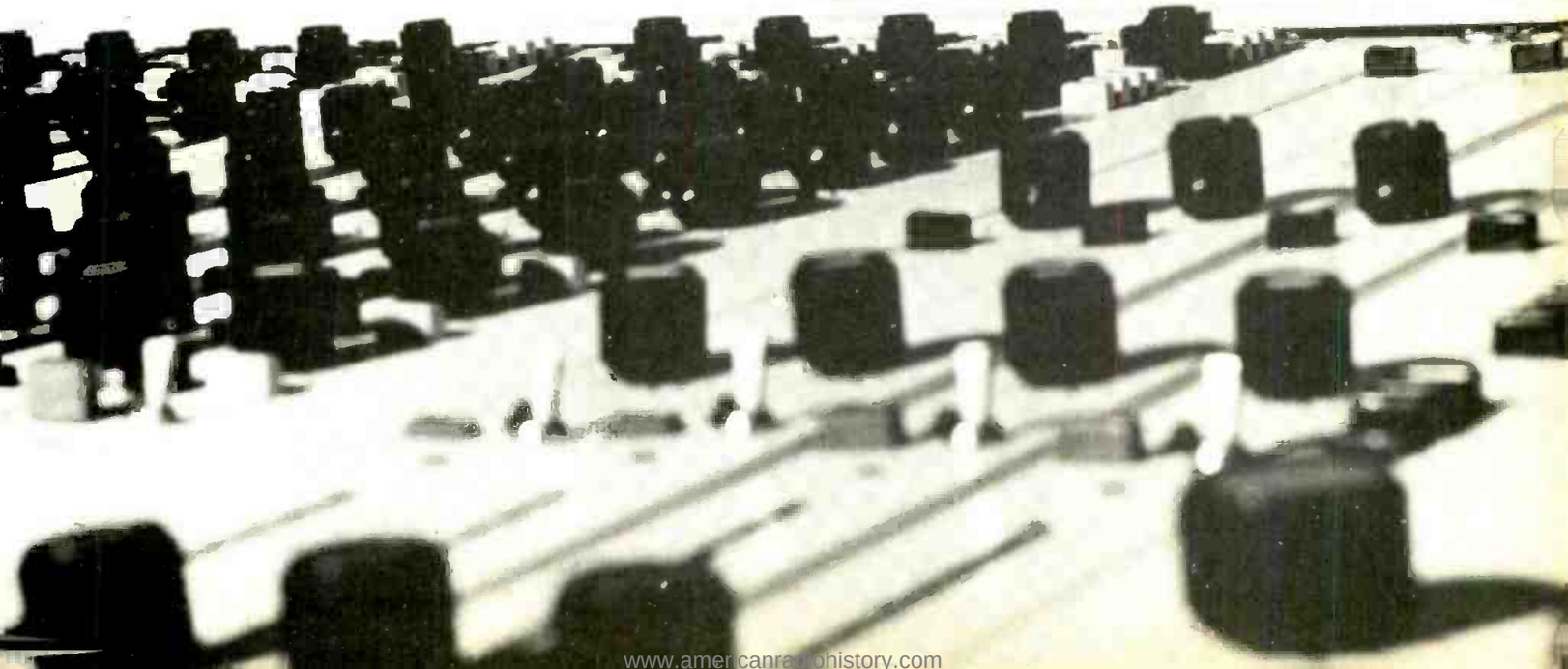
No. Hollywood, CA 91605
Phone: (213) 875-1900 TWX: 9104992669

A division of Cetec Systems LTD.
U.K. Sapphire House, 16 Uxbridge Rd., Ealing,
London W52BP
Phone: 01-579-9145 Telex: 837329

For More Details Circle (164) on Reply Card





www.americanradiohistory.com

Tech Data

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nel, and n-channel dual FETs organized into application areas. There are detailed characteristics on all processes, including all parts manufactured from a particular process by package type.

The book also features selection guides, applications information and data sheets for the line of analog switches and other monolithic FET structures.

An applications section includes articles on such topics as *The Low Noise JFET, A Linear Multiple-Gain-Controlled Amplifier,* and *Monolithic Dual FETs vs. 2-Chip Dual FETs.*

For More Details Circle (322) on Reply Card

Clifford B. Hannay & Son, Inc.—Specialized use of reels for electric cable is described in a series of brochures.

Each brochure shows typical applications of power rewind, spring rewind and manual rewind reels in handling cable for power transmission, signal transmission and for grounding.

A cutaway photo shows features of a typical reel. The brochures cover applications for industrial electric service, utilities, electrical contractors and broadcast engineering.

For More Details Circle (323) on Reply Card

Signal Transformer Co., Inc.—*Transformers* is a new catalog packed with detailed design information on all kinds of power transformers. The bulletin, a combination short-form catalog and quick application guide, presents major functional specifications and mechanical data on the company's transformers, along with schematics.

In addition to filter chokes and power-isolation transformers, the catalog includes SPLIT/TRAN® and FLATHEAD® printed-circuit board transformers.

The SPLIT/TRAN transformer features a split-bobbin construction that provides high isolation (2500V RMS Hipot) and eliminates the need for electrostatic shielding. The new FLATHEAD transformer offers an 0.850-inch high silhouette for easy mounting on tightly stacked pc boards.

For More Details Circle (324) on Reply Card

RCA—*Closed Circuit TV Accessories*, a 40-page catalog, offers a quick selection guide to over 700 CCTV accessories. Referred to as CCV-113A, this guide is arranged by major product categories for easy access and gives a brief description of each product, its model number, the optional user price and the data sheet number on which more detailed information will be found.

For More Details Circle (325) on Reply Card

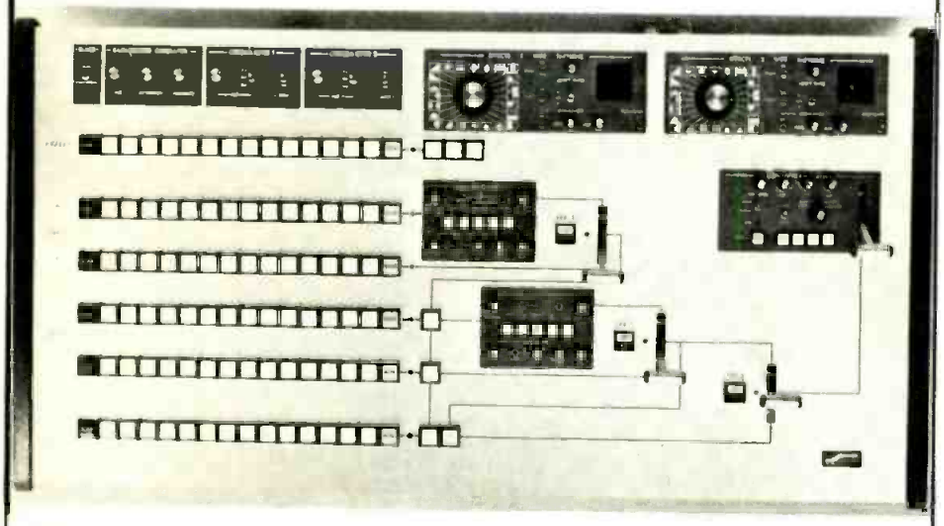
Federal Communications Commission—A new edition of the Radio Control Service rules has been made available from the Government Printing Office.

The Radio Control Service involves radio signaling and radio control of remote objects or devices such as model airplanes, model boats and all other types of models; garage door openers; burglar alarm systems and cameras.

The new, separate edition includes all of the rules a Radio Control Service licensee is required to follow. The FCC reminded such licensees that they were required to keep up with changes in subpart C of part 95 of the rules. Changes are published in the Federal Register shortly after their adoption. □

For More Details Circle (326) on Reply Card

ANNOUNCING THE ROSS RVS 16-6C



The Ross RVS 16-6C pictured above features:

1. An additional matte generator (colorizer) which allows the titles to be colored independently of the main background generator in the switcher.
2. Switchable black or white borders.
3. Switchable OFF, BORDER, SHADOW and OUTLINE modes.
4. Master fade to black on downstream keyer.

PLUS all of the other unique features which have made ROSS the fastest-selling switchers in Canada!

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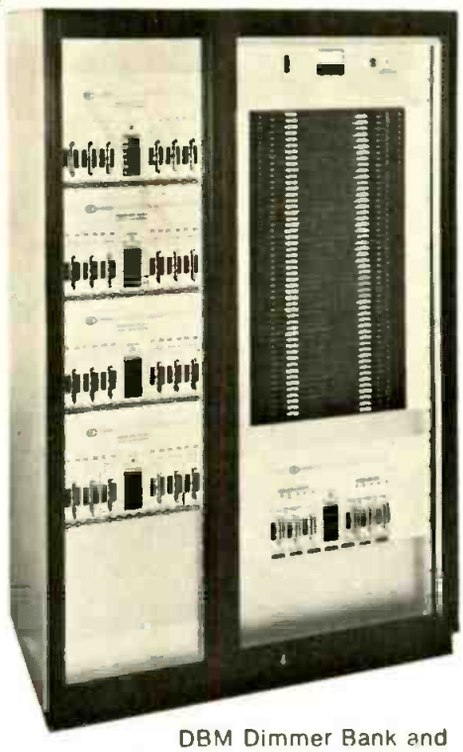

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Modular system: The plug-in units can be removed from the rack for maintenance without the use of any tools. The module can be removed under power without any damage to the units.

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For More Details Circle (166) on Reply Card

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new products

Low-frequency function generator

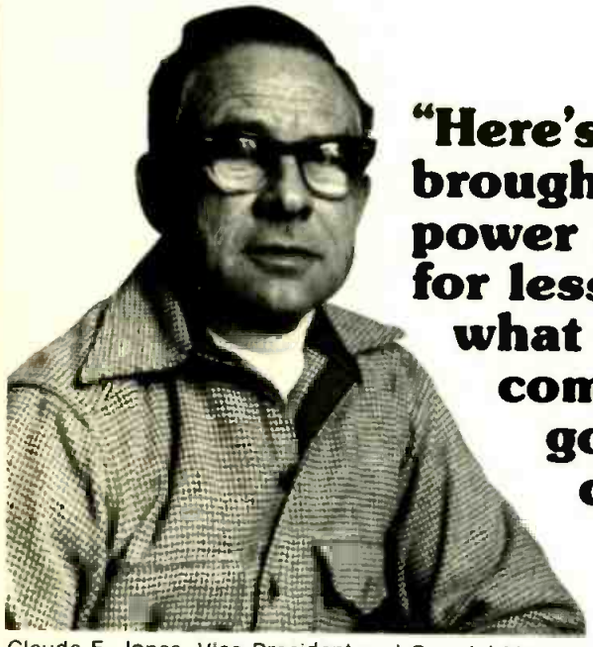
A new low-frequency function generator has been developed by *Phillips Test & Measuring Instruments, Inc.* The PM5129 generator has an output from 1 Hz to 1 MHz. The low-distortion sine, square and triangle waveforms can be varied in amplitude, frequency, DC level and duty cycle.

Output frequency is set by a linear scale over eight ranges and can be stable or swept by an internal ramp signal or modulated internally by a 2 Hz to 20 kHz tone.

Two features of the PM5129 are the single shot and burst modes. Single shot outputs may be initiated by pushbutton control, a variable "peak-level" control or by external TTL signals. In burst mode the number of cycles in each burst can be varied by the period control over a 10 to 1 ratio.

The PM5129 has a maximum output of 30V into 50 ohms and can be step attenuated down to 68 dB. A variable of 0.2 dB amplitude control shows approximate output levels.

For More Details Circle (327) on Reply Card



"Here's how we brought 3-phase power to WSLW for less than 5% of what the power company was going to charge us"

Claude F. Jones, Vice President and General Manager
Radio Station WSLW, White Sulfer Springs, W. Va.

When WSLW decided on moving their transmitter to higher ground to increase their service area and potential listenership, they were faced with the problem of 3-phase power availability. WSLW's Vice President and General Manager, Claude F. Jones first called the Utility Company for an estimate. Then he called Kay Industries. Mr. Jones found the difference hard to believe. Kay's Phasemaster® Rotary Converter brought 3-phase power to WSLW for less than 5% of what it would have cost to bring in utility-supplied 3-phase power. And with the Phasemaster®, not only were transient spikes eliminated but, WSLW also got excellent voltage regulation.

The Phasemaster® 3-Phase Rotary Converter is making it possible for AM and FM stations all over the country to *economically* convert single phase to 3-phase power. A full line of these rotary converters, from ¼ to 200 HP, is available from Kay Industries, Inc. For more information concerning the Phasemaster's® various broadcast applications, write to Kay Industries.

Phasemaster® Rotary Converter the equivalent of utility-supplied 3-phase power at an affordable price.

KAY
INDUSTRIES, INC.
604 North Hill Street, Dept. BE
South Bend, Indiana 46617
219/234-0171

For More Details Circle (167) on Reply Card

TV time code character generator

Gould, Inc., Control and Systems Division, has expanded its Datametrics digital timing equipment for SMPTE editing to include the model SP-722, a single unit which will generate and read SMPTE time code and display the decoded time on an editing monitor.

The new feature of digitally displaying hours/minutes/seconds/frames is accomplished by "mixing" with the video signal. Time characters are adjustable to any position on the monitor, have switchable size and style, and can be adjusted for optimum intensity.

For More Details Circle (328) on Reply Card

Tape transport consoles

Rus Lang Corporation has introduced two new tape transport consoles, the RL 600 and RL 700.

The RL 600 is designed to accept the new style of tape decks 19" x (up to) 21" which have their electronics integrated with the transport. The RL 700 will accommodate tape transports 19" x (up to) 24½", such as the Ampex 300 Series. The RL 500, introduced last year, handles 19" x 15¾" decks.

All three models feature front panel access in both horizontal and vertical positions, plus a rear shelf for power supplies.

For More Details Circle (329) on Reply Card

News lighting system

Cinema Products Corporation has made available a new, lightweight CP/Newslite 12V/100W lighting system. It is ideal for use with the new, faster film stocks (Eastman VNF 7250 and Fujicolor RT400, both rated at 400 ASA) in most television

continued on page 222

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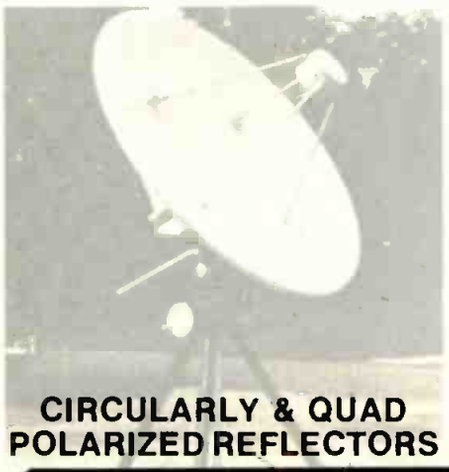
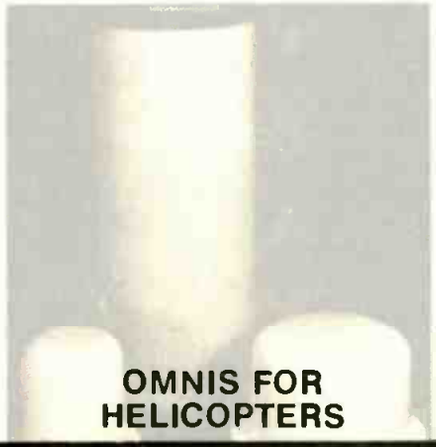


CIRCULARLY & QUAD POLARIZED REFLECTORS



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For More Details Circle (169) on Reply Card

New Products

continued from page 220

newsgathering, documentary, and similar applications.

The ultra-lightweight lighting system consists of a focusing CP/Newslite, a 100W/12V 3400°K "Quartz" lamp, and a CP 12V battery (with built-in charger).

Designed to be top-mounted on CP-16, CP-16R and other 16mm cameras, the focusing CP/Newslite also features a convenient integral handle and a detachable yoke.

The CP 12V battery recharges overnight and includes a black leather case and shoulder strap.

Intercom interface adapter

Clear-Com will soon introduce Adapt-A-Com.

The Adapt-A-Com allows a Clear-Com user to interface their system with any known two-wire, three-wire or four-wire communication link. This includes carbon, Telco-loop telephone type or professional television closed-circuit systems.

Controls include a mode select switch, transmit and receive gains, and set-up functions. Connections include cannon type, connector for use with test headset and Clear-Com interconnection plus binding posts for interface to external communication systems.

For More Details Circle (330) on Reply Card

Microphones

A. B. Pearl of Sweden, manufacturer of high-quality microphones, has appointed *Cara International, Limited* as its import agent for the western section of the U.S.

Cara Pacific Sales Company will handle the Pearl line in the Pacific Coast states. All inquiries should be directed to Cara International Limited, 4145 Via Marina, #120, Marina del Rey, California 90291.

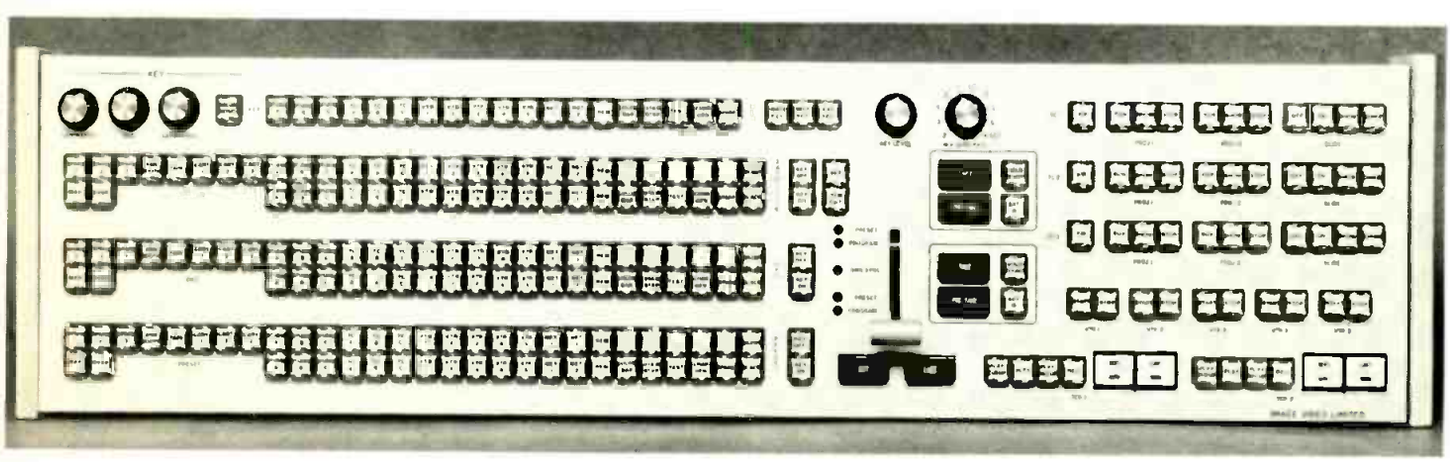
Pearl microphones have been available for several years under the PML trademark. Encompassing a wide range of microphones for all sound recording, broadcast, television, public address and home recording applications, the line includes a wireless mic system, an interference tube (shot-gun) system, and a complete range of accessories and power supplies for SYMSI 12- and 48-volt systems.

Suggested user net prices for the line of dynamic mics range from

continued on page 224

CKY-TV WINNIPEG chooses IMAGE VIDEO

Audio-Video Master Control Switcher designed for future computer operation



CKY-TV had a custom requirement which included a master control facility to control the main transmitter at Winnipeg and a satellite transmitter, machine controls for VTRs, 16mm and slide projectors. They also wanted to provide for the future installation of computer control. This was to be supplied with a console which matched up with an existing console at the station.

The complete equipment package was supplied by IMAGE VIDEO.

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...Whatever your problems: new equipment, rebuilt equipment, reconditioning or updating. Accurate Sound's "Total Systems" capability can solve your problem. Our experts will design a system for your complete audio/video complex, including building construction and acoustics. This service also includes consultation to determine the exact equipment required for your particular application. In addition, we offer technical assistance in the construction and installation of your system. Accurate Sound assembles and pretests ALL equipment prior to shipment to your facility. Lease finance is available.

Accurate Sound / MCI 2600

This recorder/reproduce system provides complete recording using Invonics, three speed electronics, AG-440, Ampex 351, MCI JH5 or other electronics. The transport features our new tape motion control box that eliminates the tape handling deficiencies typical of most older tape transports. We offer a one year parts warranty with 90 days labor. Priced without console:

$2,675.00 mono
$3,265.00 2-channel
$4,645.00 4-channel

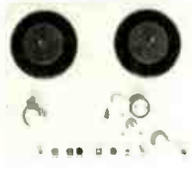
For a walnut formica console, add $330.00 to the above prices.

2400 Duplicator

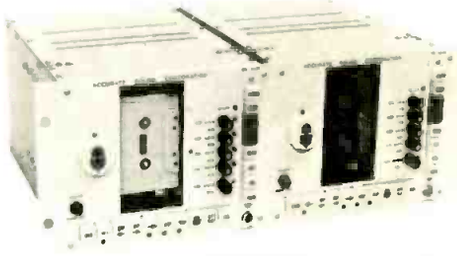
Brings you real time duplication quality 16-times faster. It produces copies at 7½ ips; 30HZ to 18KHZ with less than 45 degrees phase error. Features: automatic recueing of master for preset number of cycles. Reload slaves while master rewinds. Precision-mounted ferrite heads. Head assemblies contain equalization level calibrations. State-of-the-art tape motion control includes constant tension holdback, motion sensing, dynamic and mechanical braking. Two channel systems from $7,500.00.

2600 Transport

Functions are fully remotable, including record and tape lift. Standard version includes constant tension holdback, delayed stop, three speed, constant tension takeup, capstan slow start and a two inch tape capability. The 2600 is available with Ampex, Accurate Sound, Inovonics, MCI or Scully electronics. Standard version $1,495.00.



Cassette Recorder



Designed primarily as an on-line logging recorder for broadcast use. It is a four channel recorder / reproducer with many transport functions: skip-forward, skip-backward, automatic play with either continuous run or BOT/EOT sense, optional bi-directional play, optional capstan engage for search and cue, digital readout tape position indicator, any speed available between .5 and 20 ips with variable speed option...all with remote controllable functions. The system is packaged in a two module bay with provision for module to module dub function. The package size is 7" high x 19" wide x 12" deep. Price $4,800.00.

Accurate Sound Model 445

Professional, high quality, two channel reproduce only electronics equally suited to new installations as well as updating existing systems. Features include: built in power supply providing transport power via a rear panel connector, dual EQ settings and remote EQ access for properly wired transports. Plus, the 445 makes use of plug-in, 44-style cards. Priced with meters at $695.00 and without meters for $595.00.

Tentelometer

The Tentelometer Tape Tension Gage can diagnose mechanical sources of WOW and flutter, in addition to helping set-up and maintain a quality audio recording. Priced from $179.00 complete.

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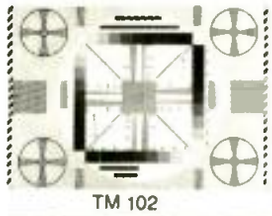
TELE-PAT PRECISION TEST SLIDES PUT YOU RIGHT IN THE PICTURE

Whether you're a top network station or an independent videotape producer, the picture your viewers see must be clear, sharp and color-true. There's only one way to make sure—and that's to check and align your TV cameras regularly with Tele-Pat precision test pattern slides.

Tele-Measurements provides 17 different test patterns in two sizes. The 100 series slides are 2" x 2" in size, for film multiplexers and spot scanners. The 300 series are 8"x 10" for use with Tele-Pat test pattern illuminators. Series 200 and 400 are special color patterns, and series 500 are customer specified slides, available on special order.

All test slides are mounted in optical glass and are electronically accurate to ± 1% of vertical and horizontal tolerances. Test patterns include:

TM-101 & TM-301 Resolution Slide (Retma). Standard reference for measuring resolution, testing for streaking, interlace, shading, scanning linearity, and aspect ratio. Horizontal and vertical wedges with 200 to 800 line resolution.



TM 102

TM-102 & TM-302 Resolution/Extended Gray Scale. Same as TM-101 and TM-301, with the addition of four logarithmic gray scales for transfer characteristic testing.

TM-202 & TM-402 Color Fleshtone Slide. For overall color performance and set-up purpose.

TM-501 Station I.D. Color Slides. Supplied with your station call letters, channel, and location. Professional identification for local monochrome and color programming.

TM 501

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For More Details Circle (172) on Reply Card

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This rugged, heavy duty bulk tape eraser wipes sound from all magnetic tapes, cartridges, cassettes and magnetic film stock; handling up to 2".

It erases with minimum residual noise because the field automatically diminishes at the end of each 30-second cycle.

A thermal control and blower keeps the unit below 71° C.

Available for 60Hz or 50Hz operation.

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For More Details Circle (173) on Reply Card

New Products

continued from page 222

under $40 to $170. The condenser prices range from $85 to $1,125. The condenser mics feature a rectangular diaphragm and employ FET preamplifiers. The models DC-63 and ST-8 are provided with variable pickup patterns.

For More Details Circle (331) on Reply Card

Power amplifier

BGW Systems' new professional power amplifier, model 250C, delivers 100 watts/channel into 8 ohms with less than .03% IM distortion, and 150 watts/channel into 4 ohms at 1 kHz.

The 250C features: modularized amplifier output stages; front panel clipping indicators; relay-operated delay and speaker protection; front panel gain controls; front panel mounted magnetic circuit breaker; separate chassis and signal grounding rear panel connections for elimination of ground loops; rear panel convertible bridged mono operation slide switch; and plug-in matching input transformer provision with mechanical guard.

For More Details Circle (332) on Reply Card

Remotely operated television transmitters

Howe-Yin Research has announced the addition of a series of remotely operated, unattended service VHF television transmitters to its line of television broadcast equipment. Presently available in 100 watt and 1 kilowatt ratings, 3 kilowatt and 10 kilowatt models are scheduled as future additions.

These transmitters feature low-level IF modulation and quarter-wave re-entrant type cavities designed and manufactured by the company. Extensive use of CMOS logic circuitry provides complete manual and remote control, protective interlocking and monitoring of all vital functions, fault memory and display, and maximum "on air" reliability through automatic bypassing of any or all PA stages in the event of a continuous overload.

For More Details Circle (333) on Reply Card

Circularly polarized antenna

A circularly polarized TV broadcast antenna employing patented end-fire elements is being offered by *CCA Electronics Corporation.*

The new antenna, specifically

continued on page 226

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29 STATIONS
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A few have Autotron I, the complete automatic traffic and billing system, that provides several terminals, for several of your stations, doing several tasks all at the same time...
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...still others have chosen Autotron VI, *the only total automation system* made, adding program automation control and memory (not just interface, CONTROL) to traffic, billing, payables, general ledger and payroll; and, throws Automatic Transmitter Logging in at no extra charge, while even automatically rescheduling discrepancies...
...finally a group or two has chosen one central computer with remote terminals at their other stations.

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And now, we're proud to introduce the ultimate program automation system—(CUERAC)—Autotronics Division of Automation Electronics, Inc. exclusively presents Cuerac and Cuemaster reel-to-reel and cartridge players and recorders, all automation ready. Cuerac features 500 "on-line" cartridges and is available as a stand-alone system or as a part of the Autotron business systems. Think of the walk-away possibilities. Until now programming formats have been limited to available automation equipment; now, at last a total system that can bring new dimensions to formatting. Economical when automation alone, but when combined with the Autotron system—it's absolutely great! The Autotron Systems and Cuerac are on display...ask about them and then see them in action...you'll wonder how you got along without them so long.

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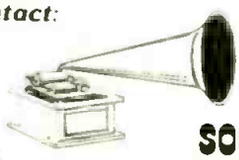

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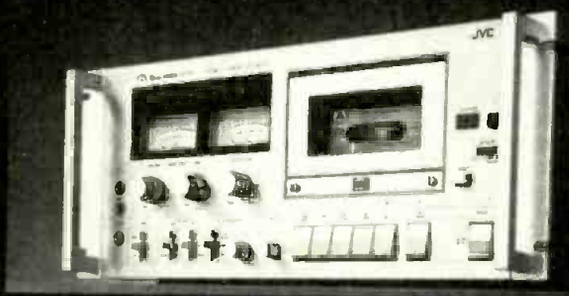
A Cassette Recorder That's Ideal for the Broadcaster



STABLE MECHANISM AND TRANSPORT THE JVC KD-95 USES TWO MOTORS. AN FG SERVO TYPE FOR CAPSTAN DRIVE AND A DC TYPE FOR REEL DRIVE. IT HAS THREE ELECTROMAGNETIC PLUNGERS FOR PAUSE. BRAKE AND PLAY. ALL OPERATIONS ARE UNDERTAKEN ELECTRONICALLY WITH TOUCH OF THE BUTTONS. DIRECT CHANGE OF MODES CAN BE ACHIEVED WITHOUT FEAR OF TAPE DAMAGE THANKS TO THE JVC-DEVELOPED TTL IC. IT PROVIDES ABOUT ONE SECOND OF DELAY BEFORE SELECTED MODE OPERATION BEGINS. HEAD AZIMUTH, HEIGHT AND TILT CAN BE ADJUSTED FOR ACCURATE ALIGNMENT. THE JUMBO FLYWHEEL IS 80MM IN DIAMETER AND IS COUPLED TO THE 2-MOTOR ID MECHANISM TO CONTRIBUTE TO A REDUCED WOW AND FLUTTER OF 0.05% WRMS. DIMENSIONS ARE 420 mmW x 211mmH x 320mmD (16-1 4 in.W x 8-5/ 16 in.H x 12-5/8 in.D)

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For More Details Circle (176) on Reply Card

New Products

continued from page 224

designed to eliminate ghosting problems in TV signal propagation, is now permitted based on amended FCC rules. The rule changes allow television broadcasters to convert from horizontal to circular or elliptical polarization for their broadcast systems.

The antenna utilizes the slot array for the horizontal component and is the only currently manufactured antenna which allows future addition of circular polarization without incurring the cost at the time of initial purchase.

For More Details Circle (334) on Reply Card

Color television camera

The FP-1212 color television camera from *Hitachi Denshi America, Ltd.* features a built-in IQ-type encoder which makes it possible to utilize the FP-1212 for broadcasting purposes by attaching an optional, large magnification lens. Accurate fidelity in color reproduction is assured through the use of an RGB three-tube Plumbicon™ camera.

NTSC or PAL color composite signals can be obtained from the built-in encoder, without employing an accessory unit (broadcasting IQ encoder for NTSC color system). Independent RGB (red, green, blue) output terminals are provided to use with an external encoder. (RGB signals are available simultaneously with encoder signal.)

Additional features include: aperture correction circuit; built-in color bar generator; automatic iris control circuits; remote-controlled registration circuits; remote-controlled color temperature compensation circuits; removable viewfinder; and tally lamp and intercommunication circuit.

For More Details Circle (335) on Reply Card

Solar electric generators

Solar Power Corporation has announced the availability of model P-1002 Solar Electric Generators and Arrays for remote powering of radio repeater stations, microwave links, signaling devices, cathodic protection, water pumps, telemetry equipment and other remote power applications.

Using 57mm silicon solar cells wired together in series and mounted in a UV-stable case made of polycarbonate, P-1002 Arrays withstand impact, wind, tempera-

continued on page 228

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Introducing two new ways to get the lighter side of the news.

Microwave Associates' MA-2CP and MA-2EP.

They're by far the lightest, easiest to carry, simplest to use and maintain portable microwave radios to move onto the market.

Because they're so light, the 2 watt MA-2CP and 8 watt MA-2EP open up a new era of flexibility in news gathering at 2GHz. You can go almost anywhere the news is.

Both models have a unique frequency offset capability that gives you a total of 21 microwave channels. Three times the frequency agility of older models.

If you want, we also offer the 2CP and 2EP in 1-channel and 7-channel versions.

In addition, the MA-2EP provides sophisticated diagnostics, switch-selectable tuning and the opportunity of mounting the RF head up to 30 feet away.

Both the MA-2CP and MA-2EP are engineered with people in mind. And each system is compatible with all our Portable Line accessories.

So if you need two great little portables for ENG remotes, write or call for the complete details.

The MA-2CP. And the MA-2EP.

They're guaranteed to give your news gathering a nice, light touch. Microwave Associates, Communications Equipment Group, Burlington, MA 01803. 617-272-3100.

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The Super System

THE TW INTERCOM SYSTEM: A refined, high-quality, and ultra-reliable intercom system for the demanding professional. Employing only two wires for operation, up to fifty units may be connected on line without loading or serious performance degradation. Features include: mic level limiter, flashing signal light, adjustable side tone, and powerful two watt headphone amp.

Portable system standard with two channels; rack mount standard with three channels. The RTS "TW" Intercom System is compatible with all carbon or dynamic mic headsets. It is completely field serviceable and handsomely packaged to provide super service under the toughest conditions. In addition, the system is uniquely flexible, allowing custom requirements such as multiple channels, discrete channel talk & listen switching, iso switching, and special interfacing.

For more information please call or write: RTS SYSTEMS, 4167 FAIR AVENUE, NORTH HOLLYWOOD, CA 91602 (213) 980-0511

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A Rare Sight

YOU MAY NOT SEE IT FOR ANOTHER 10 MONTHS

When an installation such as this microwave station in Greenland is accessible for only a few months a year you need a dependable, remote power source. Inside the protective shelter TELAN thermoelectric generators are the sole source of power. For more information about TELAN please call or write to us today.

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110 W. Timonium Rd., Timonium, Md. 21093
Phone: 301-252-8220 Telex: 8-7780 Cable: TELISES

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New Products

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ture and severe weather conditions.

The electrical output for a single P-1002 module is 1.4 watts of peak power with .60 amps and 2.3 volts also produced at peak power. A low-voltage drop-blocking diode is used to prevent storage battery discharge at night. Ten feet of neoprene-jacketed two-conductor output cable is also provided.

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Image enhancer

The PAL/SECAM version of the "Crisp-Matic" image enhancer and noise reducer was displayed at the recent Montreux Symposium and Technical Exhibition. The PAL/SECAM "Crisp-Matic" is manufactured and sold by *Yves Faroudja, Inc.*

The three units on display at the company's booth were delivered to VCI in Paris (a duplication facility), the IBA in England, and a representative in Munich after the exhibition. European distribution is being arranged through video product representatives who saw the product on display and expressed an interest.

For More Details Circle (337) on Reply Card

Camera lens system

Rank Precision Industries is offering a new Varotal Multi-Role Lens (MRL), which for the first time gives television camera users a common set of optical zoom lens modules for both TV broadcast standard cameras and for portable cameras.

Considered a major breakthrough in lens system design, this Rank Optics-Taylor Hobson MRL permits the user to select lens modules to make up a system tailored to his individual needs and budget. To extend lens usage, Rank has put together an extremely compact objective with a wide specification to full professional standards. Three interchangeable lens fronts give wide-angle, narrow-angle and standard possibilities—a total focal length range of 56 to 1. Rank offers the MRL for most broadcast TV cameras.

The MRL's location arrangement and release set-up gives instantaneous lens interchange which needs no re-registration or camera adjustment.

The portable MRL was designed basically for use with tripod-

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High Precision Rebuilding—
Your Assurance of Quality

Putting it all together at Econco

SERVICE

Econco's prompt 30-day repair service, coupled with fast reliable UPS handling, makes getting tubes repaired a quicker method than ordering a new tube from a distributor. 7-Day repair rush orders and 1-day delivery available in emergencies. Add to this Econco's improved capability in making glass seals, mesh filaments and improved grid making capability.

RECYCLE USED TUBES

As we become more and more conservation conscious of energy and virgin materials, we encourage stations to consider selling their used tubes to us. Save your packaging and when you get a few or a lot, send them to us for cash. We'll make them better than new.

TUBE TESTING

All rebuilt tubes are fully tested and must meet new tube specifications or we do not ship them. Tubes which do not meet specs. are repaired again or scrapped if not repairable.

THE PRICE IS RIGHT

Econco's prices average approximately 50% of new tube prices. These savings are even greater when you include sales tax on new tubes.

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With the trend to use higher power tubes and increased needs for this service, Econco now provides high power tube repair. Econco can now repair most internal defects on 5671's and 5681's. We have also been able to add the 4CX35, 000C, 6697A and 5682's to our price list.

Begin recycling today - send us your used tubes.

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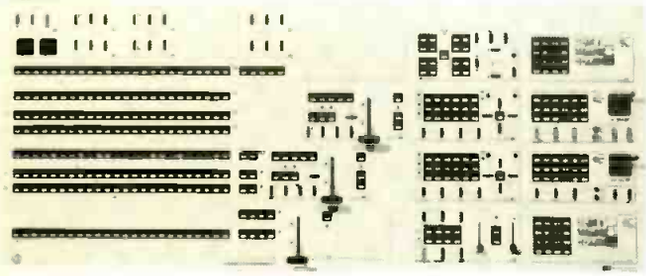
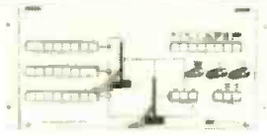
Central Dynamics.
International pacesetter in television broadcast equipment.

Video switchers.

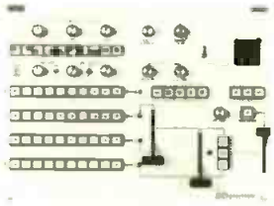


New, Super Powerful CD 480 The Smart Switcher
Revolutionary modular switchers with unprecedented production power. They outperform the largest conventional switchers, yet are extremely simple to operate. Their power and ease of operation are due to CDL's new Sequential Effects (SFX) Amplifier, which can cut, mix or wipe between two Background Sources and two separate Key Sources either individually or in any combination. Models with one or two SFX Amplifiers provide all the standard and optional features you need, including Rotary & Random wipes, RGB Shadow keys, Hard and Soft Color Border wipes, Color Border keys, Quad with Color Borders, Encoded Chroma keying, Key Mask generator, and 16, 24 or 32 inputs. A variety of modular accessories will continue to keep your switcher smarter than the rest as new technology develops.

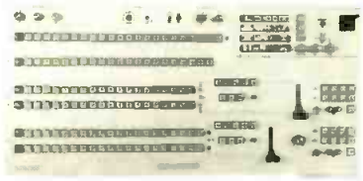
The CD-480 is now being shipped.



VS-10
An inexpensive broadcast quality 8-input switcher that features flexibility and ease of operation. Self-contained electronics for rapid installation in ENG and other small mobiles.



VS-14
Sophisticated enough for large studio production, yet compact and inexpensive enough for small mobiles. Soft wipes and keys—even a Downstream keyer—are standard. Self-contained and remote versions available.



VSP-1260S
An amazing value
Now the smallest station can afford a conventional 20-input mix/effects switcher of the highest quality and reliability.
All features, including an Encoded Chroma keyer and Bordered keys, are standard (not optional, as is often the case). And the price is astonishingly affordable.

Automation.

System 100
Computer controlled automation system for Technical Operations that communicates directly with a Business Computer System. Stores and retrieves the schedule with entry error checking, makes automatic time corrections, performs complicated audio/video switching sequences (including dissolves, fades, wipes and keys), assigns machines, verifies material and prints the "As-Aired" log.

Master Control Switchers
Ranging from CDL's new CD 480 MC to a 2 Bus MCS-829 or a 3 Bus MCS-770. All 3 can be interfaced to System 100 Technical Automation System.

Tape editing systems.

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Video Tape Editor
A computer editing System with easily operated control panel and CRT display for rapid and precise control of VTR's & Switcher CDL's unique Self Learning Cueing Software Program is a new feature.

EDS-200
Video Tape Editor
A two machine Time Code microprocessor Editor that interfaces to Quad or Helical VTR's.

Also a complete line of production and TV terminal equipment, including:
- SMPTE Time Code Generators and Readers
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Applied Video Electronics, Inc., D 1-9, Box 25, Brunswick, Ohio 44212

Aristocart Div., Western Broadcasting Co., Ltd., 1960-505 Burrard St., Vancouver, Canada V7X 1M6

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Broadcast Cart Service 11917 Laurelwood Dr., Suite 2 North Hollywood Calif. 91604 (213) 985-3959 Bryant Ellis
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Radford Associates 3203 Lanier Dr. Atlanta Ga. 30319 (404) 237-6097

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Artist's Engineering, Visual Communications Div., 234 2nd St., Davis, Calif. 95616

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Arvin/CATV Box 200 Lancaster Ohio 43130 (614) 756-9222 Jack Cauldwell
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Landy Associates, Inc. 1890 E. marlton Pike Cherry Hill N.J. 08003 (609) 424-4660 James Landy
Communitronics Corp. 1907 Kingshighway St. Louis Mo. 63110 (314) 771-7160 Bob Bergfeld

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T. Shigezaki (312) 298-4380

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Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22314

Atlas Sound, 10 Pomeroy Rd., Parsippany, N.J. 07054

Audico, Ltd., 219 Crossen Ave., Elk Grove Village, Ill. 60007

Audi-Cord Corp., Box 611, Normal, Ill. 61761

Audio Accessories Inc., 163 Water Street, Keene, N.H. 03431

Audio Designs & Mfg., 16005 Sturgeon, Roseville, Mich. 48066

Murray A. Shields (313) 778-8400

Audio Distributor Inc., D 1-9, 2342 S. Division Ave., Grand Rapids, Mich. 49507

Dave Veldsma (616) 452-1596

Audio Magnetics Corp., 234 W. 146th St., Gardena, Calif. 90248

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

Rolf Drucker (516) 546-4239

Auditronics, Inc., 3750 Old Getwell Rd., Memphis, Tenn. 38118

Phil Germano (901) 362-1350

Auratone Products, Box 698, Coronado, Calif. 92118

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CADAC Holland G.V. Amstelstraat 97 Hilversum The Netherlands 035-17722 Dick L. Th. Swaneveld

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Automated Processes, Inc., 790 Park Ave., Huntington, N.Y. 11743

Automation Electronics, Inc., 1001 South Street, Lafayette, Ind. 47905

L. E. Zaiser, Pres., Sandi Agnor, Sales Mgr. [317] 423-2572

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BGW Systems Inc., 13130 S. Yukon Ave., Hawthorne, Calif. 90250

Wayne Freeman, Sales Mgr. (213) 973-8090

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BSC Inc., 2932 River Rd., River Grove, Ill. 60171

The BTX Corp., 438 Boston Post Rd., Weston, Mass. 02193

Ronald Barker, Dir. of Mktg. (617) 891-1239

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Barbizon Electric, 426 West 55th St., New York, N.Y. 10019

Bardwell & McAlister, 7269 Santa Monica Blvd., Hollywood, Calif. 90046

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Intermedia-Broadcast Center 405 Altura St. Santa Mesa, Manila Philippines 2806 62-32-20, 62-34.89 Felix Zamora, Jr.

Belar Electronics Lab., Inc., Lancaster Ave. at Dorset, Devon, Pa. 19333

John J. Quinn, Sales Mgr. (215) 687-5550

Belden Corp., Box 1327, Richmond, Ind. 47374

Bell & Howell, Audio Visual Div., 7100 McCormick Rd., Chicago, Ill. 60645

Bell P/A Prod. Corp., 1200 N. Fifth St., Columbus, Ohio 43201

Berkey-Colortran Inc., 1015 Chestnut St., Burbank, Cal. 91502

Beston Electronics Inc., 903 S. Kansas Ave., Olathe, Kans. 66061

Beta Technology, Inc., 94 Verdi St., Farmingdale, N.Y. 11735

Bird Electronic Corp., 30303 Aurora Rd., Cleveland, Ohio 44139

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

Bogen Div., Lear Siegler, Inc., Box 500, Paramus, N. J. 07652

Bogner Broadcast Equipment Corp., 401 Railroad Ave., Westbury, N. Y. 11590

Mike Bogner, Sales Mgr., Richardo D Bogner, Tech. Dir (516) 997-7800

Boonton Electronics, Rt. 287 Smith Rd., Parsippany, N.J. 07054

Boston Insulated Wire & Cable Co., 65 Bay St., Boston, Mass. 02125

Boston Sound & Power Systems, 3 Fredith Rd., Weymouth, Mass. 02189

Brand-Rex Co., Box 498, Williamantic, Conn. 06226

Bristol Div., of Acco, 40 Bristol St., Waterbury, Conn. 06720

Don Britton Enterprises, Drawer G, Waikiki, Hawaii 96815

Broadcast Aids, Inc., 20 Red Rose Dr., Levittown, Pa. 19056

Broadcast Automation Assoc., D 1,-2,5,6, 5199 N.E. 12th Ave., Ft. Lauderdale, Fla. 33334

Broadcast Cartridge Service, D 1-9, Box 1790, N. Hollywood, Calif. 91604

Broadcast Communications Devices, Inc., D9, 5526 E. La Palma Ave., Anaheim, Calif. 92807

Broadcast Component Dist. Communication Medias, D 1-9, Tilghman at Jefferson Sts., Allentown, Pa. 18102

Bill Davies (215) 437-0607

Broadcast Consultants Corp., D5, 6, Box 590, Leesburg, Va. 22075

David Green (703) 777-8660

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Broadcast Equipment Distributors, Communication Medias, Tilghman at Jefferson Sts., Allentown, Pa. 18102

Broadcast Equip. Leasing Co., 3612 Blvd. of Allies, Pittsburgh, Pa. 15213

Broadcast Equipment & Supply Co., D 1-9, Box 3141, Bristol, Tenn. 37620

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Broadcast Specialties, 3163 Ocean Beach Hwy., Longview, Wash. 98632

Broadcast Video Systems, Ltd., 1050 Mc Nicoll Ave., Agincourt, Ont., Canada M1W 2L8

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Broadcast Communications Devices, Inc. 7100 S.W. Hampton St. Suite 118 Tigard Ore. 97223 John Odgers
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Buhl Optical Co., 1009 Beech Ave., Pittsburgh, Pa. 15233

John Stapsy (412) 321-0076

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Central Dynamics Corp., 331 W. Northwest Hwy., Palatine, Ill. 60067

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Chrono-Log Corp., 2 W. Park Rd., Havertown, Pa. 19083

Chronotron Systems, Inc., 230 Mineola Blvd., Mineola, N.Y. 11501

Chyron Telesystems, 223 Newtown Rd., Plainview, N.Y. 11803

Cine 60, Inc., 630 9th Ave., New York, N.Y. 10036

Cinema Products Corp., 2037 Granville Ave., Los Angeles, Calif. 90025

David Clark Co., Inc., 360 Franklin St., Worcester, Mass. 01604

Clear-Com, 759 Harrison St., San Francisco, Calif. 94107

Coastcom, 2346 Stanwell Drive, Concord, Calif. 94520

Coaxial Dynamics, 13110 Enterprise, Cleveland, Ohio 44135

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

Collins Radio, Rockwell International, Mail Station 406-240, Dallas, Tex. 75207

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SYS/COM 880 Maude Ave. Mountain View Calif. 94043 (415) 967-8229 Bob Herhusky

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Computer Image Video Controllers, Dytek Industries, Inc., 2475 W. 2nd Ave. Suite 4, Denver, Colo. 80223

Computer Labs, 505 Edwardia Dr., Greensboro, N.C. 27409

Jim Poitras, Donald Brockman, Edward Grazes (919) 292-6427

Computer Magnetics Corp., 125 W. Providencia Ave., Burbank, Calif. 91502

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Comquip, Inc., 366 S. Maple Ave., Glen Rock, N.J. 07452

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Conrac Corp., Cramer Div., Mill Rock Road, Old Saybrook, Conn. 06475

Conrac Div., Conrac Corp., 600 North Rimsdale Ave., Covina, Calif. 91722

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Consolidated Video Systems, 1255 E. Arques Ave., Sunnyvale, Calif. 94086

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Frank Mestre (305) 822-1421

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Cook Electric Co., 6201 Oakton St., Morton Grove, Ill. 60053

Cooke Engineering Co., See Dynatech Data Systems, 900 Slaters Lane, Alexandria, Va. 22314

Corning Glass Works, 3900 Electronics Dr., Raleigh, N. C. 27604

Cosmicar Lens Div., Asahi Precision Co., Ltd., 424 Higashi Oizumi, Nerima-Ku, Tokyo, Japan 177

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Crown International, Inc., Box 1000, Elkhart, Ind. 46514

Custom Audio Electronics, 2828 Stommel Rd., Ypsilanti, Mich. 48197

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Dana Laboratories, Inc., 2401 Campus Dr., Irvine, Calif. 92715

Datalogic-Rust Co., Box 273, Everett, Mass. 02149

Datatek Corp., 1166 W. Chestnut St., Union, N. J. 07083

Datatron, Inc., Box 11427, Santa Ana, Cal. 92707

Davis Mfg., Div. of J I Case, Box 9228, Wichita, Kans. 67277

Davis & Sanford Co. Inc., 24 Pleasant St., New Rochelle, N.Y. 10802

Decca Austin Insulators, 71 Selby Road, Brampton Ont., Canada L6W 1K5

W. O. Chamberlain (416) 457-8720

Delta Electronics Inc. (N.C.), 145 Fayette St., Winston Salem, N.C. 27101

Delta Electronics Inc. (Va.), Box 1508, Springfield, Va. 22151

Joseph Novik (703) 321-9845

Delta Products, Inc., Box 1147, Grand Junction, Colo. 81501

Denson Electronic Corp., D 1-9, Box 85, Rockville, Conn. 06066

Dielectric Communications Div. Sola Basic, Inc., Route 121, Raymond, Me. 04071

Stanley O. Thomas (207) 655-4555

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Arva-Hudson, Inc. Box 1512 Bellevue Wash. 98009 (206) 455-0773 Bob Hudson
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Communication System Assoc. 320 W. 5th St. Cameron Mo. 64429 (816) 632-7616 Bill Hendrix
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Tessco, Inc. 1931 Greenspring Dr. Timonium Md. 21093 (301) 252-0860 Rich Lawrence
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Future Electronics 5647 Ferrier St. Montreal, Que. H4P 2K5 Canada (514) 735-5775 Martin Gordon
Measurement Consulants Corp. (Industrial Market) 181 West St. Waltham Mass. 02154 (617) 890-4400 John O'Donnell
Chamberlin & Murray (2-Way Radio Market) 336 baker Ave. Concord Mass. 01742 (617) 369-803 Jim Murray
Johnson Associates 100 White Spruce Rd. Rochestr N.Y. 14623 (716) 473-6060 Gerald Acierno
Sola Basic International Marine Plaze, Suite 1934 Milwaukee Wis. 53202 (414) 276-1480 Jim Hosler

Digital Concepts Corp., 249 Route 46, Saddle Brook, N.J. 07662

Digital Video Systems, 519 McNicoll Ave., Willowdale, Ont., Canada M2H 2C9

Digi-Tech, Box 2114, Salem, Ore. 97301

Dimension 3 Recording Co., Box 326, New Milford, N.J. 07646

J. Lemke (201) 265-5599

REGIONAL SALES CONTACTS:
Dimension 3 Recording Co Box 427 New City N.Y. 10956 (914) 634-9021 John Kent

Ditch Witch, P.O. Box 66, Perry, Okla. 73077

Di-Tech Inc., 315 Wyandanch Ave., N. Babylon, N.Y. 11704

Tony Bollentino (516) 643-4040

Dolby Laboratories, Inc., 731 Sansome St., San Francisco, Calif. 94111

Dranetz Engineering Labs., Inc., 2385 S. Clinton Ave., South Plainfield, N. J. 07080

Duca-Richardson Corp., 11465 W. 48th Ave., Wheat Ridge, Colo. 80033

Duncan Electronics, Inc., 2865 Fairview Road, Costa Mesa, Calif. 92626

Duotone Co. Inc., Box 1168, South Miami, Fla. 33143

E. I. du Pont de Nemours & Co., Inc., Magnetic Products Div., Old du Pont Airport, Bldg. 1, Wilmington, Del. 19898

Dyma Engineering, Inc., Box 1697, Taos, N. M. 87571

C. G. Cunningham (505) 758-2686

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DYMA 926 Wisteria Way Dallas Tex. 75080 (214) 235-8236

Dynair Electronics, Inc., 5275 Market St., San Diego, Cal. 92114

Robert A. Jacobs (714) 263-7711, Ext. 225

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Dynasciences, Div. Whitaker Corp., Township Line Road, Blue Bell, Pa. 19422 *J. B. Waltrich. Video Product Mgr. (215) 643-0250*

Dynatech Data Systems, 900 Slaters Lane, Alexandria, Va. 22314

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Dytek Industries, Inc., 2475 W. Second Ave., Denver, Colo. 80223

Bill Myers (303) 934-5804

E

EDCO Products, Inc., 680 Bizzell Dr., Lexington, Ky. 40504

EECO, 1441 E. Chestnut Ave., Santa Ana, Calif. 92701

EIMAC, Div. of Varian, 301 Industrial Way, San Carlos, Cal. 94070

EIP, Inc., 3230 Scott Blvd., Santa Clara, Calif. 95051

ELPA Marketing Industries, Inc., New Hyde Park, N. Y. 11040

EMCEE Broadcast Products, P.O. Box 116, White Haven, Pa. 18661

EMT Franz VGmbH, Box 1520, D-763 Lahr, W. Germany

ESC Electronics Corp., 534 Bergen Blvd., Palisades Park, N. J. 07650

ESE, 505 1/2 Centinela, Inglewood, Calif. 90302

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Comad Communications 1770 Albion Rd. Rexdale. Ont. M9V 1C2 Canada (416) 745-6494 Emil Adamyk
Track Audio. Inc. 2134 S. 295th Federal Way Wash. 98003 (206) 941-2233 Brian Hayashi
David Green Broadcast Consultant 21 N. Wirt St. Leesburg Va. 22075 (703) 777-B660 David Green
Arbuthnot Electronics 307-400 Tache Ave. Winnipeg. Man. R2H 3C3 Canada (204) 233-4941 Mike Arbuthnot
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Ro-Cel Electronics 731 Voice of the Theater Bldg. Pittsburgh Pa. 15223 (412) 781-2326 Claire Rosenberger

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Econco Broadcast Service Inc., Rt. 2 Box 188, Woodland, Calif. 95695

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Edcor Div. of P.A.C., 3030 Red Hill Ave., Costa Mesa, Calif. 92626

Edison Electronics Div., Grenier Field, Manchester, N.H. 03103

Editel Communications, 729 N. Highland, Hollywood, Calif. 90038

Edutron, Inc., 3700-B2 N.E. 53rd Ave., Gainsville, Fla. 32601

Virgil Lowe (904) 377-8276

Eidson Electronic Co., Box 96, Temple, Tex. 76501

Eigen Video, Box 1027, Grass Valley, Calif. 95945

Elcom Engineering Co., Box 10432, Santa Ana, Calif. 92711

Jim Lawrence (714) 544-5760

Electro Controls, 2975 S. 300 W., Salt Lake City, Utah 84115

Electro Impulse, Inc., Box 870, Red Bank, N.J. 07701

Mark Rubin (201) 741-0404

Electro Sound, Inc., 160 San Gabriel Dr., Sunnyvale, Calif. 94086

Electrohome Ltd., 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6

Bill Ellis, Sales Mgr. (519) 744-7111

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The Crockett Sales Co. 2204 Griffin Dallas Tex. 75202 (214) 748-8209
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Ken Parr Assoc. 9314 W. 122nd St. Palos Park Ill. 60464 (312) 448-8488
Electro-Visual Corp. of Americas 3617 W. macArthur Blvd., Suite 508 Santa Ana Calif. 92704 (714) 545-6991

Electronic Devices, Inc., 21 Gray Oaks Ave., Yonkers, N.Y. 10710

Electronic Inst. & Spec., 42 Pleasant St., Stoneham, Mass. 02180

Electronic Transport Systems, Box 861, Westfield, Mass. 01085

Electronics Diversified, Inc., 1675 N.W. 216th, Hillsboro, Ore. 97123

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DeGraffenreid Assoc. Box 3518 Reno Nev. 89505 (702) 826-2313 Dean DeGraffenreid
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Equipto Storage Systems, 225 S. Highland, Aurora, Ill. 60507

Essex Group, 6235 S. Harlem Ave., Chicago, Ill. 60638

Eventide Clock Works Inc., 265 West 54th St., New York, N. Y. 10019

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Frequency Devices Inc., 25 Locust St., Haverhill, Mass. 01830

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RADCO 614 First Union Nat'l. Bank Bldg. Winston-Salem N.C. 27101 (919) 722-9671 Robert Dinning
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Tracan Electronics Corp. 6600 Trans Canada Hwy. Pointe Claire, Que. H9R 4S2 Canada (514) 694-2355 Jean-Claude Brais
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Fuji Photo Film USA, Inc., Magnetic Products Dept., 350 5th Ave., 70th Floor, New York, N. Y. 10001

Fujinon Optical, Inc., 672 White Plains Rd., Scarsdale, N.Y. 10583

F. Makajima, Pres. (914) 472-9800

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GTE Lenkurt, Inc., 1105 County Road, San Carlos, Calif. 94070

GTE Sylvania Inc., Lighting Products Group, 100 Endicott St., Danvers, Mass. 01923

Garner Industries, 4200 No. 48th St., Lincoln, Nebr. 68504

Philip S. Mullin (402) 464-5911

Geleco Electronics Ltd., 2 Thorncliffe park Dr., Unit 28, Toronto, Ont., Canada M4H 1H2
(416) 421-5631

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General Devices Co., Inc., Box 19188, Indianapolis, Ind. 46219

General Electric Co., ISO Div., EP #7, Rm. 301, Syracuse, N. Y. 13201

General Electric Co., Mobile Radio Dept., Box 4197, Lynchburg, Va. 24502

General Electric Co., Tubes/MW Devices, 316 E. Ninth St., Owensboro, Ky. 42301

General Electric Co., Video Display Equip. Op., Electronics Park 6-206, Syracuse, N. Y. 13201

Jerrold P. Gunderson, Mgr. Mktg. (315) 456-2562. 2533. 2179

General Television Ntwk., D 3, 13225 Capitol Ave., Oak Park, Mich. 48237

General Time Service, Box 4067, Mesa, Ariz. 85201

Glentronix Ltd., D 1-9, 160 Duncan Mill Rd., Don Mills, Ont., Canada M3B 125

Thomas E. Pressley, Pres. (416) 444-8497

Gorman Redlich Mfg. Co., 6 Curtis St., Athens, Ohio 45701

Jim Gorman (614) 593-3150

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

Gould, Inc., Control & Systems Div., 340 Fordham Road, Wilmington, Mass. 01887

Joseph Swyt, Dir. of Mkt. (216) 361-3315

Gould Inc., Instrument Systems Div., 3631 Perkins Ave., Cleveland, Ohio 44114

Gralex Industries, 155 Marine St., Farmingdale, N. Y. 11735

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Robert E. Lynch (916) 273-8421

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The Grass Valley Group, Inc. 810 W. Bristol St., Suite E Elkhart Ind. 46514 (219) 264-0931 Louie Swift
The Grass Valley Group, Inc. Station Plaza East Great Neck N.Y. 11021 (516) 487-1311 Bob Webb

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H

HM Electronics, Inc., 6151 Fairmount Ave., San Diego, Calif. 92120

Hallikainen & Friends, Inc., 340 Higuera, San Luis Obispo, Calif. 93401

Clifford B. Hannay & Son, Inc., 402 Main St., Westerlo, N.Y. 12193

Harris Corp., Broadcast Products Div., Box 290, Quincy, Ill. 62301

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Harris Corp. New York Service Center 130 E. 34th St. New York N.Y. 10016 (212) 889-0790 Frank H. Cambria, Manager

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Heath Co., Benton Harbor, Mich. 49022

Matt Cutter (616) 982-3200

Hickok Elect. Instrument, 10514 Dupont Ave., Cleveland, Ohio 44108

Hitachi Denshi America, Ltd., 58-25 Brooklyn Queens Exp., Woodside, N.Y. 11377

Bob Blair, Mktg. Mgr. (212) 898-1261

Holland Electronics, 970 E. 92nd St., Brooklyn, N. Y. 11236

Houston Fearless 76, 833 E. Walnut St., Carson, Calif. 90746

Houston Photo Products, Inc., 655 E. 20th St., Yuma, Ariz. 85364

Howe-Yin Research Co. Inc., Box 3518, Fremont, Calif. 94538

Dana Sigler and Stephen T. Nicol (415) 656-1600

Hughes Microwave Communication Products, Box 2999, Torrance, Calif. 90509

Hughey & Phillips Inc., 3050 N. California St., Burbank, Cal. 91505

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Harris Corporation Quincy Ill. 62301 (217) 222-8200

Philip A. Hunt Chemical Corp., Roosevelt Place, Palisades Park, N.J. 07650

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Nick Solberg (206) 733-4567

ITT Jennings, 970 McLaughlin Ave., San Jose, Cal. 95122

Rod Neibaur (408) 292-4025

Idaho Magnetics, Rt. 5, Box 5099A, Caldwell, Idaho 83605

Gary Taylor (208) 459-6567

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Leonard C. Smith, Pres. (215) 374-4932

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Image Magnification, Inc., 739 Airway Circle, New Smyrna Beach, Fla. 32069

Don Quinlan (904) 427-5293

Image Transform, Inc., 4142 Lankershim Blvd., No. Hollywood, Calif. 91602

Industrial Marketing Advisory Services, Inc., 2425 Wilson Blvd., Arlington, Va. 22201

Stevan B. Dana, Pres. (703) 525-0400

Industrial Sciences, Box 1495, Gainesville, Fla. 32602

Charles Moore (800) 874-7590, (904) 373-6783

Innovative Television Equipment, Inc., P.O. Box 681, Woodland Hills, Cal. 91364

Inovonics, 503-B Vandell Way, Campbell, Calif. 95008

J. B. Wood, Pres. (408) 374-8300

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Mel Audio/Video 1122 E. Chevy Chase Dr. Glendale Calif. 91205 (213) 245-7708
VIF International 1151 Viscaino Ave. Sunnyvale Calif. 94086 (408) 739-9740
Sound Dynamics Box 32055 San Jose Calif. 95152 (408) 926-3588

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Track Audio, Inc. Box 24722 Seattle Wash. 98124 (206) 941-2233

Interand Corp., Telestrator Div., 450 E. Ohio St., Chicago, Ill. 60611

International Communications, & Control Corp., Box 11749, Knoxville, Tenn. 37919

International Electro-Magnetics, 350 Eric Dr., Palatine, Ill. 60067

Tony Pretto (312) 358-4622

International Instrument Div., 88 Marsh Hill Rd., Orange, Conn. 06477

International Microwave Corp., 33 River Rd., Cos Cob, Conn. 06807

International Nuclear Corp., 608 Norris Ave., Nashville, Tenn. 37204

International Tapetronics Corp., Box 241, Bloomington, Ill. 61701

Bob Tria (309) 828-1381

Intertec Publishing Corp., P.O. Box 12901, Overland Park, Kan. 66212

Irish Magnetic Recording Tape, 270-78 Newtown Road, Plainview, N. Y. 11803

Ivie Electronics, 500 West 1200 South, Orem, Utah 84057

J

J&D Electronics Div., 402 S. Main St., Williamstown, N.J. 08094

JSH Electronics, Inc., Box 2898, Culver City, Calif. 90230

JVC Industries, Inc., 58-75 Queens Midtown Exp., Maspeth, N.Y. 11378

Jamieson Film Co., 6911 Forest Park Rd., Dallas, Texas 75235

Mike Foster, Pres., Bill Miller, Nat'l Sls. Mgr., (214) 350-1283

Jampro, --see Cetec Broadcast Group, 75 Castilian Dr., Goleta, Calif. 93017

Janson Industries, Box 6090, Canton, Ohio 44706

Javelin Electronics, D9, 6357 Arizona Circle, Los Angeles, Calif. 90045

Jensen Sound Laboratories, 4136 N. United Pkwy., Schiller Park, Ill. 60176

Jensen Tools & Alloys, 1230 S. Priest Dr., Tempe, Ariz. 85281

Joa Cartridge Service, D2, Box 7112, Philadelphia, Pa. 19117

Joslyn Electronic Sys., Box 817, Goleta, Cal. 93017

K

K & H Products, Ltd., Box 246, North Bennington, Vt. 05257

KVC Video Systems Inc., D 1,2, 770 Lexington Ave., New York, N. Y. 10021

Kahn Communications, Inc., Box 591, Freeport, N.Y. 11520

Kaitronics Corp., 870 Mahler Rd., Burlingame, Calif. 94010

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Kappa Networks, Inc., 165 Roosevelt Ave., Carteret, N.J. 07008

Karex, Inc., 1262 Lawrence Station Rd., Sunnyvale, Calif. 94086

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

Kay Industries, Inc., 604 N. Hill St., South Bend, Ind. 46617

Aaron Katz (219) 234-0171

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe, N.Y. 10707

Kliegl Bros. Lighting, 32-32 48th Ave., Long Island City, N.Y. 11101

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Furrer Marketing Baarerstrasse 91 P.O. Box 99 CH-6300 Zug 2 Switzerland 042-218146 George Furrer

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LPB Inc., 520 Lincoln Hwy., Frazer, Pa. 19355

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Lampkin Lab. Inc., Box 9048, Bradenton, Fla. 33506

Landy Associates Inc., D 1,2, 1890 East Marlton Pike, Cherry Hill, N.J. 08003

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

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Lectrotech Inc., 5810 N. Western Ave., Chicago, Ill. 60659

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Auvinic Ltd. 1280 Lachaine St. St. Vincent de Paul, P.Q. H7C 2N7 Canada (514) 661-5120 Maurice Dupont

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Video Media, Inc. 250 N. Wolfe Rd. Sunnyvale Calif. 94086 (404) 733-6500 Bill Stickney

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C. M. Levit Electronics, D 1-9, 200 Park Ave. S., New York, N.Y. 10003

Liberty Industries, 598 Deming Rd., Berlin, Conn. 06037

Lightning Elimination Assoc., Inc., 12412 Benedict Ave., Downey, Calif. 90242

Lipps Inc., 1630 Euclid St., Santa Monica, Cal. 90404

Lipsner-Smith Corp., 4700 Chase St., Lincolnwood, Ill. 60646

Tom Tisch (312) 675-8473

Listec TV Equip. Corp., 39 Cain Dr., Plainview, N.Y. 11803

Logitek Electronic Systems, Box 25304, Houston, Texas 77005

The London Co., 811 Sharon Drive, Cleveland, Ohio 44145

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Lowel-Light, 421 W. 54th St., New York, N.Y. 10019

Lumitrol, Ltd., 400 Don Park Rd. (Unit 23), Markham, Ont., Canada

M

3M Company, see listings under T.

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Collins Radio Corp. 1225 N. Alma Rd. Richardson Tex. 75080 (214) 690-5000
Sphere Associates 11250-14 Roger Bacon Dr. Reston Va. 22090 (703) 471-1230 Ted Bennett
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Oakwood Audio Labs. Ltd. 654 King Edward St. Winnipeg, Man. R3H 0P2 Canada (204) 775-8231 Ron Paley

MacKenzie Laboratories, Inc., 5507 N. Peck Road, Arcadia, Calif. 91006

Magnasync/Moviola Corp., 5539 Riverton Ave., North Hollywood, Calif. 91601

Magna-Tech Electronic Co., Inc., 630 Ninth Ave., New York, N.Y. 10036

Magnecraft Electric Co., 5575 N. Lynch Ave., Chicago, Ill. 60630

Magnum Towers, Inc., Box 419, Fair Oaks, Calif. 95628

Magnusonic Devices Inc., 290 Duffy Ave., Hicksville, N.Y. 11801

P. R. Mallory & Co. Inc., Box 1284, Indianapolis, Ind. 46201

Marco Video Systems, Inc., D 2,5, 6114 North 20th St., Philadelphia, Pa. 19138

Marconi Communication Systems Ltd., Marconi House, Chemsford, Essex, England CM1 1PL

Marconi Electronics Inc., 100 Stonehurst Ct., Northvale, N. J. 07647

Rich Lunniss, Fred Bones (201) 767-7250

Marconi Instruments, 100 Stonehurst Ct., Northvale, N. J. 07647

Keith Elkins, Tony Ramsden (201) 767-7250

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Kenneth W. Meyers Co. 7442 N. Harlem Chicago Ill. 60648 (312) 774-6440 Ken Meyers
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Marti Electronics, Box 661, Cleburne, Tex, 76031

George Marti (817) 645-9163

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Mastertone Co., Inc., 1105 Maple, West Des Moines, Iowa 50265

Maury Microwave Corp., 8610 Helms Ave., Cucamonga, Calif. 91730

Maxell Corp. of America, 130 West Commercial Ave., Moonachie, N. J. 07074

Maze Corp, D6, Box 6636, Birmingham, Ala. 35210

John W. Gober III, Pres. (205) 956-5800

McBee Laboratories, 5151 Wisconsin Ave. NW, Washington, D. C. 20016

McCurdy Radio Ind. Inc., 1711 Carmen Dr, Elk Grove Village, Ill. 60007

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McCurdy Radio 108 Carnforth Rd. Toronto, Ont. M4A 2L4 Canada (416) 751-6262 Stan Maruno

McKay Dymek Co., Box 2100, Pomona, Calif. 91766

Renae Goertz, Sls. Coordinator [714] 623-1236 [800] 472-1783. Outside CA: [800] 854-7769

McMartin Industries, Inc., 4500 South 76th St., Omaha, Neb. 68127

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Turabo Radio Corp. Box 487 Caguas Puerto Rico 00625 (809) 744-3131 Jesus M. Soto

Media Concepts, Inc., D 1-9, Box 10745, St. Petersburg, Fla. 33733

Memorex Corp., Professional Products Group, 1200 Memorex Drive, Santa Clara, Cal. 95052

Merlin Engineering Works, Inc., 1880 Embarcadero, Palo Alto, Calif. 94303

Merill Cable Equipment Corp., Box 13741, Phoenix, Ariz. 85002

Metrotech Corp., 670 National Ave., Mountain View, Calif. 90443

Micro Communications, Inc., RFD 3, Grenler Field, Manchester, N.H. 03103

Micro Consultants, Box 10057, Palo Alto, Calif. 94303

George Grasso (415) 321-0832

Micro Control Associates, Inc., Box 13250, Arlington, Texas 76013

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Micro-Technical Industries, Box 287, South Laguna, Calif. 92677

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Wilkinson Electronics, Inc. 701 Chestnut St. Trainer Pa. 19013 (215) 497-5100 Guffy P. Wilkinson
WRH Productions 5 Industrial Way Riverside R.I. 02195 (401) 434-6272 Warren Hartwell
Broadcast Distributors Bible Pl. Cleveland Tenn. 37311 (615) 472-8200 Thomas Duncan
Broadcast Equipment & Supply Box 314 J Bristol Tenn. 37620 (615) 968-7342 Clifton Droke
CLW Broadcasters 6815 Shallowford Rd. Chattanooga Tenn. 37421 (615) 698-3429 William Kitchen
Electra Distributing Co. 1914 West End Ave. Nashville Tenn. 37203 (615) 329-3971 James Howell
Collins Radio Group Rockwell International 1225 N. Alma Rd. Richardson Tex. 75080 (214) 690-5000 Al Senter
Crouse-Kimzey Co. 3507 W. Vickery Fort Worth Tex. 76107 (871) 773-7991 John R. Crouse
Harris Corp. Gates Radio Div. 4019 Richmond Ave. Houston Tex. 77027 (713) 623-6655 Bernie Geisler
Media West 187 West 3100 South Bountiful Utah 84010 (801) 295-3308 Morris J. Jones
Broadcast Consultants Corp. 21 N. Wirt St. Leesburg Va. 22075 (703) 777-8660 David Green
Lee Hartman & Sons 3236 Cove Rd. N.W. Roanoke Va. 24017 (703) 366-3493 Robert L. Hartman
Harris Corp. Gates Radio Div. 1522 K St. N.W. Washington D.C. 20005 (202) 223-5500
Broadcast Supply West 2711 Locust Ave. Tacoma Wash. 98466 (206) 565-2301 Irv Law
Sylvan Ginsberry Ltd. Queene Anne Rd. Teaneck N.J. 07666 (201) 837-1100 William P. Munroe
Orbex Corp. 9719 S. Dixie Hwy. S-12 Miami Fla. 33156 (305) 665-3476 Orland J. Cabrera
Singer Products Co. One World Trade Center, Suite 2365 New York N.Y. 10048 (212) 432-1400 Arthur Singer
Entertainment Products Box 11129 Newington Conn. 06111 (203) 522-6824 Bruce Utman
Altair Corp. 722 Brooks St. Box 34 Ann Arbor Mich. 48103 (313) 663-8558 Lance Korthals
Fred Locke Stereo 60 Woodlawn Rd. Berlin Conn. (203) 828-5249 Fred Locke
Dow, Hebert & Plourde Box 969 Carribou Maine 04736 (207) 493-3163 Clarence Dow
Interstate Rental Service 384 Amory St. Boston Mass. 02130 (617) 442-1555 Eddie Jacobs
Save Productions, Inc. 218 Willowick Ave. Temple Terrace Fla. 33617 (813) 988-3491 Grace Sweat
Boller Electronics 181 Fairway Blvd. Columbus Ohio 43213 (861) 521-0522 Steve Boller
Quality Control Sounds 1 N. 44th St. Belleville Ill. 62223 (618) 277-6466 John Lehmann
Sound Productions, Inc. 5929 Schaefer Rd. Dearborn Mich. 48126 (313) 559-8303 Mark Correll
Quality Sound Enterprises 1221 Hay St. Fayetteville N.C. 28305 (919) 483-1212 Mark Lynch
Houston Cinema & Sound 3732 Shepard St. Houston Tex. 77018 (713) 691-4379 Louis Gasche
John T. Curran Sound Co. Box 1239 Anchorage Alaska 99510 John T. Curran
Broadcast Engnrs. & Equip. Reps. Box 4777 Richmond Va. 23233 Melvyn Lieberman
Electronic Industries, Inc. 19 E. Irving Ave. Box 266 Oshkosh Wis. 54901 (414) 235-8930 Michael R. Gerth
Landy Associates, Inc. 1890 E. Marlton Pike Cherry Hill N.J. 08003 (609) 424-4660 James E. Landy
Lightning Electric Co. 40 E. Willow St. Millburn N.J. 07041 (201) 379-6800 Albert A. Richman
Midwest Telecommunications 1395 Air Rail Ave. Virginia Beach Va. 23455 (804) 464-6256 Sam Silverstein
Recording Consultants 7912 Georgia Ave. Silver Spring Md. 20910 (301) 565-2270 Jay W. Kingery
Sonics Associates, Inc. 2601A Warrior Rd. Birmingham Ala. 35208 (205) 787-8609 Lynn A. McCroskey
Sound Manufacturing 2536 La Mar Grand Island Nebr. 68801 (308) 384-8728 Ed Hall
Sound Unlimited Systems 14724 Ventura Blvd., Suite 1204 Sherman Oaks Calif. 91403 (213) 995-1125 Ed King
Southeast Electronics, Inc. Box 41308 Jacksonville Fla. 32203 (904) 356-3007 H. Clark Overton
Stereo Sonics Laboratories 117 Robin Rd. Altamonte Springs Fla. 32701 (305) 831-2575 Allan P. Smith
Teamco, Inc. 404 E. Fireweed Lane Anchorage Alaska 99503 (907) 277-6522 J. M. Cait
Caldwell Audio/Video Equipment 1080 Bellamy Rd. N. Scarborough, Ont. M1H 1H2 Canada (416) 438-6230 W. Jones
Harris Corp. Gates Radio Div. 212 Brunswick Ave. Pointe Clare, Que. Canada (514) 695-3751 Vic Hosquet
MSC Electronics Ltd. 254 Wildcat Rd. Downsview, Ont. Canada (416) 661-4180 David LaFrenais
McCurdy Radio Industries ltd. 108 Carnforth Rd. Toronto, Ont. M4A 2L4 Canada (416) 751-6262 George McCurdy
Nortec West, Ltd. 325 W. 5th Ave. Vancouver, B.C. Canada (416) 872-8525 R. Whitehouse
Oakwood Audio Labs, Ltd. 652 King Edward St. Winnipeg, Man. R3H 0P2 Canada (204) 786-6711 Ron Paley
Orange County Associates Chateau Seven Group Ltd. 1125 Empress St. Winnipeg, Man. Canada (204) 772-6350 Michael Gillespie
Pineway Electronics 1875 Leslie St., Unit 3 Don Mills, Ont. M3B 2M5 Canada (416) 449-1343 Mel Crosby
Lee Engineering Ltd. Napier House, Bridge St. Walton-On-Thames, Surrey England 43124/5/6 Tom Lee
R. F. Enterprises Ltd. 1-22-2 Yoyogi, Shibuya-ku Tokyo Japan 370-3417 Yasuo Nakanishi
Tropelco, S.A. Apartado 8465 Panama 7 Republic of Panama 23-1285 Roy Bettis
Itame, S.A. C/Ing. Alfonso Pena Boeuf 15 Poligono Industrial Fin de Semana Madrid 22 Spain 215-59-37 Jose L. de la Rosa
Applied Electronic Industries CA Av. Casanova-Calle Recreo, Edf. Rupi, P-4, Ofc. 43 Sabana Grande, Caracas Venezuela 72-88-37 Fitzroy Nesbit
General Electric de Venezuela S.A. Apartado No. 1,666 Caracas, 101 Venezuela 71-98-11 R. E. Farrell
Otacca Apartado de Correos 3994 Caracas Venezuela 781-1022

Microtran Co., Inc., Box 236, Valley Stream, N.Y. 11582

Microwave Assoc. Inc., South Ave., NW Industrial Prk., Burlington, Mass. 01803

H. P. Scott (617) 272-3100

REGIONAL SALES CONTACTS:

Northeast 22 Union Ave., Suite 10 Sudbury Mass. 01776 (617) 443-5139 Stan McCarthy
Southeast 14 Perimeter Park, Suite 115 Atlanta Ga. 30341 (404) 455-3815 Phil Cass
North Central 2 Clarence Road Wayland Mass. 01778 (617) 358-5054 Clyde McCauley
Southwest 13771 N. Central Expwy. Dallas Texas 75243 (214) 234-3522 John Fielek
Midwest 10920 Ambassador Dr., Suite 119 Kansas City Mo. 64153 (816) 891-8538 Mert Knold
Rocky Mountain Area 10920 Ambassador Dr., Suite 119 Kansas City Mo. 64153 (816) 891-8538 Dick Shannon
West 850-A Stewart Dr. Sunnyvale Calif. 94086 (408) 733-0222 Carl Guastaferro

Millard Metal Service Center, Inc., Box 'O', Braintree, Mass. 02184

Miller-Stephenson Chemical Co., Inc., George Washington Hwy., Danbury, Conn. 06810

Minneapolis Magnetics, Inc., 8125 Pleasant Ave. S., Minneapolis, Minn. 55420

Modular Audio Products, Unit of Modular Devices, Inc., 50 Orville Dr., Bohemia, N. Y. 11716

Rick Belmont (516) 567-9620

REGIONAL SALES CONTACTS:

J. D. Allyn Co. 419 S. Bruner St. Hinsdale Ill. 60521 (312) 325-0495 J. D. Jerry Allyn
Rixan Associates 5062 Wadsworth Rd. Dayton Ohio 45414 (513) 278-4216 Rick Harris
Sylvan Ginsbury, Ltd. Export 1500 Queen Anne Rd. Teaneck N.J. 07666 (201) 837-1100 Robert Kolts (Export)
Cara Pacific Sales Co. 4145 Via Marina, #120 Marina del Rey Calif. 90291 (213) 821-7898 Bill Cara
Hollywood Sound Systems 1526 N. Ivar Ave. Hollywood Calif. 90028 (213) 466-2416 Ron Fuller
BSC, Inc. 2932 River Rd. River Grove Ill. 60171 (312) 452-5551 Paul Bergetz
Technicarts 8555 Fenton St. Silver Springs Md. 20910 (301) 585-1118 Bill Moore
Broadcast Supply West 2711 Locust Ave. W. Tacoma Wash. 98466 (206) 565-2301 Irv Law
Richard S. Pass Associates 9003 Eastview Rd. Philadelphia Pa. 19152 (215) 464-9444 Richard S. Pass

Monroe Electronics, Inc., 100 Housel Ave., Lyndonville, N.Y. 14098

Charles Moore, Box 2023, Rocky Mount, N.C. 27801

Moseley Assoc. Inc., 111 Castilian Drive, Goleta, Cal. 93017

John E. Leonard, Jr., VP/Mktg (805) 968-9621

Motorola Semiconductor Products, Inc., 5005 E. McDowell Rd., Phoenix, Ariz. 85008

Mountain West Alarm, D8, Box 10780, Phoenix, Ariz. 85064

Multronics, Inc., 9005 Red Branch Rd., Columbia, Md. 21045

N

NEC America, Inc., Broadcasting Equip. Div., 130 Martin Lane, Elk Grove Village, Ill. 60007

Hugh F. Gillogly (312) 640-3792

REGIONAL SALES CONTACTS:

MCB Laboratories 5151 Wisconsin Ave. NW Washington D.C. 20016 (202) 244-2345 Malcolm M. Burleson
AV Media 3344 W. Broad St. Columbus Ohio 43200 (614) 228-2477 John McMullin
Technical Video Systems, Inc. 245 Olson St. Winston-Salem N.C. 27103 (919) 768-9536 James E. Holladay
Lebow Labs Audio-Video, Inc. 424 Cambridge St. Allston Mass. 02134 (617) 782-0600 Will Morin, Pres.
Broadcast Communications Devices 5526 E. La Palma Ave. Anaheim Calif. 92807 (408) 984-6614 John Baumann

Nagra Magnetic Recorders, Inc., 19 W. 44th St., Room 715, New York, N.Y. 10036

Nagy Research Products, Box 289, McLean, Va. 22101

Narda Microwave Corp., 75 Commercial St., Plainview, N.Y. 11803

National Electrolab Ltd., 1536 Columbia St., North Vancouver, BC, Canada V7J 1A4

Terry C. Gould (604) 985-0511

Neumade Products Corp., 720 White Plains Rd., Scarsdale, N.Y. 10583

P. K. Neuses Inc., 1401 Rohlwing Rd., Rolling Meadow, Ill. 60008

Rupert Neve, Inc., Berkshire Industrial Park, Bethel, Conn. 06801

Tony Langley (203) 744-6230

REGIONAL SALES CONTACTS:

Rupert neve Inc 6255 Sunset Blvd., Suite 609 Hollywood Calif. 90028 (213) 465-4822
Rupert Neve of Canada, ltd. 2717 Rena Rd. Malton, Ont. 4T 3K1 Canada (416) 677-6611

North American Radio Corp., 3814 Marquis Dr., Suite 111, Garland, Tex. 75042

North Hills Electronics, Inc., Alexander Pl., Glen Cove, N.Y. 11542

North Wind Power Co., Box 315, Warren, Vt. 05674

Norton Associates Inc., 10 Ditomas Court, Copalgue, N.Y. 11726

Nortronics Co., Inc., 8101 Tenth Ave. N., Minneapolis, Minn. 55427

Mike Nystrom (612) 545-0401

REGIONAL SALES CONTACTS:

Bud Ente Sales Co. 558 Commonwealth Ave. Newton Centre Mass. 02159 (617) 244-2585
Audio Plus, Inc. 350 Northern Blvd. Great Neck N.Y. 11021 (516) 482-8676
Roussil Associates, Inc. 9507 Culver St. Kensington Md. 20795 (301) 949-3002
D M F & Associates 8 Perimeter Pt. N.W. Suite 850 Atlanta Ga. 30339 (404) 435-2616
Paul Stone Sales Co. 5257 N. Tacoma Ave., Suite 6 Indianapolis Ind. 46220 (317) 257-4277
E. N. Seversen Associates 7061 Willow Springs Rd. La Grange Ill. 60525 (312) 352-2055
Twentieth Century Marketing 20710 S. Leapwood Ave., Suite B Carson Calif. 90746 (213) 532-3040
Carmine Vignola Associates 1001C Southwest Blvd. Box 569 Jefferson City Mo. 65101 (314) 893-3205
The Collins Co. 10155 Plano Rd., Suite 10 Dallas Tex. 75228 (214) 341-7866
Norris & Co. 2860 S. Circle Dr., Suite 308 Colorado Springs Colo. 80906 (303) 576-3324
R. A. Albrecht Co., Inc. 4379 Orion Rd. Rochester Mich. 48036 (313) 652-2520
Gemini Electronics Marketing 1144 N. 175th St. Seattle Wash. 98133 (206) 542-1116
Len Finkler, Ltd. 25 Toro Rd. Downsview, Ont. M3J 2A6 Canada (416) 630-9103
Moulthrop Sales, Inc. 7080 Commerce Dr. Pleasanton Calif. 94566 (415) 846-0550
L. P. Hench Co. 9900 S.W. 168th St. Miami Fla. 33157 (305) 251-4343
Marsey Sales, Inc. 206 Park Ave. Rochestr N.Y. 14607 (716) 442-9700
Snider & Associates 1020 Auahi St., Bldg. 3 Honolulu Hawaii 96814 (808) 941-2400
James H. Podolny Co. 251 S. Court St. Box 565 Medina Ohio 44256 (216) 725-8814
Vector Sales 4901 W. 77th St., Suite 131 Edina Minn. 55435 (612) 835-5820

Nova Corp., Box 2121, Canoga Park, Calif. 91306

Kim Forrest (213) 888-5122

REGIONAL SALES CONTACTS:

System Associates 7020 Delco Ave. Canoga Park Calif. 91306 (213) 340-7862 Billy H. Seidel
TMC System Sales, Inc. Tabako Kaikan, 2-10 Shinogawacho Shinjuku-Ku Tokyo Japan K. Aya

Nurad, Inc., 2165 Druid Park Dr., Baltimore, Md. 21211

Leslie K. Lear (301) 462-1700

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RAI Corp. 50 E. Malvern Ave. Salt Lake City Utah 84115 (801) 486-8822 Robert C. Bacon
H. M. Holzberg Associates Box 322 Totawa N.J. 07511 (201) 256-0455 Herbert M. Holzberg
Bennett Engineering Assoc., Inc. Box 23 Mercer Island Wash. 98040 (206) 232-3550 Stanton D. Bennett
Radford Associates 1331 Otter Creek Rd. Nashville Tenn. 37215 (615) 373-0231 Ralph L. Hucaby

O

Oak Industries, Inc., Crystal Lake, Ill. 60014

O'Connor Eng. Labs. Inc., 100 Kalmus Drive, Costa Mesa, Calif. 92626

Cary C. Clayton (714) 979-3993

Oktel Corp., 1731 Dell Ave., Campbell, Calif. 95008

Bernard Okey (408) 374-1811

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Oldham Tower Systems, 48 Bayou Dr., Indianola, Miss. 38751

The Olesen Co., 1535 Ivar Ave., Hollywood, Calif. 90028

Onan, 1400 73rd Avenue NE, Minneapolis, Minn. 55432

Opamp Labs, Inc., 1033 N. Sycamore Ave., Los Angeles, Calif. 90038

B. Losmandy (213) 934-3566

Optek, 5526 E. La Palma Ave., Anaheim, Calif. 92807

John Baumann (714) 528-2321

Optima Enclosures, 2166 Mountain Industrial Blvd., Tucker, Ga. 30084

The Orange County Electronics Corp. Ltd., 1125 Empress St., Winnipeg, Man., Canada R3E 3H1

Orban/Broadcast, 680 Beach St., Suite 365, San Francisco, Calif. 94109

Jesse Maxenchs (800) 227-4068; Calif. (415) 441-0666

Orban/Parasound, 680 Beach St., San Francisco, Calif. 94109

Sid Goldstein (415) 673-4544

REGIONAL SALES CONTACTS:

John B. Anthony Co. 992 High Ridge Rd. Stamford Conn. 06905 (203) 322-9202 Jack Anthony
Cara Pacific 4145 Vai Marina, Apt. 120 Marina Del Rey Calif. 90291 (213) 821-7898 Bill Cara
Eldiserco 12 Estel Place Green Brook N.J. 08812 (201) 968-0344 Jim Loder
H.P. Marketing 917 W. Heatherbrae Phoenix Ariz. 85013 (602) 279-4883 Alan Karl Pace
H.P. Marketing 2530 W. Church Ave. Littleton Colo. 80120 (303) 794-8367 Dan Peterson
Theodore Pappas & Assoc., Inc. 5218 W. Diversey Ave. Chicago Ill. 60639 (312) 685-2338 Ted Papas
J. B. Parent Co. 5188 Wedgewood Rd. Medina Ohio 44256 (216) 725-8871 Jim Parent
Technical Systems Reps 2065 Peachtree Ind. Ct., #215 Chamblee Ga. 30341 (404) 457-0426 Norm Schneider
V.F. Sales, Inc. 181 Worcester Rd. Natick Mass. 01760 (617) 237-6544 George Markunas
H.P. Marketing 9628 S. Raintree Pl. Sandy Utah 84070 (801) 942-5684 Jon Hooper
Audiolab Hellas 8, Eniamos Str. Athens (104) Greece Cristos Lilis
Audio Products Int'l. Via G. Spontini, 3 20131 Milano Italy Roberto Beppato
Audio Products Int'l. Via S. Bernadette, 76 Roma 00167 Italy Piero Marziali
Cadac Holland C.V. Amstel St. 97 Hilversum Holland Dick Swanaveld
Delta Equipment Rue de Calevoet 112 B-1180 Bruxelles Belgium L. F. Velu
Electronica Fernandez 208 Eleanor Roosevelt St. Box 415 Hato Rey Puerto Rico 00918 (809) 767-3500 Jose Arturo Fernandez
Electronica Gramcko Av. Sanz-Edificio Escar-Local B Caracas Venezuela Manuel Caraballo
Elmus GmbH Herderstrasse 16 D1 Berlin 12 West Germany Heinrich Keinert
Industrial Tape Applications 1-7 Harewood Ave., Marleybone Rd. London W1N England Martin Parmiter
Larex Electronica Ltda. Ave. Princeza Isable, 7 Sala 915/916 Rio de janeiro Brazil Claus Eppenstein
M. Llewellyn-Jones Apartado, 8-178 Madrid 8 Spain M. Llewellyn-Jones
Scenic Sounds Equip. 97-99 Dean St. London W1V 5RA England David Hawkins
Schaeffer, Riesser & Cie 14 Bis, Rue Marbeuf Paris 8e France Jean Planchard
A. D. Smith Cinema (Phils) Inc. Box 1342 Makati, Rizal Philippines Tony Smith
Sudamcorp S.A.C.I. Florida 165 Buenos Aires 1333 Argentina Thomas Graham
Tal & Ton AB Kungsgatan 5 411 19 Goteborg Sweden Jan Setterberg
Syntec Pty. Ltd. 5-7 Smith St. Chatswood N.S.W., 2069 Australia E. C. Sloss

Oregon Magnetics, Box 13374, Portland, Ore. 97213

Jim Carlock (503) 233-8295

Oregon Sound, D 9, 665 Wilson St., Eugene, Ore. 97402

Otari Corp., 981 Industrial Rd., San Carlos, Calif. 94070

Lew Barrett (415) 593-1648

P

PSI Paperwork Systems, Inc., Box 38, Bellingham, Wash. 98225

Pacific Recorders and Engrg. Corp., 11100 Roselle St., San Diego, Calif. 92121

Jack Williams (714) 453-3255

M. Palmer & Associates, 525 S.W. First St., Lake Oswego, Ore. 97034

Martin Palmer (503) 635-3238

REGIONAL SALES CONTACTS:

Dwayne Hoover 3246 Salem Ave. Albany Ore.
M. Palmer & Associates Box 10941 Eugene Ore. 97401

W. A. Palmer Films, Inc., 611 Howard St., San Francisco, Cal. 94105

Panasonic Video Systems Div., Box 1501, Secaucus, N.J. 07094

Alvin Barshop (201) 348-7683

REGIONAL SALES CONTACTS:

Panasonic Video Systems Div. Northeast Area 50 Meadowlands Pkwy. Secaucus N.J. 07094 (201) 348-7627 Morris Washington, Regional Mgr.
Panasonic Video Systems Div. Southeast Area #2 Meca Way Duluth Ga. 30136 (404) 448-5683 Leroy Wright, Regional Mgr.
Panasonic Video Systems Div. Midwest Area 1098 Greenleaf Ave. Elk Grove Village Ill. 60007 (312) 539-0710 Gary Olson, Regional Mgr.
Panasonic Video Systems Div. Southwest Area 1825 Walnut Hill Lane Irving Tex. 75062 (214) 256-1388 Terry Conner, Regional Mgr.

Paso Sound Products Inc., 251 Park Ave. S., New York, N.Y. 10010

Peirce-Phelps, Inc., D 2, 5, 2000 N. 59th St., Philadelphia, Pa. 19131

Pentagon Industries, Inc., 4751 N. Olcott Ave., Chicago, Ill. 60656

Permag Corp., 88-06 Van Wyck Expwy., Jamaica, N. Y. 11418

Perrott Engineering, 1020 N. Fillmore St., Arlington, Va. 22201

Phelps Dodge Communications Co., Rt. 79, Marlboro, N.J. 07746

Saul Escoff, Mgr., Special Products (201) 462-1880

Philadelphia Resins Corp., 20 Commerce Dr., Montgomeryville, Pa. 18936

Richard E. Dearborn (215) 855-8450

REGIONAL SALES CONTACTS:

Engineering Service Associates 1500 Massachusetts Ave. N.W. Washington D.C. 20005 (202) 659-8800 Richard Shamp
Jon B. Jolly, Inc. 5416 California Ave. S.W. Seattle Wash. 98136
The Heckerman Corp. 814 W. Hyde Park Blvd. Inglewood Calif. 90302 (213) 678-2264 Fred Heckerman
Breit Tower Service Dinner Key Marina Miami Fla. 33132 (305) 858-3143 Charles E. Breit
Tool-Tronics Box 1611 Zephyrhills Fla. 33599 (813) 782-7177 John Clanton
Taurus Industries 188 South Blvd. Baton Rouge La. 70808 (504) 383-9955 Dale Pearson
McLaughlin Industries 5824 Chestwood St. Houston Tex. 77017 (713) 641-1266 Pat McLaughlin
M.S.E. Engineering Systems, Ltd. 265 Canartic Dr. Downsview, Ont. M3J 2N7 Canada (416) 661-5646 Al Egerton

Philips Broadcast Equip Corp., 91 McKee Dr., Mahway, N. J. 07430

William E. Amos, V.P. Mktg. (201) 529-3800

REGIONAL SALES CONTACTS:

Philips Broadcast Equip. Corp. Northeast Region 91 McKee Dr. Mahwah N.J. 07430 (201) 529-3800 Joseph Nigro
Philips Broadcast Equip. Corp. Mid Atlantic Region 91 McKee Dr. Mahwah N.J. 07430 (201) 529-3800 Michael Hartt
Philips Broadcast Equip. Corp. National Sales Div. 3300 Northeast Expy., Suite 1G Atlanta Ga. 30341 (404) 458-0171 Gino Nappo, Nat'l. Sales Mgr.
Philips Broadcast Equip. Corp. Southeast Region 3300 Northeast Expy., Suite 1G Atlanta Ga. 30341 (404) 458-0171 Jeffrey Clarine
Philips Broadcast Equip. Corp. Central Region 801 Branding Iron S.E. Albuquerque N.M. 87123 (505) 299-0583 Chuck Buzzard
Philips Broadcast Equip. Corp. Central Region Norelco House, 7530 Frontage Rd. Skokie Ill. 60076 (312) 679-8600 Harry Gladwin
Philips Broadcast Equip. Corp. Western Region 3760 Cahuenga Blvd. North Hollywood Calif. 91604 (213) 766-8185 Kenneth Gustafson
Philips Broadcast Equip. Corp. Northwestern Region 3760 Cahuenga Blvd. North Hollywood Calif. 91604 (213) 766-8185 Jerry Kraus
Philips Broadcast Equip. Corp. Southwestern Region 412 Roy Court Keller Tex. 76248 (817) 379-5484 Richard Bock

Philips Test & Measuring Instruments, Inc., 85 McKee Dr., Mahwah, N. J. 07430

Stu Rauch, Marketing Mgr. (201) 529-3800

REGIONAL SALES CONTACTS:

BCD, Inc. 5526 E. La Palma Ave. Anaheim Calif. 92807 (714) 528-9505 John Boumann
BCD, Inc. 1400 Coleman Ave., Suite 14 Santa Clara Calif. 95050 (408) 984-6614 Martin Jackson
Philips T & M, Inc. 1393 Main St. Waltham Mass. 02154 (617) 889-4492 Rick Sharp
Philips T & M, Inc. Box 54 Mechanicsville Pa. 18934 (215) 677-5770 John Bell
Philips T & M, Inc. 6 Leswyn Rd. Toronto, Ont. M6A 1K2 Canada (416) 789-7188 Jack Weldon
Highsmith & Co. 3733 Monroe Rd. Charlotte N.C. 28205 (704) 333-7743 Carlo Della Mea
Torkelson Associates 540 W. Frontage Rd. Northfield Ill. 60093 (312) 446-9085 Frank Clayton

Photo Research, Div. of Kollmorgen Corp., 3000 N. Hollywood Way, Burbank, Cal. 91505

Plastoid Corp., 633 3rd Ave., New York, N. Y. 10017

Pleasantville Labs, Box 15068, Baltimore, Md. 21208

G. Romero or A. Levin (202) 223-3749

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

David G. Harry (301) 589-2662

Power-Optics Inc., Box 266, Fairview Village, Pa. 19409

Precision Elect. Inc., 9101 King St., Franklin Park, Ill. 60131

Prestolite Wire Div., 3529 24th St., Port Huron, Mich. 48060

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

Professional Audio Service, Box 1953, Fort Worth, Texas 76101

Jeanie Sims (817) 536-6254

Project Support Systems, 750 N. Mary Ave., Sunnyvale, Calif. 94086

Pulse Dynamics Mfg. Corp., (PDMC), Box 355, Colchester, Ill. 62326

Pulse Techniques Inc., 1411 Palisade Ave., Teaneck, N.J. 07666

E. R. Shenk (201) 837-2575

Q

QEI Corp., Rt. 73, Kresson, N. J. 08053

QRK Electronic Products, 1568 N. Sierra Vista, Fresno, Calif. 93703

Quad-Eight Electronics, 11929 Vose St., North Hollywood, Calif. 91605

Quantum Audio Labs, Inc., 1905 Riverside Dr., Glendale, Calif. 91201

John Pritchett, Pres. (213) 841-0970

Quick-Set Inc., 3650 Woodhead Drive, Northbrook, Ill. 60062

Mark Stolman (312) 498-0700

R

RCA Broadcast Systems, Front and Cooper Streets, Camden, N.J. 08102

RCA Community Television Systems, 7355 Fulton Ave., North Hollywood, Calif. 91605

RCA Distributor & Special Products Div., Cherry Hill Offices, Camden, N.J. 08101

RCA Electro Optics and Devices, New Holland Ave., Lancaster, Pa. 17604

RCA Power Tube Marketing, Lancaster, Pa. 17604

RCA Solid State Div., Rt. 202, Somerville, N.J. 08876

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

RHG Elect Labs, Inc., 161 E. Industry Court, Deer Park, N.Y. 11729

ROH Corporation, 107 Technology Park, Norcross, Ga. 30092

James B. Godwin (404) 449-0873

REGIONAL SALES CONTACTS:

Broadcast Communications Devices, Inc. 5526 E. LaPalma Ave. Anaheim Calif. 92807 (714) 528-9505 John Baumann
Caldwell A/V Equipment Co. 1080 Bellamy Rd. North Scarborough, Ont. M1H 1H2 Canada (416) 438-6230 Ron Skelly, David Strachan, Tony Sharpe
Control Technology 2513 Tortugas Lane Ft. Lauderdale Fla. 33312 (305) 587-2716 Jim Woodworth
Doug Cook Associates 2182 Trent Rd. Columbus Ohio 43229 (614) 471-4114 Doug Cook
Didier/Denver Box 1599 Evergreen Colo. 80439 (303) 674-6000 Herb Didier
H. M. Dyer Electronics 31185 Ten Mile Rd. Farmington Hills Mich. 48024 (313) 478-2157 Mike Dyer, Dick Pinter
Emmons Associates 10700 Lyndale Ave. South Minneapolis Minn. 55420 (612) 881-1118 Keith Emmons
H. M. Holzberg Associates Box 322 Totowa N.J. 07511 (201) 256-0455 Herb Holzberg
Landy Associates 1890 E. Marlton Pike, Rt. 70 Cherry Hill N.J. 08003 (609) 424-4660 Jim Landy, Dick Fine
NBE, Inc. RR #2 Westport N.Y. 12993 (518) 962-4567 John Ring
NU-CDM Associates 1916 N.E. Ballinger Way, Suite B Seattle Wash. 98155 (206) 364-9911 John Nutting
Radford Associates 3203 Lanier Dr. Atlanta Ga. 30319 (404) 237-6097 Lou Radford

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Singer Products Co., Inc. One World Trade Center, Suite 2365 New York N.Y. 10048 (212) 432-1400 Richard Stanco
The Gene Sudduth Co. 845 39th St. S.E. Paris Tex. 75460 (214) 785-5764 Gene Sudduth
Television Engineering Corp. 519 Rudder Rd. Fenton Mo. 63026 (314) 343-5605 Jack Vines

RTS Systems, 4167 Fair Ave., North Hollywood, Calif. 91602

Doug Leighton (213) 980-0511

Jules Racine & Co., Inc., 85 Executive Blvd., Elmsford, N.Y. 10523

Radio Time Service, Box 6613, Tucson, Ariz. 85733

Ram Audio Systems, Inc., 17 Jansen St., Danbury, Conn. 06810

Ramko Research Inc., 11355 'A' Folsom Blvd., Rancho Cordova, Calif. 95670

Jack M. Ducart (916) 635-3600

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Ryder Magnetic Sales Corp., 1147 N. Vine St., Hollywood, Cal. 90038

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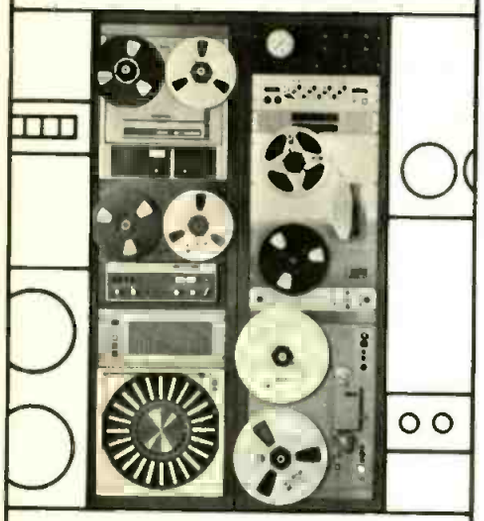

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continued from page 228

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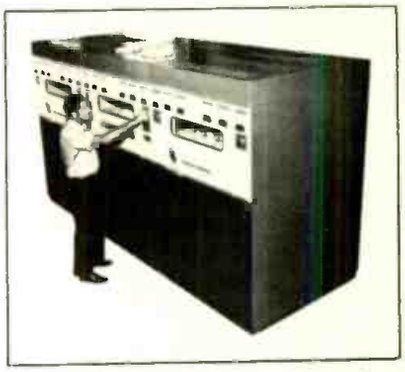

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For More Details Circle (196) on Reply Card

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New Products

continued from page 247

system is also included in case program material is missing.

Other features of the VIF Intermix models include: all solid-state circuitry utilizing computer type integrated circuit logic; plug-in cards for switching capability and all program sources; photo cells for completely noise-free switching of all audio functions; built-in speaker for cueing or off-the-air monitoring; light emitting diode program stage indicators; pushbutton rapid advance; and VU meter(s) pre-set so that zero equals plus 4 dBm, with other output levels available on request at no additional charge.

For More Details Circle (340) on Reply Card

Distribution amplifier

The *Di-Tech* model 170 audio D.A. features a 200K resistive input balanced or unbalanced with six 600-ohm outputs. Output type is balanced, resistive buildout.

Maximum input level is +24 dBm continuous. Distortion at these levels is 0.1% maximum. The six outputs are adjustable via a single control which is located on the front of the unit.

A unique feature of the model 170 is the front panel headphone jack. This jack permits a simple access to the audio D.A. for listening purposes either for program identification or for troubleshooting purposes. The audio signal is not disturbed when utilizing the headphone set.

Model 170 utilizes the standard Di-Tech frames, model 101 or 103, for mounting purposes.

For More Details Circle (341) on Reply Card

Zoom blow-up positioner

The *Warren R. Smith Company* has made the Zoom Blow-up Positioner available for use on telecine chain projectors. Models are available for both 16mm and 35mm projectors, including RCA FR-35, GPL, Simplex, RCA TP-66, Kodak CT-500, as well as Bell & Howell, Kodak and other AV types.

Using this unit, you can correct composition errors, zoom in or out while transferring film to tape, pan or tilt independently, reposition for title insertion, mix film with chroma-key scene and "build" commercials on telecine. The positioner also makes it possible to zoom without focus change, from twice to ¼ film frame.

It has independent pan-tilt-focus-iris controls and manual or servo motor drives. There is optional Cinemascope capability and a range of zoom lenses can be used. High resolution and ample light output are exhibited. No alteration to the projector is necessary.

A model for telecine slide projectors, which is now under development, will be available soon. With this unit any area of vertical or horizontal slides can be panned and zoomed.

For More Details Circle (342) on Reply Card

Video edit buzz tone eliminator

A. F. Associates has developed a gated video circuit that eliminates extraneous RF buzz tones during video only edits when using an Ampex VR 2000 or VR 1200.

This device can be installed in less than an hour, and it features CMOS technology, RF turn-on and RF turn-off, and plug-in connectors to the VTR's RF circuits.

Designed to eliminate the 960 Hz tone in video-only edits, the device is good enough for network and post-production operations.

For More Details Circle (343) on Reply Card

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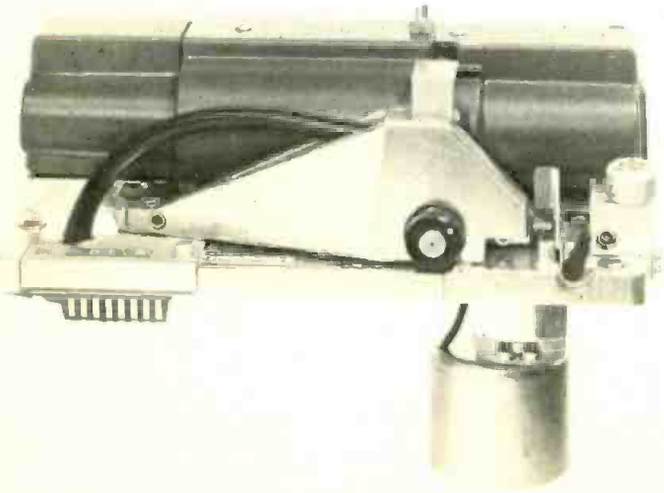

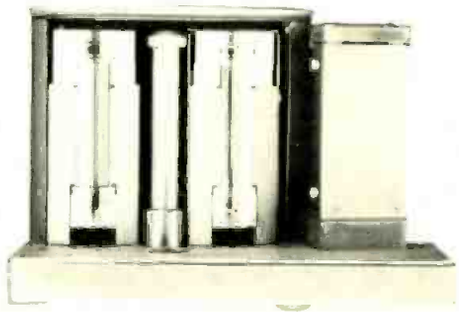

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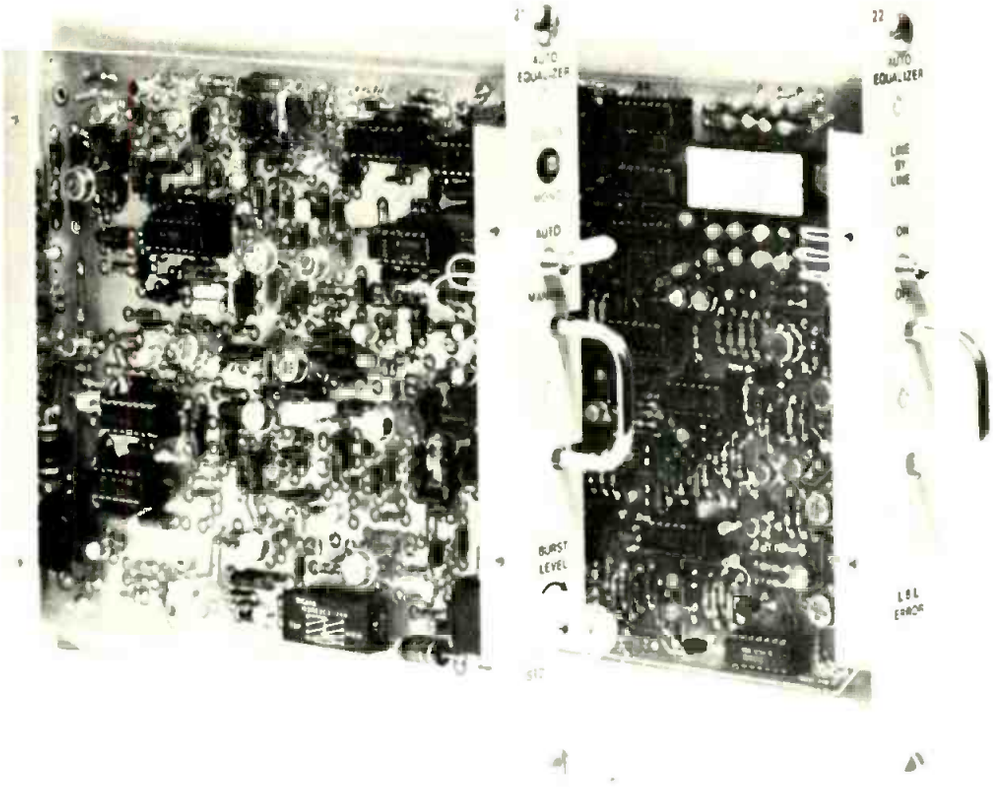

COMPUTER MAGNETICS CORPORATION

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For More Details Circle (197) on Reply Card

Video editing controller

Panasonic's model NV-A950, an editing controller, when combined with Panasonic model NV-9500 master cassette editing recorder and NV-9200 or NV-9300 slave-player cassette recorders, combine to create an efficient ¾-inch cassette editing system that delivers broadcast quality programming.

The unit performs insert and assembly edits automatically, preroll function backspaces each recorder so they will be up to speed and locked in sync when edit point is reached.

Features include slow rewind, fast play, and search functions, non-locking pushbutton controls with logic memory, and light emitting diode (LED) function indicators.

For More Details Circle (344) on Reply Card

55 kw FM transmitter

CCA Electronics Corporotion has added a new 55 kw FM broadcast transmitter, model FM55000EP, to its line of AM, FM and TV transmitters.

The 55 kw FM transmitter is conservatively rated for 55,000 watts power output, and is FCC type-accepted to operate from 25,000 to 60,000 watts power output. The CCA FM55000EP features parallel final amplifiers to eliminate downtime due to single amplifier design. Optional exciter and amplifier switching get around failures of individual component parts in the system which can cause transmitter shutdown.

The CCA FM55000EP utilizes a 100-watt solid-state frequency synthesized exciter with regulated power supplies. Stereo performance can be added with the optional CCA Optimod-FM stereo generator. Simultaneous SCA operation can also be added with the CCA SCA-1E sub-carrier generator.

The transmitter consists of two cabinets containing independent high-power amplifiers, a center cabinet housing the 100-watt exciter(s), hybrid splitter, exciter switching and system status and control equipment.

For More Details Circle (345) on Reply Card

Character generator

A television character generator with four times the memory capacity of its predecessor has been developed by 3M Company.

The new model D-3016 character generator features a 16-page capacity memory. Like the model it replaces, the D-3000, which had a 4-page memory, the new system is designed for professional television systems that require quality titling/captioning capability. From a character-quality point of view, both units are identical.

Three font styles are available with the D-3016: Video Gothic, Piper Roman and Helvetica Semi-Bold. All are available in upper-case style with matching lower-case characters. The D-3016 can accommodate either two different upper-case font styles or a matching upper and lower case font.

Like the D-3000, the new unit displays up to 22 characters in a row and 10 rows per page. It also features 3-speed vertical roll and horizontal crawl movements and automatic centering.

For More Details Circle (346) on Reply Card

Low drain weighting filter

A low profile C-message weighting filter, requiring ±3 mA of current from power supplies between ±5 and ±18 VDC, is now available

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For More Details Circle (199) on Reply Card

New Products

continued from page 249

from Frequency Devices, Incorporated.

Specifically designed for use in portable telephone circuit test instrumentation, the model 581-3 frequency response characteristic simulates, to within ±1 dB, the perceived response of the human ear to telephone noise in accordance with Bell Technical Reference 41009.

Other key specifications include input impedance: 10 kilohms minimum, output noise: 50μV DC to 50 kHz, rated output: ±10 volts at 2 mA, output impedance: less than 1 ohm. Over the 0°C to +70°C operating temperature range, output drift is 100μV/°C.

This encapsulated modular package measures 0.4"x2"x2".

For More Details Circle (347) on Reply Card

Flying spot color film chains

Three new Rank Cintel MK3 Flying Spot Color Telecines have been installed by *Rank Precision Industries, Incorporated.*

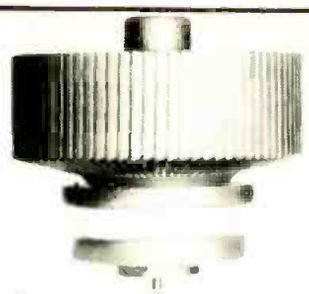
These installations are in New York City at Magnosound, and in Los Angeles at MCA Discovision and Ruxton Limited. This brings the total number of MK3 Telecines operating in North America to seven. The other machines are located at Rombex (New York City); Transworld (Las Vegas); and Motion Picture Video and Advertel (Toronto).

Rank's Flying Spot MK3 Telecine reportedly gives excellent reproduction from color or mono, positive or negative, 16 or 35mm film, or from slides with the use of the same transport mechanism.

The MK3 uses a flying spot system which eliminates the camera together with the problems of lag, color registration and noise in the picture low lights. The single scanning tube utilizes a short afterglow phosphor with the high intensity required for reproducing dense material.

Of particular interest to the U.S. market is the machine's built-in capability to reproduce 16mm or 35mm Cinemascope films full frame with electronic panning. Its ability to handle negative stock safely opens possibilities for grading direct from camera original to videotape for editing.

The Telecine operates on either 625/50 or 525/60 standards. On 625 lines 50 Hz field rate, the film



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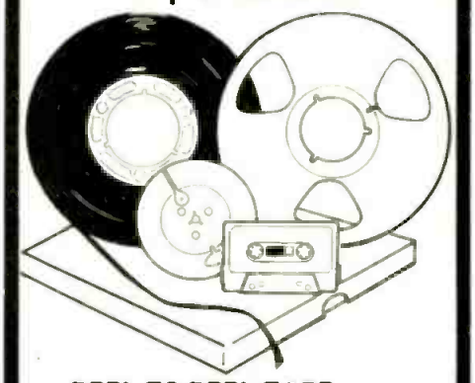

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For More Details Circle (266) on Reply Card

needs. The company also has data input and work desks.

While Amco offers several options, the three most popular are the vertical racks (with side panels and with or without a door), and sloped and low silhouette versions that can be ordered with a writing surface that extends from the cabinet at typical table top heights.

For More Details Circle (349) on Reply Card

Two-channel receiver

Edcor's new two-channel wireless receiver, model ST-3B2, allows two wireless microphones to be used at one time. The crystal-controlled receiver has both a high and low impedance audio output for each channel.

The unit has an external telescoping antenna split internally for two channels. Other features include: AC or DC operation, lightweight construction, easy installation, and it can be used with any Edcor wireless microphone.

For More Details Circle (350) on Reply Card

Microphones

Audio-Technica's new microphones are available in three elec-

continued on page 252

travels at a constant 25 frames per second, and two rasters alternate in position to scan each film frame twice as it passes over the vision gate aperture. On 525 lines 60 Hz, the film travels at 25 frames per second, and film frames are scanned alternately 3 times and 2 times.

While the mechanism is in motion the raster height is half normal, the other half being made up by the motion of the film. When the mechanism is stationary, a normal 4x3 raster is generated. Frame position information is derived from a film driven sprocket fitted to each format gate. Electronic framing is provided by changing system phase. The entire transport and scanning system references to station syncs and is independent of power supply frequency.

For More Details Circle (348) on Reply Card

Racks and cabinets

Amco Engineering, an old-line equipment rack and cabinet manufacturer, has several new versions of their standard lines.

These cabinets are strictly professional, with designs, contours and colors to match most broadcast

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For More Details Circle (244) on Reply Card

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New MM thin-line faders are great for small portable mixers or lighting consoles. Only half the width of conventional faders, our 3/4-inch wide MM series lets you build a lot of mixing or control capability into a limited space. No performance compromise, either. You get Waters' proprietary MystR® conductive plastic resistance elements. Glass-hard. Smooth. Long-lasting. You get Waters' computer-controlled curve shaping for highest tracking accuracy. And, you can choose 2 3/4-inch or 4-inch travel; 600 ohm or 10,000 ohm impedance; linear, audio, or true log characteristic. For complete information, circle the reader service card, or call Don Russell at (617) 358-2777.

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For More Details Circle (245) on Reply Card

New Products

continued from page 251

tret condenser and two dynamic "moving coil" models. Each type is available with cardioid (unidirectional) and omnidirectional acceptance patterns.

A-T's initial offerings of electret condensor mics are designated AT801, AT811 and AT813. All have aluminum alloy bodies.

The AT801 is Audio-Technica's omnidirectional electret condenser microphone. Listing for $50, the AT801 yields a frequency response of 40-18,000 Hz. Sensitivity is rated at - 48 dB. The output, balanced, is 600 ohms (nominal). Weight is 5.6 ounces, less cable and clamp.

The AT811 is a cardioid (unidirectional) electret condenser mic. Listing for $75, it yields a frequency response of 50-20,000 Hz. Sensitivity is rated at -54 dB. The output, balanced, is 600 ohms (nominal). Weight is 6 ounces, less cable and clamp. A special feature is a built-in protective screen with multistage filters to reduce wind noise and "pops" from close-up use.

For More Details Circle (351) on Reply Card

10-Station intercom

N.O.V.A. Corporation's new NOVA-COM is a 10-station speaker intercom system. Touch-tone operation requires only pushing the button for the desired station, talking into the microphone and releasing the button to listen. When the conversation is over, push the "off" button. There is an "all call" which when released is also an all listen. Every station is a master.

Installation requires a 4-conductor cable. A single 24 VDC power supply is needed. Additional stations can be added at any time.

For More Details Circle (352) on Reply Card

Production switcher

Shintron has announced the model 375 Chromatic Production Switcher for medium scale broadcast applications.

The model 375 switcher is a 12-input, all vertical interval switcher that will withstand continuous use in remote pick-up or ENG vans. Electrical specifications are fully broadcast. The electronic circuitry is packaged separately from the remote control panel.

Notable features of the model 375 are: built-in chroma keyer, soft and edge wipes, two independent color background generators (one for main matte, the other for down-

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stream matte), and autotake.

The wipe generator is equipped with 10 patterns all with wipe limit controls. Patterns can be modulated by the built-in audio generator.

The main matte keyer uses a complementary color from the background generator. The downstream matte key can be dissolved to black for panic situations.

The front panel design is human engineered for easy use and uses professional, high-reliability components. PAL version is also available.

For More Details Circle (353) on Reply Card

Color videomonitor

Incorporating the 25-inch Trinitron picture tube, the PVM-2550 has the largest screen-size of any color video monitor Sony has ever offered in the United States. The dual input color unit has external synchronization capability.

The PVM-2550 employs a color picture tube with a beam scanning velocity modulation system. This innovation improves resolution, providing a sharp picture over the entire screen area. The new modulation system also suppresses white color distortion and eliminates "snow" noise.

The monitor offers flexibility as a display device for video use at trade shows, point of purchase displays or wherever any large size displays are required.

For More Details Circle (354) on Reply Card

Digital troubleshooting videotape program

"Digital Troubleshooting," a color videotape program with accompanying textbook and lab workshop designed to provide training in the growing field of digital instrumentation, is available in a completely updated version from the *Hewlett-Packard Company*.

This 14-videotape program has a total running time of 5 hours and 31 minutes, and includes a 180-page textbook, lab workbook and study guide.

The curriculum is designed to provide instruction for individuals learning digital troubleshooting for the first time and for technicians needing a refresher course on digital (versus analog) techniques.

Topics discussed in the tapes include an introduction to digital electronics and the binary system; the basics of transistors and ICs; logic gates and symbols; digital IC families; troubleshooting digital ICs; flip flops; counters; shift registers; combinational logic circuits; display technologies; IC manufacturing; and memories.

Each videotape is available in ¾-inch videocassette. Other formats can be supplied on request. The videotapes, text and workbook may be purchased individually.

For More Details Circle (355) on Reply Card

English command control system

"BASIC" is IGM's new system control which uses English commands, virtually eliminating coding of information, event numbers or other alpha-numeric encoded data. Working with Intel and utilizing the latest microprocessor computer-based technology, IGM engineers designed BASIC systems A and B to perform more tasks than most existing systems.

BASIC A is programmed, controlled and monitored from a single enclosure rack, using a standard keyboard with 18 special-function keys. It can handle 16 sources, expandable in increments of 16. Capacity of the static RAM memory system is 4,000 schedule entries, expandable to 8,000 in increments of 2,000. Programmable audio fade control for each source with un-

continued on page 254

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For More Details Circle (248) on Reply Card

New Products

continued from page 253

limited real-time switching abilities is standard. English print-out logging is also standard.

BASIC B stores memory on floppy discs for up to 6,000 schedule entries per day with 8,000 format or subroutine entries common to all days and offers color CRT.

Four types of control procedures are included:

- Normal audio or external relay, and whether this event must be followed by another regularly scheduled event. Audio Fade-on and OFF controls and up to 30 classification descriptions like COMMERCIAL, PAS, ID, etc.;
- Branching control for switch "JUMP TO" subroutines;
- Real-time event control, including five functions: immediate, approximate, external, dead-roll and switch voice track; and
- Conditionals which remain in the system indefinitely and are only used under special conditions.

For More Details Circle (356) on Reply Card

Audio-video head cleaner

The recorder care division of *Nortronics Company, Inc.*, is offering a new QM-35 Foam & Cleaner, an all purpose tape head cleaning combination for audio, video, instrumentation and digital recording equipment.

The kit contains a quantity of reusable cellular foam swabs, for removing oxide and dirt accumulations that build up on recorder heads, capstans and guides when used in conjunction with the liquid head cleaner supplied to loosen these accumulations.

Once the liquid cleaner breaks deposits away, the nonabrasive foam swabs permit heavy scrubbing action. The liquid head cleaner is specially formulated for safe use on rubber parts and tape heads and will not leave any residue. A special orifice on the cleaner bottle prevents accidental contamination.

For More Details Circle (357) on Reply Card

Microwave tower warning light control

Hughey & Phillips have developed a solid-state microwave tower warning light control and alarm unit for unattended microwave radio-relay stations.

The unit is designed so it does not have to be removed from the housing for repair. Plug-in "modular-type" components are used for

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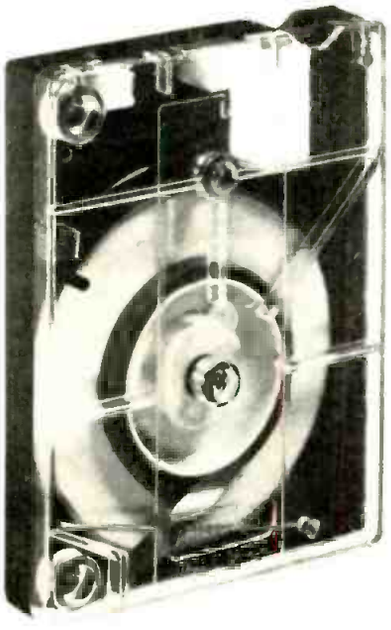

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For More Details Circle (226) on Reply Card

all relays, photo-control PC board and solid-state beacon flasher. The main panel's power relays, terminal blocks, solid-state timer, and solid-state beacon flasher connect with surface wiring for easy access. There is no wiring or components on the back of the panel.

All control circuits are on the PCB and operate at 12 VDC derived by the small power transformer mounted on the PCB. The dry contacts on the alarm circuits are rated at 5 amps 120 VAC resistive load. All input power and tower lighting circuits are protected from line surges and surges coming from the tower lights with GE's MOVs.

For More Details Circle (358) on Reply Card

Acoustic coupler

A new telephone coupler by *Shure Brothers, Incorporoted* features improved transmission quality and ease in feeding recorded material into a telephone for remote broadcasting.

Called the Shure 50AC, the coupler may be strapped to any telephone in seconds. Connect it to a cassette tape recorder, flip the "play" switch and the recorded material is automatically fed into the phone.

There is no need to tie into the telephone wiring system or to remove the telephone mouthpiece. The 50AC completely covers the telephone mouthpiece. There is no background noise, no loss in intelligibility and the unit has no induction coils. The 50AC may also be driven by the Shure SM82 Line Level Microphone.

A lever built into the 50AC also allows adding live commentary without interrupting the transmission of a taped interview or message. In addition, the 50AC may be used as a microphone by speaking directly into the unit while its "mini-plug" is connected to the MIC input of a recorder. A 300 to 3,000 Hz tailored frequency response approximates the response of the telephone.

For More Details Circle (359) on Reply Card

ENG color camera

A three-tube color TV camera weighing only 21.1 pounds, including 10X1 zoom lens and built-in camera control unit, has been developed by *JVC Industries Company*.

The CY-8800U is equipped with three ⅔-inch magnetic-focus, magnetic-deflection Plumbicon® tubes. Saticon tubes will also be available.

The CY-8800U is a self-contained

continued on page 256

Low Cost High Performance Professional Degaussers

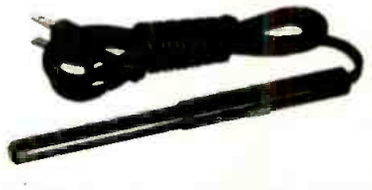
- *Save Time*
- *Save Tape and Film*
- *Save Money*

WRE's wide range of degaussers are designed for years of dependable service for clean and simple erasure of magnetic film and tapes in just about any configuration.

Backed by years of proven reliability, these units are the answer to cutting man-hours and reducing material costs by allowing reuse of prerecorded media.

TYPE 9205A Degausser is ideally suited for complete erasure of program and residual noise from video, audio, and data recording tape and magnetic film—in reels, cartridges and cassettes. This unit will bulk erase reels up to 2 inches thick and 17 inches in diameter. Available for 115 or 230 volt operation.

TYPE 642-21 Degausser is similar to the 9205A except it is limited to erasure of 10½ inch reels. This unit is recommended where size and cost are limiting factors.



TYPE 8905 Magnetic Erasing Pencil is an excellent tool for erasing limited, small areas of tape or film and for demagnetizing record/play heads. In program material, words, complete sentences, and even syllables may be erased. This unit is equipped with a press-to-operate switch on the handle.

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

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For More Details Circle (227) on Reply Card

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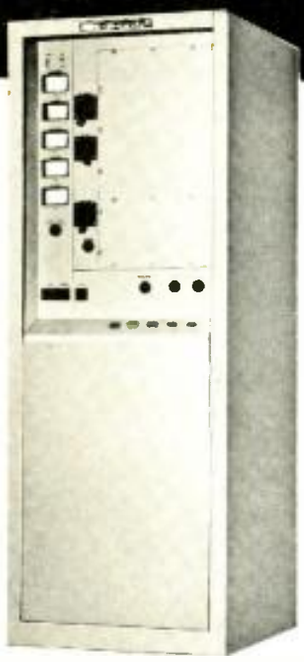

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For More Details Circle (202) on Reply Card

New Products

continued from page 255

unit which can be activated by 12 VDC power. It features a 1.5-inch CRT view-finder that can be moved forward and back, up and down and laterally.

The camera has external synchronization capability (SC plus sync or composite video) and can be operated remote through an optional unit. It also features a built-in color bar generator and can be used as an encoder or color monitor for line checking.

Horizontal and vertical corrector circuits are provided for crisp pictures. Likewise, a circuit for indicating the wave form of the video signal is built in for constant monitoring.

The CY-8800U provides high sensitivity, high resolution color registration by combining the three-tube system with dichroic-mirror color-separating optics. It has a 49 dB signal-to-noise ratio at f/4.0 with 277 foot-candle illumination.

For More Details Circle (360) on Reply Card

Multiplexer

TeleMation's new TMM-205 Multiplexer accepts up to three projector inputs and can accommodate 8mm, 16mm and 35mm film projectors for operation with a color or monochrome camera. Transitions between optical sources occur in approximately 0.5 of a second and are bounce-free. The entire mechanism is designed to eliminate acceleration and shock loading forces. A fiberglass cover protects the optical assembly from dust and prevents extraneous light from entering the camera lens.

A local control panel permits selection of film 1, film 2 and slide, and contains the master AC switch and fuse. All equipment is connected to a shelf or pedestal with a three-point adjustable mount, making the system installation and optical alignment of the TMM-205 simple and permanent.

For More Details Circle (361) on Reply Card

Production switcher

3M Company's Mincom division has developed a low-cost production switcher for industrial and educational video studios.

The model 812 production switcher is capable of 12 effects which are selected by knob control, including a circle, diamond, upper left corner, and square diagonal. A joystick positioner allows positioning of five effects. Effects can be enhanced

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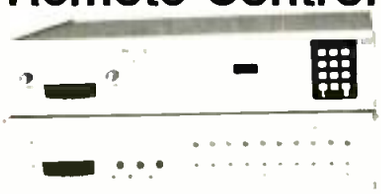
Remote Control



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For More Details Circle (228) on Reply Card

further by built-in softwipe and spotlight controls.

The unit has eight video inputs. The first seven are loop-through with built-in 75-ohm terminating switches. The eighth is selectable to either internal colorizer or internal color black generator signal.

The 812 features a 3-buss configuration: program, preview A and preview B. To assure a quality video output, a non-sync warning indicator alerts the operator to non-mixable video inputs.

A preset control allows for mix-to-preset-wipe and wipe-to-preset-mix operations. An auto mix/wipe button automatically mixes or wipes to the new input.

For More Details Circle (362) on Reply Card

Field-production TV camera

Commercial Electronics, Inc., (CEI) has agreed to manufacture the new EMI 2008 broadcast color television camera for *EMI Sound and Vision* who will market it primarily in Europe. The EMI 2008 is a field-production television camera system nearly identical to the new CEI-310, recently developed by CEI.

For More Details Circle (363) on Reply Card

Satellite TV receivers

Microdyne Corporation's new model 1100-FFC is a single frequency, stand-alone satellite TV receiver designed to reduce the cost of adding TV channels to any existing or new domestic CATV or international satellite receive-only terminal. When using channel dedicated receivers and any type of frequency agile receiver as backup for any one channel, all current channels plus others soon to follow can be readily accommodated at minimum cost.

The 1100-FFC is a compact 3½-inch rack mount unit, fully EIA and CCIR compatible. It interfaces without system modifications and offers the same video, audio and related performance specifications as the standard model 1100-TVR(VT) receiver—including the 8 dB C/N threshold.

Options offered are: ability to change frequency, composite video output, monitor output for a redundancy network and split configuration.

For More Details Circle (364) on Reply Card

A-D and D-A converters

Tektronix, Inc. has introduced two new video devices: the ADC 820, an 8-bit 20 MHz analog-to-

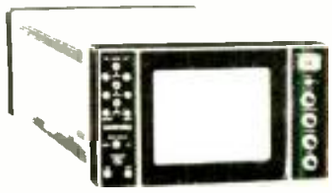
continued on page 258

Available in NTSC, PAL and SECAM

The honest-value compact color monitors

AMTRON
RACK MOUNT COLOR MONITORS

AMTRON AM-5



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New Products

continued from page 257

digital converter and the DAC 850, an 8-bit 50 MHz digital-to-analog converter. Both designs are optimized for video applications.

The ADC 820 is built on a single circuit board, 6"x8"x1", and dissipates less than 7 watts. Power requirements are ±12 volts, +5 volts, -5.2 volts. It has an on-board low pass anti-aliasing filter right at the input to the quantizer. The entire quantizing and digital coding process is performed by three proprietary Tektronix LSI chips. The architecture of the chips and the surrounding circuitry eliminates the need for a Sample and Hold. Differential phase and gain are less than ½° and 1% RMS.

The DAC 850 is also 6"x8"x1", and has the same voltage requirements. Dissipation is less than five watts. It comes with three times or four times subcarrier output filters, or with no filter. Differential phase and gain are less than ¼° with ¾% RMS.

For More Details Circle (365) on Reply Card

Real-time audio processor

A computer-based processor that eliminates unwanted noises from audio signals and recordings in real-time has been developed by *Rockwell International Corporation's* Electronics Research Center.

The processor can be used either to "clean" an audio signal as it is being received, or to enhance a recording that has already been made. It can remove from 40 dB to 50 dB of highly-correlated noise with minimal degradation in the desired voice signal.

The portable Automatic Digital Audio Processor (ADAP) can be used both on-site (by police in making recordings, by on-scene reporters, or for on-location television and motion picture filming, etc.) and in a studio or sound room in conjunction with other audio equipment.

The processor removes two types of noises from voice tracks: additive sounds, such as music, traffic or other background noises; and convolutional sounds, such as resonances, room acoustics or noises inherent in recording equipment. The ADAP recognizes the undesired sound and eliminates it within 200 milliseconds.

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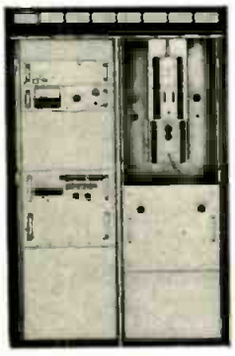

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For More Details Circle (269) on Reply Card

components. It has a full complement of panel control that may be replaced by internal plug-in switches for single-use applications.

For More Details Circle (366) on Reply Card

Camera junction box

Sharp Electronics Corporation has introduced a rack-mounted junction box, XJB-2000. It is designed so that two junction boxes are mounted on a single 19-inch panel with all connections to the junction box made inside the rack. The only connections showing from the outside of the frame is the camera input. The XJB-2000 camera junction box is designed for use when interfacing the Sharp XC-2000 color camera into a system.

For More Details Circle (367) on Reply Card

Portable scope

Hitachi Denshi America, Ltd. has introduced the "mini-portable" V-059B and V-158 oscilloscopes.

Weighing less than 6½ pounds, the V-059B is a 7 MHz oscilloscope designed for use in the field, as a troubleshooting tool, and as a TV waveform monitor. The TV sync separator provides automatic lockup at horizontal and vertical rates; a 2H-2V switch gives correct TV WFM presentation. Keyed DC restoration, external trigger input and external horizontal inputs are other features of this scope that may be powered from AC line, 12 VDC or self-contained rechargeable battery with built-in charger.

The V-059B also features direct or 10X probe input, vertical deflection sensitivity of 10mV/div, and sweep rates from 20ms/div to 10us/div, plus a 10X magnifier. The sweep may be triggered from internal, external or line with selection of positive or negative slope in either automatic or normal (triggered) mode. The internal graticule is an 8x10 division format with 6.35mm (.25 inch) divisions. The green light incorporates a 100-0-40 IRE graticule for TV waveform display.

For More Details Circle (368) on Reply Card

Parametric equalizer

A second-generation Parametric Equalizer (model 622) is now available from *Orban/Parasound*. Encompassing all of the features of the model 621 series, the new 622 offers in/out switches on each of its four bands, standard balance input with output transformer option, extensive RF shielding, and 115/230 volt,

continued on page 260

NEW . . .

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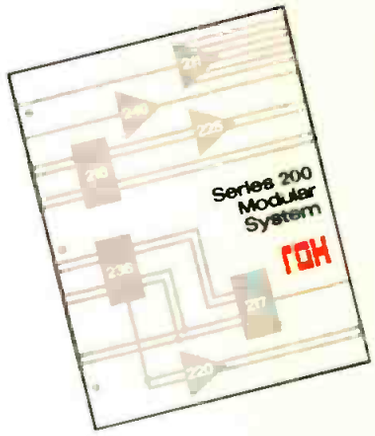

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For More Details Circle (250) on Reply Card

New Products

continued from page 259

50-60 Hz AC power supply included in the package.

A new proprietary parametric bandpass filter is virtually immune to the effects of control wear, and complements the unique "constant Q" design by permitting -40 dB notches to be consistently obtained. THD has been reduced to less than 0.025%, 20-20,000 Hz at +18 dBm.

All other features of the 621 series are retained: four cascaded sections, each with non-interacting, continuously variable center frequency, bandwidth, and amount of boost or cut. Each section tunes over a 25:1 frequency range, with broadly overlapping coverage for maximum flexibility. An overload light is provided which monitors all potential overload points in the circuit, and overloads can be easily corrected with the integral gain control.

For More Details Circle (369) on Reply Card

Video monitor

A newly-styled 14-volt professional monochrome monitor for VTR over-console mounting in a tape bridge is available from Conrac.

Model DZB offers the broadcast engineer a dependable, performance-stabilized picture. Modular design and quick-disconnect circuit boards permit rapid replacement of circuits.

The all solid-state, ultra-rectangular 15-inch D6500 phosphor CRT monitor features horizontal and vertical delay switches, linearity within ±1% picture height and modular high voltage supply. A front panel selector switch, optionally remote, allows either of two matched video inputs to be viewed for picture comparison.

Since the model DZB utilizes a keyed back-porch clamp, the black level will not vary more than 1 fL as the duty cycle is changed from 10% to 90% APL over a temperature range of 20°C to 55°C. The unit will display hum, noise and spurious signals on the incoming line. DC restoration can be cut in or out by a switch on the chassis deck. Sync signal analysis is accomplished through a front panel control which permits the operator to shift the picture one-half line, while simultaneously increasing the oscillator horizontal time-constant to display tape recorder jitter.

For More Details Circle (370) on Reply Card

Directional wattmeter

Bird Electronic Corporation's model 4431 is a new Thruline® RF directional wattmeter for the measurement of forward or reflected CW power with the additional feature of an adjustable RF sampling output for frequency analysis on a scope, spectrum analyzer or frequency counter.

The wattmeter is designed for ±5% power measurement from 100 milliwatts to 5000 watts from 2 to 30 MHz and up to 1000 watts from 30 to 1000 MHz, using the same standard plug-in elements in dis-

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For More Details Circle (271) on Reply Card

crete bands and power-levels as catalogued with model 43. No plug-in elements are needed for RF analysis. The sample signal is adjustable from 15 dB to over 70 dB below the main line signal, offering protection from overload for high-sensitivity instrument inputs.

The model 4431 has a low insertion VSWR of 1.07 at most settings. A major feature resulting in this low VSWR value is the use of the QC Quick-Change Connectors, which permit mating with male or female N, BNC, TNC, UHF, C, SC, HN, GR, Type 874 and 7/8-inch EIA lines without the need for performance-degrading adapters.

For More Details Circle (371) on Reply Card

Condenser microphone system

Electro-Voice's "System C" is a modular professional microphone system. It consists of a number of elements which can be interchanged to fit specific applications. Elements in the system include two electronic preamplifiers—one for handheld applications and one for boom use. The boom preamplifier operates from either phantom or AB remote power. Four interchangeable capsules are available: omnidirectional, cardioid, hyper-cardiod and Cardiline® shotgun. Accessories, including windscreens and shock mounts, are also available.

System C is backed by a two-year, unconditional warranty.

For More Details Circle (372) on Reply Card

Remote pick-up transmitter

McMartin Industries has engineered a portable remote pick-up transmitter, the RPU-1103, to meet all the FCC requirements effective August 1, 1977. The unit is a 3-watt, 150 MHz solid-state, dual frequency transmitter. The RPU-1103 comes with a rechargeable nicad battery which will provide eight to ten hours on-the-job reporting at a 30% duty cycle.

Standard equipment includes a shoulder strap and whip antenna which can be replaced with the lower profile rubber duck type antenna. Two-frequency operation is achieved with a front panel switch when the optional second channel frequency element is installed.

Two audio inputs are provided. One is a mic input with 25 dB of compression with an LED indicator to display proper operation. A line input is provided for use with a portable tape recorder or cassette player. When combined with the

continued on page 262

Q.
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PRECISION DIGITAL ANTENNA MONITOR—$1390

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Precise, high resolution measurements of phase, true ratio, and relative amplitude, in a compact 3½" rack mounting chassis. DA—1 or DA—2, up to five towers. Continuous phase sign display. Accepts 1.8—15 VRMS sample signal; compatible with existing sampling systems. Choice of N or UHF receptacles, 50 or 75 ohm termination. For stations that will take antenna monitor readings at the transmitter site.

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For More Details Circle (253) on Reply Card

New Products

continued from page 261

talk-over feature of the push-to-talk button on the microphone, the recorder of player allows for production in the field.

The unit is designed for broadcast quality type microphones and the input jack is provided so that any available microphone can be used. The unit displays typical distortion of 1% and audio response of less than 1 dB from 50 to 7500 Hz with 75 microsecond pre-emphasis.

For More Details Circle (373) on Reply Card

Camera tripod

Based on precision-made Swiss components, the new *Images Devices Inc.* Super Stix Tripod features lightweight, weatherproof aluminum construction (8½ lb.) with a maximum height of 6'7½" and a minimum height of 2'2". It is supplied with a Miller F head at $695, a Ronford F-1 head at $995, or an O'Connor 30 head at $960.

Other features include: removable leg wedges for low angles, adjustable leg friction, hanger hooks for paraphernalia, a reversible rising column, a balanced carrying handle, a D-ring for included leather shoulder strap, adjustable telescopic legs with rubber feet and steel spikes.

For present owners of similar Swiss tripods, IDI will modernize the units with the addition of leather shoulder strap, balanced carrying handle, hanger hooks, Velcro tieups, and extra D-ring; price: $35.

For More Details Circle (374) on Reply Card

Five-cavity klystrons

Varian has introduced two five-cavity vapor-cooled klystrons for use as final amplifier tubes in both

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VIDEO TAPE TIMER

- Bright LED display
- More accurate tape time
- Optional remote display
- Hold button freezes display
- Available for all 2-inch VTRs

still lowest cost

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For More Details Circle (254) on Reply Card

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visual and aural sections of UHF-TV transmitters.

The VA-953H and VA-954-H offer improved linearity and higher operating efficiency by providing lower DC input power for the same transmitter power rating. Special design permits multiplexing both visual and aural signals at 50% to 75% of the visual-only rating.

Features include high gain of at least 47 dB producing a 55 kW peak-of-sync output with less than 0.7 watts of RF drive. Efficiency is up to 42% (standard tubes operate at 29% to 32% efficiency). Bandwidth of 1 dB is at least 7 MHz over the tuning range. Frequency range for the tubes is 470 MHz to 698 MHz. Peak output is 57 kW.

For More Details Circle (375) on Reply Card

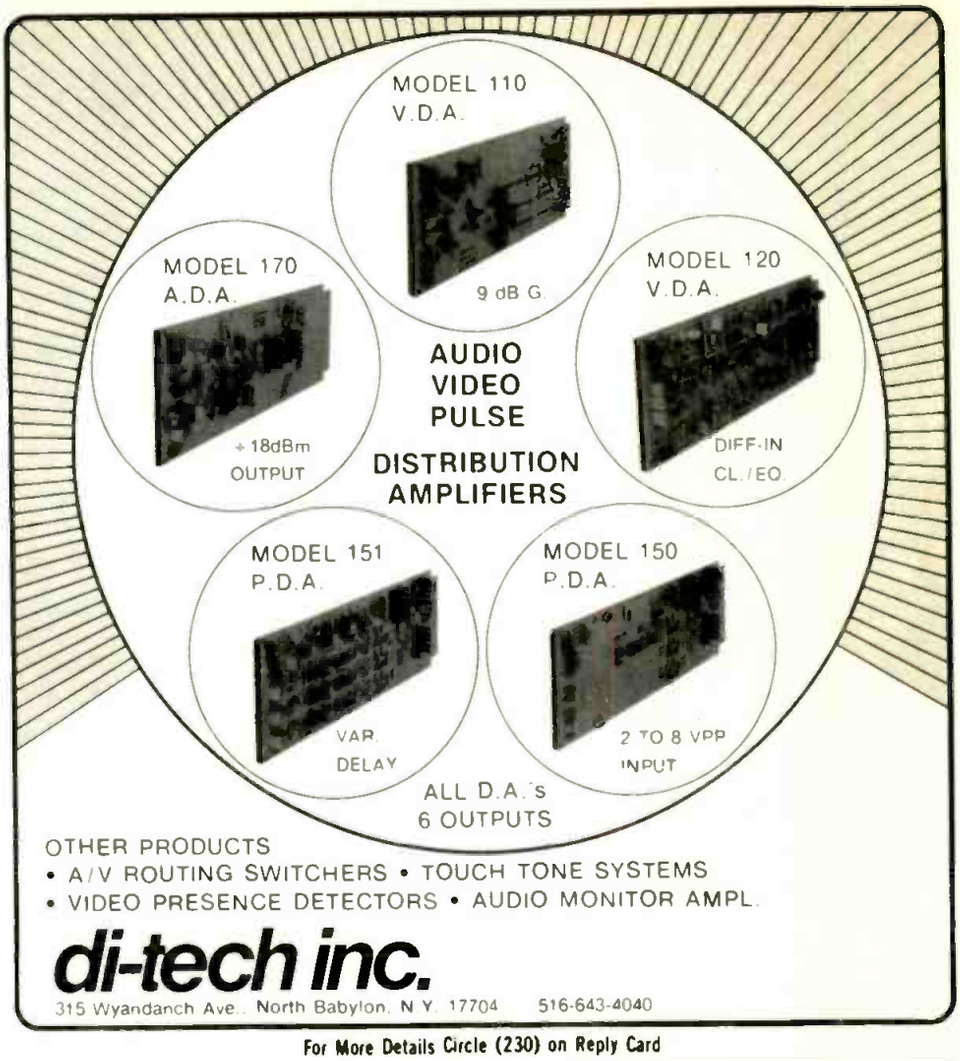
Background music tape reproducer

A new background music tape reproducer is now available from *VIF International* for use in radio station automation as well as background music applications.

The model 450 offers individual amplifiers for each track, each equipped with level set and high/low frequency equalization adjustments. The amplifier assemblies, as well as all control circuitry components, are mounted on plug-in type printed circuit cards and are accessible from the rear of the machine.

The model 450 Background Music Tape Reproducer features low take-up tension; capstan mounted between the head stacks; high-level audio switching at each amplifier output; automatic reversal at the end of each playing direction; and "Reel Change" actuation that will shut the 450 off automatically at the end of a complete playing cycle when the supply reel is full.

continued on page 264



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- Cleans and winds tapes
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- Extend VTR head life
- Hundreds installed worldwide
- Leasing program available

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Now you can completely automate your video tape erasing jobs with Garner's new Video'Raser unit. It's a simple one-step, in-and-out operation. Tapes pass on a continuous belt over high flux coils, giving you tape erasure depth exceeding professional standards. Built rugged and compact, it easily handles video cassettes. You'll also like the Video'Raser's competitive price.

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For More Details Circle (209) on Reply Card

New Products

continued from page 263

The model 450 is capable of handling reels up to 14 inches in diameter, and is available in either ½-track monaural or ¼-track stereo with playing speeds of either 3.75 inches per second or 7.5 inches per second.

For More Details Circle (376) on Reply Card

Soldering pistol

The Kager KL 3000 is a lightweight instrument as suited to precision applications in the electrical and electronics fields as it is to the production-line worker.

The solder is incorporated in the pistol. By simply squeezing the trigger, it is fed to the heated soldering tip. The precise amount of solder required for a particular joint may be selected by turning a knob. Cold soldering spots are minimized because the object being soldered or the copper lamination surrounding it is heated prior to the application of the solder.

The KL 3000 is available with power inputs of 20 to 60 watts.

For More Details Circle (377) on Reply Card

Color Monitor

A high-resolution 13V color monitor designed for size-limited signal evaluation applications in broadcasting and teleproduction is available in production quantities from Conrac.

The compact unit, model 5722, can be mounted over VTR consoles and is compatible with VTR instrumentation/monitor bridges. The monitor also has a cabinet configuration as an option for portable teleproduction use.

The model 5722 features a 13V high-resolution Colormatch shadow mask CRT which allows critical

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- Off line time code writer
- Records at 8 times speed
- Writes both control and cue
- Saves VTR time and heads
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signal evaluation. The unit includes preset controls for contrast, brightness, chroma, phase and aperture; horizontal and vertical delay switches; a horizontal AFC time-constant switch; and phase linear aperture correction.

For More Details Circle (378) on Reply Card

Operational amplifier

A low-noise, general-purpose operational amplifier offering a wider bandwidth and improved output drive capability is now available from *Signetics*.

The SE/NE5534 is capable of driving 10V (RMS) into 600 ohms directly, and features a small-signal bandwidth of 10 MHz and power bandwidth of 200 kHz.

Other specifications of the 5534 include: DC voltage gain, 100,000; AC voltage gain, 6,000 at 10 kHz; and supply voltage range, ±3 to ±20V.

For More Details Circle (379) on Reply Card

FM audio processor

The broadcast products division of *Harris Corporation* has expanded its MSP-100 (Maximum Signal Processor) FM Audio Processor for use with AM.

The MSP-100 is an audio control package designed for ease of adjustment, enabling stations to tailor sound to individual formats.

This single unit incorporates a tri-band AGC which processes separate segments of the audio spectrum independently. Operational parameters, including frequency bandwidths, thresholds and shapes, and attack/recovery constants. The signal within the protection module, which follows the limiter, is split into two frequency bands to optimize the limiting of the high frequency signal content.

continued on page 266

Holds any model

Ampex, MCI, Scully, Tascam, Otari and any other 19" x 15¾" tape transport fits our RL 500 console. Constructed with the same care as the Scully consoles which we have manufactured for the past 12 years, the RL 500 incorporates the newest design features, including front panel removal for deck access in both horizontal and vertical positions and a rear shelf for your power supplies. Add these advantages to Rus Lang's reputation for quality, and the RL 500 becomes the best value on the market. Ask for details and pricing.

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VR-1200	TR-22
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- Prolongs head and tape life

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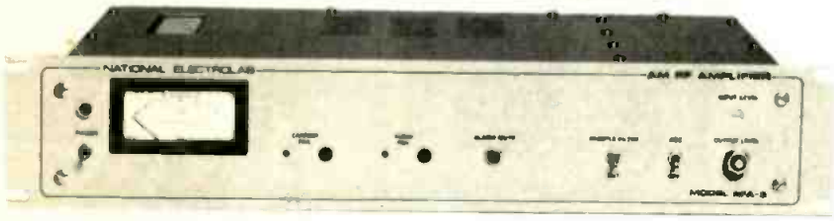
Set it and forget it



The NEW RFA-5 AM RF Amplifier

• 30dB AGC Range • Signal Strength Meter • Three RF Outputs for monitors, frequency counter and oscilloscope • Optional 600 ohm Balanced Audio Output and Carrier/Audio-Fail Alarms.

"Set it and forget it" – that's the comment most often heard from AM station engineers who have installed a National Electrolab AM RF Amplifier. The new RFA-5 is even better than the previous RFA-4. AGC is now standard, and a built-in carrier level meter makes setup easy. As well as driving most modulation monitors, the RFA-5 also delivers a low level oscilloscope output and a clipped/limited output for a standard frequency counter. Four double-tuned selective stages in the preamp, combined with a MOS-FET front end, provide outstanding performance in frequency-congested areas. Over 250 radio stations in Canada and the U.S.A. are presently using National Electrolab RF amplifiers. Try one yourself – and forget it. *For complete information, call any office of Gates Broadcast Equipment Div. of Harris Corp. or:*

NATIONAL ELECTROLAB LTD.

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Canada: 1536 Columbia St., North Vancouver B.C. V7J 1A4 Phone (604) 985-0511

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New Products

continued from page 265

The only change necessary in converting from FM to AM is to replace the FM protection module with an AM protection module.

The AM protection module contains a fast broadband peak limiter featuring low distortion and low noise. Asymmetrical limiting of the signal is achieved through the use of innovative circuitry to allow 125% positive peak modulation. Noiseless switching is achieved through zero crossing phase reversal.

In the FM version of the MSP-100, pre-emphasis is selectable at 25 microsecond intervals from 0 to 75 microseconds.

Both AM and FM employ active input and output for the best frequency and transient response. In addition, a peak reading meter is provided.

For More Details Circle (380) on Reply Card

Stereo disc-equalizer

A stereo disc-equalizer, with a head amplifier developed especially for record reproduction in high-grade audio systems, has been introduced by Accuphase and distributed in the U.S. by *TEAC*.

The model C-220 has a built-in head amplifier, with a gain as high as 26 dB, and it accepts inputs from any brand of moving coil (MC) cartridge. The unit also exclusively employs a Class A symmetrical push-pull circuit and is the first MC cartridge head-amplifier to use a ring emitter transistor. The equalizer circuit employs a low-impedance differential amplification push-pull circuit, which can realize a signal-to-noise ratio of 85 dB against an input of 2 mV. The C-220 also has a large capacity power supply circuit.

Frequency response is ±0.2 dB,

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- Standard in the industry
- World wide customer base
- Leasing program available

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For More Details Circle (213) on Reply Card

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20 Hz to 20,000 Hz, and total harmonic distortion of 0.01% at rated output level, 20 Hz to 20,000 Hz.

For More Details Circle (381) on Reply Card

Video distribution amplifiers

Video Aids Corporation of Colorado has introduced two new video distribution amplifiers to their line. The model VDA-1 is a VDA which can be operated from any 12-volt DC power supply capable of delivering 70 mA.

The model VDA-1P has its own self-contained power supply. These video distribution amplifiers are designed for installation in TBCs and other equipment where additional video outputs or feeds are required. The VDA-1 is priced at $79, and the VDA-1P at $125.

For More Details Circle (382) on Reply Card

Stereo headphones

Burwen Research's new family of stereo headphones includes two patented orthodynamic and three dynamic models. Produced in West Germany, the entire line features wide-range frequency response extending beyond the range of human hearing, extremely low distortion even at high sound levels, solid basses, clear trebles and precise transients.

Styling is simple, emphasizing light-weight comfort and featuring both around and on-the-ear models. Extras include solid RCA phono jacks, 10-foot cables and heavy-duty cable protection.

The orthodynamic driver used in the top-of-the-line model PMB 8 is a push-pull sound producing unit. It eliminates the cost, weight and technical complications of electrostatic or electret units. The PMB 8 utilizes an ultra thin voice coil diaphragm, positioned between two

continued on page 268

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Model 525

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For More Details Circle (274) on Reply Card

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- High speed cassette tester
- Edge damage counter
- Gross error counter
- Measures cassette length
- Still useful as recorder/player

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HERCULES HYDRO
Weight: 8.5 lbs. (3.9 kg.)
Wt. capacity: 50 lbs. (22.7 kg.)
Dimensions: 6"x5"x6" (cm.: 15.2x12.7x15.2)
Tilt: ±80° Pan: 360° Code No. 4-52810-3

Introducing the perfect go-togethers for Cine/ENG.

Ideal combination of lightweight, high capacity, portability.

SAMSON Cine/ENG
Weight: 9 lbs. (4.2 kg.)
Wt. capacity: 70 lbs. (31.8 kg.)
Max. ht.: 58" (147.3 cm.)
Min. ht.: 32" (81.3 cm.)
Code No. 4-70150-4

HERCULES HYDRO fluid head designed specifically for Cine/ENG cameras to 50 lbs. (22.7 kg.). Provides effortless, smooth pan and tilt movements. Spring-loaded to counter balance uneven weight. Independent pan, tilt tension and lock controls, for pro-level performance. Telescoping control handle, standard. Dual handle operation, too.

SAMSON Cine/Eng tripod designed for use with fluid heads. Made completely of aluminum. Lightweight, extremely rigid, completely adjustable. Features Pro Jr. mounting base, quick head connect/disconnect, telescoping legs. Can use any of QUICK-SET's four fluid heads.

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INCORPORATED

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For More Details Circle (255) on Reply Card

New Products

continued from page 267

perforated disc magnets. The diaphragm has coaxial conductors printed on its surface. These spiral in opposite directions to ensure uniform electrical impulses.

The two disc magnets are sintered, which provides a large surface area for the active magnetic material. Perforations allow the sound waves to pass through from the headphone to the ear. The drive unit segments are joined at the center and the edge, so that the segments respond in phase.

For More Details Circle (383) on Reply Card

Color camera service tapes

Hitachi Denshi America, Ltd. has just completed a series of set-up and maintenance tape programs for several of its cameras. The program covers complete set-up of a camera and explains each control or adjustment. It also shows by split screen, a waveform monitor resulting from the described adjustment.

The tape presentations on video cassette format are meant to be an aid to customers and dealers in correct set-up procedure of the Hitachi color cameras.

The tapes presently cover the SK-70, SK-80 and FP-1212 systems and others are in process of production. The price is listed at $90 and they will be available from Hitachi Denshi dealers across the country.

For More Details Circle (384) on Reply Card

Portable DMM

A new RFI shielded 3½-digit portable DMM has been announced by *B&K-Precision, Dynascan Corporation*. The model 2810 features .01 ohm resolution and selectable high-/low-power ohms.

The 2810 is a full-feature digital multimeter with a basic DC accuracy of 0.5%. The 3½-digit display uses bright .3-inch LED readouts. Twenty-nine overload protected ranges provide maximum resolution. Auto-ranging capability reduces the need for frequent range changes.

A highly valuable function of the 2810 is the 10-ohm range. This range, with its .01 ohm resolution, is ideal for locating a shorted winding in a transformer, motor or coil. A front panel 10-ohm ZERO control allows the user to zero-out the minute amount of test lead resistance.

The high-/low-power ohms switch is operated independently from the range switch, allowing high/low

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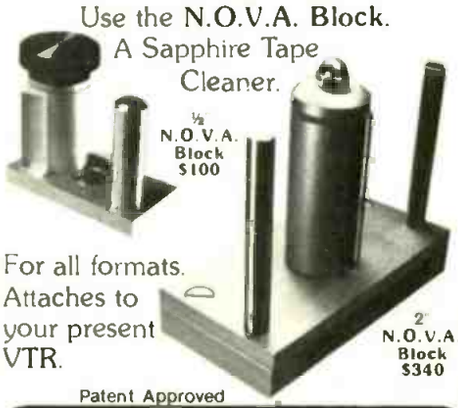

For all formats. Attaches to your present VTR.

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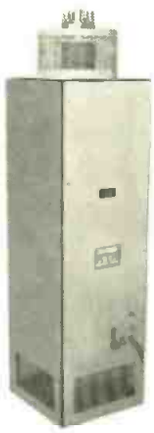

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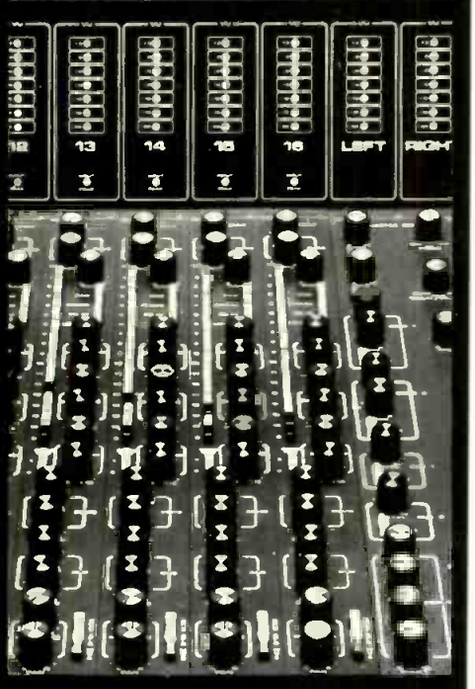

tangent 3216

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- 3-Band Parametric EQ
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- Balanced In, Out, Return
- Gain (Mic Pre-Amp)
- LED Peak Indicators

Write for complete information on specifications and features!

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phoenix, arizona 85034
602-267-0653

For More Details Circle (275) on Reply Card

selection on four ranges. The low-power ohms position permits resistance measurements in solid-state circuitry without biasing semiconductor junctions.

AC and DC voltage ranges cover from 100 mV to 1000 volts with 100% overrange reading and automatic polarity indication. Four AC and four DC current ranges read from 1μA to 2 amps.

For More Details Circle (385) on Reply Card

Video cassette editing recorder

Panasonic has introduced model NV-9500, a high performance videocassette editing recorder for color or black-and-white recording, editing or playback of ¾-inch videocassettes.

Features include direct-drive video head cylinder motor for high stability and less jitter, capstan servo system to maintain precise head-to-tape speed, signal-to-noise ratio of better than 45 dB for excellent picture quality, even in second and third generation tapes, and high resolution of 330 lines monochrome and 250 lines color. Special features include a dubbing mode switch for improved dubbing and editing.

Model NV-9500 also offers automatic selection of color or black-and-white mode; vertical sync input and sub-carrier input for use with time base corrector; chroma level adjustment; dropout/noise compensator; HPF heads; diecast chassis for strength and durability; new gear tape loading system for reliable tape threading; three cooling fan blades for improved ventilation; and uniform design of printed circuit boards, with low density component layout on individually removable panels for easier servicing.

For More Details Circle (386) on Reply Card

Crystal filter

An 8-pole switchable bandwidth crystal filter has been designed as an AM/LSB IF filter for AM-SSB CB sets. The filter, by *CTS Knights, Incorporated*, can be switched electrically from AM wide-band operation to SSB narrow-band operation by applying 7 VDC 50 mA to the switch terminal.

Minimum 3 dB bandwidth is 6 kHz in the AM mode and 2.7 kHz in the SSB mode. The new filter is available with center frequencies in the range of 10 to 13 MHz. Other operating characteristics include temperature range: -20°C to +60°C; band-

continued on page 270

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QUALITY TALKS FOR KPUG

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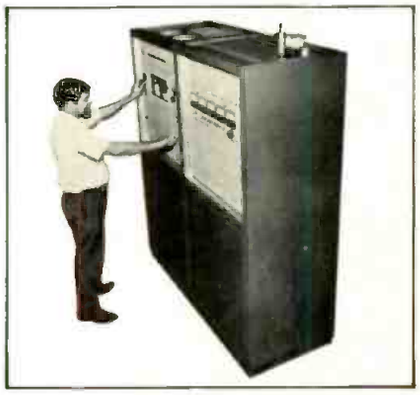

Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the cleanest sound around. Listen to Continental: quality talks.

Write for brochure: Continental Electronics Mfg. Co. Box 270879 Dallas, Texas 75227 (214) 381-7161

Continental Electronics

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(215) 374-4932

For More Details Circle (258) on Reply Card

New Products

continued from page 269

width at 3 dB; 6 kHz minimum with switching current off, 2.7 kHz minimum with switching current on, switching power 7 VDC 50 mA; termination: 50-ohm resistive or natural 2.5 kilohms, 4.8 pf; center frequency drift: 20 ppm maximum.

For More Details Circle (387) on Reply Card

Patchcord system

Data Sheet 75-350 from *AMP Incorporated* describes standard and low-profile programming systems that provide signal and power circuit capabilities in one unit.

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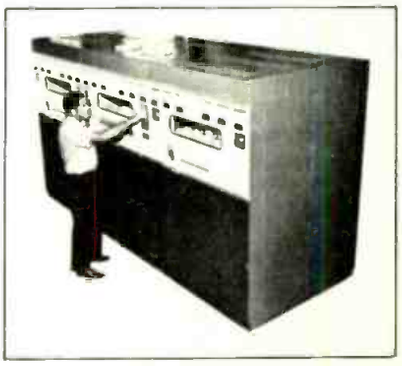

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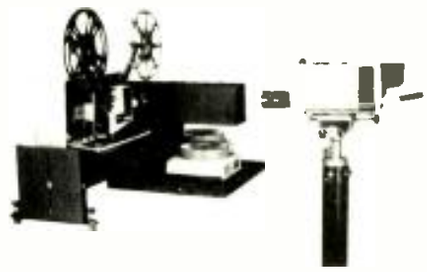

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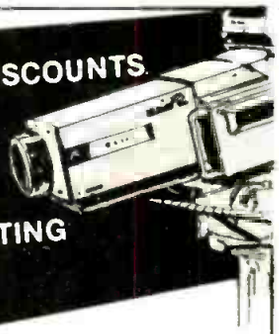

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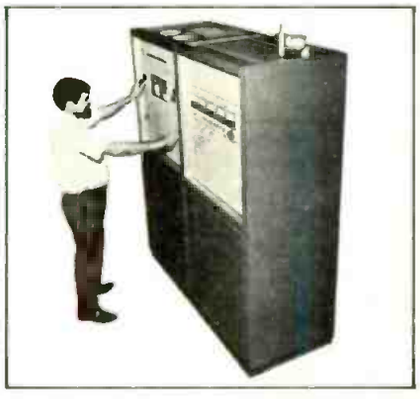

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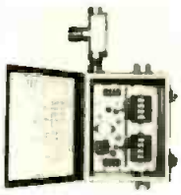

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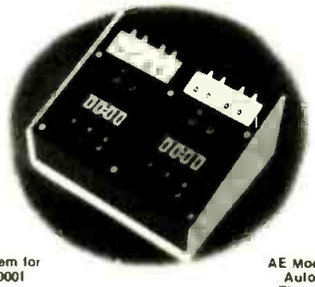

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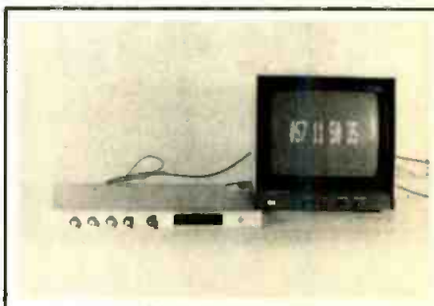

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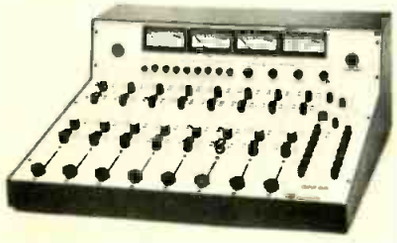

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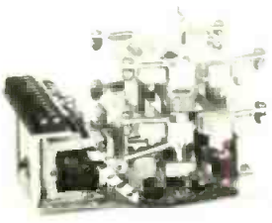

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MAJOR MARKET RADIO CHIEF ENGINEER—New facility in Top 20 Midwest market requires person with strong audio and directional experience. FM stereo experience desirable. Group operation with excellent fringe benefits. Top pay for right man. E.O.E. Send resume to: Walter J. Ellis, Box 7630, St. Paul, MN 55119. 9-72-1t

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NEW YORK VIDEO teleproduction company wants talented, innovative and creative engineering staff. We need a Videotape Editor, Telecine Operator, Assistant Chief Engineer and Scheduling personnel. Broadcast Engineering, Dept. 391, P.O. Box 12901, Overland Park, KS 66212. 9-77-1t

HELP WANTED (Cont.)

TELEVISION—CCTV Video Maintenance Technicians. Full Benefits. Greater New York, Suffolk County or New Jersey Area. Send resume to: VPC, P.O. Box 268. New Hyde Park, N.Y. 11040. 6-77-tf

CHIEF ENGINEER—Experienced Chief needed for 5 Kw AM, DA, and Class A automated FM. Good salary, equipment, and working conditions. Midwest small market has good school system and climate. Send resume, references, salary requiremets to John David, KMPL Radio, P.O. Box 907, Sikeston, Mo. 63801. 8-77-3t

ASSISTANT CHIEF ENGINEER for TV station. Requires first phone, good maintenance background and supervisory experience. An equal opportunity employer. Send resume including salary history to: General Manager, KOLO-TV, P.O. Box 2610, Reno, Nevada 89505. 8-77-2t

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Minimum of 10 years' experience in video recording with intimate knowledge of systems hardware/architecture of a studio. Experience must be consistent with "leading edge" in the field in order to propose and implement innovative approaches to program objectives. Must be familiar with editing and formating process and equipment.

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Please call collect or send resume to Gene Henn, 716-442-5400. Brucks Personnel Corp., 2541 Monroe Avenue, Rochester, New York 14618.

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BROADCAST ENGINEER

Public broadcast station WIPB-TV has an opening for the right individual to oversee the operation and maintenance of the WIPB-TV audio and video equipment. 3-4 years experience with first class FCC license required. Excellent fringe benefits. Educational opportunities. Application deadline 9-20-77. Send resume to:

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MANAGER OF INSTALLATION AND SERVICE: Direct a staff of product engineers in providing full support of all broadcast product lines. Formulate procedures to ensure that all installations are carried out according to spec and provide technical guidance to see that field people are properly trained and equipped to maintain the product with a high degree of efficiency. Candidate should possess an EE degree, have proven ability to manage a technical group and have several years of direct involvement in servicing broadcast customers.

Location—N.Y.C. area

VTR PRODUCT ENGINEERS: Assume complete product-support responsibility for specialized video tape recorders. Evaluate field problems, prepare service literature in rough form for engineering change notices, field modifications and service bulletins. Train regional engineers to understand and maintain new products. Candidates should possess an EE degree and have thorough technical knowledge of studio-type recorders and maintenance procedures with at least three years of direct maintenance experience.

Location—N.Y.C. area

COLOR-CAMERA PRODUCT ENGINEERS: Assume complete product-support responsibility for state-of-the-art ENG cameras. This includes follow-up on field and application problems, training of field people and the generation of technical support literature such as service/modification bulletins and engineering change notices. Candidates should possess an EE degree and have in-depth knowledge of modern multiple pick-up tube cameras and alignment techniques with a minimum of three years experience in direct maintenance.

Location—N.Y.C. area

VIDEO ENGINEERS: Work with customers to service video equipment at customers' location and on the bench in regional service labs. Provide on-site training for customer technicians. Candidates should possess an associate degree or equivalent, have an in-depth knowledge of video and VTR systems, and have a minimum of three years direct maintenance experience.

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Starting salary will be commensurate with your education and related experience. **Benefits are liberal and full expenses are given for international assignments.** Relocation expense will assist you with your initial move. Please send your resume, including salary history data, to: Mr. Lawrence M. Carlstone, Professional Employment Supervisor. HARRIS CORPORATION BROADCAST PRODUCTS DIVISION, Quincy, Illinois 62301.

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FULL-TIME CHIEF ENGINEER: requirements include First Class Radiotelephone License and experience in the areas of directional antenna operation, solid state devices, remote control systems, VHF, microwave and radar equipment. Full company benefits and top money for top people. Equal Opportunity Employer. Send resume to: Chester Grubbs, Director of Engineering, KTOK Radio, Box 1000, Oklahoma City, Ok. 73101. 8-77-2t

TELEVISION ENGINEER: Community College needs TV Engineer competent in areas of systems design, installation, maintenance, technical production and training. BA degree in Broadcasting with FCC license preferred. Minimum of three years experience. Send resume to Personnel Department, St. Louis Community College, 5801 Wilson, St. Louis, MO 63110. An Affirmative Action/Equal Opportunity Employer. 9-77-2t

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TELEVISION ENGINEER with electronic editing experience. 1st Class FCC license required. Computer training desirable. Must be familiar with Ampex Quad VTR's. Salary negotiable. Contact: Jim Masten, Net Television, Inc., 2715 Packard Road, Ann Arbor, Mi. 48104. E.O.E. 9-77-1t

TELEVISION CHIEF ENGINEER: Outstanding opportunity for Chief Engineer highly qualified in both technical and managerial skills. Must have an excellent track record in management and be able to assume full responsibility for a metropolitan market TV station. Experience in planning, budgeting and effectively and efficiently managing staff is important. This is a unique job opening in one of the most exciting locations imaginable. It offers a tremendous professional challenge with excellent total compensation package. To be considered, please send a brief employment history to Dept. 388, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. All replies will be held confidential. An Equal Opportunity Employer, M/F. 9-77-1t

BROADCAST PRODUCTION, post-production facility in San Francisco area seeks chief engineer, maintenance engineer, video technicians and CMX editors. Send resume to Dept. 389, Broadcast Engineering, Box 12901, Overland Park, KS 66212. 9-77-3t

WANTED, MAINTENANCE ENGINEER for RCA Quad Tape, IVC and Sony Helical, IVC 500A Cameras and JVC E.N.G. Cameras. Salary negotiable. Position in Huntsville, AL. Contact D of E at 205/533-4848, WYUR-TV-48, 4949 Governors Dr. 35801. 9-77-2t

REPS WANTED. Major manufacturer of Broadcast Audio Products is establishing exclusive Rep. sales force. All territories open. Send company resume and line list to: Dept. 390, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 9-77-2t

CHIEF TELEVISION ENGINEER: The King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia. Immediate opening for qualified individual with B.S. in Electronic Engineering or a closely related field of study, eight years of related experience in design and maintenance of CCTV systems, and at least two years experience in a supervisory capacity. The setting is a new, modern, 250-bed, acute-care hospital and research center located in the capital city of Saudi Arabia. The Hospital and Department of Audio Visual Services are developing and expanding rapidly. Salary and benefits are exceptional. The 25-month contract includes housing, transportation and a 30-day vacation. Interested, qualified candidates should submit a resume with current salary to: Pershing P. Stahlman, Hospital Corporation International, One Park Plaza, Nashville, Tennessee 37203. 1-800-251-2561. An Equal Opportunity Employer. 9-77-1t

REMOTE TV ENGINEER. For studio and remote operations. FCC license required. Must have technical and operating background. Send resume and salary requirements to: Chief Engineer, WTCG-TV, 1018 West Peachtree St., Atlanta, Georgia 30309. 9-77-2t

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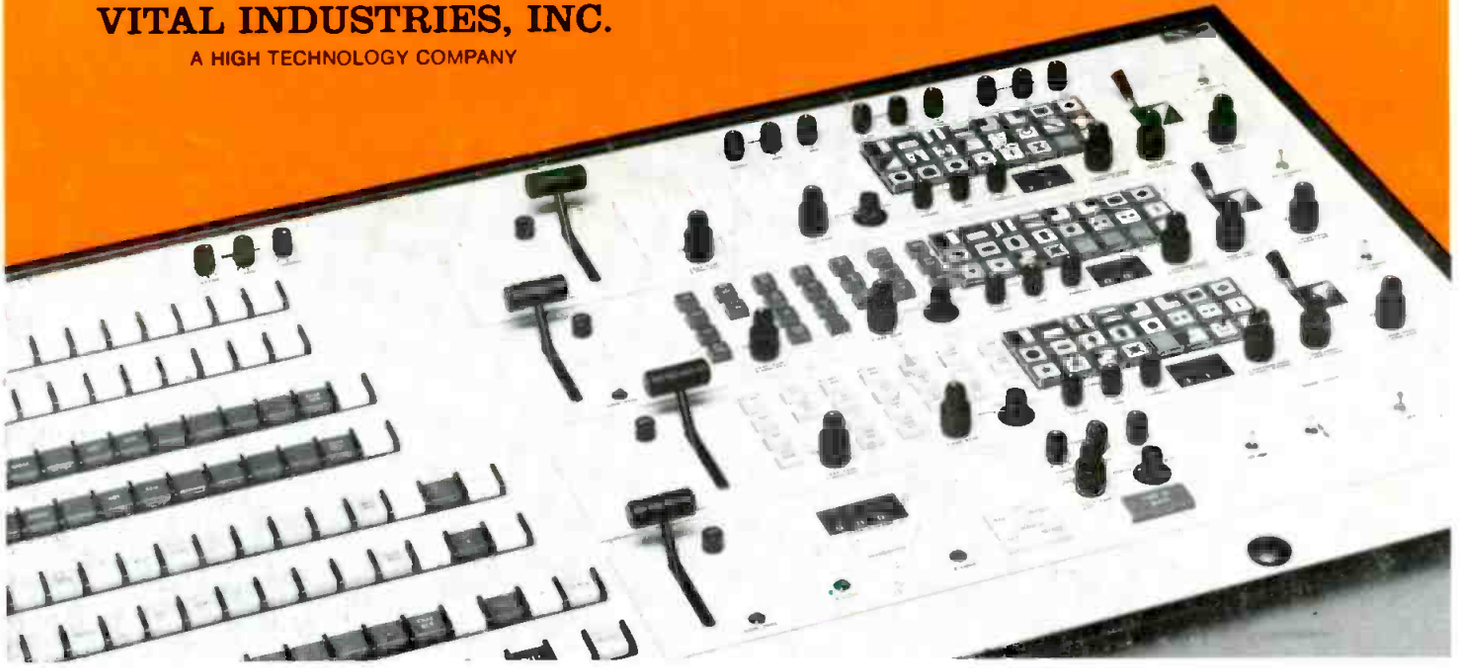

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