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THE INTERNATIONAL JOURNAL OF BROADCAST TECHNOLOGY

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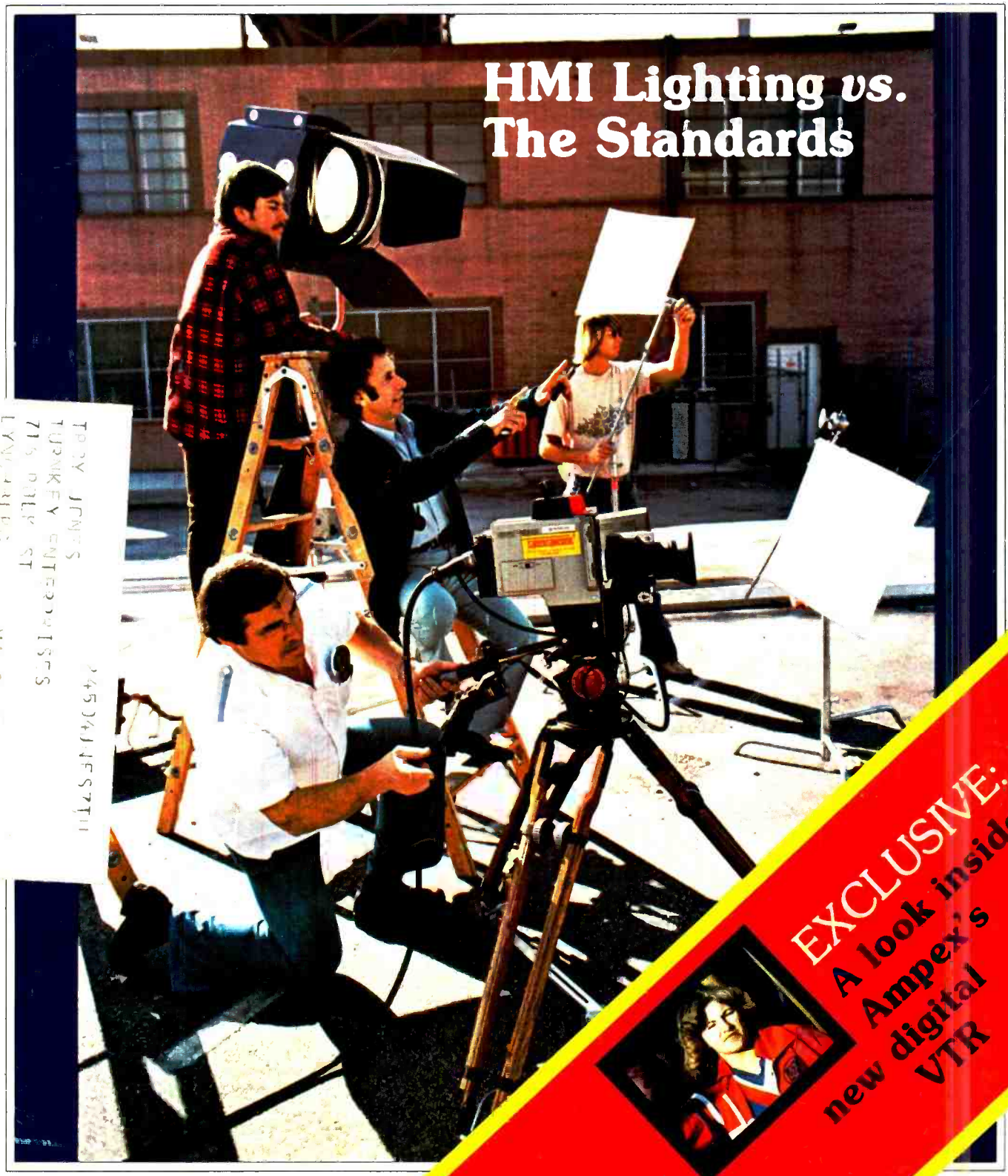

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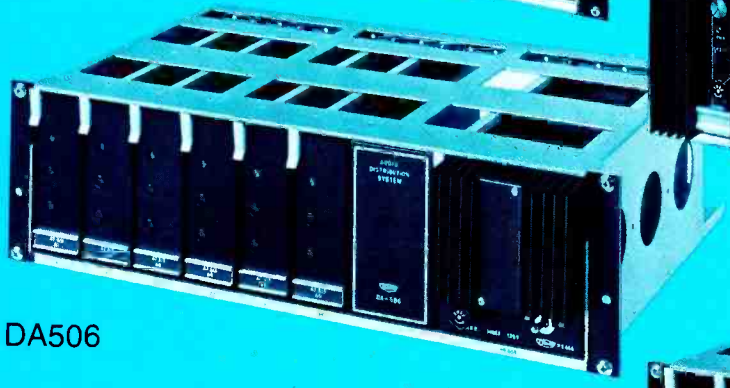

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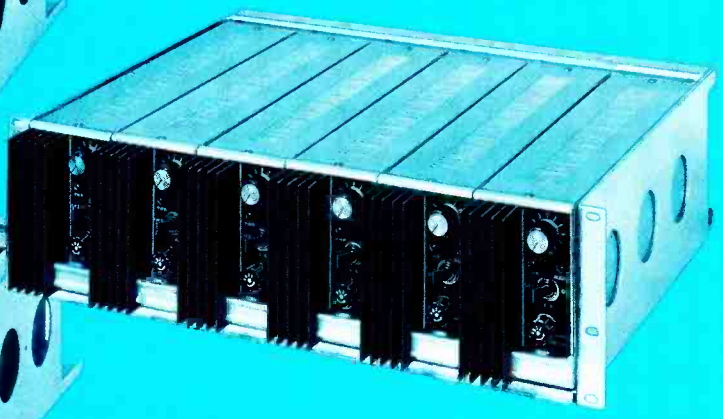

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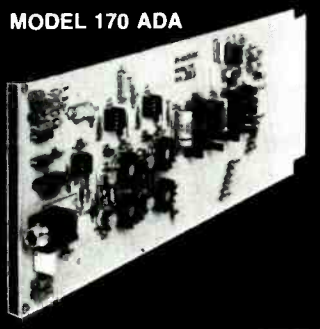

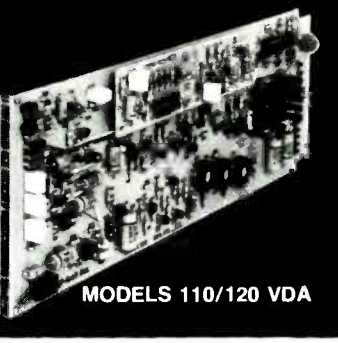

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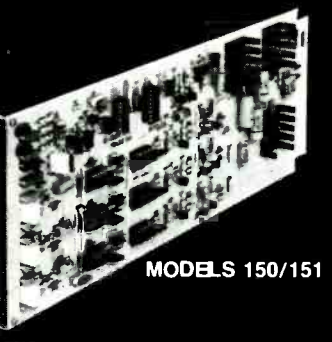

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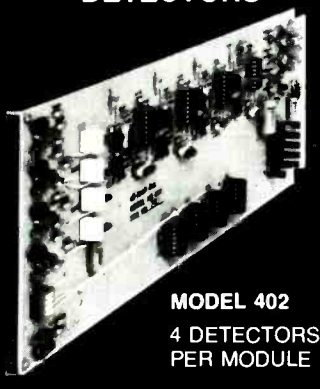

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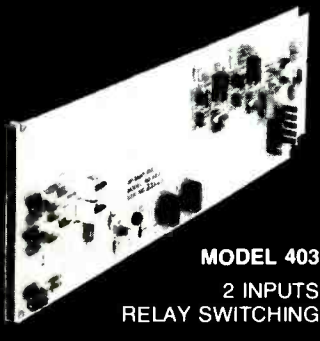

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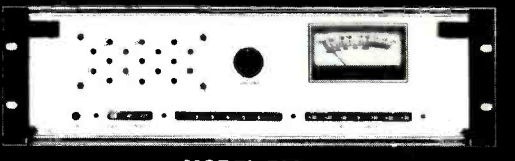

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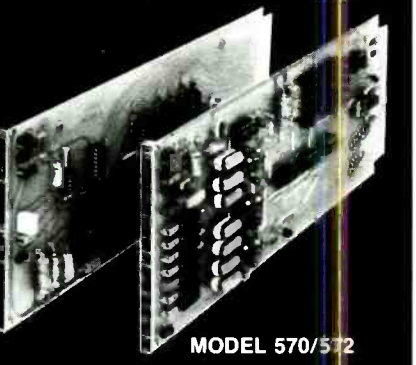

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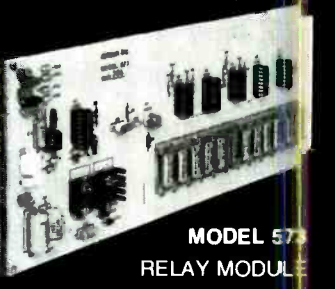

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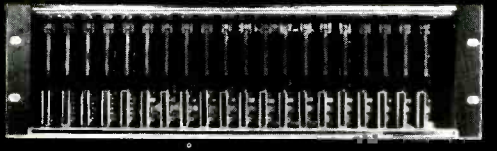

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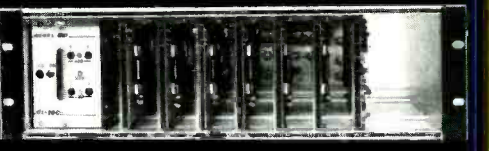

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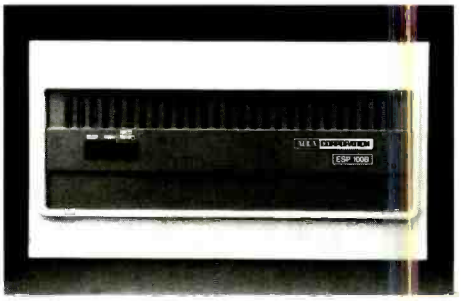

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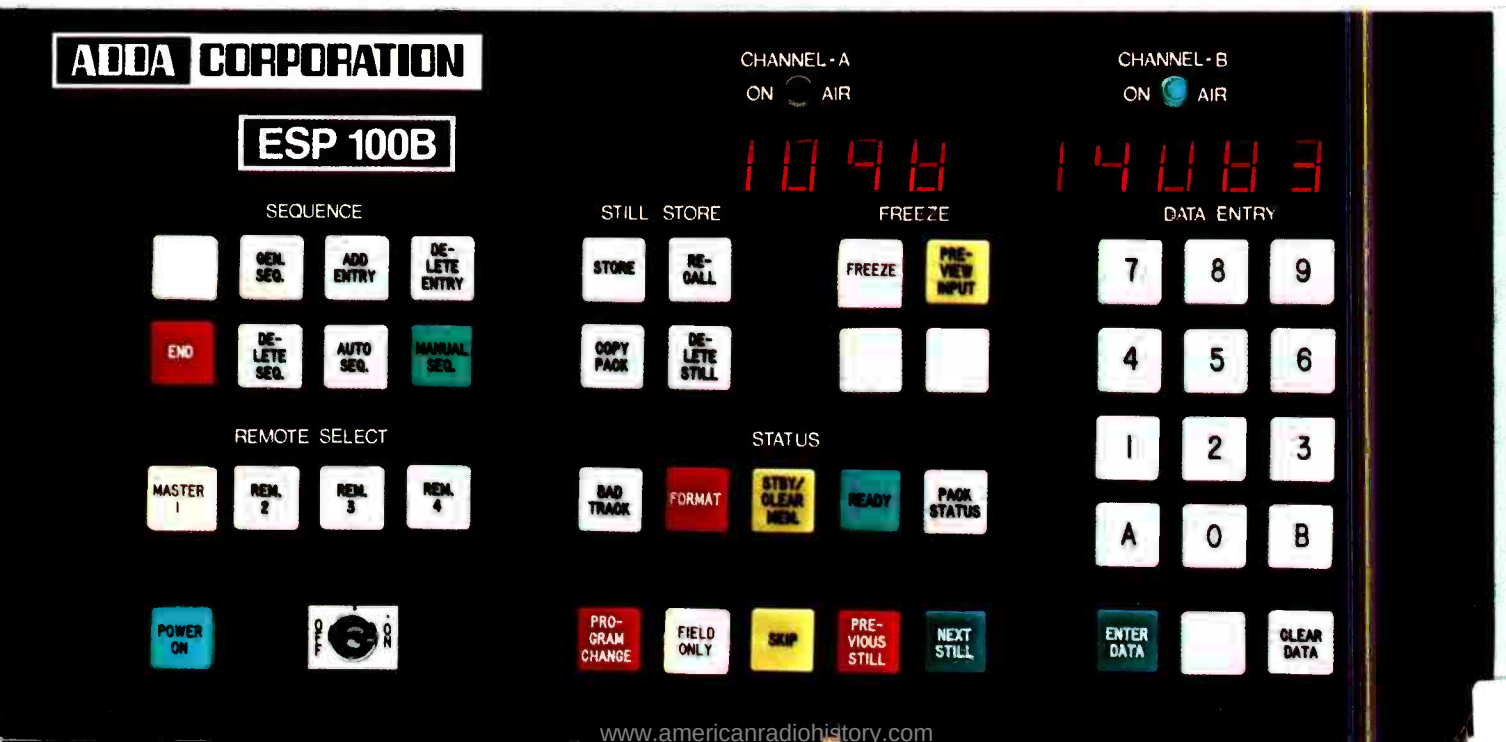

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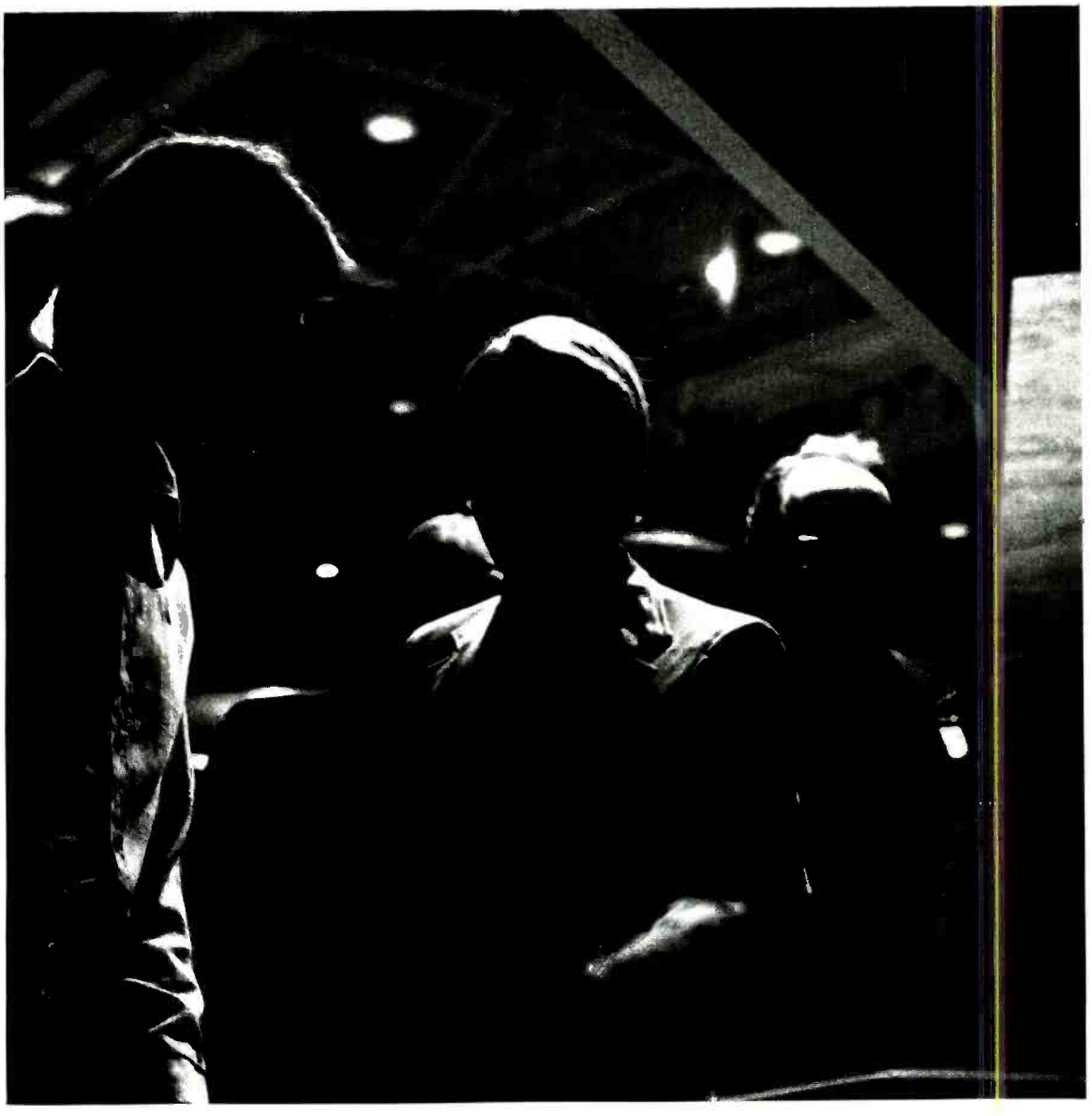

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SBE: Accepting the challenge

By James E. Hurley, *President*
Society of Broadcast Engineers

To the dismay of some, much has been said about the changing role of the chief engineer in a broadcast station. For that reason, I'm reluctant to take a stand on this issue. It is my opinion, however, that the heretofore so called "dividing line" between engineering and the other departments with a broadcast facility has become much less visible.

With the changing techniques, complexity of equipment (both technical and operational), the increased use of computers, complex special effects, the ever increasing roll of lighting and quality sound, to maintain such a rigid division is simply not in the best interest of engineering, production, arts, station management, or the broadcasting industry in general.

It is certain that we need all the expertise that can be generated by all facets of our industry. If you will just step back from the crunch of our working world and observe for a couple of minutes a programme produced just ten years ago, you can immediately see the advancements we have all made in a relatively short period of time. The results were not the product of one group, but rather the efforts of many people in all departments. And that team effort has been further enhanced by the research and development teams from the manufacturer.

The challenge today is to keep our perspective clear and our professional societies responsive to the real world. Regardless of what our job responsibilities are, the part we all play individually and collectively is relevant to the future of the industry.

I am nearing the end of my term as president of the Society of Broadcast Engineers. I intended to seek a second term, but other commitments influenced my decision to pass the challenge on to a new president. There were, and still are, many challenges that will demand a maximum effort from the SBE officers: increasing membership; building confidence between the membership and the national office; closing the communications gap between the chapters and the national officers; effectively participating in the standards committees; and generating a professional stature never before attained for the technical community.

Among the many areas where our efforts were directed, we achieved some degree of success. Certainly not as much as we had hoped, but it's a beginning.

Our certification programme is now very well organised. Its establishment as a standard of excellence is gaining the recognition that it well deserves, evidenced by ads appearing in the trade magazines preferring that job respondents be SBE certified. With time, we hope this kind of recognition will become commonplace.

Our insurance programme has reached maturity, having a wide range of benefits and showing an annual premium reduction of as much as 40 percent.

But we must also generate an atmosphere for better understanding and dialogue between the engineering community and the upper level of station management, and develop a public information office for the Society, so our aims and accomplishments get the maximum exposure in the trade publications and the press in general.

Occasionally, our efforts become overburdened by the more obvious problems and we tend to lose sight of the purpose for our existance. It was the intention of the SBE founders that the Society of Broadcast Engineers provide a communication vehicle for the avalanche of advancing technology to be directed to the technician who is in the mainstream of the station's daily operation. The Signal, our official newsletter, must, in addition to providing SBE news, become a journal whose main purpose is to reach each of its members with the important developments on advancing technology and actions that are taken by the standardisation groups and governmental regulatory agencies.

With this issue of *Broadcast Communications*, the Society of Broadcast Engineers is once again working with old friends. Ron Merrell and others at the management level of *Broadcast Communications*, have long supported the goals of the SBE. As a matter of fact, they have presented the SBE with some challenges that may be difficult for us to fulfill.

This industry probably has greater influence on the formulating of opinions of our population than any medium since the beginning of time. It is encumbant upon us to work together . . . with the technical, the creative, and the artistic working hand in hand.

I see a bright future for the Society of Broadcast Engineers. With the dedication and trust of those at the chapter chairperson level, our chances of success are greatly enhanced.

James E. Hurley

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CANADA

Re-Canadianising television

President of the CBC calls for the revitalisation of Canadian programming and additional controls over foreign-made programmes.

Nearly two-thirds of all programmes available to English-speaking Canada last year were produced outside the country, mostly in the United States. English Canadians spend about three-fourths of their TV viewing time watching foreign programmes. English-speaking children, ages 2 to 17, spend 83 percent of their time watching programmes produced outside of Canada.

These statistics have caused Albert Johnson, president of the Canadian Broadcasting Corporation (CBC), to set down some priorities for the CBC and Canadian broadcasting in general for the 1980s. And the keyword in his priorities is "re-Canadianisation."

Speaking before the Canadian Radio-television and Telecommunications Commission (CRTC), Johnson said:

"What I am trying to say, quite bluntly, is that it does matter whether our children watch American rather than Canadian television. For they are being influenced by the values and attitudes and traditions which are reflected on American television instead of Canadian values and attitudes and traditions. They are in danger of growing up American!

"We stand to be enriched by the cultures of the world, both as they are expressed in other countries and as they are expressed by Canadians who come from those other countries. And we are greatly enriched, too, by our proximity to a vital and vibrant, and ever fascinating neighbour to the south of us. But to swamp the expression of Canadianism on our television screens with U.S. and other foreign programming, to let Canadian programming wither — that's quite another thing. To let this go on is to be guilty of indifference to the expression and the realisation of the Canadian identity. And today more than ever that is an unpardonable guilt, in my view."

At a time when Canadians are preoccupied with discovering their sense of national identity, television is bombarding them with programmes displaying lifestyles and attitudes alien to the Canadian culture, Johnson said. Recent statistics show that Canadians spend approximately 50 percent of their leisure time watching television. And with nearly 40 percent of the programmes shown by the CBC and more than 50 percent of those shown by private broadcasters being foreign-made, Canadians are being robbed of their cultural identity.

To illustrate why many stations prefer broadcasting foreign (especially American) programmes *vs.* programmes made in Canada, Johnson presented the CRTC with cost figures for producing and transmitting programmes. For example, Canadian networks can purchase the rights to *All in the Family* (an American show originally costing $270,000 to produce) for about $10,000. On the other hand, to produce a Canadian programme would cost about $60,000. So not only does the Canadian programme cost more than it does to merely purchase rights to an American show, the quality of the production is also superior in the American-made programme.

Addressing himself to the future of Canadian television, Johnson said the government must set three simple and straightforward objectives:

- to increase the amount, quality, and exposure of Canadian programming on Canadian stations and networks and cable;
- to prevent the increasing of American channels on fully developed cable systems until Canadian programming catches up with foreign programming; and
- to refuse to let technology dominate the development of Canadian broadcasting to the detriment of Canadian programming.

To reach these goals, Johnson outlined specific actions the government needs to take. The first step would be the raising of the prime-time content requirement. At the present time, private broadcasters are required to show 50 percent of Canadian programmes during prime time; the CBC must show 60 percent. Johnson proposed that this be raised to 55 percent and 65 percent, respectively.

In the area of cable television, which presently broadcasts a great many U.S. channels, Johnson wants to allow no more than four U.S. channels on cable systems currently being developed. And once these systems are developed, they should contribute to the cost of additional Canadian programme services. Cable companies should also be encouraged to improve the quality of their specialised and non-competitive community service.

Johnson told the CRTC: "The essence of these proposals is that cable companies should be regarded as part of the Canadian broadcasting system. Cable companies should have a role in producing local and specialised services, with existing broadcasters providing the broad national and local programming services. And cable subscription fees should be regarded as a source of funds for Canadian programming, along with the commercial revenues of broadcasters and the Parliamentary grants to the CBC."

While these proposals are subject to the decisions of the CRTC, certain actions can be taken by the CBC. And Johnson listed several steps now underway to improve the quality and quantity of Canadian programming.

The first priority, Johnson said, is to Canadianise the English Television Service: "Our prime-time schedule must provide an alternative — a distinctly Canadian alternative — that will attract and engage audiences with Canadian programmes." The CBC wants to have 80 percent Canadian content in prime time on the English Television Service by the 1980s.

The CBS is working to improve its French-language television service, and to have the English and French networks work more closely together to improve Canadian programming.

Johnson also said the CBC would work to be more open and responsive to the needs of the public, to lengthen the national news on the English network, and to increase the use of independent production companies and of feature films.

To accomplish these objectives, however, Johnson let it be known that the government must continue its support of the CBC. He told the commission, "The CBC is the only consistent and serious producer of drama and music and variety and children's and documentaries and science and agricultural programmes in the country."

To continue this role, the CBC needs funding. But with the recent $71 million budget reduction imposed on the CBC by the government, the future role of the CBC is in jeopardy.

Johnson firmly believes, however, that to achieve a re-Canadianisation of

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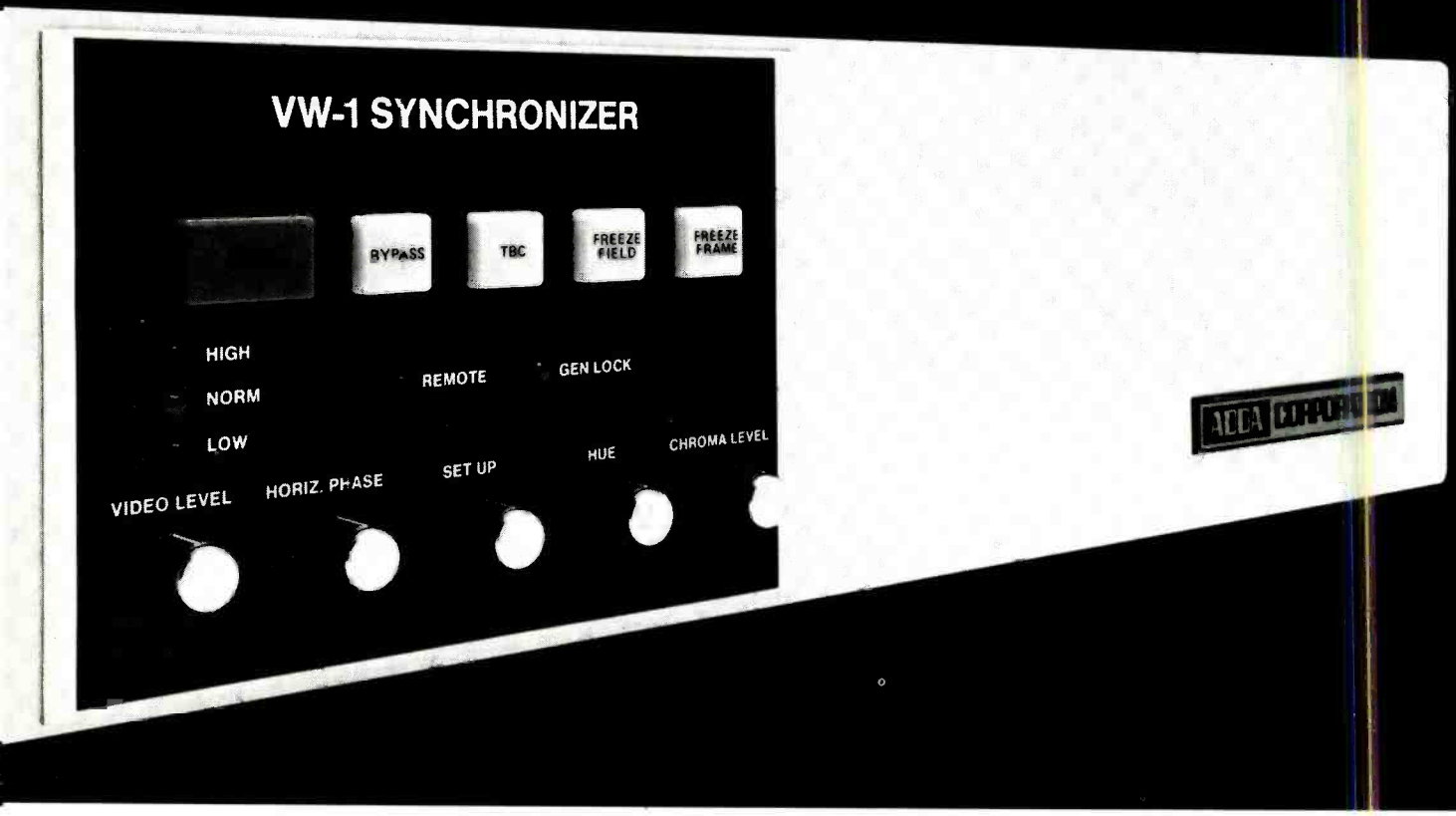
ADDA does it again!



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the broadcasting service, the government (the country) needs the CBC: "There is no way out. If we want to have a vital Canadian broadcasting system we must have strong public sector support."

UNITED STATES

Reviewing FCC actions

A quick review of what lies ahead for the broadcaster in dealings with the Federal Communications Commission (FCC).

With FCC Chairman Charles Ferris and several FCC commissioners scheduled to speak at the upcoming NAB convention in Dallas (March 25-28), many broadcasters are preparing themselves to ask the right questions and listen for the right answers that might solve or prevent problems, or clear up confusion relating to current FCC actions.

To assist broadcasters in doing their homework, *Broadcast Communications* decided to present a quick review of some of the issues that might come up during the convention.

Although the courts, in 1976, ordered the FCC to recalculate fees collected between 1970 and 1976 and make appropriate refunds, the Commission has still failed to take action. In fact, it only recently issued a Notice of Inquiry which addresses both the fee refund and a complete restructuring of fee schedules.

With action expected this year, it looks as if the Commission will conduct its fee refund programme in two phases. The first phase will cover all refunds exceeding $20. It is estimated that there are more than 300,000 individual claims falling into this category, with a total of $90 million involved. According to recent reports, the Commission expects to refund about 69% of all such fees in the first phase.

Phase two of the refund programme will have few actual refunds. This phase will cover all refund claims for $20 or less, of which $10 million were collected. Because of the administrative costs, however, fee claimants will probably see little or no money if the claim was for a small amount.

The FCC's position regarding the cable TV industry will no doubt be a major topic during talks with the commissioners at the convention. One aspect of this issue, which hopefully will be resolved by July, is the payment of copyright fees by cable television systems to allow them to broadcast copyrighted programme material on a secondary basis.

A Copyright Royalty Tribunal has been set up to distribute fees collected from cable TV systems, but it has failed to set guidelines for fee distribution. The tribunal has wanted an industry-wide group of potential copyright claimants to decide upon a workable plan for distribution. However, this has failed to work, and the burden has once again fallen on the tribunal to develop a distribution schedule.

The tribunal may soon have to decide upon such a schedule, since claims for entitlement to the license fees for programmes broadcast between July 1, 1978, and June 30, 1979, must be filed by July 1979. The tribunal is presently working on a form that could be used for

Continued on page 14

Business Hotline

TOSHIBA CORPORATION has announced that it is entering the U.S. and Canadian broadcast equipment market. The Tokyo-based company is a major world supplier of radio and television broadcast equipment. The new Broadcast Electronic Systems Division, a branch of Toshiba International Corp., will be headquartered in Sunnyvale, California; Ronald Fried, former president of International Video Corporation, has been named vice president/general manager of the new division. According to Fried, the new division will concentrate initially on marketing the Toshiba line of colour television cameras and auxiliary equipment.

CEZAR INTERNATIONAL LTD. and VIDEOMEDIA have jointly announced the sale of the Z6 editing systems developed by Cezar to Videomedia. Under terms of the agreement, Videomedia will handle the marketing and financial end, while Cezar International will concentrate on further development of the expansion products, mainly the F and Z versions. The Z6 editing system is being introduced this month at the SMPTE conference and at Video Expo, both scheduled for San Francisco.

VICTOR DUNCAN INC. will host a pre-NAB equipment symposium on Saturday, March 24, which will feature demonstrations of products supplied by Cinema Products, Christie Electric, HME, O'Connor Engineering, and Rosco. Cinema Products will display their exclusive line of NEC video equipment: the MNC-71CP ENG/EFP colour video camera; the MNC-710CP studio/field production system; and the TTR-7 lightweight one-inch helical cartridge VTR and its matching system studio/mobile van counterpart, the TTR-5. Christie Electric will demonstrate their NiCad batteries and the new "burping" charger. Rosco will have their line of light control media for both film and video production. HME will feature its wireless mike, and O'Connor Engineering will be displaying their newest fluid heads for film and video cameras. Additionally, many other products will be on display for inspection. For more information, contact Victor Duncan Inc., 2659 Fondren, Dallas, TX 75206; (214) 369-1165.

CONTINENTAL ELECTRONICS MFG. CO. has received a contract from the General Services Administration (GSA) to build 11 shortwave radio broadcast transmitters for Radio Free Europe/Radio Liberty (RFE/RL). The contract calls for the design and manufacture of 250,000 watts shortwave radio broadcast transmitters employing the latest technologies. The transmitters will be used to upgrade and improve RFE/RL broadcasting services in Europe.

E & O SYSTEMS LTD., a subsidiary of Electro & Optical Systems Ltd. of Toronto, has been appointed exclusive U.S. distributor for the A/V and Computer Display divisions of Barco Electronic N.V. of Belgium, manufacturer of high-quality colour video displays and ancillary equipment.

INTRODUCING *Microtouch* By AMPRO

LOOK AT ALL THE THINGS IT DOESN'T HAVE!

It doesn't have a HIGH PRICE TAG
advanced manufacturing techniques keep the price range from only $1495-$3495.

It doesn't have MAINTENANCE PROBLEMS
Microtouch switching technology replaces "old-fashioned" lever key switches...a chronic maintenance headache.

It doesn't have a LARGE SIZE
compact packaging ...5 channels only 21" wide, 8 channels only 26".

It doesn't have RF PICKUP
all inputs and outputs are transformer isolated. Ground plane shielding protects circuitry.

It doesn't have OPERATOR CONFUSION
human-engineered panel design logically groups associated controls. LED's and self-indicating input switches provide operator feedback.

It doesn't have ELECTROSTATIC SWITCHING
Microtouch mechanical switching requires deliberate action. Prevents human error due to accidental contact.

And...Microtouch doesn't have the limited capability typical of small consoles. Available with up to 21 inputs in 5 and 8 channel, rotary and linear fader configurations with dual mono or dual stereo outputs. Microtouch, the ultimate in cost effective, state-of-the-art console design from Ampro.

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such claims.

Although most of these fees will go to the networks, syndicators, movie producers, sports promoters, and other major suppliers of programming, some stations may receive money as well. Many cable systems do use locally produced programmes (both television and radio); and, therefore, these stations are entitled to a share of copyright fees.

The Commission is working hard to give a new deal to women and minorities. In recent actions, the Commission agreed to issue tax certificates to sellers of broadcast stations to groups having a substantial minority representation. Also, the Commission has endorsed distress sales of stations in certain instances where the station is going to a minority licensee. Under consideration is a plan by which minority groups will be able to purchase blocks of broadcast time to show special programmes.

In other matters, the Commission is considering the allocation of new VHF assignments to four cities, even though UHF broadcasters oppose such a move. These broadcasters want to develop UHF and feel this will only happen when the FCC declares the VHF spectrum closed.

While the Commission looks toward more VHF stations, it may eliminate AM clear-channel stations. It appears that clear-channel stations are on the way out, allowing more opportunities for minority groups wanting to enter the broadcast field.

In addition to these areas, broadcasters are sure to quiz the commissioners scheduled to appear at the NAB convention on actions relating to new definitions of "community service" programmes; current policies toward mass-media cross-ownership; and of particular interest to financial management, the present inquiry into the amendment of FCC Form 324 (Annual Financial Report) and the possible elimination of the confidential status of financial reports.

AUSTRALIA

Remote areas to receive television

A government task force has proposed a new satellite communications system.

In an effort to provide television service to more than 500,000 people living in remote areas, a government task force has recommended the funding of a $190 million satellite communications system to become operational by 1985.

The task force, set up in 1977 to investigate the feasibility of such a system, said despite a few uncertainties on the final costs of such a project, the advantages of an improved communications system across Australia were many.

A major concern of the task force was bringing television to the remote areas of the country. The satellite system finally proposed would not only provide new service to these areas, but also make possible simultaneous television broadcasts nationwide. Also, several new stations would likely result from the proposal, including two in Sidney, two in Melbourne, and an additional station in 11 other cities.

The new system would involve two satellites, to be launched in 1984 and operational the following year. A third satellite would be launched in 1987. The task force recommended that a government statutory authority be created to operate the satellite system, which would be supported by subscribers.

The only dissension on the task force came from P. J. Coleman, the Department of Finance representative. Coleman's major objection concerned the cost of such a system. He said if a remote area telephone service was added an additional $120 million would be spent. And direct broadcast to remote areas could cost as much as $90 million over the original projection of $190 million. In Coleman's view, the actual cost of the proposal would be closer to $500 million.

UNITED STATES

Diversity vs. restraint

Current government proposals to change the broadcast industry are not necessary, and may even be a threat.

The present structure of the broadcast industry is working to provide U.S. audiences with quality, diverse programming. And "to rely on the federal government to correct [the network's] shortcomings is to head down a road that will simply deprive our children and their children of a precious resource."

John Backe, president of CBS Inc., issued that warning at a recent meeting of the Academy of Television Arts and Sciences in Los Angeles.

Backe defended the present network structure at a time when the mood of the government is to find new ways to improve the broadcast industry, with the emphasis on more "diversity." But Backe pointed out repeatedly that the present system is diverse, and the government's attempt to alter the industry would only serve to disrupt and, in some cases, restrain the broadcaster.

"The buzz word in Washington today is 'diversity,'" he told the audience. "And as applied by some, it means 'less is more' — a rationale for proposed changes in broadcasting that would change our system drastically. 'Diversity' as used by some government reformers promises many new stations, many new networks, less of this kind of programming, more of that kind of programming."

According to Backe, government regulators have forgotten the built-in "checks and balances" that already make for a diverse industry:

"Audiences select the shows they will watch, advertisers select the programmes they will support, affiliates choose their networks, and sometimes they change their affiliation. There are developments like the growth of cable television and the creation of independent networks for special programmes. All of this adds up to a strong system of contending forces which encourage — even demand — innovation and produce the constantly evolving diversity our critics find so appealing. The point is the marketplace produces change and improvement through its own dynamics and without the need for regulation."

Backe supplied an abundance of facts and figures to support his position that the marketplace guarantees diversity — the old "supply and demand" theory modified. Competition among the networks necessitates the constant search for quality material; and to obtain the right combination, the networks spend literally millions of dollars to develop and produce programmes, some of which never make it to the final stage of airing. In fact, CBS has spent $60 million in programme development in the last two years. The cost of operating and programming the CBS Television Network was $600 million last year, double that spent just four years earlier.

Much of this money is lost, Backe said, but the very fact that CBS and the other networks spend these sums indicates their seriousness in constantly seeking to improve television programming. The ratings affect advertising, and advertising supports the network. And this fact makes it mandatory that the network improve its programming, develop better news coverage, and, of course, make a profit.

It was on the subject of news coverage that brought the greatest warning from Backe. Recent court actions restricting the freedom of the press have caused great concern among U.S. broadcasters. Television news coverage is a vital part of American journalism, and CBS' special news reports and weekly *60 Minutes*

Continued on page 16

With our new 3200 your audio can equal your video

Somewhere along the line, video technology got ahead of audio technology. Now, Audio Designs and Manufacturing has evened the score.

Our new modular audio consoles are the perfect match for today's video equipment. In fact, we believe our new 3200 and 1600 broadcast production consoles are the forerunners of the audio equipment of the 80's. You won't see anything else like them, at least not this side of late 1979.

Our totally new consoles employ the finest proven components and integrate them into a cohesive, versatile, reliable unit . . . one that will accommodate your most exacting requirements. Our total in-house design and manufacturing capability put so much quality into all of our consoles that ADM® offers an exclusive 5-year warranty, the most comprehensive in the industry.

Learn more about how ADM can increase your audio capabilities. Contact Audio Designs and Manufacturing, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone: (313) 778-8400. TLX-23-1114. Southeastern Office: Phone (904) 694-4032. AMPEX Distributed outside U.S.A. by Ampex International Operations, Inc.

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programme have made significant contributions to news coverage, and have served the American people by providing in-depth reporting of major issues of the day. However, these recent court rulings have weakened the ability of the press to investigate stories, and this worries Backe.

He told the audience: "Anything that weakens the network structure concerns me greatly. If our ability to deal with a multitude of diverse entertainment programming sources is constrained, the real loser is the viewer at home. If our news division finds its ability to monitor the events of government and to perform its traditional watchdog function is constrained, the real loser is the entire democratic system. A weakened press is a toothless watchdog."

To combat this trend, he called upon the management side of the broadcast industry to work together with the creative members of the Academy. Backe went so far as to call upon the two sides to join in a "marriage of necessity" — a joint effort striving to preserve the present structure of the industry; in other words, an effort to preserve the status quo.

CANADA

Satellite-to-home broadcasting

Several projects using Anik-B get underway this month.

This month marks the beginning of a series of projects designed to bring a variety of promising new social uses of satellite communications out of their current experimental stage and closer to everyday reality.

The projects will be conducted via Canada's newest satellite, Anik-B, launched last December. At least 17 groups or agencies will be involved in these advanced communications pilot projects, aimed at refining new services, further examining the viability of others, and making both new and potential users of satellite services more experienced in or aware of their most effective use. The projects are part of the Department of Communications' Anik-B Communications Programme.

One of the most promising new satellite applications will be direct, satellite-to-home broadcasting. The DOC plans to conduct trials and demonstrations of a variety of small satellite ground stations, known as TVRO (television receive-only) terminals, produced by Canadian industry.

This can be done because Anik-B is a dual-band satellite: 12 channels in the conventional 4 and 6 GHz microwave bands, for service in Telesat's existing commercial satellite communications system; and six channels in the new 14 and 12 GHz frequency bands, first used by Canada's Hermes satellite.

The DOC is leasing this high-frequency capacity of Anik-B for a two-year series of carefully selected pilot projects in the fields of health care, education, community communications, TV programme distribution, provision of government services, remote sensing, data communications, propagation measurements, and geophysical science.

Two-year leasing of the 14/12 GHz channels, with an option for three more, is costing the DOC $32 million, including launch and extra operating costs attributable to the government programme. Earth station completion, administration, and other departmental costs will run to another $4 million. BC

You may never have thought of us as a world wide broadcast equipment company.

Yet in 1919 we pioneered in the manufacture of transmitting tubes.
In 1936 we were building television cameras.
In 1940 we built our first VHF television transmitter.

In recent years we've built and sold thousands of color television cameras. And we're about to introduce the industry's most advanced broadcast studio camera at the 1979 NAB.

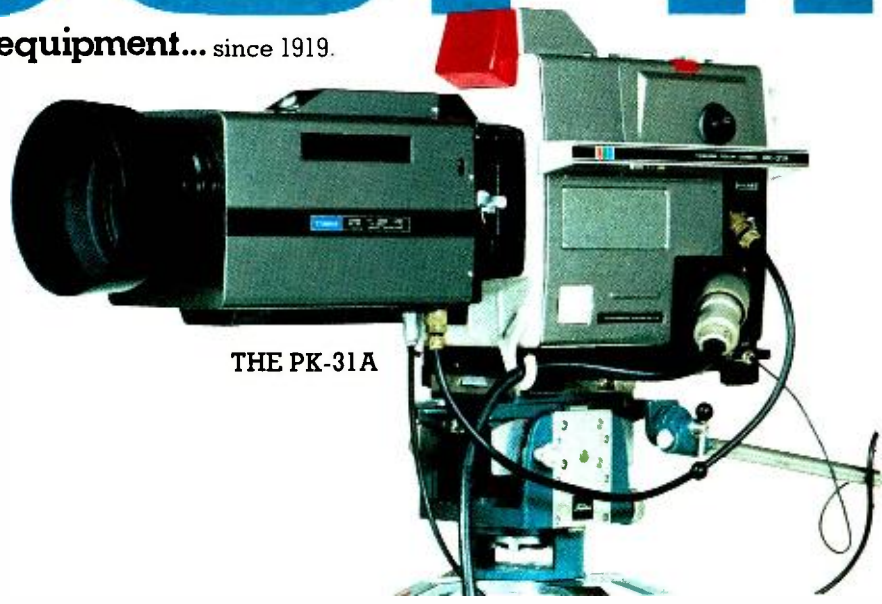
We're 110,000 employees with over 1,600 people dedicated to basic research and product development. We rank as one of the 100 largest companies in the world with sales exceeding $8 billion. Our products include everything from light bulbs to nuclear reactors.

We're probably not who you think we are. In fact, we've never marketed our broadcast products in North America . . . until now.

If you want to know who we are, come to Booth 2701 at NAB. But if you want a head start, turn the page.

TOSHI

A new name in broadcast equipment... since 1919.



THE PK-31A

You've probably heard of us. We make appliances, components, and industrial equipment. We're into power generation, transportation, radiology, computers, and lighting. We make hundreds of products. But you might not know that we've been building for broadcasters for over 50 years. We've been making color television cameras since the sixties when we introduced the world's smallest color camera. We also make quad VTR's, control equipment, and transmitting equipment. You'll find Toshiba cameras, VTR's, broadcast systems, and mobile units from Africa to the Middle East, from Australia to Latin America, from Spain to the Philippines.

Now it's time to introduce a superb camera product line to the world's most sophisticated broadcast television market.

THE PK-39—Perhaps the most versatile, flexible, portable ENG/EFP broadcast camera ever designed. Self-contained or two-piece. Auto beam control, auto white balance, and auto iris. Choice of Plumbicon* or Saticon** tubes.

THE PK-31A—A computerized studio color camera featuring automatic setup and 30 mm Plumbicon tube format.

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THE PK-39

. . . And for NAB.

THE PK-40—A major advance in digitally controlled cameras. The next generation of digital cameras is coming from Toshiba. The PK-40, which includes a self-contained mini-computer, provides:

- computerized automatic setup and fault diagnosis
- superb stability and reliability
- one-inch diode gun with improved picture quality
- triax cable

Toshiba's half a century of broadcast experience means a corporate commitment not only to the way we introduce the company and its products to North American broadcasters, but to provide the customer support that must follow. It took us a while to get here. But we came well prepared.

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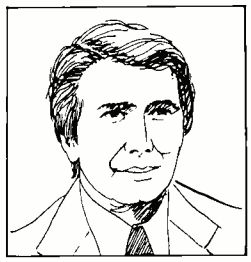
NEWSMAKERS



Andre Lamy was recently named vice president, audience relations, of the Canadian Broadcasting Corporation (CBC). Lamy, formerly government film commissioner and chairman of the National Film Board, will be responsible for maintaining good relations between the CBC and its many audiences. This will mean working with the several communities which the CBC is primarily concerned with, including arts and cultural, business, labour, agricultural, parliamentary, and the press.

Peter A. Lund, vice president, CBS-Owned AM Stations, New York City, replaced **Sherril Taylor** as a member of the National Association of Broadcasters' Radio Board of Directors. In other action by the NAB, **Robert Mitchell** was named vice president for membership. Mitchell succeeds **Wayne Cornils,** now NAB radio vice president.

The Association of Independent Television Stations (INTV) recently announced the appointment of **Robert Hartman** as chairman of its marketing advisory committee. Hartman, general sales manager of WUAB-TV, Cleveland, succeeds **Harold Protter.**

The new director of broadcasting of Radio and Television Singapore (RTS) is **Mrs. Wong-Lee Siok Tin,** who has served in the position for the past four years. Her former post was that of deputy director.

Cornelius "Neil" Knox has been named vice president, affiliate relations, CBS Radio Network. Knox, formerly the network's national manager, affiliate relations, joined CBS in 1955 as an account executive with the Radio Network.

Continued on page 22

Harold Ennes (second from right), *Broadcast Communications* digital editor, was awarded the Order of the Iron Test Pattern at the national office of the Society of Broadcast Engineers (SBE), Indianapolis. Ennes has been associated with the broadcast industry for many years, and is the author of several textbooks on digital technology and radio/television maintenance. The Order of the Iron Test Pattern was initiated by Dynair Electronics last month to honour those making significant contributions to the television industry. Looking on are (left to right): Pat Satter, SBE executive secretary; Jim Wulliman, SBE certification committee chairman; and Mary Brush, SBE certification committee secretary.

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NEWSMAKERS

Phyllis Moore is the first woman to be appointed operations director of a beautiful-music station in the Harte-Hanks communications chain. Moore is the new operations manager of WEZI-FM, Memphis, Tennessee. In her new position, she will supervise the operations of the production, announcing, public service, and news department staff of the station.

At the CBS Radio Division, **Susan Segal** was named manager of marketing services. Segal had been an account executive with WCBS-FM, a CBS-owned station in New York. She rejoined CBS in February 1977 as an account executive with CBS-FM Sales and moved to WCBS-FM when the station organised a separate sales department later that year.

Md. Abdul Rashid has been appointed ABU technical liaison officer for Radio Bangladesh. Rashid, deputy research engineer for the Directorate-General, began his broadcasting career in 1961 with Radio Pakistan. For the past few years he has worked with Radio Bangladesh, specialising in HF frequency prediction and international monitoring. He also has extensive experience in the installation, operation, and maintenance of transmitters, studios, and receiving centres.

Radio station WKY, Oklahoma City, recently announced that **Lee Allan Smith** resigned as the station's general manager to accept a new position as vice president and general manager

Continued on page 26

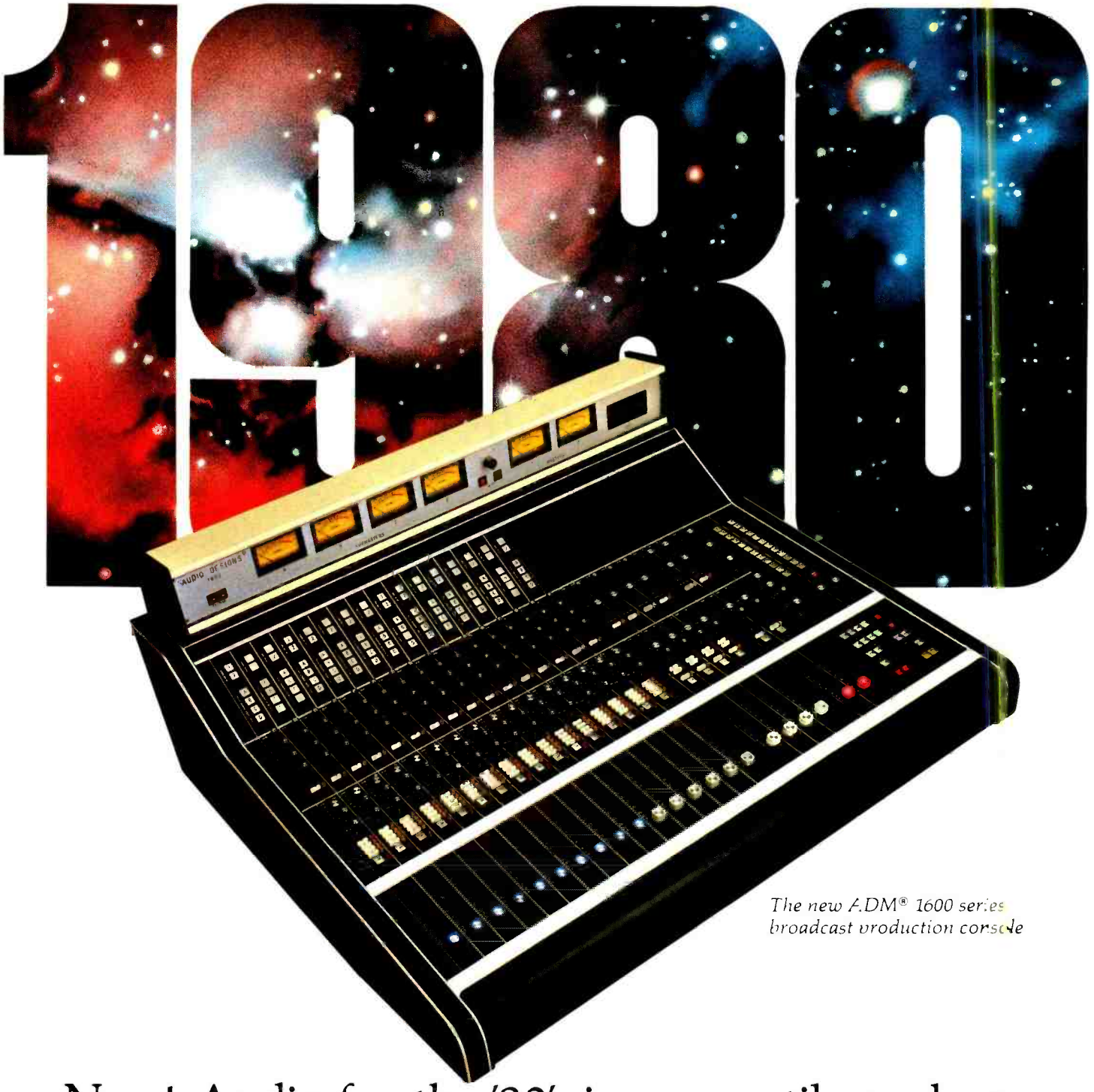
Moving Up

JOHN CAMARDA has been appointed director of marketing at RF Technology Inc. Before joining the company, Camarda was general sales manager for Thomson-CSF Labs in Stamford, Conn.

JIM LUCY, formerly director of sales for McMartin Industries, was recently appointed broadcast sales manager of C.S.P. Inc., Doylestown, Pennsylvania. Lucy will handle product and market development for C.S.P.

SAMUEL C. LA CONTE is the first appointee to the newly created position of sales coordinator at Ikegami Electronics (USA) Inc. La Conte will serve to interface between the company and its customers to help keep the factory/customer relationship smooth by insuring product delivery and resolving any problems.

W. DOW JONES moved from Harris Corporation to Broadcast Electronics Inc., where he became the automation service manager. In his new position, Dow is responsible for installation checkout and any subsequent service work with the company's new Control 16 Automation System.



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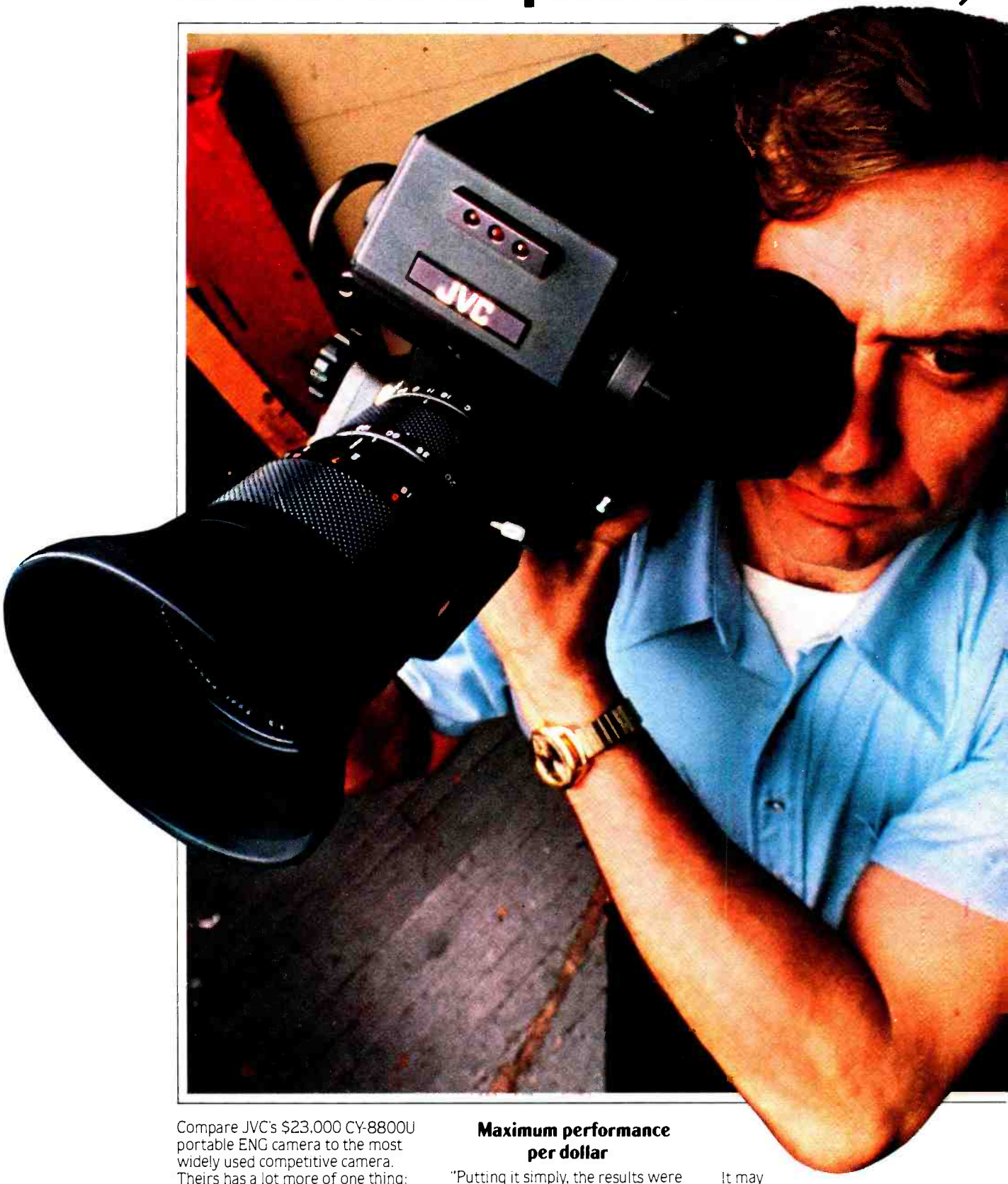

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But there, for all intents and purposes, the differences end.

Because, in any ENG/EFP assignment where you find normal lighting conditions, you'd be hard pressed to see any difference in results.

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Behind that performance are high sensitivity and S/N ratio (50 dB). 500-line resolution. Sensitivity doubling (6 or 12dB). Auto white balance. And horizontal and vertical contour correction.

and save over $20,000.

The CY-8800U even has some features that the high-priced camera doesn't have. Such as level control compensation for hot spots. Internal time lapse meter which indicates tube life. Plus a moisture-proof, rugged, sleek case that you can rest on your knee or the ground.

What do you really need?

Think about it. If you can get excellent results from JVC, do you really encounter enough critical poor-light assignments to warrant paying twice the price?

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of KTVY-TV, also in Oklahoma City. **Dee Sadler,** assistant general manager and general sales manager under Smith, is the new general manager.

James Kangwana, director of broadcasting of the Voice of Kenya (VOK), is presently on a special assignment with the United Nations Economic Commission for Africa (UNECA) in Addis Ababa. Kangwana, who will complete his assignment in May, is helping prepare reports for the Communications and Transport decade (1978-1988). In addition to his post with the VOK, he is currently vice president, programmes and administration, of the Commonwealth Broadcasting Association (CBA).

Ed Clare of Cinema Products was recently elected to the board of trustees of the Professional Motion Picture Equipment Association (PMPEA). Clare's name was spelled incorrectly as "Clark" in the January issue.

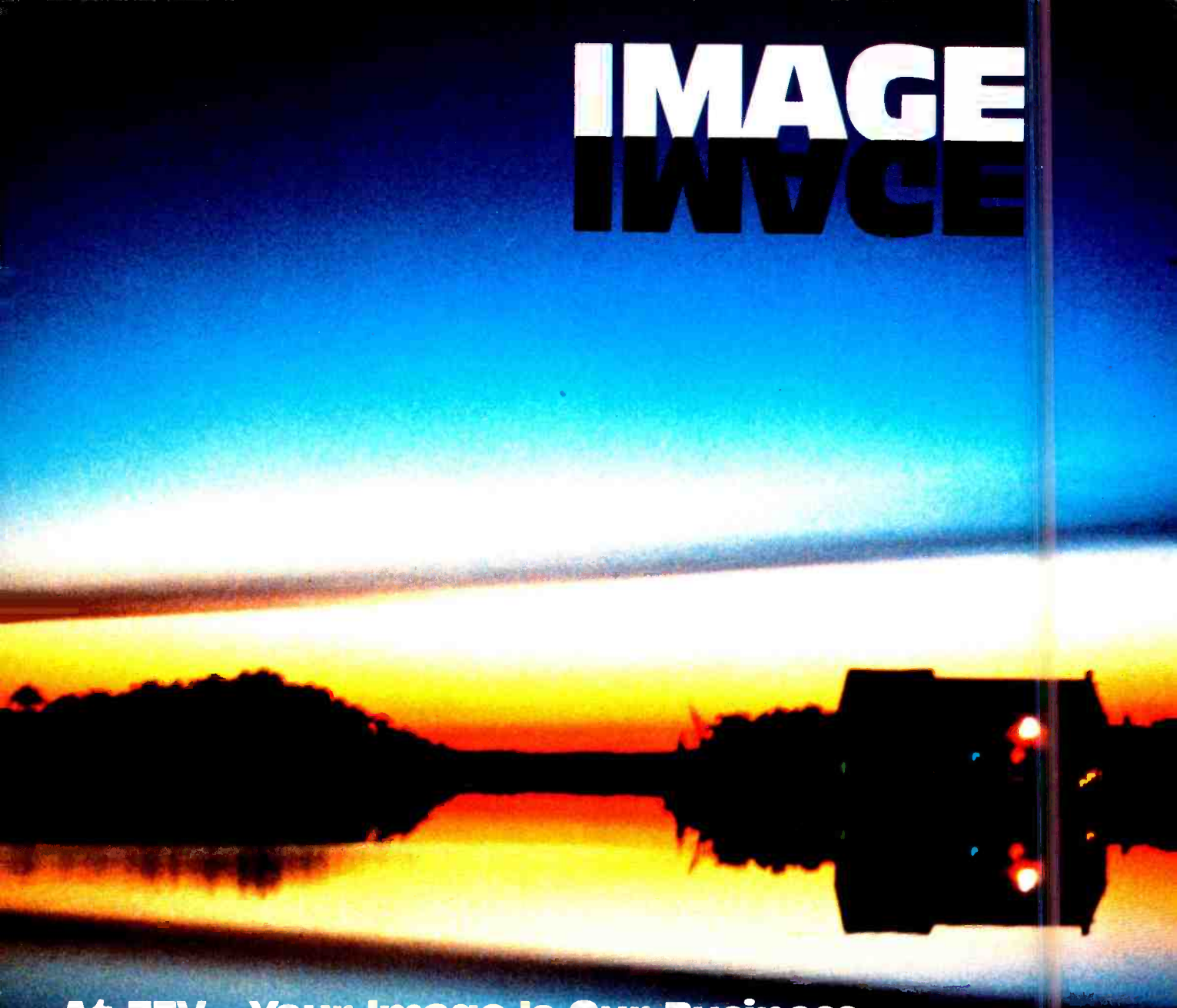
After an absence of several months, **Randy Shaw** rejoined the Mutual Broadcasting System as news director of the Mutual Southwestern Radio Network. He will be responsible for the overall administration of the Mutual SWRN news and sports units. Shaw, a former award-winning newscaster with station WTOP, Washington, was managing editor of the Northern Virginia *Daily Sun* newspaper before entering the radio news field.

Arthur Schlaman has retired from WTAQ, La Grange, Ill., after 28 years of service with the station. Schlaman joined WTAQ in 1951, beginning as an on-air personality and ending his career as vice president of business and finance. He will remain associated with the station as a consultant and an occasional talk-show host through 1979.

Ed Knapp recently became chief engineer for WXLO-FM, New York. Knapp joined RKO in 1963 as a staff engineer and moved to WXLO in 1977 as maintenance supervisor. Prior to joining RKO, he served as chief engineer for several other radio stations.

Alan M. Levin has been named vice president, business affairs, CBS Entertainment. Levin, who just last April became vice president and assistant to the president, will now report directly to Robert A. Daly, president, CBS Entertainment. Levin joined CBS in 1969 as an assistant director in the CBS News business affairs department. He replaced **Jerry Rubin,** who resigned to become executive vice president of the David Gerber Company.

Lucius Chikuni, acting general manager of the Malawi Broadcasting Corporation (MBC), began his career 16 years ago as an announcer with the Federal Corp. of Rhodesia and Nyasaland at Blantyre. Since then, he has studied broadcasting in the United States and has worked in France and Germany. His professional background includes experience in production, engineering, and programming. Prior to his recent appointment, Chikuni was assistant director of programmes for MBC. BC



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Microcam, developed by Thomson-CSF Laboratories. The first shoulder-mount color TV camera to offer the combined benefits of studio-quality broadcasting with lightweight portability. In fact, Microcam weighs just 12.4 pounds for a total of 22 pounds, complete with motorized lens and a 5 pound silver cell battery which operates the camera for 6 hours on a single charge. Microcam provides all the essential features for superior pictures from the field or in the studio.

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Plus complete VTR Control, including start-stop, VTR stand-by and return video. And a complete set of operating indicators, including VTR status, located in the viewfinder.

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SMPTE/United States

Digital dominates meeting

Part 1/By Aubrey Harris

Digital's growing popularity was obvious at the winter conference in San Francisco.

Any lingering notions that one may have had as to whether the 1-inch helical scan videotape recorders are going to replace 2-inch quadruplex VTRs were effectively dispelled by the praise and comments from many critical users during the SMPTE winter conference. And the fine demonstrations made by equipment manufacturers certainly reinforced their views.

In the first session at the conference, speakers from the networks, production houses, and independent stations were unanimous in their high esteem for equipment using the new formats. Dave Fibush recalled that it was only two years ago that the type B and C standardisation activities began.

Raymond Schneider of the CBS Television Network told of the benefits which the organisations has reaped in the first year and a half of operations with the 1-inch VTRs. At the beginning of 1979 they had 25 of the machines in use. By the end of the year they expect to be using double that number.

They are using the 1-inch machines in virtually all modes of their operations, for programme production recording and playback, post-production editing, in special editing systems in studio dedicated facilities, and for delayed network recording and playback service. At the network delay centre at Television City in Hollywood, four 1-inch helical machines are in use for recording incoming programmes and playing them back at a later time for the Pacific Coast network feed. The VTRs operate for an average of 20 hours each day. One remark which Schneider made drew laughter from the delegates: ". . . four 2-inch quad machines are used as 'back-up' for the 1-inch recorders."

Users of the recorders were unstinting in their acclaim, citing both lower capital expenditures as well as lower operational costs. A typical 1-inch helical scan recorder complete with time-base-corrector costs now about $55,000 compared to about three times that amount for a "fully-loaded" 2-inch quad-head machine; the latter also requires about twice the floor space and needs supplies of compressed-air and vacuum.

Head life on the one-inch has been found to exceed 1500 hours in many cases, in comparison to 350 to 400 hours for the quad machines. Power consumption is down to about 750 VA, less than one-third that for the 2-inch VTA. Most significantly, the cost of 1-inch tape stock is about $80 per hour, approximately one-half the expense of 2-inch quad tape. Daily setup time and equipment failure rates are considerably lower than with 2-inch machines.

For a close-up view of the Ampex DVR, demonstrated at SMPTE, see page 124.

Operationally improved editing performance has been achieved with machines having the ability to shuttle tape both forward and in reverse whilst delivering locked colour pictures at up to eight times normal speed and black-and-white images at up to 30 times normal play speed. Vertical-interval time-code allows frame identification at very slow speeds as well as during still framing.

The use of microprocessors and microcomputers for the control and operation of video apparatus and systems was the subject of the second session at the conference. Norman Hobson of RCA Corp. described the philosophy and design of the TK-47 which integrates the use of a microprocessor and digital memory. This results in a camera chain with high stability and reliability, increased system flexibility and requiring much shorter setup time; all this with a reduction in the amount of technical effort needed.

These advantages have been achieved by replacing much hardware with software, by the increased use of integrated circuits (to keep the discrete component count low) and of customised LSI. In the camera system described all normal set-up controls were deleted from the camera head itself and the camera-control-unit. The 120-odd analogue functions previously located in the camera and CCU are now adjusted from one control point — the Set-Up Terminal (SUT). The SUT has associated with it a waveform monitor, picture monitor, and vectorscope. Such an assembly can service several cameras, as once setup is completed, the terminal itself is disconnected from the camera proper. Each camera has its own microprocessor and memory for maintenance of the camera analogue functions; a battery supplies power for the necessary digital circuitry when the main power is removed.

The setup terminal is a self-contained microcomputer. Its basic function is to generate appropriate digital data, responding to the operator's commands for adjustment to and monitoring of the camera. To the operator the SUT appears very simple, basically four knobs and a series of LED readouts. The operator's attention is concentrated on the alpha-numeric messages displayed on the readouts; and he does not suffer the confusion and distraction of being faced with scores of red, green and blue colour controls, as was common in earlier camera designs.

The information transfer between the camera head and the SUT is via one twisted-pair of wires. It is a two-way data link, as the SUT must process return data from the camera and in response produces a variety of indications about the status of the camera. One of the tasks of the microcomputer is to supervise the generation, processing and timing of the camera data; it also instruments all the operator interface, latching appropriate circuits, generating and displaying alpha-numeric messages. This is accomplished under fixed programme instructions contained within its own read-

Continued on page 32

Aubrey Harris is the Video Technical Editor.

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3M

Circle (21) on Reader Service Card

only-memory (ROM). The ROM also has a programme sequence which has the capability of guiding the operator through the complete technical alignment of the camera chain.

The microcomputer has two input ports, one of which receives serial input data from the terminal and converts it to parallel data for loading onto the microprocessor data bus. The other port inputs the structure from the auto-light/black-balance circuit. A parallel latch is the output port which sequentially loads the memory output into one digital-to-analogue converter. This then feeds the analogue demultiplexing circuits throughout the camera.

Television system sync is used as a clock signal for the timing and control of the data being transferred. The interchange of data is at the rate of one bit per line, repeated every field. Each field is divided into three time periods, one each for setup data, operating data, and return data.

Other speakers told of how microcomputers and microprocessors were being integrated into the design of videotape editing and VTR control systems. Several advantages were noted in video production switching. Until recently, the video sources at the input to a switcher have been virtually as generated by the camera or other image pickup device; modification of such images may have been done by optical processes. Digital field stores have enabled image-size and aspect-ratio changes (up or down), picture inversion, mirror imagery, and multiple image generation to become commonplace.

Microprocessor circuitry in a production switcher adds more creative capability to the device and at the same time can reduce the amount of work involved in setting up complicated effects. Post-production operations and television news programmes often call for complex effects requirements. Digital memories allow for the recall of such sophisticated, preset image combinations with the actuation of a single control.

The highlight of the conference for many was the demonstration given by J. Diermann and M. Lemoine of Ampex Corporation of their developmental digital VTR. This is reported on in detail in a separate article by Joe Roizen in this issue of *Broadcast Communications*.

One of the obstacles needing to be overcome in the digitizing of video signals is the great bandwidth required in the system to accommodate the high bit rate seemingly necessary. For example, using eight bits for each picture element sampled at three times the subcarrier rate in the NTSC system results in a data rate of 85.6 Mb/s (10.7 MHz) and sampling at four times subcarrier the data rate is 114.4 Mb/s (14.3 MHz). The comparable rates for the 625-line PAL system are 106.6 Mb/s (13.3 MHz) and 141.8 Mb/s (17.7 MHz).

The use of such high information transfer rates is obviously expensive and much research work is proceeding now to devise possible methods of reducing these rates while maintaining high video performance standards.

Peter Rainger of the British Broadcasting Corporation gave a presentation on "A Low Bit Rate System for Digital Coding of the Television Picture." He explained that high bit rates are generally thought to be necessary when several digital signalling systems must be cascaded. A low sampling rate normally causes the modulation spectra to overlap and give rise to 'alias' components causing picture degradation. Ideally, a sampling rate of four times the subcarrier frequency would be used were it not so expensive, however, Mr. Rainger described a means of using a sampling rate of only twice the subcarrier frequency yielding no observable or apparent errors on moving pictures. The target the BBC is aiming at is 34 Mb/s to carry both a 625-line PAL picture and also sound information.

The system effectively performs like a 4 x Fsc method but samples at half that rate (2 x *f*sc). The high rate was simulated by adding the lower rate samples to those obtained from the previous line. This is possible with a simple one-line delay. The alias components tend to cancel between adjacent lines as the spectra of these components are of equal magnitude but of opposite sign.

Results have shown that sampling at the rate of twice the subcarrier rate with a 4.5 bit non-linear quantizing law gives signals which are cascadable with no observable errors on stationary images and no apparent impairment on moving pictures.

With the rapid development in the past few years of digital technology in television the question has been raised regarding the nature and extend of degredation of picture quality by the connection in tandem of multiple *codecs*. (A codec, formed from the words COder/DeCoder, refers to a pair of A-to-D and D-to-A converters. A digital time-base-corrector or a digital frame store would each include one codec.)

The magnitude of picture impairment caused by a number of codecs in tandem is of significance in a large television operational plant and therefore also in equipment design. Charles P. Ginsberg, who is chairman of the SMPTE Study Group on Digital Television, discussed a series of TV tapes made at Ampex Corp. in recent weeks to be used for the subjective assessment of such impairment.

The original signals were from a production colour camera viewing 8-in x 10-in colour transparencies in a light box. The codecs for the recordings were those in nine digital time-base-correctors and one experimental digital television tape recorder. A production video switcher was used to connect various numbers of codecs (up to 19) in tandem. Fifty-seven presentations were recorded, with the number of codecs in use for each presentation being selected entirely at random. Each test presentation consisted of ten seconds of reference picture (the one to be used for the test but not yet fed through any codecs), 3 seconds of black, 10 seconds of the test picture being passed through the codecs and seven seconds for respondents to judge and note their assessment.

All the codecs were sampling at the rate of 3 x *f*sc but no attempt was made to synchronise the sampling circuitry in an individual codec with any other codec. A portion of the tape was shown to delegates at the conference but reactions were not sought from them as the conditions under which viewing took place were not considered suitable for valid results to be obtained. The tapes will be made available to people and organisations who have the facilities and interest in carrying out subjective assessments.

SBE/United States

National meeting slated for Dallas

Increasing membership and improving the Society's status in the industry are two of the priorities to be covered at the SBE's annual meeting.

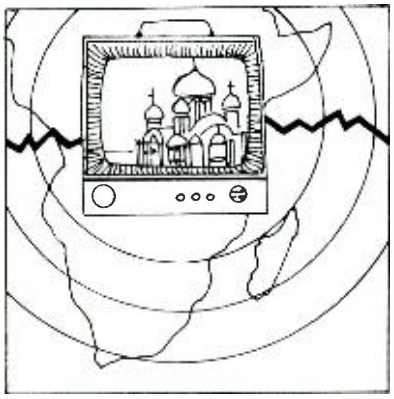
The Society of Broadcast Engineers has quietly been growing into a major force in the U.S. broadcast industry. With a current membership of well over 3,200, a popular engineering certification programme, ever improving internal and external communications, a digital course programme for members, and an increasing awareness of the need to be more involved in guiding the industry, the SBE is taking giant steps forward.

These goals and accomplishments will be high on the priority list of SBE business that will be concluded during their annual national meeting to be held during the NAB convention in Dallas. The

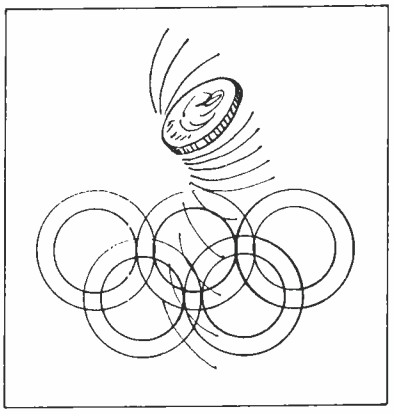
Continued on page 34

FEDERAL REPUBLIC OF GERMANY — Following three years of tests on the feasibility of reducing the power of television sound transmitters, the country has adopted a vision/sound power ratio of 20:1 in normal service for ARD and ZDF transmitters. The normal ratio in Europe varies from country to country, but is usually 5:1 or 10:1. The new ratio adopted by the Federal Republic of Germany will reduce the interference between transmitters operating in the same channel.

SOUTH AFRICA — Letters from viewers who reported the reception of unknown TV signals were recently received by the South Africa Broadcasting Corporation (SABC). After an investigation, the SABC announced that the strange signals were being received from the USSR's EKRAN satellite launched in 1976. The pictures were visible on ordinary television sets; and although of poor quality, the pictures were easily identified as coming from the Soviet Union.



UNITED KINGDOM — When the 1980 Olympics finally arrive, viewers in the U.K. will be able to watch them via coverage provided by the BBC and IBA — maybe. But the IBA didn't necessarily want it that way. Lady Plowden, IBA chairman, recently suggested that a coin toss should decide who would cover the Olympic Games in Moscow. However, the BBC's chairman, Sir Michael Swann, rejected the offer. In



his written response to Lady Plowden, Sir Michael said, ". . . the BBC regards an Olympiad for what it is — a four-year span. That is why the BBC supports both major and minor sports, week in, week out, throughout these four years. The Olympic Games are the culmination of these years of professional commitment — a commitment which the ITV Companies simply have not attempted to match since Independent Television began."

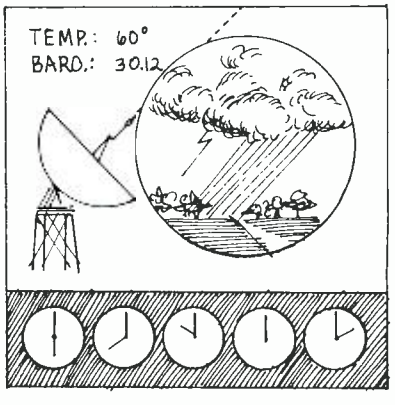
SIERRA LEONE — Two Marconi 50 kW B6034 transmitters have been ordered by the Sierra Leone Broadcasting Service (SLBS), along with programme input equipment, an antenna system, VHF link, and backup equipment. The transmitter, to be installed at Goderich, will be linked to the new SLBS studios scheduled for completion early in 1980.

SAUDI ARABIA — Saudi Arabian Radio and Television (SAB/SAR) is installing two 10 kW and two 1 kW UHF television transmitters as part of its SECAM colour television expansion programme. The transmitters, to be operational later this year, are being installed at Al Hassi and Al Ma'mah.

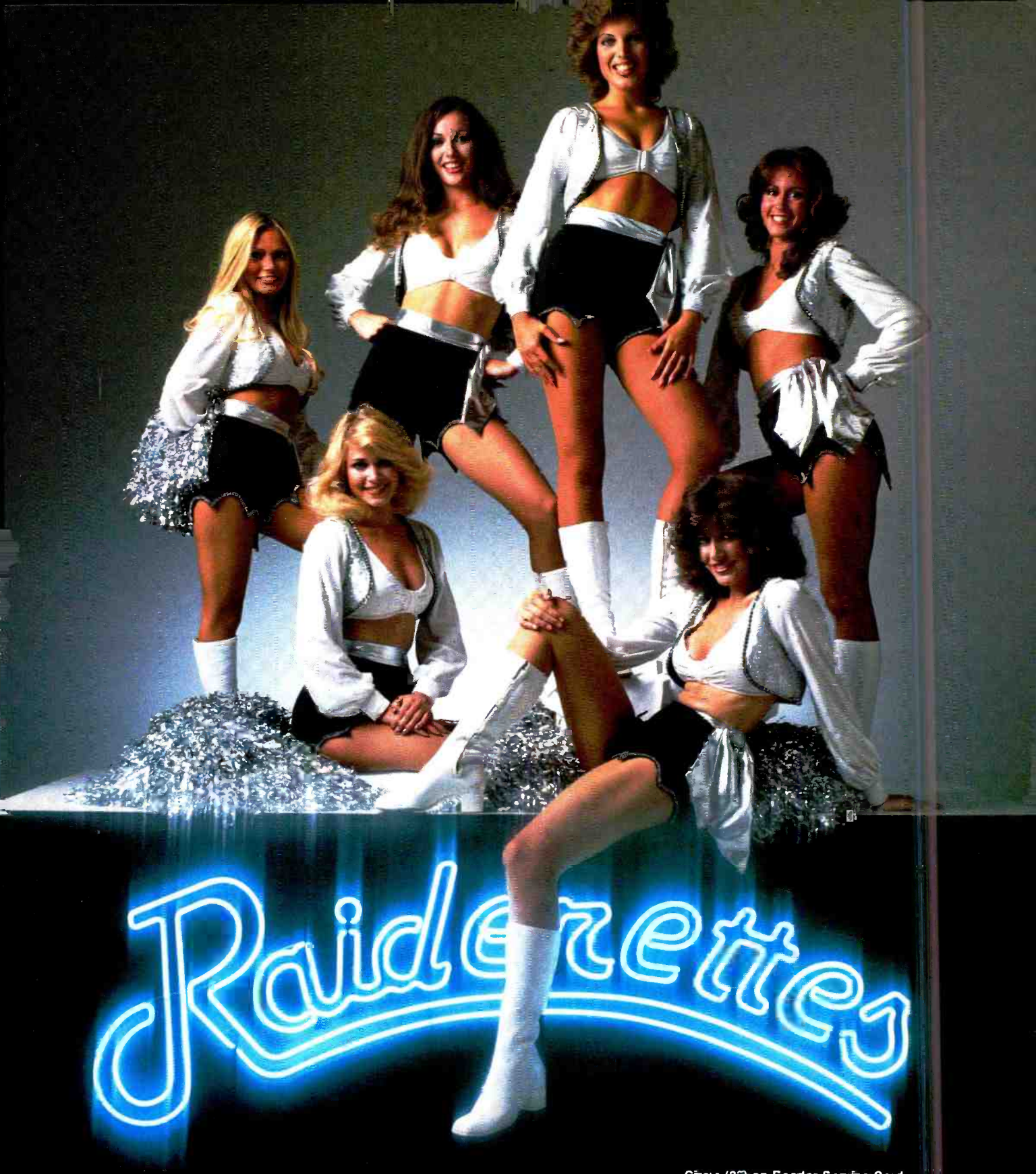
INDIA — A new generation of high-power domestic broadcast satellites to begin operation in 1980-82 is being planned by India, Iran, and the Arab Consortium. The Indian satellite will have one transponder operating in the 4-6 GHz band for point-to-point communications; a second transponder will operate at 2.5 MHz and 6 GHz for broadcasting. The Arab communication satellite will have five transponders of 40W each. Iran's satellite will have three 100W transponders.

PEOPLE'S REPUBLIC OF CHINA — Under an agreement reached with the Federal Republic of Germany, the People's Republic of China will be able to use the Franco-German Symphonie satellite for a series of telecommunication experiments. The experiments will focus on the transmission of analogue and digital signals. Earth stations designed and manufactured in China will be used in the experiments.

ITALY — A new satellite to be launched in May 1981 will provide a communications relay system by which African weather stations will have access to each other's data, and a laser-based system by which standard clocks can be synchronised worldwide. The new Sirio 2 programme is receiving more than 60% of its financing from Italy, with the Federal Republic of Germany and France also providing financial support. Under the programme, approved by the European Space Agency Council, the backup spacecraft from Italy's Sirio communications satellite programme will be given a new payload and put into synchronous orbit in a 1981 Ariane launch.



GLOBALVIEW



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SBE is inviting all members and interested parties to attend their meeting which will be held Monday, March 26, in the Convention Center in Room N (215-217), with a cash bar open between 4:00 and 5:30. The membership meeting will get underway at 5:30.

And this year the meeting will include a talk on closing the communications gap between broadcast engineers and station management. Russ C. Coughlan (KGO-TV, San Francisco) will be the guest speaker.

In other SBE news, the Certification Committee has set the dates for its spring 1979 certification exams: May 19 through June 2. All engineers interested in taking the exams should move quickly, because applications to take the exams should be received by April 2.

According to the SBE, those who wish to take the exam should request an application form by writing to SBE Certification Secretary, P.O. Box 50844, Indianapolis, Indiana 46250. SBE will send you a list of suggested study materials, sample exam questions for AM/FM and TV at both levels, and a list of SBE chapters where the tests may be taken.

If you plan to attend the NAB convention, you can pick up a certification application at the SBE booth which will be located on the second level of the exhibit area across the aisle from the Sharp Electronics booth. (The booth location on the *Broadcast Communications* no-nonsense exhibit map in this issue is N1, near the main entrance to the second level.)

Evidence of the acceptance of the certification programme is increasing on all fronts, including engineering "help wanted" ads in trade magazines.

Additional spotlighting of SBE engineers took place recently when the Texas Association of Broadcasters president, Jim Philips, presented the association's Engineer of the Year Award to W. T. McGill, VP and CE of KTSM AM-FM-TV.

Meanwhile, circle Monday, March 26, on your activities calendar.

Continued on page 36

SBE MONTHLY LOG

CHAPTER 2 — Northeastern Pennsylvania. Tom Wahl of the National Weather Service presented a programme on "Weather Forecasting & Broadcasting." The meeting took place at the WVIA TV-FM studios in Pittston.

CHAPTER 3 — Kansas. CATV system construction and operation techniques were covered by Chuck Cibes of the Junction City Cable TV.

CHAPTER 9 — Phoenix, Arizona. Tom Newman, Harvey Pond, and Ed Grant of Capitol Magnetics presented a technical demonstration of the new Capitol Magnetics broadcast cartridge. The demonstration was given at the new facility of Fisher-Burke Professional Audio.

CHAPTER 11 — Boston, Mass. WGBH, Allston, was the site of a special programme on "Home Computers, How We Can Use Them in Business, Engineering and at Home." The presentation was made by Wayne Green, publisher and editor of KILOBAUD magazine. He demonstrated a TRS-8 computer with several demo programmes and discussed the capabilities, applications design, and cost.

CHAPTER 16 — Seattle, Wash. The use of a mobile monitoring truck by the FCC was the subject of a talk by Dane Erickson.

CHAPTER 18 — Philadelphia, Penn. Len Laabs of Hubert Wilke Inc. gave an illustrated talk on "The World Beyond Broadcasting" and described his company's installations of TV studios around the world, its construction problems, and solutions.

CHAPTER 20 — Pittsburgh, Penn. Following the installation of new chapter officers, Gred Pedigo of Belden spoke on "Audio and Video Broadcast Cable." New officers are Roy Hoover, chairman; Mike Komichak, vice chairman; and Frank Walters, secretary/treasurer.

CHAPTER 22 — Central New York. Chapter members presented a plaque to Fran Thissie and Al Chismark upon their retirement. In addition, Barry Enders of Tektronix gave a talk and demonstration on the Tektronix TV demodulator with synchronous demodulation and SAW filter technology.

CHAPTER 25 — Indianapolis, Ind. Members went on a tour of the various training areas which included the video centre and the customised training cars. Gary Tomey and Ron Gaertner conducted the tour.

CHAPTER 28 — Milwaukee, Wis. "Hobby Computers" was the subject of the monthly meeting, held at the Marquette University Instructional Media Center TV studios. Presentations were made by Walter White, chief engineer of Milwaukee's Video Images; Gary Somogji, chief bench technician of Video Images, and John Trautschold, TV maintenance engineer for WITI.

CHAPTER 40 — San Francisco Bay Area. Inventor Steve Dutkovitch gave a presentation on the "Dutko MAP 3000 Holographic Sound Projector." This device modulates sound location in three dimensions and can be used not only for pre-recorded sound sources, but is adaptable to the live performance.

CHAPTER 43 — Sacramento, Calif. Hewlett-Packard was the location of a meeting hosted by John Noble who traced the history of modern instrumentation, culminating in a discussion and demonstration of H-P's new 8754 A Network Analyzer and 8568 A Spectrum Analyzer.

CHAPTER 45 — Charlotte, N.C. Jerry Collins, manager of Antenna Engineering for Harris Broadcast Products, gave a presentation on circularly polarized antennas.

CHAPTER 46 — Baltimore, Md. RCA representatives gave a talk on RCA's 1-inch helical scan videotape equipment: type TH100 and TH-50 portable recorder only.

CHAPTER 49 — Central Illinois. Bruce Electronics in Springfield was the site of an informal social gathering for chapter members.

CHAPTER 50 — Fort Collins, Co. "Slow Scan TV for Broadcast Applications" was the subject of a paper presented by Glen Southworth of Colorado Video Inc.

CHAPTER 51 — Tri Cities, Wash. Clark Poole of the FCC gave a tour of an FCC van.

CHAPTER 52 — Central Ohio. The new Sony BVU-100 portable video recorder was demonstrated and discussed in-depth at a meeting featuring Paul Minadeo and Terry Younce of Sony.

CHAPTER 53 — South Florida. John Lowry, president of Digital Video Systems, spoke on frame storers and time base correctors.

CHAPTER 55 — St. Louis Area. A special demonstration was given by Dave Spindle and Dennis Shelton of TeleMation of their TDF-1 digital noise reducer.

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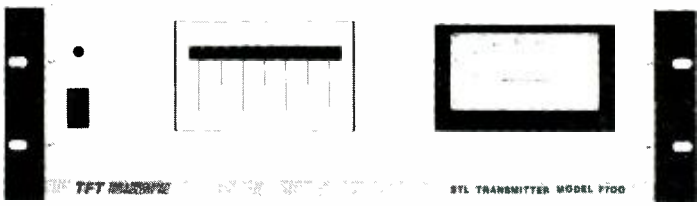

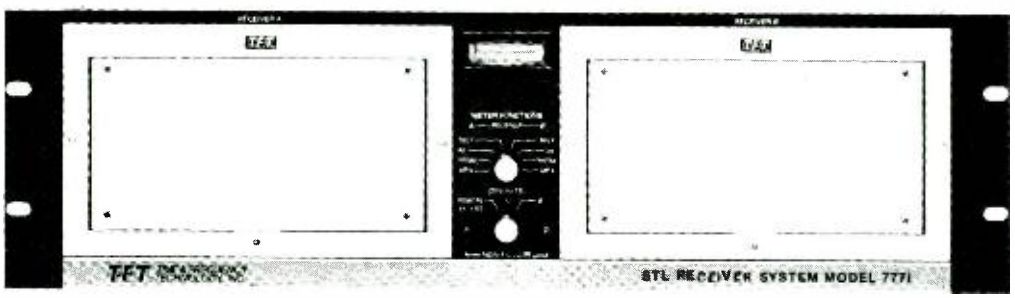

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NAB/United States

Don't isolate the children

The NAB speaks out again on the FTC's proposed restrictions on children's advertising.

The Federal Trade Commission's proposed restrictions on television advertising directed at children "are founded upon conjecture and supposition, are arbitrary and ambiguous, and are not amenable to substantiation or implementation."

These charges were contained in a filing issued to the FTC by the National Association of Broadcasters (NAB.) In its arguments against the proposed restrictions, the NAB emphasized that industry self-regulation is working. It also noted that children should not be isolated from the real world, but cushioned in varying degrees to encourage their healthy development.

Supporting its position against government interference and the FTC's questionable reasoning, the NAB made the following points:

- Significant numbers of young children can distinguish programmes from advertisements, can understand the selling purpose of advertisements, and can understand persuasive intent or otherwise comprehend or evaluate advertising.
- Parents, not television, exert the strong influence over their children, transmitting family values concerning socialisation.
- There is no cause-and-effect relationship between information gain (knowledge) and behavior change.
- There is no cause-and-effect relationship between (1) product sugar content and tooth decay, (2) sugar product advertisements and tooth decay, or (3) sugar product advertisements and a belief that "sugar is good for you."
- Substantial viewing is not synonymous with purchase request, and/or purchase.
- Repetition, frequency, and rate of exposure of commercials may not impact upon behavior.
- Audience composition cannot be used to trigger application of an advertising ban.
- Bans triggered by demographics impinge upon First Amendment rights of others.
- Prior restraints of commercial speech are unconstitutional.
- Reducing or eliminating commercial support would undoubtedly reduce either the quality or the quantity of children's programming, or both.
- Natural sugars in snack foods are not healthier than added sugars.

The FTC has recommended a series of bans on televised advertising aimed at children. If these bans take effect, there would be a ban on all advertising to young children, a ban on highly sugared food commercials to older children, and a requirement for counter-commercial type "disclosures" on health and nutrition.

These proposals have created a major controversy in the broadcast industry. James H. Rosenfield, president of the CBS Television Network, recently told a Washington Advertising Club audience that the FTC has distorted the facts pertaining to the impact of children's advertising (see *Broadcast Communications*, November 1978). American Women in Radio and Television (AWRT) has also called on the FTC to prove that present TV advertising aimed at children is unfair and deceptive.

In issuing the comments, Wilma Kriner, AWRT president, pointed out that remedies are presently available to the FTC and the industry to deal with unfair and deceptive advertising. According to Kriner, the AWRT is "concerned about the government using television for social engineering, no matter how appealing the ultimate goal may be. If the government is allowed to decide what nutritional or other information must be broadcast, should be broadcast, or cannot be broadcast, it could set a precedent for government agency violation of the First Amendment."

The NAB is also concerned about the implications of these government restrictions. The association told the FTC not to ban otherwise truthful advertising for lawfully sold products just because large numbers of children are in the audience. FTC's claim that children cannot understand selling intent of commercials is wrong; it is the parents, not television, that exert strong influences on kids.

Leonard Swanson, chairman of the NAB's Children's Television Committee, has written television broadcasters urging them to participate in the children's television proceeding being conducted by the Federal Communications Commission (FCC).

He warned the broadcasters that if they do not participate, the FCC "may adopt detailed rules and regulations designed to substitute the government's judgment for yours on children's programming and advertising."

CCTA/Canada

Support for cable expansion

Among several applications for expanded cable service are two wanting to study teletext-type systems.

The Canadian Cable Television Association (CCTA) has filed an intervention in support of four applications for expanded cable service in Canada. The applications were made by Grand River Cable TV Ltd., London Cable TV Ltd., Ottawa Cablevision Ltd., and Rogers Cable TV Ltd.

Grand River's application to provide information services of a pseudo-interactive and potentially fully interactive retrieval type will study teletext-type systems, both from the United States and Canada. Rogers Cable is also planning to establish an information retrieval system.

London Cable wants to conduct tests with fire alarms, burglar-intrusion alarms, medical alert, and other security services. Two hundred homes in the London area will be outfitted with special terminals for the test.

The Ottawa application is for a similar test, but is seen as complementary to industry studies of future services for cable customers. The Ottawa Cablevision application is for burglar/intrusion, fire, and medical alarms; however, while it has the same potential as London's test for providing a more secure lifestyle to Canadians, it uses a different technical approach. Also, an integral part of Ottawa Cablevision's application is the marketing of the system on an expanding basis, giving a controlled marketing input on the needs of subscribers.

In a recent hearing before the Canadian Radio-television Commission (CRTC), Ken Hancock, CCTA director of engineering, said that while the purposes of the applications differ, they all have a common objective.

"This objective," he told the hearing, "is to immediately commence user-oriented pilot projects and market reserach to bring to the Canadian public what the cable television industry perceives to be much needed new services. Thus, what is important about all these applications is their impact in terms of Canadian innovation, and ultimately, improvements to the Canadian lifestyle. It is a step forward to making use, in a socially conscious and business-like manner, of the latent potential of Canada's highly advanced cable television distribution system." BC

Special Edition:

TECHNOLOGIES SHARE CROWDED CONVENTION SPOTLIGHT

Experimental digital VTR from Ampex will set the stage for NAB's most important convention ever.

By Ron Merrell, Editorial Director

In keeping with the idea that there isn't such a thing as a typical NAB convention, this year's extravaganza will have its share of product "hits of the show" and unusual sessions.

Ampex will demonstrate a digital VTR, and that in itself is enough to keep attendees buzzing in the aisles and suites. Important as that is (its covered in another article in this issue), they'll still have to share the spotlight with other innovations and emerging technologies.

This time around there will be something for everyone. The lineup of new and recently modified video equipment will touch virtually every corner of television broadcasting, from input to output.

And while radio equipment will have a nearly equal number of show stoppers, some FMers will still be asking about signal processing and status reports on Quad. AMers will be anxious to hear the latest on AM stereo happenings. And both will tune in on digital audio.

In fact, there is more reason for excitement from all quarters than any previous convention. Never have so many emerging technologies had a legitimate right to compete for the spotlight. Consider some of the technical attractions: teletext; satellites and earth stations; digital VTR; digital audio; digital video effects; fibre optics; AM stereo; HMI lights; CP antennas; microwaved ENG; microprocessor-based equipment in all directions; and the general digital invasion.

Any of these subjects would be enough to generate session attendance and create aisle traffic.

Trouble is, the new specialty products and improved equipment lines in somewhat less dramatic introductions could escape the casual observer. In another section of this issue, *BC* has introduced a convention equipment directory. In it you'll find a comprehensive list of standard lines and new product introductions.

And we've included an exhibit area map that will help you locate any exhibitor in about 30 seconds. Using the state highway map format, we've assigned all exhibitors locator codes. D2 for example might be the code for a booth you want to see. Across the top of the map you'll find the letters A through Z. And down the left side you'll see a row of numbers. Find the intersection of D and 2 and there's your exhibitor.

Of course not all the action will be in the exhibit area. One really different attraction this year is the reception being held for current or former amateur radio operators. The reason the NAB decided to recognise a hobby in the middle of a professional broadcast convention is that a significant number of broadcast professionals were attracted by the industry because of their amateur radio experience. In fact, there was a time when many of the technical innovations in this industry were coming off the benches of station engineers who were enthusiastic ham experimenters.

The reception won't be a formal affair. It's just the first of what will likely be an annual event designed to recognise the contribution of amateur radio to professional broadcasting. It should be a fun reception. Check your NAB programme schedule.

Fortunately, the innovations of this convention won't end with competitive technologies and special receptions. The working sessions in Dallas will be almost as challenging and unique.

For example, a radio session on the "Birth of a Radio Jingle" will attract a standing-room-only crowd. Complete with singers, writers, and musicians, this session will demonstrate how a professional jingle is conceived, written, and produced. That's new.

And one of the oldest problems in this industry is construction of new studios or heavy modification of old facilities. There are some new trends in the variations off this theme, and they'll be covered in a subject long overdue for session and workshop exposure.

In between, management and engineering attendees will find a number of sessions and workshops (listed in another section of this issue) that are sure to capture the interest and imagination of both groups. The dependence on technology is so deeply entrenched in broadcast routines that management can't afford to skip every engineering session. And the business of the business is becoming important enough to the engineer that it would be a mistake to bypass important management sessions just because they fall under the management listings.

But if it can't happen yet in the sessions, it will happen here and there in the hospitality suites. And this year there should be a record number of suites open in the after-convention-hours each day.

Now if there is anything typical about this convention, it'll be the knashing of teeth over FCC actions and congressional direction, or the lack of it. The Communications Act rewrite is being rewritten. Deregulation to many will look a lot more like re-regulation. Wage and price guidelines have their voluntary limits. Minorities are looking for slots at the top and frequency assignments. What will happen to the clear channels? Renewals? Ascertainment? And children's television?

Combine the technical and non-technical attractions of a record number of exhibitors, comprehensive and unique sessions and workshops, and the opportunity to share your ideas on broadcasting and you have the recipe for a convention the broadcast community will be remembering for a long time to come. Better make your reservations now.

BC

Generator, Reader and Calculator in one advanced, integrated grouping.

Telcom's Time Code Center gives you, in a single compact unit, a combination of features that will help you increase videotape editing efficiency.

For instance, the Time Code Center lets you repair poorly recorded, intermittent, or otherwise faulty time code.

The JAM SYNC feature facilitates easier assembly editing.

If you are synchronizing audio and video tapes with differing time codes, the Time Code Center can change one of the time codes by any amount, to permit use of a conventional synchronizer.

Options include remote control keyboard, which can be located as far away as 1000 feet from the Time Code Center, and a character generator, a plug-in module which provides a video display for all functions.

Another option is Telcom's large typewriter keyboard which can be used with the character generator for titling or generating video messages for operator prompting, tape identification and many other practical uses.

Many more standard and optional features make Telcom's Time Code Center an outstanding addition to your videotape editing facilities. Write for Telcom's fully detailed brochure. There's no obligation.

TELCOM'S TIME CODE CENTER

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Our EFS-1 Frame-Stor™ is a sports nut

Courtesy of the networks and many others, we've had front seats at the Kentucky Derby, Super Bowl, Indianapolis 500, the Olympics and many, many sports specials.

The EFS-1 has also been on the town

We've reported the Academy Awards, Emmys, National election coverage and other heavy TV specials.

It's Merv Griffin's favorite camera. Now Rona Barrett has her very own Frame-Stor. It's even used in production for animation effects.

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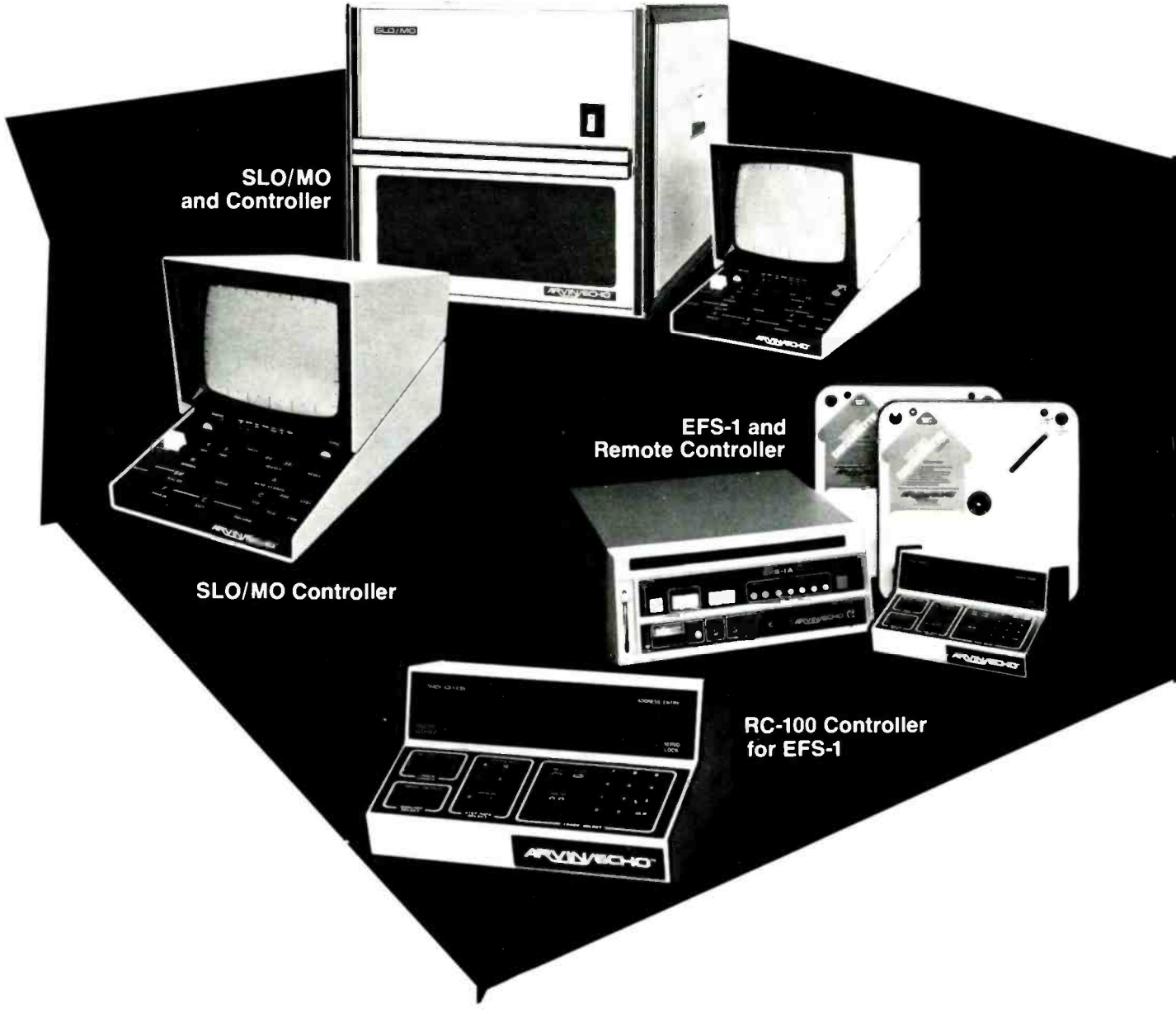
Our EFS-1 and TEL-WEATHER™ Systems have created vast new reporting opportunities for meteorologists. Animated color weather graphics, developed by our equipment, fed from radar or satellite sources, have brought accurate and timely information to those whose lives or businesses depend on it.

Weather journalism as we know it now would not be possible without these systems.



can take us anywhere.

SLO/MO is now within reach of everyone

First, our SLO/MO is different. You can afford it. It's also very portable. It loves to travel from studio to field to studio in a car, van, truck, whatever. Also it's rugged. When it gets there it simply works.

Now, we're compelled to mention a couple of features: ☐ Forward or reverse play at any speed ☐ Time lapse recording ☐ Digital comb filter ☐ Auto cue ☐ Animation ☐ Frame edits ☐ Freeze frame ☐ and many other features.

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Arvin/Echo has, over the years, built a reputation for tough, rugged, high technology recorders that really go anywhere...on land, sea and in space... anywhere.

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Where it's all at...
BOOTH 390, NAB '79

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Special Edition:

CONFERENCES look at the year ahead

By Michael Scheibach, Managing Editor

On Sunday, March 25, the 57th annual NAB convention will get underway with a special joint session featuring Donald Thurston, NAB board chairman, and an address by NAB President Vincent Wasilewski entitled "Broadcasting: The Year Ahead.".

That title is appropriate this year, because the convention includes an equipment exhibit with over 300 booths; radio, television, and engineering sessions and workshops; and paper presentations on almost every vital facet of broadcasting.

On the management side, the radio and television conferences include tips on improving the bottom line, from better ways to sell your format, to tips on how to avoid costly construction errors, conduct promotion campaigns, use your ratings, and get your fair share of available ad dollars. Also scheduled are sessions on FCC regulations, children's television, the Communications Act rewrite, government guidelines, and selecting the proper format for your station.

Engineers will get state-of-the-art updates on teletext, AM stereo, one-inch videotape, colour cameras, microprocessor-based equipment, digital applications, satellites, and much more.

"Broadcasting: The Year Ahead" could have been the name of the whole conference. But if you're going to the convention, you have just four days to discover where the industry is going. And if you don't plan your time well, you may miss some important intersections. As a safeguard, here's a quick review of the radio, television, and engineering conferences to help you plan your convention schedule.

RADIO CONFERENCE. For the general sales manager looking for ways to improve the station's ad volume, there will be four RAB Radio Sales workshops, each focusing on the bottom line: profits. The RAB's Miles David, along with station and outside experts, will give you ideas and techniques to use when you get back home. And don't worry about the size of your station or the amount and type of advertising. There will be special sessions for small, medium, and large markets.

You can't afford to compound station facility construction problems, and you can't afford to miss the "Next Time We Build One of These . . ." session. If you want answers to costly decisions such as console positioning, windows *vs.* no windows, heating/air-conditioning, lighting, sound construction, and construction dollar conditioning, this session is a must.

On the subject of saving money, the NAB is planning a special session on finding the right person to fill the right position. "Whatever Happened to Old What's-His-Name?" will tell you how to find (and keep) good people. Topics to be covered include proper interviewing techniques, testing, job positioning, orienting new employees, and firing with finesse.

"That Automation Unit Has More Personality Than My Morning DJ" is a 75-minute quickie course on selling, programming, and engineering an automated station . . . the right way.

The FCC also appreciates you doing it the right way, so another hot session will be "How You Can Avoid Pressing the FCC's 'Violation Hot Button' in 1979." An important session explaining how to comply with the Commission's "most violated" list.

To reveal how FM stations are making money from unused space on their subcarrier, a session has been scheduled on "My Subcarrier Bills More Than My FM Station." Increasing your station's revenues is also the central theme in several other workshops. A sampling:

- "National Farm $$$ in Small Markets? You Bet!" How to attract national farm advertising to small markets.
- "Community Involvement Can Increase Your Numbers." The NAB's Darryl Dillingham moderates this "must" session, which will emphasise how community involvement can make a tremendous difference in your station's image, audience, programming, news, and of course, pocketbook.
- "Promoting: 'The World's Greatest Radio Station' in the Medium/Large Markets." Leading industry experts explain how to get the most from your promotion budget.
- "Promoting: 'The World's Greatest Radio Station' in the Small Market." Different session, same topic as above.
- "If Business Is So Good, How Come There's Nothing in the Checking Account?" A quick course on what you can and cannot do in the "cash flow" game.
- "I Will Buy More Radio If. . . ." A panel of national advertising experts give advise on how radio can get more ad dollars.

If radio sales and promotion is not your major concern, there will be a number of other sessions that will catch your interest.

"Radio Research — You Can't Tell the Players Without a Scorecard" will be moderated by John Dimling, NAB's vice president and director of

Continued on page 44

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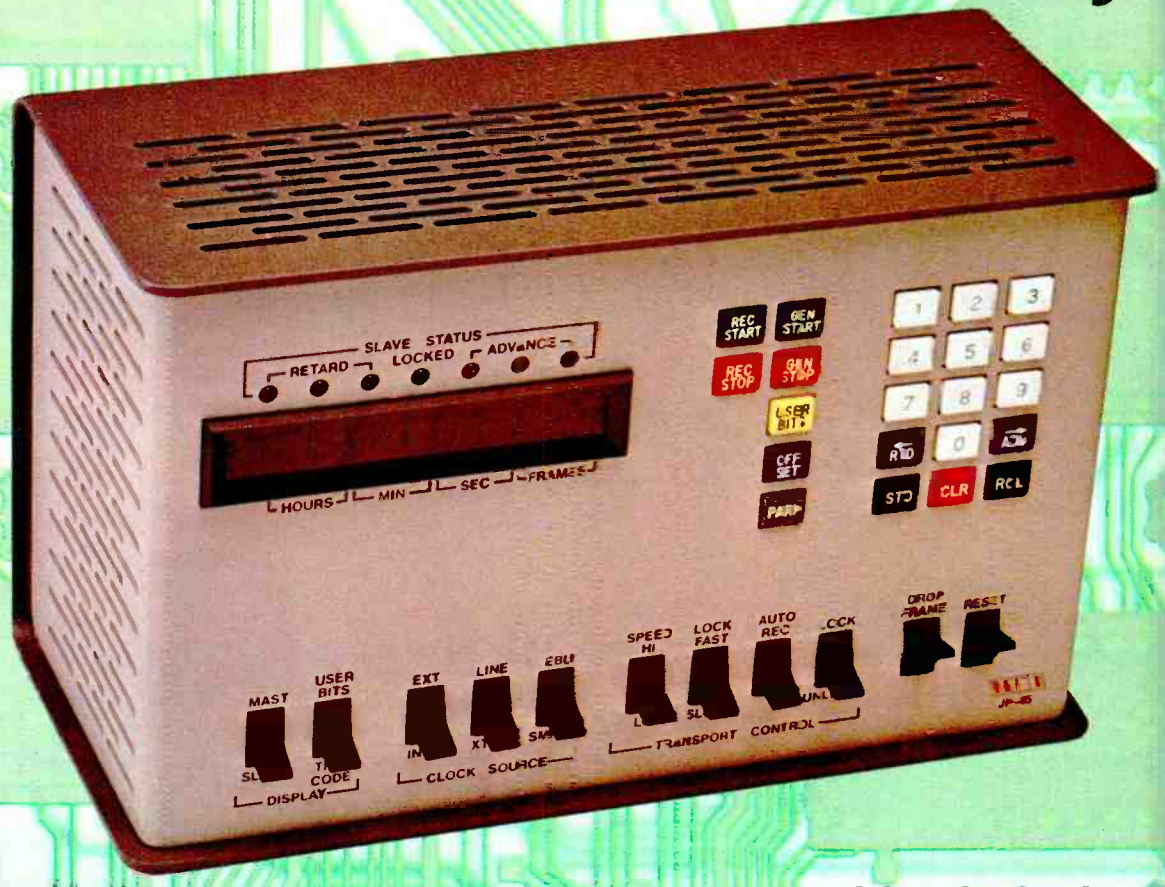

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RADIO AGENDA

Sunday, March 25th

3:00-5:00 p.m.
Opening Joint Session and Entertainment

Monday, March 26th

9:30-10:15 a.m.
General Session — Opening Remarks and Featured Speaker

10:30-11:45 a.m.
Concurrent Workshops

Noon-1:15 p.m.
Concurrent Workshops

1:15-6:00 p.m.
Afternoon free to visit exhibits

Tuesday, March 27th

9:30-11:00 a.m.
General Session — Featured Speaker, Miles David, RAB and Panel Discussion

Featured Speaker, Miles David, RAB and Panel Discussion

11:00-Noon
FCC Department Heads Q & A Session

Noon-2:15 p.m.
Radio Luncheon

2:30-3:45 p.m.
Concurrent Workshops

4:00-5:15 p.m.
Concurrent Workshops

Wednesday, March 28th

9:30-Noon
Joint Closing Sessions

12:30-2:00 p.m.
Closing Luncheon and Entertainment

2:00-5:00 p.m.
Afternoon free to visit exhibits

TELEVISION AGENDA

Sunday, March 25th

3:00-5:00 p.m.
Opening Joint Session and Entertainment

Monday, March 26th

9:30-11:00 a.m.
General Session — Opening Remarks and Featured Speaker

11:15-Noon
Concurrent Workshops

12:30-2:00 p.m.
Television Luncheon

2:30-4:00 p.m.
General Session — IN THE BOX

4:15-5:00 p.m.
Concurrent Workshops

Tuesday, March 27th

9:30-10:15 a.m.
Concurrent Workshops

10:30-11:15 a.m.
Concurrent Workshops

11:30-1:00 p.m.
General Session — IN THE BOX

1:00-6:00 p.m.
Afternoon free to visit exhibits

Wednesday, March 28th

9:30-Noon
Joint Closing Session

12:30-2:00 p.m.
Closing Luncheon and Entertainment

2:00-5:00 p.m.
Afternoon free to visit exhibits

IN THE BOX

Mini-debates on three of the hottest TV topics of the year:

- Resolved: The FTC Should Regulate Children's Television Advertising.
- Resolved: Television Stations Should Pay Substantial Spectrum Fees.
- Resolved: Television Channels Should Be Set Aside for Use by Minorities.

research. This session will tell you all you need to know about the world of radio research — where it started, where it is, where it's going, and why it matters.

For the jingle maker, look out. The NAB plans a unique session: "The Birth of a Radio Jingle" — live, from conception to delivery, it includes the full cast of characters to demonstrate the process.

And for the radio manager who doubles as a programme director, the NAB has something just for you: a special session called "Formats — An Exclusive Session for Radio Managers Who Also Wear A Program Director's Hat."

TELEVISION CONFERENCE. On the television side, a number of workshops and general sessions are planned to help you solve those nagging management problems.

If you've been asking yourself what all those FCC rules and regulations mean, don't miss "FCC Rules and Policies You Must Know." The NAB's Erwin Krasnow will moderate this one-hour course on staying in compliance with the FCC.

Staying in compliance with those new wage and price guidelines can also become a chronic problem, unless you attend "Living with Wage and Price Guidelines."

And don't forget the EEO rules, the ones that tell you who to hire and how to go about it. If you have recurring problems that need answers, be sure to attend "Successful Personnel Recruiting Within EEO Guidelines."

The sales manager is also taken care of this year, as the NAB has planned several sessions and workshops designed to improve the bottom line:

- "Creative Selling in 100 Plus Markets." Experts tell you how to improve your image without exceeding your budget.
- "How to Use Television Ratings." Ratings do make a difference, but to find out more, don't miss this one. Representatives from Arbitron, Nielsen, and other services will tell you how to get the most from the books.

Not into sales, but interested in promotion? "Promoting Your Station Using ENG" will detail how your station can use ENG as a promotional tool. Experts from BPA will tell you how ENG is currently being used for PSAs and other local promotion.

The Radio and Television News

Continued on page 46

When The Others Don't Come Up To Level

AGFA-GEVAERT Magnetic Tape will ...and then surpass it!

It doesn't matter if your needs are studio mastering tape, video tape, or bulk audio tape, AGFA-GEVAERT has been answering the high level requirements of a demanding professional European and U.S. market for a long time. And surpassing it everytime—with quality, performance, reliability, and availability.

Our Studio Mastering Tape has been accepted on the highest level as "the tape" for top quality original recording. It's available to the discerning in a low-noise, high-output, low print tape in ¼", ½", 1" and 2"; Bintape in ¼", ½" and 1"; and in Duplicating Tape, ¼" x 3600'.

When your needs for video tape are varied, AGFA-GEVAERT Video Tape has the range to fill them. From 2" Quad to 1" Helical; ½" VIDEOCHROM to ¾" U-matic cassette; and ¾" bulk tape to magnetic film. Whether you're producing professional, semi-professional, or amateur programming, with our Video Tape you'll project a high level image.

The Professional Audio Tape has long held the reputation as the one tape that really "stacks up". Supplied in pancake form on stacking hubs, Audio Tape is offered to the blank loader and tape duplicators as a Super High Density Tape, or a SUPER FERRO DYNAMIC Tape, in lengths up to 11,500'; or ¼" Low-Noise Duplicating Tape in 7,200' lengths. Also available is a Mini-Cassette Tape with 2 micron foil, Splicing, and Leader Tape

When your standards for recording and duplicating demand the highest, come up to that level and surpass it with AGFA-GEVAERT Magnetic Tape. We've been helping others do it for years. Contact us TODAY!

The trademarks VIDEOCHROM and SUPER FERRO DYNAMIC are the property of AGFA-GEVAERT, Antwerp/Leverkusen.

MAGNETIC TAPE

NAB BOOTH NO. 2621

from AGFA-GEVAERT

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Directors Association (RTNDA) is conducting a session on "The Use of Investigative Teams in TV News." Good use of reporting teams will affect your image, and this will in turn improve the ratings. Another key to success.

"More Effective Communication Thru TV Commercials" is a two-part session: The "State of the Business" and the "State of Selling." Marv Shapiro and Roger Rice of TvB are conducting this session.

For the programmers, "Children's Television — Growing Up Gracefully" takes you from *Howdy Doody* and *The Little Rascals* to contemporary children's shows — to prove once again that children's TV is meaningful, educational, and informative. Go see for yourself.

And for the legal minded, or the person who has to worry about legal questions (against his will), two sessions should be at the top of your list:

- "The Role of the G.M. In Collective Bargaining." Ron Irion of the NAB's broadcast management department moderates this workshop in which general managers share their experience in union negotiations.
- "Television and the Rewrite." Congressman Lionel Van Deerlin, chairman of the House Communications Subcommittee and principle author of the Communications Act rewrite, will be on hand to answer questions (and maybe even create new ones) to the complex version of the 1934 standard.

Is there a new woman in broadcast management? You may find out by attending "The Managerial Woman," a special session designed to answer the question, "How can I manage the managerial woman?"

As women and minorities set their sights on top-level positions, another question is raised: Are there enough jobs available? "Is There Room at the Top? A Second Look" will explore this question, and try to give general managers a look at the future.

If your problem doesn't concern personnel, but does concern perhaps a more serious subject (at least in financial terms) — developing local programmes or going syndicated — "Localism . . . Alternative to Syndication" may make your visit to the NAB a little nicer.

ENGINEERING CONFERENCE — Radio. First workshop on the agenda (Monday, 9:00 a.m.) will cover "Audio Processing: Test Measurement and Monitoring." In addition to being a review of the set-up, adjustment, and measurement of audio processing equipment, the workshop will include a discussion on possible FCC rules changes.

"Engineering Principles of Communications Satellite Systems" will be a short course on the engineering parameters of a satellite system, from transponder power to receiving dish size. Television engineers will also find this workshop important.

Monday afternoon workshops will cover "AM-FM Receivers: The Manufacturer's Viewpoint" and "AM Stereo Broadcasting." With AM stereo coming in the U.S. soon, this will be a hot session.

The Monday sessions conclude with a new NAB attraction: a special "Amateur Radio Operators Reception" from 5:00-6:00 p.m. Strictly for licensed or formerly licensed ham radio radio operators, this reception will include door prizes, a short ceremony, and a get-acquainted session for broadcasting people who are also ham radio operators.

An "Audio Cassette, Cartridge and Reel-to-Reel Tape Seminar" kicks off the Tuesday conference at 9 a.m. This workshop will discuss performance, measurements, and standards. "The

Continued on page 48

NAB honours outstanding individuals

Recipient of the NAB's 1979 Distinguished Service Award, the industry's highest honour, is Jack Harris, president, KPRC and KPRC-TV, Houston, Texas, and executive vice president of The Houston Post Company. Harris began his broadcasting career with station WSM, Nashville, Tennessee; and in 1937, as WSM's news and special events director, he supervised the coverage of the Ohio flood disaster. He joined The Houston Post Company in 1947 as manager of KPRC. He has served on the NAB's board of directors, and for five years was chairman of NBC's Television Board of Delegates. He has also served as president of the Association of Maximum Service Telecasters. Presentation of the award will be made March 25 at the opening session of the convention.

Robert W. Flanders will be presented the 1979 Engineering Achievement Award at the NAB Engineering Conference luncheon on Tuesday, March 27. Flanders is vice president and director of engineering, McGraw-Hill Broadcasting Co. Inc., and director of engineering, WRTV, Indianapolis, Indiana. He was a pioneer in the development of commercial television. He designed and built cameras and related equipment for early TV stations; helped develop the technical expertise required for live remote broadcasts; and designed and built one of the first modular TV cameras. He is a charter member and twice past president of the Society of Broadcast Engineers, and in 1973 was elected a Society Fellow.

Radio commentator and newscaster Paul Harvey, and director and actor Orson Welles have been elected to the NAB's Radio Hall of Fame. Harvey, who has been on the air for more than 30 years, is now heard over 700 radio stations. Welles is perhaps most well-known in the radio industry for his 1938 broadcast of H.G. Wells' "The War of the Worlds" — a broadcast that caused a nationwide panic and passed into radio history as a monument to the power of the medium.

Get the full picture from NEC at NAB

See us at Booth 2404

NEC

Nippon Electric Co., Ltd.

NEC America, Inc.
Broadcast Equipment Division
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Elk Grove Village, Illinois 60007

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Absence of Radiation Hazards in Broadcasting" workshop will be held from 11 a.m. to noon. This will be a discussion of the potential hazards from non-ionizing radiation (especially from microwave transmitters).

The Wednesday agenda includes just one workshop: "Building New Radio Studio Facilities: Planning, Contracting and Purchasing." An accoustical expert, an architect, and broadcasters experienced in new studio construction will offer their advice.

The radio conference will also feature three paper presentations. Monday at 2:30 p.m. a talk entitled "Adapting AM Transmitters for Stereo Transmission" will be given. The paper will focus on incidental and extraneous phase modulation, bandwidth of RF networks, design objectives, and phase response of AM amplifiers.

Tuesday morning at 10:30 there will be a paper on "Microprocessor-Based Cartridge with Open Reel Quality," a description of a microprocessor-controlled logic, cue tone and detection. At 10:30 Wednesday a paper will be presented on improving the bandwidth of a complicated antenna system. It is entitled "A Fresh Look at Directional Antenna Phasors."

ENGINEERING CONFERENCE — Television. Monday opens with a workshop on one-inch videotape, presented by the Society of Motion Picture and Television Engineers (SMPTE). This discussion, which begins at 8:30 a.m., will deal with the production and post-production experience with one-inch VTRs and digital television.

At 10:30 a.m. there will be a workshop on "Teletext, Closed Captioning and Other Television Ancillary Signals." Although teletext has been going full speed worldwide, the United States is just entering the teletext era. That makes this review of the state of these systems worldwide a definite "must" workshop for the U.S. broadcaster.

A "Television Blanking Progress Report" will be presented at 2:30 p.m. Broadcast engineers, equipment manufacturers, and FCC personnel plan to cover the current status of equipment, operations, and the industry. In addition, current FCC actions will be discussed.

Tuesday's agenda begins at 9 a.m. with "Digital Editing and Special Effects for Television: 1979 Update."

Television engineers will be able to join their radio colleagues in the joint workshop, "The Absence of Radiation Hazards in Broadcasting," 11 a.m.

"Broadcast Tall Towers: An Aeronautical Hazard?" will be held at 9 a.m. on Wednesday. This session, open to all engineers, will cover possible FAA restrictions on building tall towers.

Four important paper presentations will also be held during the television engineering conference:

- "The CBS Blanking Width Corrector." Monday, 4-4:30 p.m. A discussion of a new method created by CBS of digitising the video, storing, and reading out at a slower rate.
- "The TK-47 Auto-Cam Camera." Monday, 4:30-5:00 p.m. An RCA Broadcast Systems Division presentation on the new high-performance studio/field colour camera designed to automatically set up and optimise its adjustments for picture performance.
- "Replacement of Slow Motion with One-Inch Tape." Tuesday, 10:30-11:00 a.m. Covers technology and operation of the one-inch tape.
- "Engineering Preparations for the 1980 Olympics." Wednesday, 10:30-11:00 a.m. A description of the technical and operational considerations NBC must face prior to airing the 1980 Olympics from Moscow.

JOINT SESSIONS. "A Convention Special: Games Broadcasters Play" is a down-to-basics session designed to provide good advice on the do's and don'ts of running promotions and contests at your station. Erwin Krasnow, NAB executive vice president and general counsel, moderates this session, scheduled for Tuesday from 8:00-10:00 p.m.

Baseball Commissioner Bowie Kuhn and NFL Commissioner Pete Rozelle headline a joint Wednesday-morning session called "Sports and Broadcasting: Where Are We Headed?" From 9:30 to 12:30 p.m., a panel of experts will discuss their predictions for the future of sports broadcasting, including new methods on distribution, pay TV, and changes and opportunities for your station.

Attendees will also be able to hear Senator Ernest Hollings, chairman of the Senate Subcommittee on Communications, comment on the Communications Act rewrite on Wednesday. And they'll hear FCC Chairman Charles Ferris in a special question and answer session at Wednesday's closing general assembly. BC

Amateur radio operator's reception

For those of us who have a career in broadcasting because we started as radio amateurs, and for an industry which began with amateur radio operators, NAB is celebrating the relationship with a reception for all licensed or formerly licensed amateur operators who are registered at the 1979 NAB Convention. Of course many engineers are "hams," but there are managers, owners, newsmen, announcers, lawyers, and others in broadcasting who are also amateur operators.

The reception is an informal opportunity to meet, greet, and "chew the rag" with people whom you probably never realized were also hams. There will be a short ceremony recognising a person who has contributed to amateur radio and broadcasting, and a toast . . . to the forefather of broadcasting . . . *amateur radio!*

George Bartlett, W1MMM

Chris Payne, W3IRC

Engineering Department
National Association of Broadcasters

Note: *Broadcast Communications* will also have a representative at the reception: Ron Merrell, *BC*'s editorial director and amateur radio operator (WØO1Z).

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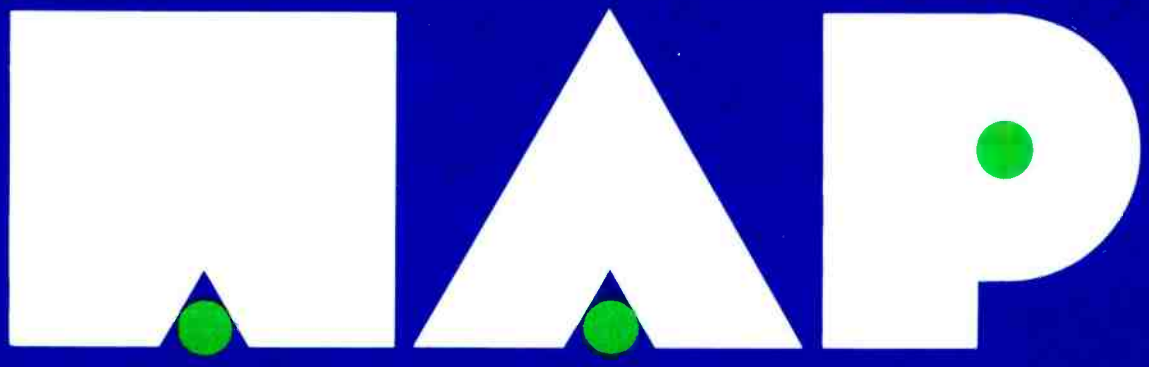


to help you locate any exhibitor without really trying

Ever work your way onto the convention exhibit floor only to be immediately confused about how to find an exhibitor's booth. Sure, it happens to all of us.

As you push your way down the aisles searching for that booth you either get sidetracked into a demo you didn't want to see or herded around the wrong corner and down another wrong aisle.

You can't fight it. After all, the crowded aisle traffic is almost sure to be moving the wrong way. But now there is relief.

This section of *Broadcast Communications* was designed with the convention attendee in mind. No more getting lost and no more exasperation from finding that as you're leaving the exhibit area after a long, grueling search you find that exhibitor's booth right inside the entrance you rushed through an hour earlier.

Turn to the exhibitor alphabetical listing. When you find the company, you'll notice a map locator number following it. D2, for example. It's as easy as using a highway map. Look for the letter D along the top, then the number 2 down the side. Presto! There's your exhibitor.

The exhibits this year will be on Level 2 and Level 3 of the Dallas Convention Center. So to make your search even easier, we've provided two maps: one for each level. Booths 300 through 500 are located on Level 3; booths 2000 and up are on Level 2. When reading the map locator number, just remember that map key numbers A through K are on Level 3, and L through P are on the second level. For example, a booth with a locator code of D4 would be on Level 3, while one located at N4 would be on Level 2.

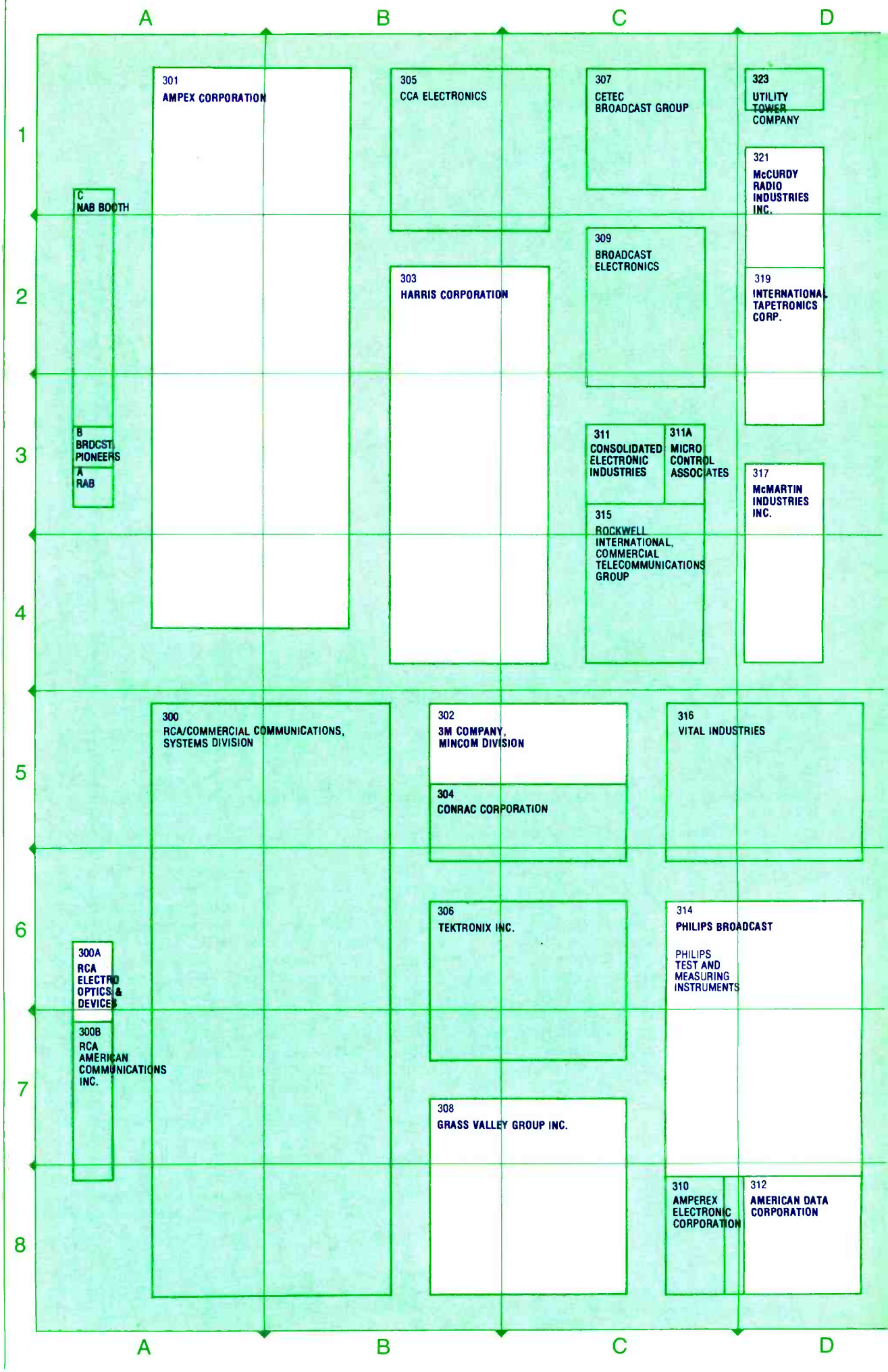
For those of you making your first trip to Dallas, it may be more difficult finding your way to the Convention Center than finding that certain exhibitor you've planned to see. To alleviate this problem, following the Exhibitor Map is a map of Dallas, showing you where your hotel is in relation to the Dallas Convention Center. And again for your convenience, a map locator number has been assigned to each major hotel and to the Dallas Convention Center.

If you hang onto your copy of this issue at the convention, you'll save a lot of time. Even if you have to swim upstream, it won't seem impossible.

COURTESY OF

BROADCAST COMMUNICATIONS
THE INTERNATIONAL JOURNAL OF BROADCAST TECHNOLOGY

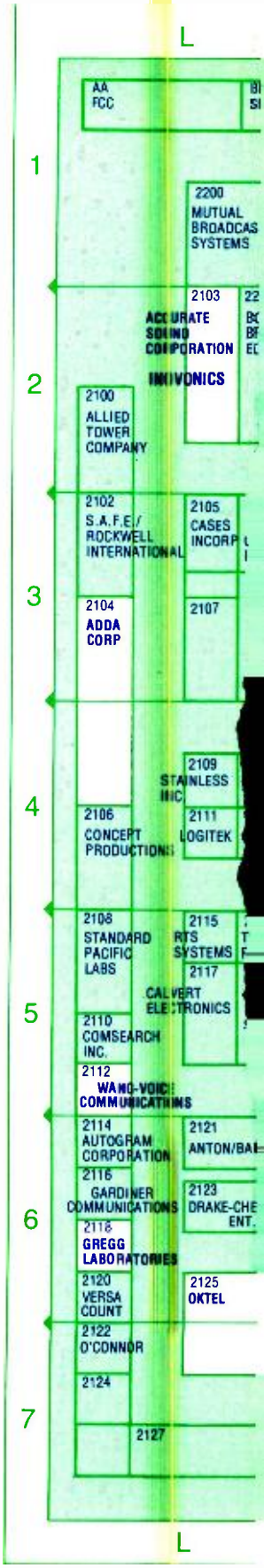
LEVEL 3



Bill Daniels Co., Booth 2417 (N6)
Data Communications, Booth 339 (E1,2)
Datametrics Inc., Booth 2813 (P3)
Datatek Corp., Booth 521 (J4)
Datatron Inc., Booth 491 (H3)
Delta Electronics, Booth 365 (E1)
Delta Group Inc., Booth 2606 (O6)
DeWolfe Music Library, Booth 2605 (O2)
Dielectric Communications, Booth 509 (J3)
Digital Video Systems, Booth 2311 (M6,7)
DiTech Inc., Booth 2403 (N2)
Dolby Laboratories, Booth 385 (F1)
Drake-Chenault Enterprises, Booth 2123 (L6)
Victor Duncan Inc., Booth 2515 (O5)
Dynair Electronics, Booth 368 (G5)
Dynasciences, Booth 497 (J3)
Dytek Industries, Booth 2301 (M2)
E E V Inc., Booth 326 (E5)
E G and G Inc., Booth 2302 (M2)
ENG Helicopter, Booth 2313 (M7)
E-N-G Manufacturing Co., Booth 2402 (N2)
ESE, Booth 403 (F3)
Eastman Kodak Company, Booth 473 (G4)
Edco Products, Booth 359 (E1)
Edutron Inc., Booth 2603 (O2)
Eigen Video, Booth 557 (K3)
Electro Controls Inc., Booth 2303 (M4)
Electro Impulse Lab, Booth 417 (F1)
Electro and Optical Systems, Booth 2803 (P2)
Electrohome Limited, Booth 535 (K2)
Electro-Voice Inc., Booth 2504 (N3)
E.M.C.E.E., Booth 328 (E5)
Enterprise Electronics, Booth 2710 (O4)
Farinon Electric, Booth 374 (G8)
Yves Faroudja, Booth 412B (K6)
Fidelipac, Booth 351 (E4)
Filmway Productions, Booth 2423 (N7)
Flash Technology, Booth 547 (K2)
Frezzolini Electronics, Booth 2415 (N6)
Fuji Magnetic Tape Division, Booth 402 (J6)
Fujinon Optical, Booth 515 (J2)
GTE Sylvania, Booth 320 (D5)
Garner Industries, Booth 415 (F1)
General Electric Co., Booth 2509 (O4)
Glentronix (U.S.) Inc., Booth 2609 (O3)
Alan Gordon Enterprises, Booth 2501 (O1)
Gorman Redlich, Booth 337 (E1)
Gotham Audio Corp., Booth 423 (F2)
Grass Valley Group, Booth 308 (C8)
The Great American Market, Booth 2708 (O3)
Gregg Laboratories, Booth 2118 (L6)
Groton Computer Inc., Booth 2204 (L3)
HM Electronics, Booth 2604 (O4)
Hallikainen and Friends, Booth 2312 (M4)
Harris Corp., Booth 303 (B2,3,4)
High-Lite Corp., Booth 2802 (P3)
Hitachi Denshi America Ltd., Booth 334 (F7)
IGM/NTI, Booth 343 (E3)
Ikegami Electronics (USA) Inc., Booth 406 (J8)
Image Transform Inc., Booth 2309 (M6)
Image Video Limited, Booth 2819 (P3)
Industrial Sciences Inc., Booth 531 (K4)
Innovative TV Equipment, Booth 388 (J7)
Inovonics Inc., Booth 2103 (L2)
Interand, Booth 2703 (P3)
International Tapetronics, Booth 319 (D2)
International Video Corp., Booth 346 (G7)
JAM — Creative Productions, Booth 2510 (N6)
Cetec Jampro, Booth 499 (J2)
Jefferson Data Systems, Booth 551 (K4)
Kaman Sciences Corp./BCS, Booth 325 (D1)
Kings Electronics, Booth 394 (J5)
Kliegl Bros., Booth 366 (G5)
Knox Ltd., Booth 2706 (O3)
LPB Incorporated, Booth 383 (F1)
L-W International, Booth 338 (F6)
Laird Telemedia, Booth 537 (K2)
Leitch Video, Booth 561 (K1)
Lenco, Booth 372 (G7)
Lightning Elimination Assoc., Booth 437 (G3)
Live Sound Inc., Booth 2714 (O5)

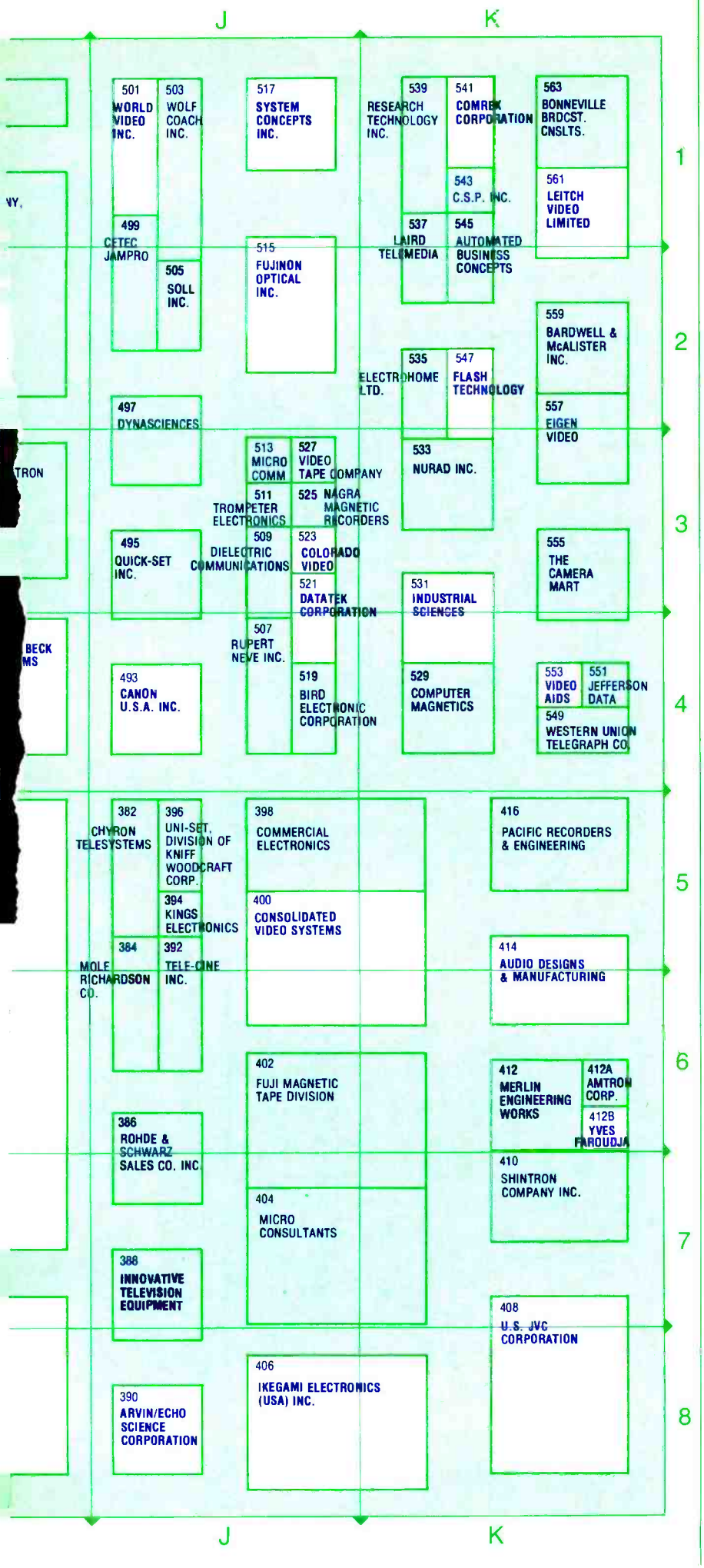
David Lint Associates, Booth 447 (G2)
Listec TV Equipment, Booth 465 (G2)
Logitek Electronic Systems, Booth 2111 (L4)
Lowell-Light, Booth 2506 (N3)
MCI Inc., Booth 401 (F4)
MBH Enterprises, Booth 2523 (O7)
MPB Technologies, Booth 2815 (P3)
3M Company, Magnetic A/V Products, Booths 302 (Video) (C5) and 439 (Mag AV) (G3)
Mach One Digital Systems, Booth 2505 (O3)
Marconi Electronics, Booth 322 (E6)
Marti Electronics, Booth 349 (E4)
Memorex Corporation, Booth 485 (H3)
Merlin Engineering Works, Booth 412A (K6)
MicMix Audio Products, Booth 421 (F2)
Micro Communications, Booth 513 (J3)
Micro Consultants, Booth 404 (J7)
Micro Control Associates, Booth 311-A (C3)
Microprobe Electronics, Booth 445 (G2)
Microtime, Booth 2305 (M,N5)
Micro-Trak Corp., Booth 391 (F3)
Microwave Associates, Booth 340 (G5)
Mole Richardson Co., Booth 384 (J6)
The Money Machine, Booth 335 (E3)
Moseley Associates, Booth 329 (D3)
Motorola, Booth 433 (G4)
Musicworks Inc., Booth 2512 (N6)
Mutual Broadcasting Systems, Booth 2200 (L1)
McCurdy Radio Industries, Booth 321 (D1)
McMartin Industries, Booth 317 (D4)
Nagra Magnetic Recorders, Booth 525 (J3)
NEC America, Booth 2404 (M,N3)
N.T.I. America, Booth 2209 (M3)
Network Recording Prod., Booth 2807 (P2)
Nortronics Company, Booth 345 (E3)
Fred A. Nudd Corp., Booth 2310 (M4)
Nurad Inc., Booth 533 (K3)
Oak Communications, Booth 2223 (M6,7)
O'Connor Creative Services, Booth 2122 (L7)
O'Connor Engineering Labs, Booth 2500 (N1)
Oktel Corporation, Booth 2125 (L6,7)
The Olesen Company, Booth 2607 (O3)
Orban Associates, Booth 429 (F4)
Orrox Corp. (CMX Systems, Videomax), Booth 350 (G8)
Otari Corporation, Booth 405 (F3)
Pacific Recorders and Engr., Booth 416 (K5)
Packaged Lighting Systems, Booth 2611 (O4)
Panasonic, Video Systems, Booth 483 (H2)
Perrott Engineering Labs, Booth 2704 (O2)
Phelps Dodge Communications, Booth 353 (E3)
Philips Test and Measuring, Booth 314 (D7)
Philips Broadcast Equipment, Booth 314 (D7)
Porta-Pattern, Booth 449 G(1)
Potomac Instruments, Booth 377 (F3)
Power-Optics Inc., Booth 2407 (N3)
QEI Corporation, Booth 435 (G4)
QRK Electronic Products, Booth 389 (F2)
QSI Systems Inc., Booth 2800 (P3)
Q-TV/Telesync, Booth 332 (E6)
Quick-Set Inc., Booth 495 (J3)
RCA/Commercial Communications Systems Division, Booth 300 (A5,6,7,8,B5,6,7,8)
RCA American Communications, Booth 300B (A7)
RCA Electro Optics and Devices, Booth 300A (A6)
RF Technology, Booth 2410 (N6)
RTS Systems Inc., Booth 2115 (L5)
Ramko Research Inc., Booth 409 (F1)
Rank Precision Industries, Booth 348 (G8)
Recortec Inc., Booth 336 (F8)
Re:DB Company, Booth 2811 (P2)
Research Technology Inc., Booth 539 (K1)
Rockwell International, Collins Transmission Systems, Booth 315 (C4)
Rockwell International/S.A.F.E. Division, Booth 2102 (L3)
Rohde and Schwarz, Booth 386 (J6)
Rosco Labs, Booth 2211 (M4)
Ross Video Inc., Booth 2508 (N4)
Rupert Neve Inc., Booth 507 (J4)
Russco Electronics Mfg., Booth 427 (F3)
SWR Incorporated, Booth 2702 (O2)

Scientific-Atlanta, Booth 477 (G2)
Scully Recording Instruments, Booth 355 (E3)
Servo Corp. of America, Booth 2716 (O6)
Sescom Inc., Booth 443 (E3)
Sharp Electronics, Booth 2400 (M,N1)
Shintron Company, Booth 410 (K7)
Shure Brothers, Booth 371 (E4)
Sintronic Corp., Booth 387 (F1)
Skirpan Lighting Control, Booth 2625 (O6)
Skotel Corporation, Booth 2827 (P5)
Elmer Smalling, Booth 2800B (P2)
Warren R. Smith Co., Booth 338 (F6)
Soll Inc., Booth 505 (J2)
Sono-Mag Corporation, Booth 397 (F4)
Sony Corp. of America, Booth 380 (H5,6,7)
Sound Technology, Booth 2405 (N2)
SpinPhysics, Booth 473 (G4)
Stainless Inc., Booth 2109 (L4)
Standard Pacific Labs, Booth 2108 (L5)
Stanton Magnetics Inc., Booth 363 (E1)
Station Business Systems, Booth 327 (D2)
Storeel Corporation, Booth 469 (G4)
Strand Century Inc., Booth 475 (G3)
Studer ReVox America, Booth 453 (G1)
System Concepts, Booth 517 (J1)
Taber Mfg. and Eng. Co., Booth 459 (G1)
William B. Tanner Co., Booth 2206 (L4)
Tayburn Electronics, Booth 2502 (N2)
Panasonic, Technics Division, Booth 481 (H1)
TM Productions, Booth 2307 (M6)
Technology Service Corp., Booth 467 (G3)
Tektronix Inc., Booth 306 (C6)
Tele-Cine Inc., Booth 392 (J6)
Telecommunications Industries, Booth 449 (G1)
Telegen, Booth 2221 (M6)
TeleMation, Booth 342 (G5)
Telemet, Booth 333 (D3)
Telescript, Booth 356 (G7)
TV Equipment Associates, Booth 364 (G5)
Television Technology Corp., Booth 2306 (M3)
Telex Communications, Booth 357 (E2)
Tentel Corporation, Booth 395 (F3)
Terracom, Booth 2401 (N1)
Thermodyne International Ltd., Booth 2408 (N6)
Thomson-CSF Laboratories, Booth 324 (E8)
Thomson-CSF Electron Tubes, Booth 2210 (L5)
Time and Frequency Technology, Booth 341 (E2)
Times Wire and Cable Co., Booth 2519 (O6)
Toshiba International Corp., Booth 2701 (P1,2)
Track Audio, Booth 2712 (O5)
Trompeter Electronics, Booth 511 (J3)
Tuesday Productions, Booth 2205 (M3)
Tweed Audio (USA), Booth 2207 (M3)
UMC Electronics, Booth 407 (F2)
US Tape and Label Corp., Booth 2201 (M1)
Unarco-Rohn, Booth 373-A (F4)
Uni-Set (Kniff Woodcraft Corp.), Booth 396 (J5)
United Media Inc., Booth 2711 (P6)
UPI, Booth 2300 (M1)
United Research Lab. Corp., Booth 375 (F3)
U.S. JVC Corporation, Booth 408 (K8)
Utah Scientific, Booth 2707 (P4)
Utility Tower Co., Booth 323 (D1)
Thomas J. Valentino, Booth 441 (G3)
Van Ladder, Booth 2804 (P4)
Varian Associates, Booth 487 (H4)
Versa Count, Booth 2120 (L6)
Video Aids Corp. of Colorado, Booth 553 (K4)
Video Associates Labs, Booth 2809 (P2)
Video Data Systems, Booth 2419 (N6,7)
Videomagnetics, Booth 2705 (P3)
Videomax (Orrox), Booth 350 (G8)
Video Tape Company, Booth 527 (J3)
Videomedia/SED, Booth 2825 (P4,5)
Videotek, Booth 2602 (O3)
Vital Industries, Booth 316 (D5)
Vitex Division, Vital Industries, Booth 2219 (M6)
Wang-Voice Communications, Booth 2112 (L5)
Ward-Beck Systems, Booth 489 (H4)
The Webster Group, Booth 2621 (O6)
Western Union, Booth 549 (K4)



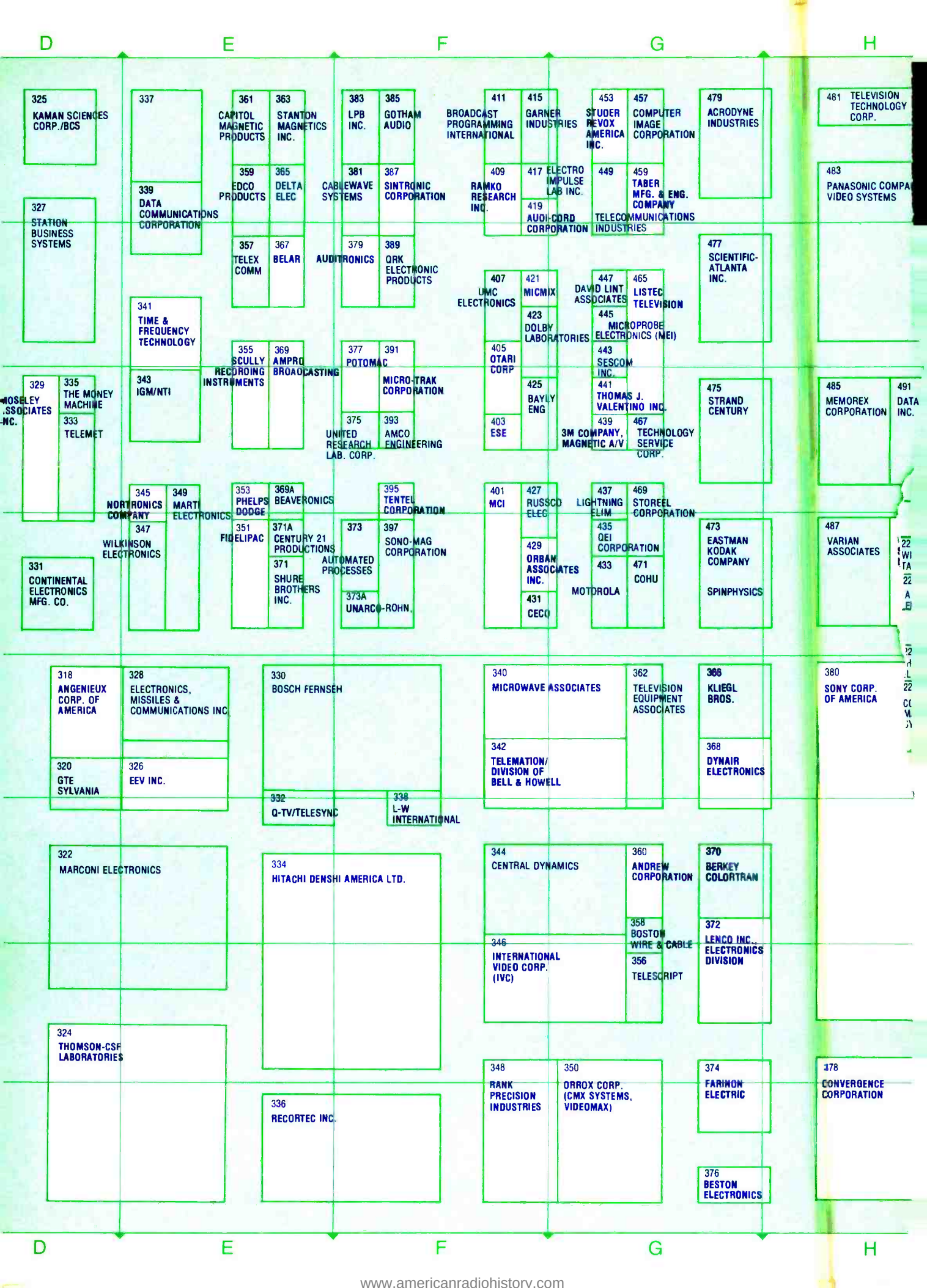
LEVEL 2

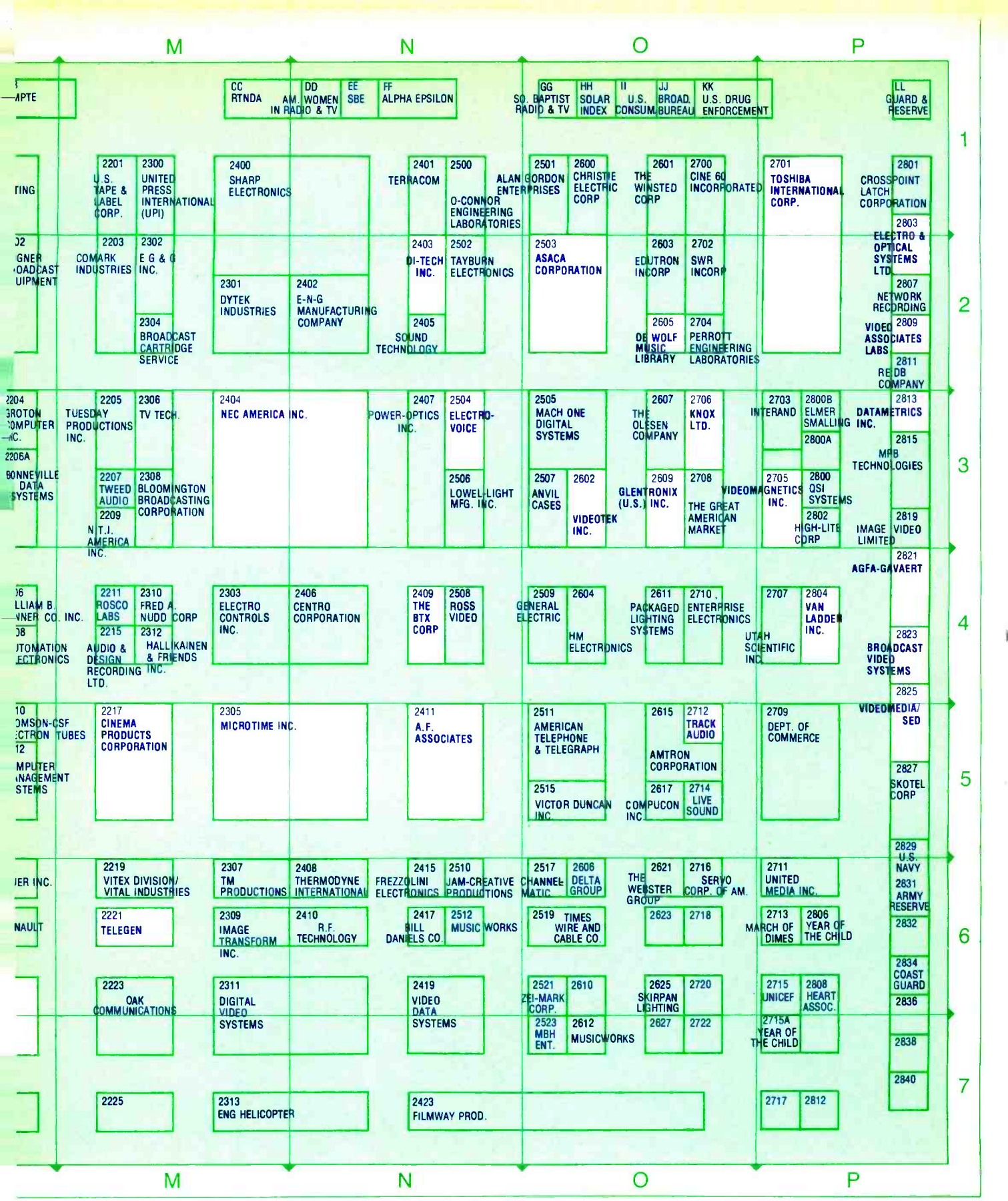
Wilkinson Electronics, Booth 347 (
The Winsted Corporation, Booth 2
Wolf Coach/Television Eng., Booth
World Video, Booth 501 (J1)
Zei-Mark Corp., Booth 2521 (O6)



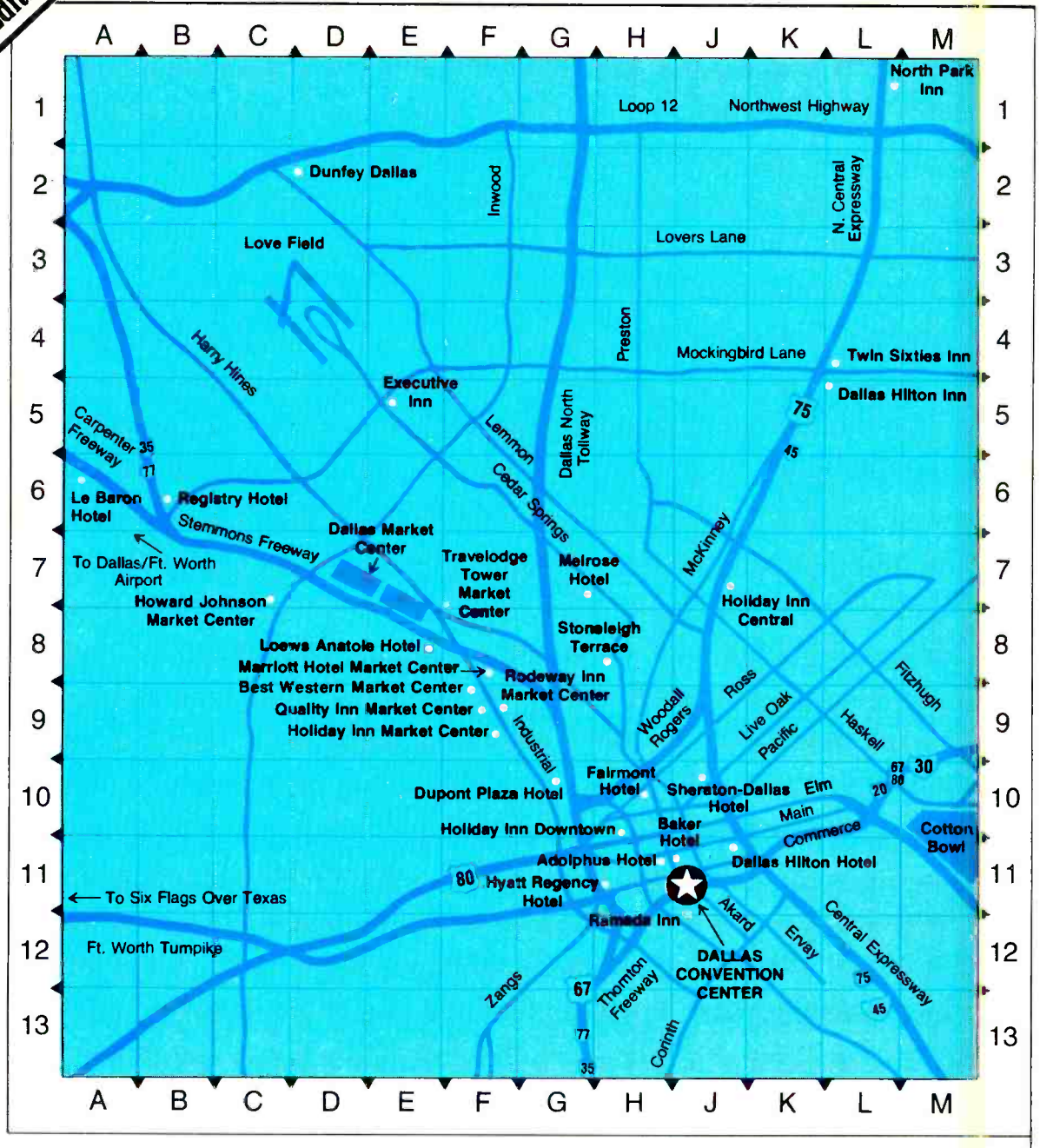
A.F. Associates, Booth 2411 (N5)
Accurate Sound Corp., Booth 2103 (L2)
Acrodyne Industries, Booth 479 (G1)
Adda Corporation, Booth 2104 (L3)
Agfa-Gevaert Inc., Booth 2821 (P4)
Allied Tower Co., Booth 2100 (L2)
Amco Engineering Co., Booth 393 (F3)
American Data Corp., Booth 312 (D8)
AT&T Co., Booth 2511 (05)
Amperex Electronic Corp., Booth 310 (C8)
Ampex Corporation, Booth 301 (A1,2,3,4)
Ampro Broadcasting Inc., Booth 369 (E3)
Amtron Corporation, Booth 412A (K6)
Andrew Corporation, Booth 360 (G6)
Angenieux Corp. of Am., Booth 318 (D5)
Anton/Bauer, Inc., Booth 2121 (L6)
Anvil Cases, Booth 2507 (03)
Asaca Corporation, Booth 2503 (02)
Arvin/Echo Science Corp., Booth 390 (J8)
Audi-Cord Corporation, Booth 419 (F1,2)
Audio Designs and Mfg., Booth 414 (K5,6)
Audio and Design Recording, Booth 2215 (M4)
Auditronics Inc., Booth 379 (F2)
Autogram Corporation, Booth 2114 (L6)
Automated Business Concepts, Booth 545 (K2)
Automation Electronics, Booth 2208 (L4)
Automated Processes, Booth 373 (K2)
The BTX Corporation, Booth 2409 (N4)
Bardwell and McAlister Inc., Booth 559 (K2)
Bayly Engineering, Booth 425 (F3)
Beaveronics Inc., Booth 369-A (E3)
Belar Electronic Labs, Booth 367 (E2)
Berkey Colortran, Booth 370 (G6)
Beston Electronics, Booth 376 (G8)
Bird Electronic Corp., Booth 519 (J4)
Bloomington Broadcasting, Booth 2308 (M3)
Bogner Broadcast Equipment, Booth 2202 (L2)
Bonneville Broadcast Consult., Booth 563 (K1)
Bonneville Data Systems, Booth 2206-A (L4)
Bosch Fernseh, Booth 330 (F5)
Boston Insulated Wire & Cable, Booth 358 (G6)
Broadcast Cartridge Service, Booth 2304 (M2)
Broadcast Electronics, Booth 309 (C2)
Broadcast Programming Int'l, Booth 411 (F1)
Broadcast Video Systems, Booth 2823 (P4)
CCA Electronics Corp., Booth 305 (B1)
CMX Systems (Orrox), Booth 350 (G8)
CSP Incorporated, Booth 543 (K1)
Cablewave Systems, Booth 381 (F1)
Calvert Electronics, Booth 2117 (L5)
The Camera Mart, Booth 555 (K3)
Canon U.S.A. Inc., Booth 493 (J4)
Capitol Magnetic Products, Booth 361 (E1)
Cases Incorporated, Booth 2105 (L3)
Ceco Communications, Booth 431 (F4)
Central Dynamics Corp., Booth 344 (G6)
Centro Corporation, Booth 2406 (N4)
Century 21 Productions, Booth 371-A (E4)
Cetec Broadcast Group, Booth 307 (C1)
Channelmatic Inc., Booth 2517 (O6)
Christie Electric, Booth 2600 (O1)
Chyron Telesystems, Booth 382 (J5)
Cine 60 Inc., Booth 2700 (O1)
Cinema Products Corp., Booth 2217 (M5)
Cohu Inc., Booth 471 (G4)
Colorado Video Inc., Booth 523 (J3)
Comark Industries, Booth 2203 (M2)
Commercial Electronics, Booth 398 (J5)
Compucon Inc., Booth 2617 (O5)
Computer Image Corp., Booth 457 (G1)
Computer Magnetics, Booth 529 (K4)
Computer Man. Systems, Booth 2212 (L5)
Comrex Corp., Booth 541 (K1)
Comsearch Inc., Booth 2110 (L5)
Concept Productions, Booth 2106 (L4)
Conrac Corporation, Booth 304 (C5)
Consolidated Electronic Ind., Booth 311 (C3)
Consolidated Video Systems, Booth 400 (J5)
Continental Electronics Mfg. Co., Booth 331 (D4)
Convergence Corp., Booth 378 (H8)
Crosspoint Latch Corp., Booth 2801 (P1)

Continued





Special Edition:



MAP OF Dallas

Dallas Convention Center, J11

Hotels

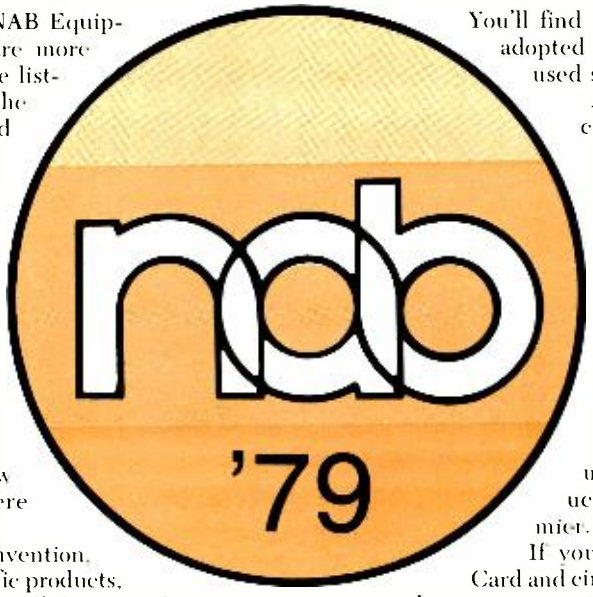
Adolphus Hotel, H11
Baker Hotel, J11
Best Western Market Center, F9
Dallas Hilton Hotel, J11
Dallas Hilton Inn, L5
Dunfey Dallas, D2
Dupont Plaza Hotel, G10
Executive Inn, E5
Fairmont Hotel, H10
Holiday Inn Central, J7
Holiday Inn Market Center, F9
Howard Johnson Market Center, C7
Hyatt Regency Hotel, H11
Le Baron Hotel, A6
Loews Anatole Hotel, E8
Marriott Hotel — Market Center, F8
Melrose Hotel, G7
North Park Inn, L1
Quality Inn — Market Center, F9
Twin Sixties Inn, L4
Ramada Inn, J12
Registry Hotel, B6
Rodeway Inn — Market Center, F9
Sheraton-Dallas Hotel, J10
Stoneleigh Terrace, H8
Travelodge Tower — Market Center, F7

Special Edition:

This section is a special NAB Equipment Directory. There are more than 90 categories in these listings, and under each you'll see the NAB exhibitors who responded to our questionnaire before our press deadlines.

The companies listed here will be exhibiting at the NAB convention in Dallas (March 25-28). And you'll note that some categories are, by necessity, general. But this will give you a compact, comprehensive directory to the equipment that will be shown at the convention. What's more, you may find some new names under categories where you have a special interest.

If you plan to attend the convention, and you are interested in specific products, this NAB Equipment Directory will show you the companies who will be exhibiting those products. The next step is to turn to the "30-second" map of the exhibit areas.



You'll find it easy to use, because we've adopted the highway map format and used simple locator codes.

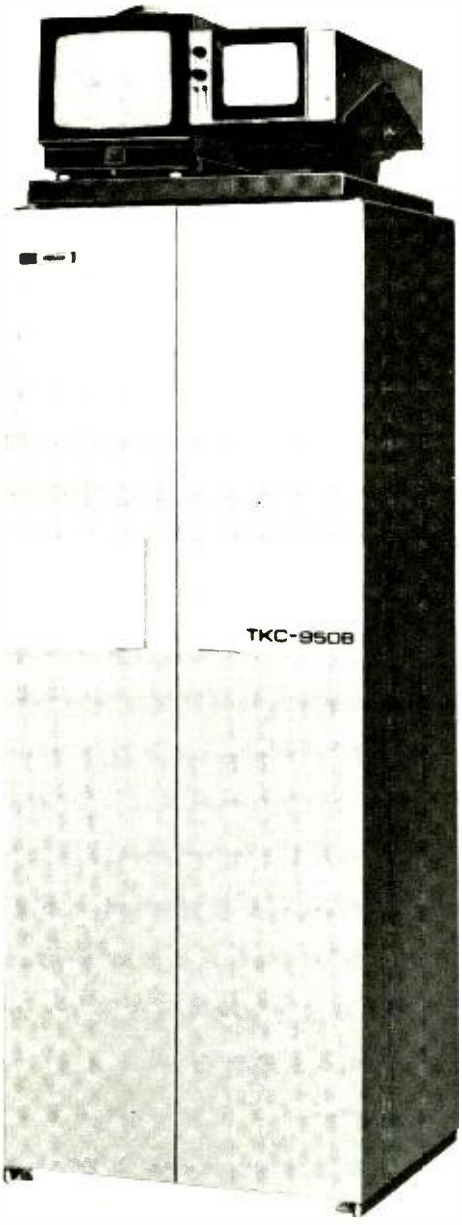
And if you can't make it to the convention this year, this section will update your annual directory. By matching your product interests with our Product Premier section and the ads in this issue, you'll be almost as up to date as those who make the trip to Dallas. Just keep an eye out for those small lines that say "Circle 46 on Reader Service Card" at the bottom of almost all ads. Other "circle" numbers are used at the beginning of products described in Product Premier.

If you turn to the Reader Service Card and circle these numbers, you'll be on the way to staying right on top of the latest product developments. The product file you build today will be your equipment directory tomorrow.

EQUIPMENT DIRECTORY

Continued on page 60

No more dirty movies.



The reason: the Ikegami TKC-950B film chain camera's unique optical system removes the correcting field lens from the focal plane where the aerial image is located. Thus, any dust that collects on the field lens is out-of-focus. When you run movies on the large-image field lens of the TKC-950B, the viewer receives a clean, sharp, dust-free picture on his home TV screen.

The TKC-950B system is dedicated to produce the highest color quality and picture stability. For example, a prism beam-splitter separates the images to its three one-inch vidicons.

The TKC-950B takes into consideration the tight quarters in which most film chains must be installed and operated. Remarkably small, it can accept an external multiplexer on either the left or right side of the unit for additional installation flexibility. Compatible with your existing equipment, it is easy to replace obsolete cameras.

Because film chain cameras must run with minimum supervision, we've built a lot of self-control into the Ikegami TKC-950B. A servo-controlled neutral-density filter disc, built into the optical system — along with fast-acting video gain control — respond so quickly, there is no need for individual light compensators with your projectors. A very stable color encoder provides precise color reproduction. Three types of test pulses with six functions, built into the unit, are provided to facilitate set-ups, daily checks and calibration of the gamma-correction circuit.

The TKC-950B is highly stable and any variations in the source material can be compensated for manually or with an optional new automatic color balance accessory which balances white, black and gamma automatically. And each function is available for local or remote control.

For a complete picture of the Ikegami TKC-950B or a demonstration, contact: Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, N.J. 07607; phone: (201) 368-9171.

Ikegami

VISIT US AT BOOTH NO. 406 AT NAB

WGBH engineers talk about the Ikegami HK-312

WGBH covers Boston Pops Orchestra concerts with Ikegami HK-312 cameras from Symphony Hall, Boston.

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

Pops without noise
Tom Keller, Director of Engineering:

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

2 IRE, but a complaint
Ken Hori, Senior Engineer for Advanced Development:

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

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

Washouts and dropouts
Bill Fairweather,
Video Control Engineer:

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

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

The HK-312 is the camera that met WGBH criteria for performance, stability, and reliability. They also have HL-53s, high-performance portable cameras that interface with HK-312 CCUs and can operate portably with their own CCUs.

Adapters for triax cable, using digital techniques, make their cameras remote-usable at nearly a mile from base stations, yet easily revertible to multicore cable whenever needed.

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

If all of this suggests that the HK-312 is probably the best studio/field color camera in the industry, consider this: camera, set-up computer, and triax adaptor are not only operational, they are deliverable. For details or a demonstration, contact **Ikegami Electronics (USA) Inc.**, 37 Brook Ave., Maywood, NJ 07607, (201) 368-9171 / West Coast: 19164 Van Ness Ave., Torrance, CA 90501, (213) 328-2814 / Southwest: 330 North Belt East, Houston TX 77060, (713) 445-0100.

VISIT US AT BOOTH NO. 406 AT NAB

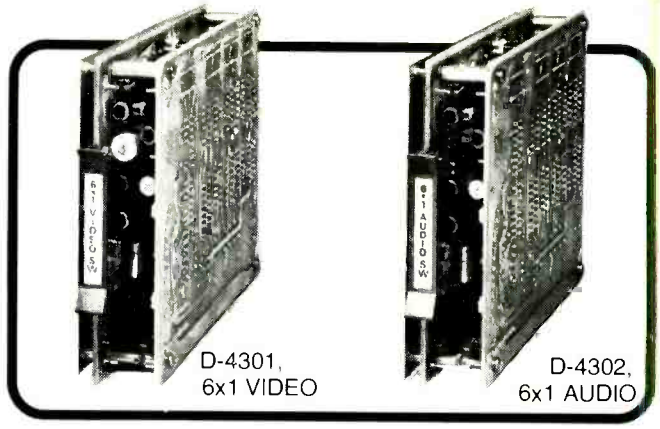
Ikegami HK-312

Circle (31) on Reader Service Card

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Automation Systems, Audio		
Broadcast Electronics Inc.	309	C2
Cetec	307	C1
Channelmatic Inc.	2517	O6
Hallikainen & Friends Inc.	2312	M4
Harris Corporation	303	B2,3,4
IGM/NTI	343	E3
Image Video Limited	2819	P3
Inovonics Inc.	2103	L2
Microprobe Electronics Inc. (MEI)	445	G2
Sono-Mag Corp. (SMC)	397	F4
TeleMation	342	G5
UMC Electronics Co. (Broadcast Products Division)	407	F2
American Data Corp.	312	D8
Consolidated Electronics Industries	311	C3
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Groton Computer Co.	2204	L3
Automation Systems, Video		
Automated Processes Inc.	373	K2
Central Dynamics Ltd.	344	G6
Channelmatic Inc.	2517	O6
The Grass Valley Group Inc.	308	C8
Image Video Limited	2819	P3
Philips Test and Measuring Instruments, Inc.	314	D7
Recortec, Inc.	336	F8
Tektronix Inc.	306	C6
TeleMation	342	G5
Videomedia Inc.	2825	P4,5
Vital Industries Inc.	316	D5
Ampex Corporation	301	A1,2,3,4
American Data Corp.	312	D8
Dytek Industries	2301	M2
Kaman Sciences Corp.	325	D1
Micro Consultants, Inc.	404	J7
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Channelmatic, Inc.	2517	O6
Groton Computer Co.	2204	L3
Microtime, Inc.	2305	M,N5
ATS Equipment		
Electro Impulse Lab Inc.	417	F1
Harris Corporation	303	B2,3,4,
Micro Control Associates Inc.	311A	C3
Moseley Associates Inc.	329	D3

Continued on page 62

THE BETTER WAY



D-4301, 6x1 VIDEO

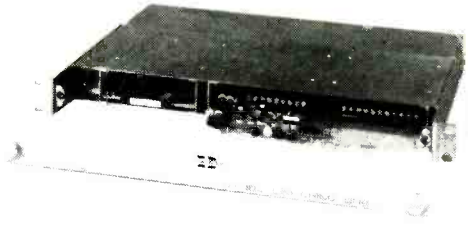
D-4302, 6x1 AUDIO

We make small routing switchers too!

D-4307, 16x1 VIDEO-AUDIO

Datatek has now added the D-4300 series video and audio switching units to its line of routing switchers. With building blocks of 6x1, 16x1 and 20x1, these switching units may be used for:

- Input preselects to production switchers to expand their capacities
- Switching inputs to vectorscopes and monitors
- Adding preview busses to existing switchers
- VTR Input selection
- These units may also be stacked to make up small routing switchers at an economic price.



D-4304, 20x1 VIDEO

D-4305, 20x1 AUDIO

For More Information, Write or Call

DATATEK CORP

1166 W. CHESTNUT ST. UNION, N.J. 07083 • (201) 964-3656

Circle (33) on Reader Service Card

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Potomac Instruments Inc.	377	F3
QEI	435	G4

Antennas, Transmission Lines, Towers and Lights

Allied Tower Co. Inc.	2100	L2
Andrew Corporation	360	G6
Bogner Broadcast Equipment Corp.	2202	L2
C.S.P. Inc.	543	K1
Cablewave Systems Inc.	381	F1
Cetec Antennas	499	J2
Comark Industries Inc.	2203	M2
EG and G	2302	M2
Electro Impulse Inc.	417	F1
Flash Technology Corp. of America	547	K2
Harris Corporation	303	B2,3,4,
Micro Communications Inc.	513	J3
Microwave Associates Inc.	340	G5
Fred A. Nudd Corporation	2310	M4
Phelps Dodge Communications Co.	353	E3
Soll, Inc.	505	J2
Unarco-Rohn (Div. of Unarco Ind. Inc.)	373A	F4
Utility Tower Co.	323	D1
CCA Electronics Corp.	305	B1
Nurad, Inc.	533	K3
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Boston Insulated Wire and Cable	358	G6
Lightning Elimination Asso.	437	G3
Nurad, Inc.	533	K3
Stainless, Inc.	2109	L4
Tayburn Electronics, Inc.	2502	N2

Amplifiers, Pre-amps, DA's

American Data Corp.	312	D8
Audio & Design Recording Ltd.	2215	M4
Audio Designs Mfg. Inc.	414	K5,6
Automated Processes Inc.	373	K2
Broadcast Electronics Inc. (BEI)	309	C2
Central Dynamics Ltd.	344	G6
Channelmatic Inc.	2517	O6
Datatek Corp.	521	J4
Di-Tech Inc.	2403	N2
Dynasciences	497	J3
Frezzolini Electronics Inc.	2415	N6
Glentronix (U.S.) Inc.	2609	O3
The Grass Valley Group Inc.	308	C8
Harris Corporation	303	B2,3,4
Industrial Sciences Inc.	531	K4
LPB Inc.	383	F1
Leitch Video Ltd.	561	K1
Logitek Electronic Systems	2111	L4
McCurdy Radio	321	D1
McMartin Industries Inc.	317	D4
Marconi Electronics Inc.	322	E6
Marti Electronics Inc.	349	E4
Micro-Trak Corp.	391	F3
Panasonic Company	481, 483	H2
RTS Systems Inc.	2115	L5
Ramko Research Inc.	409	F1
Rupert Neve Inc.	507	J4
Russco Electronics Mfg. Inc.	427	F3
Sescom Inc.	443	E3
Shintron Company Inc.	410	K7
Shure Brothers Inc.	371	E4
Stanton Magnetics Inc.	363	E1
Standard Pacific Labs	2108	L5
TeleMation	342	G5
Telemet	333	D3
Telex Communications Inc.	357	E2
Tweed Audio (USA) Inc.	2207	M3
Vitex Division, Vital Industries	2219	M6
Ward-Beck Systems Inc.	489	H4
Wolf Coach/Television Eng. Corp.	503	J1
Lenco, Inc.	372	G7
Taber Mfg. and Eng. Co.	459	G1

Audio Components, Tubes & Hardware

Accurate Sound Corp.	2103	L2
Automated Processes Inc.	373	K2
Calvert Electronics Inc.	2117	L5
Micro-Trak Corp.	391	F3
Panasonic Company	481, 483	H2
Sescom Inc.	443	E3
Shure Brothers Inc.	371	E4
Standard Pacific Labs	2108	L5
Thomson-CSF Electron Tubes	2210	E8
Boston Insulated Wire and Cable	358	G6
Ceco Communications	431	F4
United Research Labs Corp.	375	F3
Varian Associates (Eimac Division)	487	H4

Cameras, Studio & Accessories

Anvil Cases Inc.	2507	O3
Amperex Electronic Corp.	310	L8
Bosch Fernseh	330	F5
Camera Mart	555	K3
Commercial Electronics Inc. (CEI)	398	J5
Victor Duncan Inc.	2515	O5
Harris Corporation	303	B2,3,4
Hitachi-Denshi	334	F7
Ikegami Electronics (USA) Inc.	406	J8
Innovative Television Equipment	388	J7
International Video Corp.	346	G7
Listec Television Eqpt. Corp.	465	G2
Marconi Electronics Inc.	322	E6
O'Connor Engineering Labs Inc.	2500	N1
Philips Broadcast Equipment Corp.	314	D7
Wolf Coach/Television Eng. Corp.	503	J1
Panasonic Company, Video Systems Division	483	H2
Quick-Set Inc.	495	J3
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Thomson CSF Laboratories	324	E8
Sony Corporation	380	H5,6,7
Tele-Cine Inc.	392	J6

Continued on page 64

We're Unwrapping Some Surprise Packages at the NAB in Dallas.

SURPRISE #1

HIGH-RESOLUTION, SHADOW-MASK COLOR MONITORS

The finest professional shadow-mask color monitors available. Priced far below the competition. Ready for immediate delivery. Compare these features:

- Broadcast and teleproduction master monitor quality
- A/B, RGB differential inputs standard
- Complete remote control of *all* monitor functions
- Comb filter standard
- Available in 14", 20" and 23" rack or cabinet models

SURPRISE #2

A SENSIBLE ALTERNATIVE TO WAVEFORM AND VECTOR MONITORS

Now you have a reliable, high-quality alternative in a full line of waveform and vector monitors — with a no-nonsense delivery schedule. Check these outstanding features:

- *8-10 week* delivery
- Full broadcast performance
- PAL and NTSC versions
- Vector encoder option
- Exceptionally bright, 10x10 cm display
- Compact, 5-¼" high half-rack package

SURPRISE #3

THE LENCO TREASURE HUNT

If all that isn't enough to have you stampeding to our booth, we're continuing with our fabulous LENCO TREASURE HUNT. *Our 4th Annual Giveaway is $531!* No need to purchase. No restrictions. Customers, prospects, suppliers — even our competition — can play. Just sign in at our booth, or at our hospitality suite high atop the new Lowes Anatole Hotel. You'll get a set of clues to lead you to the LENCO TREASURE. The first to find it collects the loot. Don't miss the fun!

LENCO, INC., ELECTRONICS DIVISION

300 N. Maryland St., Jackson, MO. 63755, (314) 243-3147

SURPRISE YOURSELF AT BOOTH #372
NAB / DALLAS

Circle (34) on Reader Service Card

Special Edition: Equipment directory

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Toshiba International Corp.	2701	P1,2
US JVC Corp.	408	K8
Cameras, ENG & Accessories		
Amperex Electronic Corp.	310	C8
Anvil Cases Inc.	2507	O3
Asaca Corp.	2503	O2
Bosch Fernseh	330	F5
Camera Mart	555	K3
Commercial Electronics Inc. (CEI)	398	J5
Victor Duncan Inc.	2515	O5
Fujinon Optical Inc.	515	J2
Hitachi-Denshi	334	F7
Ikegami Electronics (USA) Inc.	406	J8
Innovative Television Equipment	388	J7
Listec Television Eqpt. Corp.	465	G2
Marconi Electronics Inc.	322	E6
Microwave Associates Inc.	340	G5
NEC America Inc.	2404	M,N3
O'Connor Engineering Labs Inc.	2500	N1
Panasonic Company	481, 483	H2
Philips Broadcast Eqiupment Corp.	314	D7
RF Technology Inc.	2410	N6
Sharp Electronics Corp.	2400	M,N1
Video Aids Corp. of Colorado	553	K3

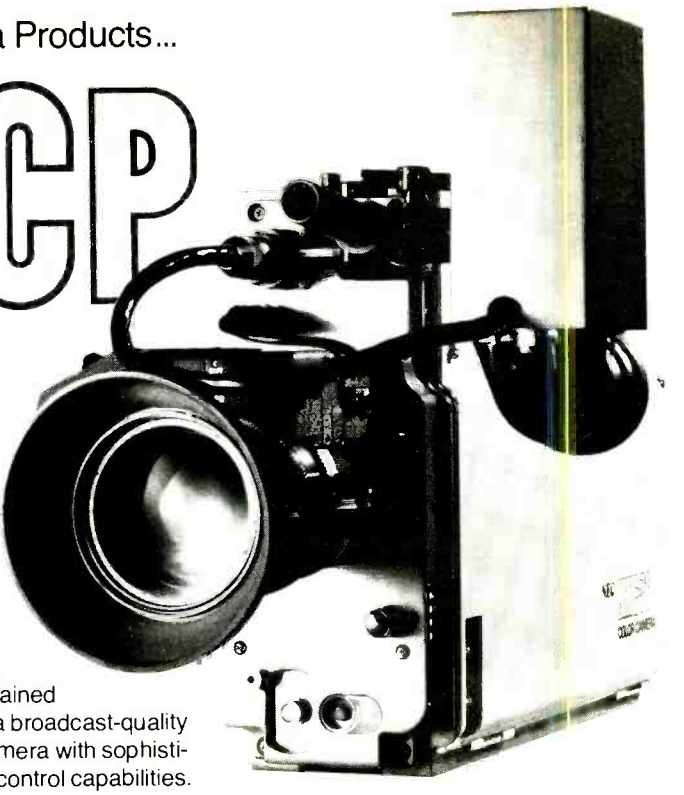
COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Wolf Coach/Television Eng. Corp.	503	J1
Ampex Corporation	301	A1,2,3,4
Christie Electric Corp.	2600	O1
Cinema Products Corp.	2217	M5
International Video Corp.	346	G7
US JVC Corp.	408	K8
Nurad, Inc.	533	K3
Sony Corp.	380	H5,6,7
Thomson CSF Laboratories	324	E8
Frezzolini Electronics Inc.	2415	N6
Cine 60, Inc.	2700	O1
Perrott Engineering Labs, Inc.	2704	O2
Tele-Cine Inc.	392	J6
Toshiba International Corp.	2701	P1,2
Yves Faroudja	412B	K6
Cameras & Projectors, Film		
Bosch Fernseh	330	F5
Victor Duncan Inc.	2515	O5
Frezzolini Electronics Inc.	2415	N6
Ikegami Electronics (USA) Inc.	406	J8
Laird Telemedia	537	K2
Marconi Electronics Inc.	322	E6
Cinema Products Corp.	2217	M5

Continued on page 68

Manufactured by **NEC** exclusively for Cinema Products...

MNC-71CP

The multi-purpose portable video camera.



News, documentaries, sports, commercials or TV specials...no matter what you're shooting, the portable MNC-71CP is the ideal camera for all your video production needs. And the best value for your money.

Because, in design and performance, the MNC-71CP is the most advanced camera of its class. With built-in linear matrix, 2-line image sharpener, comb filter and coring, I/Q encoder and color bar generator, automatic iris, white balance, black balance, flare compensation. Delivering *studio-quality* picture resolution and outstanding colorimetry, with ENG/EFP portability and versatility.

ENG/EFP Design Excellence

Manufactured by Japan's largest manufacturer of broadcast equipment — Nippon Electric Co., Ltd. (NEC) — the MNC-71CP incorporates design inputs from Cinema Products, and features many improvements over all first-generation backpackless cameras. It is a totally new video camera system, specifically designed from its inception to be used both as a compact, lightweight, fully self-contained ENG camera, as well as a broadcast-quality studio/field production camera with sophisticated remote production control capabilities.

Studio-Type Applications

There's no need to repackage the camera in a bulky outer shell for studio operation. Just add the optional 5" viewfinder and the portable production CCU (with cable compensation up to 155 feet), or the rack-mounted teleproduction CCU (with cable compensation for more than 1000 feet)... and your MNC-71CP readily converts into an MNC-710CP studio/field configuration. Ideal for multi-camera shoots on location and in the studio.

Around-The-Clock Service

The MNC-71CP was designed for utmost stability and reliability in performance as well as ease of maintenance.

What's more, it is backed by Cinema Products' outstanding after-sales service. With an unprecedented full one-year warranty, and replacement parts available anywhere in the United States within 24 hours! Plus an extensive network of MNC-71CP dealers with "stand-by" loaner/rental cameras...just in case.

And for around-the-clock seven-day video service, you can call Cinema Products' toll-free number: 800-421-7486.

Less Than $1000 Per Month!

The MNC-71CP is probably the most reasonably priced broadcast-quality camera system available. And Cinema Products' easy-term lease/purchase program makes it easier than ever to "pay as you go" on your equipment purchases. For example, you can acquire a complete MNC-71CP outfit, ready-to-shoot, for less than $1000 per month!

So be sure to call on us as you analyze your present and future equipment needs, and we will design a complete package deal specifically tailored to meet your production needs as well as your financial requirements.

MNC-710CP Studio/Field Production System

Rack-mounted Teleproduction CCU

Portable Production CCU

("Paint Box") Remote Control Panel

For full details, call 800-421-7486.

cinema products CORPORATION

Technology In The Service Of Creativity

2037 Granville Avenue, Los Angeles, California 90025
Telephone: (213) 478-0711 • (213) 477-1971 • Telex: 69-1339

SONY INVITES YOU TO SEE HOW FAR BROADCASTING HAS COME SINCE 1978.

While the engineers at Sony continue to advance the state of broadcasting technology on a daily basis, NAB conventions are, unfortunately, held but once a year.

Which means you have only four fleeting days to examine first-hand what Sony has been developing for the last 365.

And the past 365 days have indeed been fruitful.

This year at NAB, for example, we'll be introducing our improved Type C 1" VTR: the BVH-1100. A state-of-the-art recorder incorporating everything from Sony "confidence" heads for monitoring off the tape during recording, to a dynamic tracking option that makes noise-free "on air" transmissions possible from ¼ speed in reverse to double speed in forward.

The NAB show will also mark the introduction of our new digital time base corrector, the BVT-2000, plus a new dynamic tracking remote control unit, a new mid-range editor, and some things so advanced they weren't finished in time to talk about here.

And, you'll also be able to examine the Sony computer editing unit, and the complete range of portable ENG/EFP cameras, recorders and monitors that have already proven Sony's leadership in 1" technology.

Don't miss the Sony booth at the NAB show this year.

Because it would be a pity to come all the way to Dallas and not see how far the industry has come.

SONY® BROADCAST

Sony is a registered trademark of the Sony Corp. of America, 9 West 57th St., N.Y., N.Y. 10019.

Circle (35) on Reader Service Card

Special Edition: Directory

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Cart Machines, Carts & Accessory Equipment		
Accurate Sound Corp.	2103	L2
Ampro Broadcasting	369	E3
Anvil Cases Inc.	2507	O3
Audi-Cord Corp.	419	F1,2
Bosch Fernseh	330	F5
Broadcast Cartridge Service	2304	M2
Broadcast Electronics Inc. (BEI)	309	C2
Capitol Magnetic Products	361	E1
Fidelipac	351	E4
Harris Corporation	303	B2,3,4
IGM/NTI	343	E3
International Tapetronics Corp.	319	D2
Sono-Mag Corp.	397	F4
Telex Communications Inc.	357	E2
UMC Electronics Co. (Broadcast Products Division)	407	F2
Ward-Beck Systems Inc.	489	H4
The Winsted Corp.	2601	O1
CCA Electronics Corp.	305	B1
Cetec Broadcast Group	307	C1
LBP Inc.	383	F1
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
3M Company	439	G3
Character Generators		
Beston Electronics Inc.	376	G8
Bosch Fernseh	330	F5
Camera Mart	555	K3
Datatron Inc.	491	H3
Dynasciences	497	J3
Knox Video Products	2706	O3
Laird Telemedia	537	K2
3M Company, Video Products	302	C5
MPB Technologies Inc.	2815	P3
QSI Systems Inc.	2800	P3
Shintron Company Inc.	410	K7
System Concepts Inc.	517	J1
TeleMation	342	G5
Chyron Telesystems	382	J5
Colorado Video, Inc.	523	J3
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Thomson CSF Laboratories	324	E8
Consoles, Audio		
Accurate Sound Corp.	2103	L2
Amco Engineering Co.	393	F3
Ampro Broadcasting	369	E3
Audio Designs & Mfg. Inc.	414	K5,6
Auditronics, Inc.	379	F2
Autogram Corp.	2114	L6
Automated Processes Inc.	373	K2
Broadcast Electronics Inc. (BEI)	309	C2
Camera Mart	555	K3
Cetec	307	C1
Hallikainen & Friends Inc.	2312	M4

Continued on page 70

See us at Booth 2411 NAB

WHEN YOU THINK OF THE LEGENDARY AMPEX VR-1200's AND VR-2000's THINK OF AFA...

We're keeping the legend alive!

AMPEX VR-2000's and VR-1200's are the stuff legends are made of. . . they're the best. So if you can't afford a *New* VTR. . . consider owning a "pre-owned" legendary AMPEX VTR instead.

Our customers, including TV Stations, Manufacturers, Institutions, TV and Film Production Facilities have purchased $8 million in AMPEX VR-2000's; VR-1200's AVR-1's, HS-200's and paid only half that price. They know they're still getting the best in VTR's.

AFA VTR's are fully rebuilt and good as new. . . even better! These "legends" are in a class of their own. . and at prices that are becoming legendary in their own rights.

And when the New AMPEX VTR's become legend. . . AFA will be there to keep them "alive" too.

Who knows. . . some day someone will have to keep our legend alive.

AFA...the largest rebuilder of the best VTR's in the world.

AFA

A.F. ASSOCIATES, INC.
100 Stonehurst Court, Northvale, NJ 07647
2465 E. Bayshore, Suite 301, Palo Alto, CA 94303

201-767-1000
415-856-1060

Circle (36) on Reader Service Card

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Harris Corporation	303	B2,3,4
Industrial Sciences Inc.	531	K4
LPB Inc.	383	F1
Logitek Electronic Systems	2111	L4
McCurdy Radio	321	D1
McMartin Industries Inc.	317	D4
Philips Broadcast Equipment Corp.	314	D7
Micro-Trak Corp.	391	F3
QRK Electronic Products Inc.	389	F2
Rockwell International, Collins Transmission Systems Division	315	C4
Ward-Beck Systems Inc.	489	H4
RTS Systems Inc.	2115	L5
Ramko Research Inc.	409	F1
Rupert Neve Inc.	507	J4
Russco Electronics Mfg. Inc.	427	F3
Shure Brothers Inc.	371	E4
Standard Pacific Labs	2108	L5
Tweed Audio (USA) Inc.	2207	M3
UMC Electronics Co. (Broadcast Products Division)	407	F2
Wilkinson Electronics Inc.	347	E4
CCA Electronics Corp.	305	B1
Pacific Recorders and Engineering Corp.	416	K5
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Ward-Beck Systems Inc.	489	H4

Consoles, Video

Amco Engineering Co.	393	F3
American Data Corp.	312	D8
Camera Mart	555	K3
Crosspoint Latch Corp.	2801	P1
Glentronix (U.S.) Inc.	2609	O3
The Grass Valley Group Inc.	308	C8
Industrial Sciences Inc.	531	K4
Philips Broadcast Equipment Corp.	314	D7
Vitex Division, Vital Industries	2219	M6
The Winsted Corp.	2601	O1
Bayly Engineering Ltd.	425	F3
Image Video Ltd.	2819	G7

Earth Station Equipment & Services

Andrew Corporation	360	G6
Arvin/Echo Sciences Corp.	390	J8
Channelmatic Inc.	2517	O6
Comsearch Inc.	2110	L5
Microwave Associates Inc.	340	G5
Moseley Associates Inc.	329	D3
NEC America Inc.	2404	M,N3
Rockwell International Corp., Collins Transmission Systems Division	315	C4
Microtime, Inc.	2305	M,N5
Mutual Broadcasting System	2200	L1
RCA American Communications, Inc.	300-B	A7
Scientific Atlanta, Inc.	477	G2

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER

Video Editing Equipment

Bosch Fernseh	330	F5
CMX Systems	350	G8
Camera Mart	555	K3
Central Dynamics Ltd.	344	G6
Consolidated Video Systems Inc.	1662	J5
Convergence Corp.	378	H8
Datatron Inc.	491	H3
Victor Duncan Inc.	2515	O5
Dynasciences	497	J3
Glentronix (US) Inc.	2609	O3
International Video Corp.	346	G7
Mach One Digital Systems	2505	O3
Philips Broadcast Equipment Corp.	314	D7
QSI Systems Inc.	2800	P3
Recortec Inc.	336	F8
United Media Inc.	2711	P6
Video Aids Corp. of Colorado	553	K3
Videomedia Inc.	2825	P4,5
The Winsted Corp.	2601	O1
Dytek Industries Inc.	2301	M2
Panasonic Company, Video Systems Division	483	H2
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Skotel Corp.	2827	P5
Servo Corporation of America	2716	O6
US JVC Corp.	408	K8

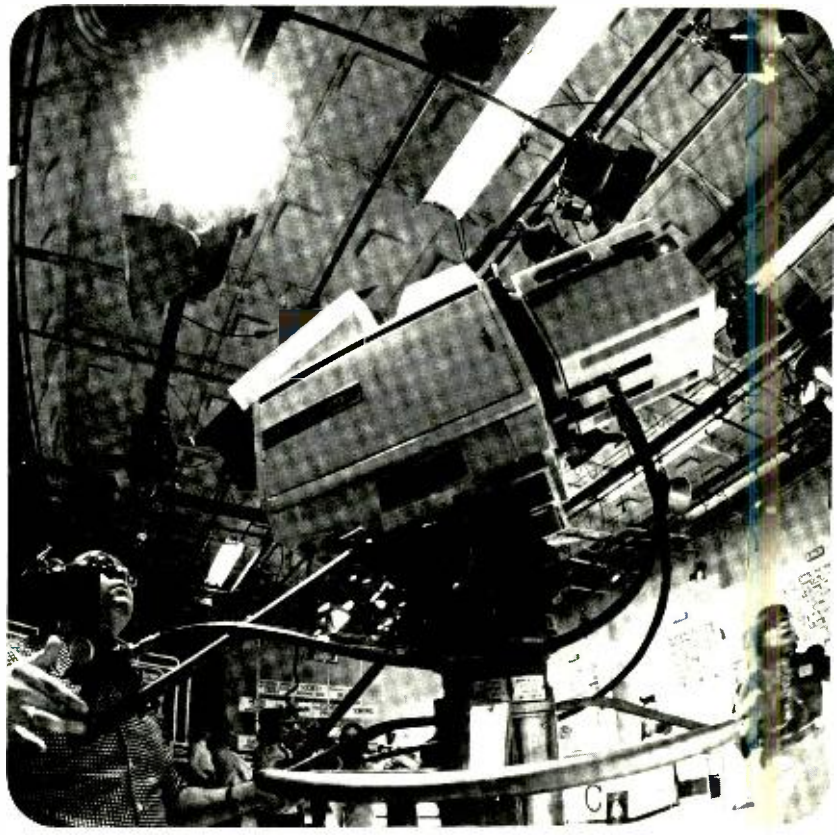
Encoders and Decoders

Accurate Sound Corp.	2103	L2
Broadcast Electronics Inc.	309	C2
Broadcast Video Systems Ltd.	2823	P4
Central Dynamics Ltd.	344	G6
Cohu Inc.	471	G4
IGM/NTI	343	E3
Logitek Electronics Systems	2111	L4
Marconi Electronics	322	E6
Marti Electronics	349	E4
Oak Communications, Inc.	2223	M6-7
Philips Test and Measuring Instruments Inc.	314	D7
Tektronix Inc.	306	C6
TeleMation	342	G5
Telemet	333	D3
Time and Frequency Technology	341	E2
United Media Inc.	2711	P6
The BTX Corporation	2409	N4
Lenco, Inc.	372	G7
MCI Inc.	401	F4
Skotel Corporation	2827	P5
Electro and Optical Systems Ltd.	2803	P2
Yves Faroudja, Inc.	412	K6

Continued on page 72

Harris Advanced Technology Creates The TC-80A....

....Delivering A Picture Better Than Network Quality Or Any Competitive Camera On The Market Today.



Due to Harris' continuing programs in camera technology, these advanced features maintain the TC-80A at the forefront of performance technology... providing the finest resolution available, allowing production of superb pictures even in poor studio or remote lighting environments.

Harris technology now brings to the TV camera market the new Diode Gun Plumbicon®* Pick-Up Tubes and Highlight Handling.

Harris is a leader in camera technology bringing to the industry the first American-built TV camera with Triax, and now the new Diode Gun Plumbicon®* Pick-Up Tubes and Highlight Handling.

For more information: Contact Harris Corporation, Broadcast Products Division, Quincy, Ill. 62301.

*Trademark of N.V. Philips of Holland

See at '79 NAB — Harris Booth 303

HARRIS
COMMUNICATION AND INFORMATION PROCESSING

Circle (38) on Reader Service Card

Equipment directory

Special Edition

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Test Sets, Vertical Interval		
Lenco	372	G7
Tektronix	306	C6
Video Aids Corp. of Colorado	553	K3
Telemet	333	D3
Television Equipment Asso.	364	G5
Rhode & Schwarz	386	J6
Marconi	322	E6
Philips Test & Measuring Instruments	314	D7
Fibre Optic Links and Lines		
Bosch Fernseh	330	F5
Rank Precision Industries, Inc.	348	G8
Telemet	333	D3
Film Chain Equipment		
Accurate Sound Corp.	2103	L2
Beston Electronics Inc.	376	G8
Cohu Inc.	471	G4
Ikegami Electronics (USA) Inc.	406	J8
LW International	338	F6
Laird Telemedia	537	K2
Marconi Electronics Inc.	322	E6
Philips Broadcast Equipment Corp.	314	D7
Porta-Pattern Telecommunications Industries	449	G1
Rank Precision Industries, Inc.	348	G8
TeleMation	342	G5
Eastman Kodak Co.	473	G4
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
RF Cueing Systems		
Comrex Corporation	541	K1
Low Frequency Extenders		
Comrex Corporation	541	K1
Frame Store Synchronisers		
Adda Corp.	2104	L3
Arvin/Echo Science Corp.	390	J8
Camera Mart	555	K3
Consolidated Video Systems Inc.	1662	J5
Digital Video Systems	2708	M6,7
The Grass Valley Group	308	C8
Micro Consultants	404	J7
NEC America, Inc.	2404	M,N3
MCI Inc.	401	F4
Microtime, Inc.	2305	M,N5
Audio Heads and Refurbishing		
Computer Magnetics Corp.	529	K4
Nortronics Company, Inc.	345	E3
Re:DB Company	2811	P2
United Research Lab Corp.	375	F3
Videomagnetics, Inc.	2705	P5
Taber Mfg. and Eng. Co.	459	G1
Video Heads and Refurbishing Services		
Computer Magnetics Corp.	529	K4
Glentronix (US) Inc.	2609	O3
International Video Corp.	346	G7
Merlin Engineering Works	412	K6
Videomax	350	G8
Ampex Corporation	301	A1,2,3,4
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Videomagnetics	2705	P5
SpinPhysics — A Kodak Co.	473	G4
Taber Mfg. and Eng. Co.	459	G1
AM Stereo Generators		
Bayly Engineering Ltd.	425	F3
Harris Corp.	303	B2,3,4
Philips Test and Measuring Instruments, Inc.	314	D7
Belar Electronics Labs Inc.	367	E2
Headphones, Speakers/Intercoms		
Accurate Sound Corp.	2103	L2
Harris Corporation	303	B2,3,4
Alan Gordon Enterprises Inc.	2501	O1
LPB, Inc.	383	F1
McCurdy Radio	321	D1
Panasonic Company	481, 483	H2
Philips Broadcast Equipment Corp.	314	D7
RTS Systems Inc.	2115	L5
Shure Brothers Inc.	371	E4
Stanton Magnetics Inc.	363	E1
Standard Pacific Ltd.	2108	L5
TV Equipment Associates	364	G5
Telex Communications	357	E2
Ward-Beck Systems Inc.	489	H4
World Video Inc.	501	J1
Lenses and Lens Services		
Angenieux Corp. of America	318	D5
Canon USA Inc.	493	J4
Victor Duncan, Inc.	2515	O5
Fujinon Optical Inc.	515	J2
Harris Corp.	303	B2,3,4
Ikegami Electronics (USA) Inc.	406	J8
Rank Precision Industries, Inc.	348	G8
Rosco Labs, Inc.	2211	M4
Warren R. Smith	338	F6
Cinema Products Corp.	2217	M5
Tele-Cine Inc.	392	J6
Ward-Beck Systems Inc.	489	H4
Warren R. Smith Co.	338	F6
Lights and Lighting Accessories		
Accurate Sound Corp.	2103	L2

Continued on page 74

"This Auditronics 501 was one of TM Productions' first

boards six years ago and it still runs a tightly packed schedule of original vocal session recording and mixdowns" says Ken Justiss, Operations Manager of TM Productions in Dallas. "Since we do more commercials and station ID's than anybody else in the world, we produce literally thousands each year, and at some point they've all gone through this Son-Of-36-Grand (serial number 011)."

"There's not a faster board to work with than the Auditronics 501 whether we use it for building demos or complex production tasks. It's compact, all its controls are so very accessible even trainees become proficient on it quickly."

"Its reliability is outstanding. We've literally worn out the faders once, and we've changed a switch or two, but the things I've seen go wrong with this board in six years are so minor, it's a waste of time to even talk about. It's an excellent creative tool and I'd find it hard to fault our Auditronics 501 in any area. In fact, our success with this board was largely responsible for our buying three more Auditronics consoles."

If you'd like to know more about how TM Productions' four Auditronics consoles are producing for Ken Justiss and his colleagues, we invite you to call him at 634-8511 while you're at NAB, or visit Auditronics in exhibit 379.

auditronics, inc.

3750 Old Getwell Road, Memphis, Tennessee 38118 (901) 362-1350

Circle (40) on Reader Service Card

Equipment directory

Special Edition

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Anvil Cases, Inc.	2507	O3
Bardwell and McAlister	559	K2
Berkey Colortran, Inc.	370	G6
C.S.P. Inc.	543	K1
Camera Mart	555	K3
Victor Duncan, Inc.	2515	O5
Electro Controls, Inc.	2303	M4
Fidelipac	351	E4
Frezzolini Electronics Inc.	2415	N6
General Electric	2509	O4
The Great American Market	2078	O3
GTE Sylvania	320	D4
Harris Corp.	303	B2,3,4
Lowell-Light Mfg., Inc.	2506	N3
Packaged Lighting Systems, Inc.	2611	O4
Roscoe Labs, Inc.	2211	M4
Skirpan Lighting Control Corp.	2625	O6
Strand Century Inc.	475	G3
Unarco-Rohn	373-A	F4
Kliegl Bros.	366	J5

Lighting Control Systems

Kliegl Brothers	366	J5
Berkey Colortran	370	G6
Strand Century	475	G3
Skirpan	2625	O6
Packaged Lighting	2611	O4

Limiters and Compressors

Accurate Sound Corp.	2103	L2
Audio and Design Recording Ltd.	2215	M4
Audio Designs and Mfg., Inc.	414	K5,6
Bayly Engineering Ltd.	425	F3
Broadcast Electronics Inc.	309	C2
Gregg Laboratories	2118	L6
Harris Corp.	303	B2,3,4
Inovonics, Inc.	2103	L2
LPB, Inc.	383	F1
Marti Electronics, Inc.	349	E4
Moseley Associates Inc.	329	D3
McCurdy Radio	321	D1
McMartin Industries, Inc.	317	D4
Orban Associates, Inc.	429	F4
QEI Corp.	435	G4
Ramko Research Inc.	409	F1
Rupert Neve Inc.	507	J4
Shure Bros. Inc.	371	E4
Tweed Audio, Inc. (USA)	2207	M3
Ward-Beck Systems Inc.	489	H4
Wilkinson Electronics Inc.	347	E4
Pacific Recorders and Eng.	416	K5
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Thomson CSF Laboratories	324	E8

Microwave, STL and Remote Control Equipment

Bayly Engineering, Ltd.	425	F3
Delta Electronics Inc.	365	E1
Farinon Video	374	G8
Hallikainen and Friends, Inc.	2312	M4
Marti Electronics, Inc.	349	E4
Micro Control Associates, Inc.	311A	C3
Microwave Associates, Inc.	340	G5
Moseley Associates, Inc.	329	D3
NEC America Inc.	2404	M,N3
R.F. Technology, Inc.	2410	N6
Rockwell International, Collins Division	315	C4
Time and Frequency Technology, Inc.	341	E2
Comsearch, Inc.	2110	L5
Logitek Electronic Systems	2111	L4
Nurad, Inc.	533	K3
Taber Mfg. and Eng. Co.	459	G1
Tayburn Electronics, Inc.	2502	N2
Terracom	2401	N1

Microphones

Accurate Sound Corp.	2103	L2
Camera Mart	555	K3
Glentronix (US) Inc.	2609	O3
Alan Gordon Enterprises Inc.	2501	O1
Gotham Audio Corp.	423	F1
HM Electronics Inc.	2604	O4
LPB, Inc.	383	F1
Marti Electronics, Inc.	349	E4
Philips Broadcast Equipment Corp.	314	D7
R.F. Technology Inc.	2410	N6
Shure Bros. Inc.	371	E4
TV Equipment Associates	364	G5
Telex Communications Inc.	357	E2
ElectroVoice	2504	N3
Panasonic Company, Video Systems Division	483	H2
Sony Corporation	380	H5,6,7

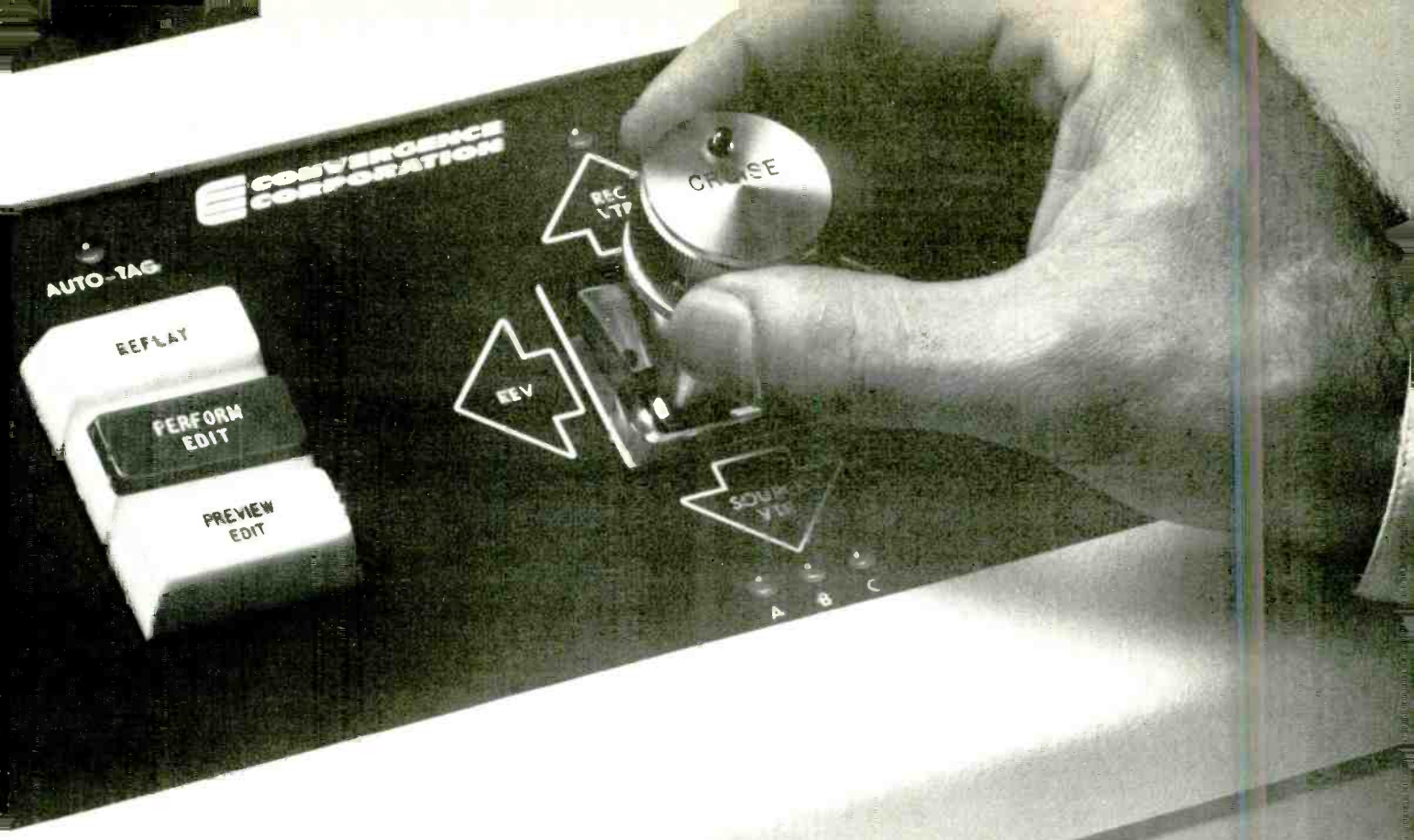
Modulators and Demodulators

Comark Industries Inc.	2203	M2
Di-Tech, Inc.	2403	N2
Dynair Electronics Inc.	368	G5
Electrohome Ltd.	535	K2
McMartin Industries, Inc.	317	D4
Philips Test and Measuring Instruments, Inc.	314	D7
Tektronix	306	C6
Telemet	333	D3
Video Aids Corp. of Colorado	553	K3
Videotek, Inc.	2602	O3
Scientific Atlanta	477	G2

Audio Monitoring, Measuring and Timing Equipment

Automated Processes, Inc.	373	K2
Delta Electronics, Inc.	365	E1
Electrohome Ltd.	535	K2
Fidelipac	351	E4
Gotham Audio Corp.	423	F1
Harris Corp.	303	B2,3,4

Continued on page 76



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For information Circle 99
For demonstration Circle 100

Equipment directory

Special Edition

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Marconi Electronics Inc.	322	E6
McCurdy Radio	321	D1
Potomac Instruments, Inc.	377	F3
QEI Corp.	435	G4
Shure Bros. Inc.	371	E4
Sound Technology	2405	N2
Tektronix Inc.	306	C6
TV Equipment Associates	364	G5
Tentel	395	F3
Time and Frequency Technology, Inc.	341	E2
Tweed Audio (USA) Inc.	2207	M3
Video Aids Corp. of Colorado	553	K3
Ward-Beck Systems Inc.	489	H4
Belar Electronics Laboratory, Inc.	367	E2
ESE	403	F3
Lenco, Inc.	372	G7
Pacific Recorders and Eng.	416	K5
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Ramko Research Inc.	409	F1
Rohde and Schwarz Sales Co. Inc.	386	J6
Telemet	333	D3
Ikegami Electronics (USA) Inc.	406	J8
Logitek Electronic Systems	2111	L4

Video Monitoring, Measuring and Timing Equipment

Broadcast Video Systems, Inc.	2823	P4
Datatek	521	J4
Electrohome Ltd.	535	K2
Laird Telemedia	537	K2
Panasonic Company	481, 483	H2
Philips Broadcast Equipment Corp.	314	D7
Philips Test and Measuring Instruments Inc.	314	D7
Porta-Pattern Telecommunications Industries, Inc.	449	G1
QSI Systems, Inc.	2800	P3
Recortec, Inc.	336	F8
Tektronix Inc.	306	C6
TV Equipment Associates	364	G5
Tentel	395	F3
Video Aids of Colorado	553	K3
Belar Electronics Labs Inc.	367	E2
Delta Electronics Inc.	365	E1
Ikegami Electronics (USA) Inc.	406	J8
Electro and Optical Systems Ltd.	2803	P2
Time and Frequency Technology, Inc.	341	E2
Leitch Video	561	K1
Lenco, Inc.	372	G7

Video Monitors

Bosch Fernseh	330	F5
Broadcast Video Systems, Ltd.	2823	P4
Camera Mart	555	K3
Cohu Inc.	471	G4
Conrac Division, Conrac Corp.	304	C5
Victor Duncan, Inc.	2515	O5
Electrohome Ltd.	535	K2
Glentronix (US) Inc.	2609	O3
Ikegami Electronics (USA) Inc.	406	J8
Panasonic Company	481, 483	H2
Philips Broadcast Equipment Corp.	314	D7
Sharp Electronics Corp.	2400	M,N1
Tektronix Inc.	306	C6
Videotek, Inc.	2602	O3
World Video, Inc.	501	J1
Amtron Corp.	412A	O5
Lenco, Inc.	372	G7
Rohde and Schwarz Co.	386	J6
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Sony Corporation	380	H5,6,7
US JVC Corp.	408	K8
Yves Faroudja, Inc.	412	K6

Noise Reduction Systems

Accurate Sound Corp.	2103	L2
Audio & Design Recording Ltd.	2215	M4
Audio Designs & Mfg. Inc.	414	K5,6
Camera Mart	555	K3
Consolidated Video Systems	400	J5
Dolby Labs	385	F2
Gotham Audio Corp.	423	F1
Inovonics, Inc.	2103	L2
Micro Consultants	404	J7
Philips Broadcast Equipment Corp.	314	D4
Rupert Neve Inc.	507	J7
Tektronix Inc.	306	C6
TeleMation	342	G5
Microtime, Inc.	2305	M,N5
Thomson CSF Laboratories	324	E8
Yves Faroudja, Inc.	412	K6

Phasors and Branching Equipment

CSP Inc.	543	K1

Processing & Equalising Equipment

Accurate Sound Corp.	2103	L2
Audio & Design Recording Ltd.	2215	M4
Audio Designs & Mfg. Inc.	414	K5,6
Computer Magnetics Corp.	529	K4
Crosspoint Latch Corp.	2801	P1
Datatek Corp.	521	J4
Dynasciences	497	J3
The Grass Valley Group	308	C8
Harris Corporation	303	B2,3,4
Industrial Sciences Inc.	531	K4
Inovonics, Inc.	2103	L2
Leitch Video Ltd.	561	K1
Lenco, Inc.	372	G7
3M Company — Video Products	302	C5
McCurdy Radio	321	D1
McMartin Industries Inc.	317	D4
Orban Associates Inc.	429	F4
Rupert Neve Inc.	507	J4
Sescom Inc.	443	E3

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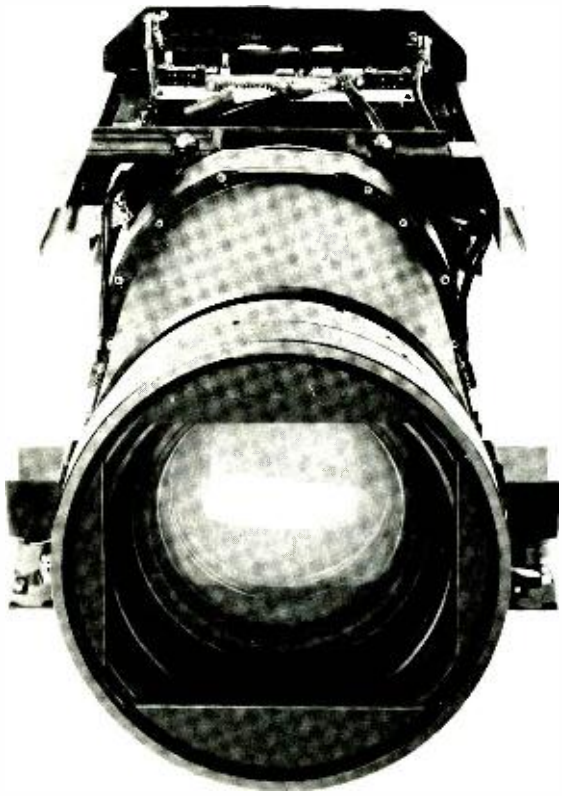
buying a studio lens

10x?, 11x?, 15x?, 16x?, 18x?, 20x?, 25x?, 30x?, 42x?



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Circle (43) on Reader Service Card

Special Edition: Directory

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
TeleMation	342	G5
Telemet	333	D3
TV Equipment Associates	364	G5
Track Audio		
Tweed Audio (USA) Inc.	2207	M3
Ward-Beck Systems Inc.	489	H4
Recorders, Audio Reel-to-Reel		
Accurate Sound Corp.	2103	L2
Gotham Audio Corp.	423	F1
Inovonics, Inc.	2103	L2
International Tapetronics Corp.	319	D2
Microprobe Electronics Inc. (MEI)	455	G2
Otari Corporation	405	F3
Panasonic Company	481, 483	H2
Ramko Research Inc.	409	F1
Rupert Neve Inc.	507	J4
Scully Recording Instruments	355	E3
Telex Communications Inc.	357	E2
United Research Lab Corp.	375	F3
Studer Revox America Inc.	453	G1
Taber Mfg. and Eng. Co.	459	G1
Remote Controls, Video		
Arvin/Echo Science Corp.	390	J8
Channelmatic Inc.	2517	O6
Convergence Corp.	378	H8
IGM/NTI	308	E3
Industrial Sciences Inc.	531	K4
Marconi Electronics Inc.	322	E6
Philips Broadcast Equipment Corp.	314	D7
Recortec Inc.	336	F8
Tektronix Inc.	306	C6
Logitek Electronic Systems	2111	L4
Tayburn Electronics, Inc.	2502	N2
Remotes Audio Equipment		
Comrex Corporation	541	K1
HM Electronics Inc.	2604	O4
IGM/NTI	308	E3
McMartin Industries Inc.	317	D4
Marti Electronics Inc.	349	E4
Micro-Trak Corp.	391	F3
Moseley Associates Inc.	329	D3
Routing Switchers		
American Data Corp.	312	D8
Central Dynamics Ltd.	344	G6
Datatek Corp.	521	J4
Di-Tech Inc.	2403	N2
Dynair Electronics Inc.	368	G5
E-N-G Mfg. Co.	2402	N2
Glentronix (U.S.) Inc.	2609	O3
The Grass Valley Group Inc.	308	C8
Image Video Limited	2819	P3
Industrial Sciences Inc.	531	K4
3M Company — Video Products	302	C5

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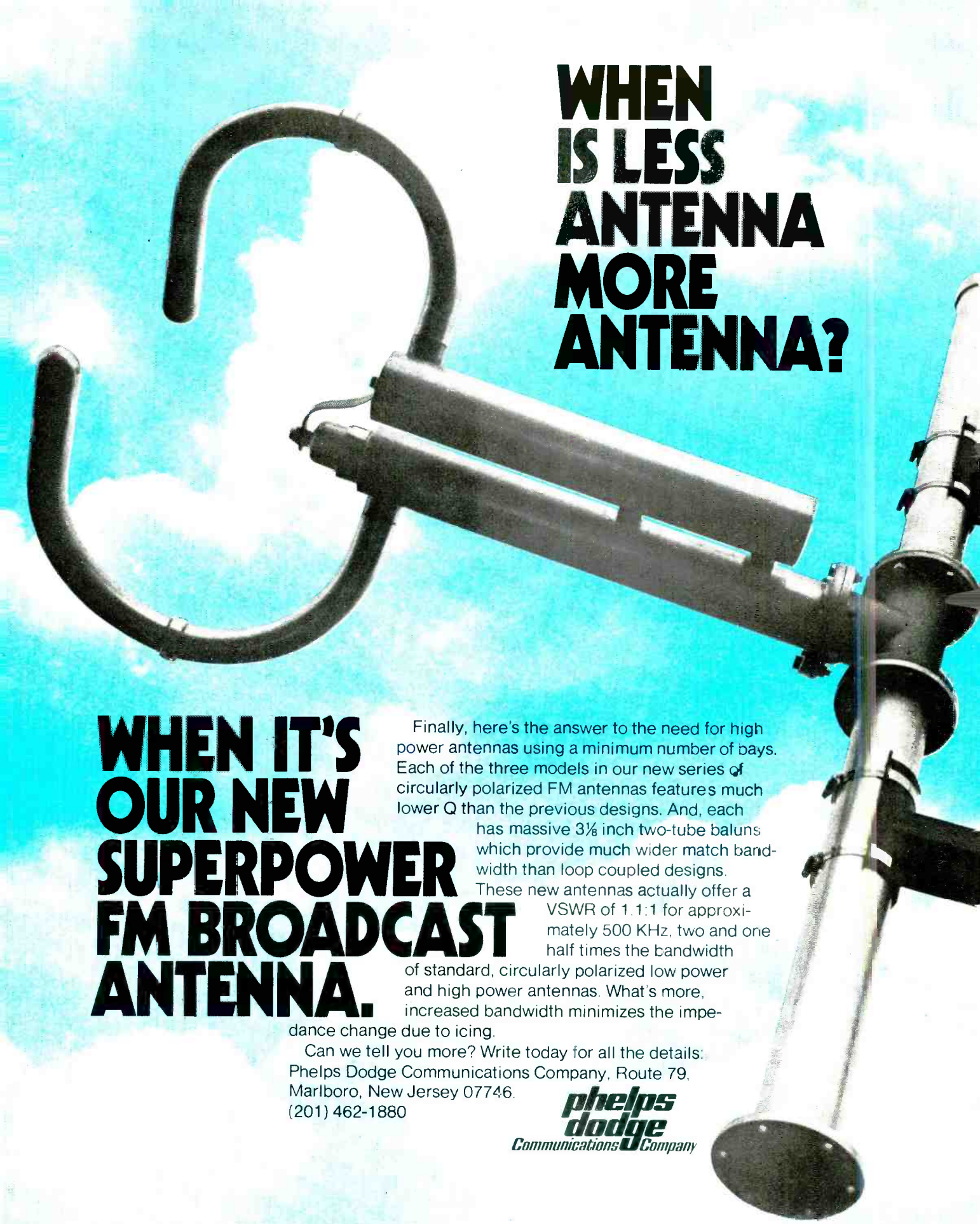

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Finally, here's the answer to the need for high power antennas using a minimum number of bays. Each of the three models in our new series of circularly polarized FM antennas features much lower Q than the previous designs. And, each has massive 3⅛ inch two-tube baluns which provide much wider match bandwidth than loop coupled designs. These new antennas actually offer a VSWR of 1.1:1 for approximately 500 KHz, two and one half times the bandwidth of standard, circularly polarized low power and high power antennas. What's more, increased bandwidth minimizes the impedance change due to icing.

Can we tell you more? Write today for all the details: Phelps Dodge Communications Company, Route 79, Marlboro, New Jersey 07746. (201) 462-1880

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Circle (44) on Reader Service Card

Equipment directory

Special Edition

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Lenco, Inc.	372	G7
McCurdy Radio	321	D1
NEC America Inc.	2404	M,N3
Ramko Research Inc.	409	F1
Standard Pacific Ltd.	2108	L5
TeleMation	342	G5
Telemet	333	D3
Utah Scientific Inc.	2707	P4
Vital Industries Inc.	316	D5
Vitex Co.	2219	M6
Ward-Beck Systems Inc.	489	H4
Dytek Industries Inc.	2301	M2
RF Components		
CSP Inc.	543	K1
Slow-Motion Replay Equipment		
Ampex	301	A1, 2, 3, 4
Arvin/Echo Science Corp.	390	J8
Bosch Fernseh	330	F5
Eigen Video	557	K3
Oktel Corporation	2125	L6,7
Special Effects Equipment & Generators, Audio		
Accurate Sound Corp.	2103	L2
Automated Processes Inc.	373	K2
IGM/NTI	343	E3
Industrial Sciences Inc.	531	K4
MicMix Audio Products Inc.	421	F2
NEC America Inc.	2404	M,N3
Orban Associates Inc.	429	F4
Ikegami Electronics (USA) Inc.	406	J8
Special Effects Equipment & Generators, Video		
American Data Corp.	312	D8
Broadcast Video Systems Ltd.	2823	P4
Bosch Fernseh	330	F5
Central Dynamics Ltd.	344	G6
Convergence Corp.	378	H8
Crosspoint Latch Corp.	2801	P1
Glentronix (U.S.) Inc.	2609	O3
The Grass Valley Group Inc.	308	C8
Industrial Sciences Inc.	531	K4
3M Company — Video Products	302	C5
Marconi Electronics Inc.	322	E6
Philips Broadcast Equipment Corp.	314	D7
Shintron Company Inc.	410	K7
Video Aids Corp. of Colorado	553	K3
Vitex Co.	2219	M6
Vital Industries Inc.	316	D5
Micro Consultants	404	J7
Ikegami Electronics (USA) Inc.	406	J8
Panasonic Company, Video Systems Division	483	H2
Switchers, Video		
American Data Corp.	312	D8
Camera Mart	555	K3
Central Dynamics Ltd.	344	G6
Convergence Corp.	378	H8
Crosspoint Latch Corp.	2801	P1
Datatek Corp.	521	J4
Di-Tech Inc.	2403	N2
Dynair Electronics Inc.	368	G5
Glentronix (U.S.) Inc.	2609	O3
The Grass Valley Group Inc.	308	C8
IGM/NTI	343	E3
Ikegami Electronics (USA) Inc.	406	J8
Industrial Sciences Inc.	531	K4
3M Company — Video Products	302	C5
Marconi Electronic Inc.	322	E6
Philips Broadcast Equipment Corp.	314	D7
Shintron Company Inc.	410	K7
TeleMation	342	G5
Telemet	333	D3
Utah Scientific Inc.	2707	P4
Vital Industries Inc.	316	D5
Vitex Co.	2219	M6
Ampex Corporation	301	A1,2,3,4
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Ross Video	2508	N4
Beaveronics, Inc.	369A	E3
Dytek Industries Inc.	2301	M2
Lenco, Inc.	372	G7
Panasonic Company, Video Systems Division	483	H2
SCA Equipment		
Bayly Engineering	425	F3
CCA Electronics	305	B1
Cetec Broadcast Group	307	C1
Colorado Video	523	J3
Farinon	374	G8
Harris Corporation	303	B2,3,4
Marti Electronics	349	E4
Moseley Associates	329	D3
McMartin Industries	317	D4
Rockwell International, Collins Division	315	C4
TerraCom	2401	N1
Time & Frequency	341	E2
Wilkinson Electronics	347	E4
Station Business Systems		
Automated Business Concepts	545	K2
Bloomington Broadcasting Corp.	2308	M3
Computer Management Systems	2212	L5
Groton Computer	2204	L3
Kaman Sciences	325	D1
Station Business Systems	327	D2
Bonneville Data Systems	2206A	L4
Slow Scan TV		
Colorado Video, Inc.	523	J3

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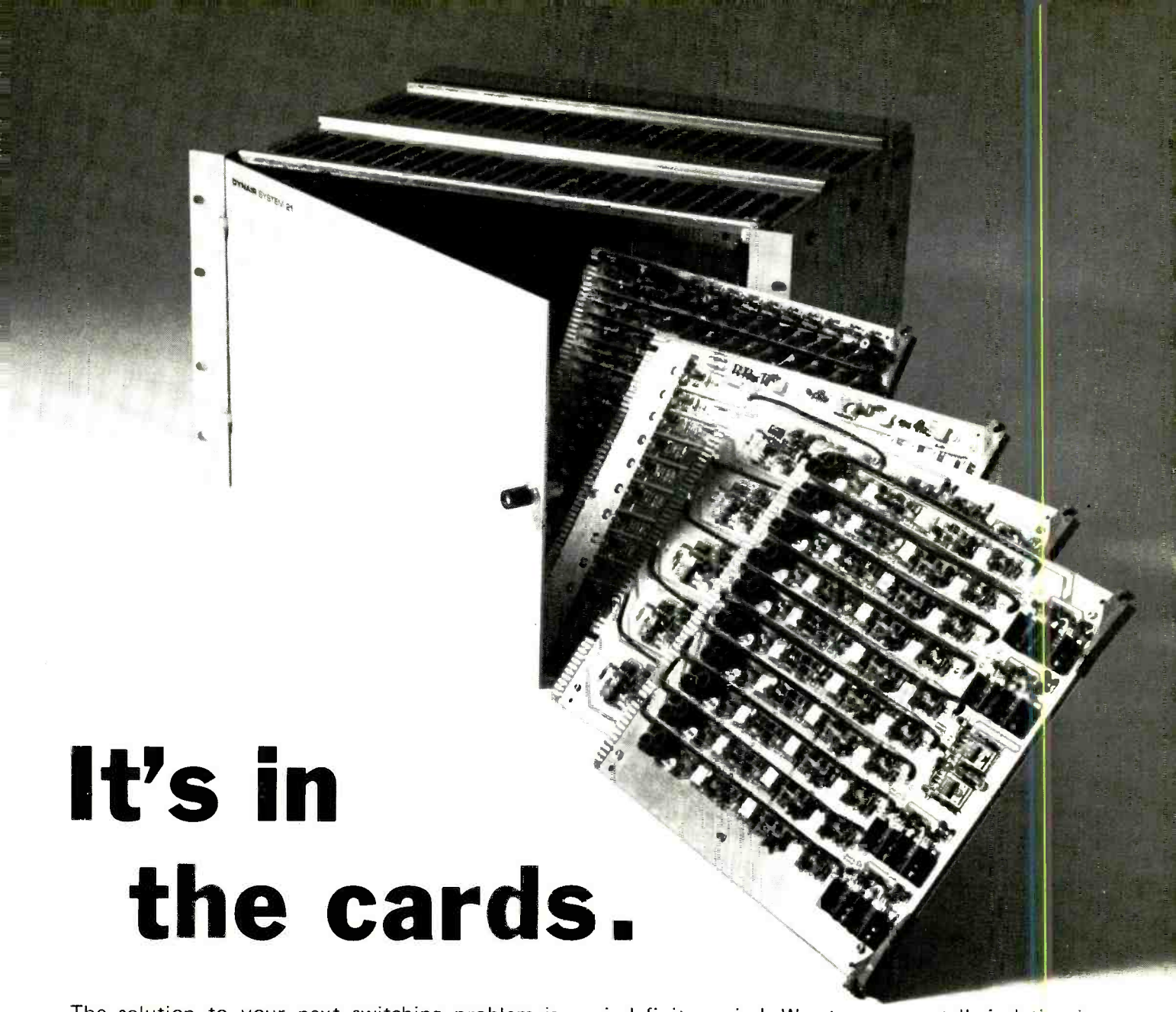

It's in the cards.

The solution to your next switching problem is probably built into one of our new System 21 cards.

We've unsnarled many a complicated distribution switching puzzle during our 22 years in the audio, video and data switching business. So, when we developed this new state-of-the-art system, we created an architecture that would let us move with cost-effective ease from 10 x 10 to 1000 x 1000 inputs and outputs.

What's your requirement? Our standard video cards in television broadcast applications offer specification numbers like 0.15% differential gain, 0.15° differential phase and ±0.1-dB frequency response to 5 MHz. Other video cards operate at 30-MHz bandwidths in high resolution environments.

Audio cards keep harmonic distortion under 0.25% at full 30 dBm output with hum and noise riding 105 dB below. They're balanced in and out and are protected against short circuits for an indefinite period. Worst case crosstalk isolation is greater than 80 dB to 15 kHz.

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Circle (45) on Reader Service Card

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Systems Engineering		
A.F. Associates	2411	N5
Loads and Wattmeters		
Bird Electronic Corp.	519	J4
CCA Electronics	305	B1
Dielectric Communications	509	J3
Electro Impulse Lab Inc.	417	F1
Harris Corporation	303	B2,3,4
Marconi Electronics	322	E6
RCA	300	A5,6,7,8
Wilkinson Electronics	347	E4
Studio Furniture		
Micro-Trak Corp.	391	F3
Storage Systems & Shipping Cases		
Storeel Corp.	469	G4
The Winsted Corp.	2601	O1
Standards Converters		
Micro Consultants	404	J7
Slow Motion Recorders		
Arvin Echo Science Corp.	390	J8
Ampex Corp.	301	A1,2,3,4

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Tape, Audio & Accessories		
Accurate Sound Corp.	2103	L2
Agfa-Gevaert, Inc.	2821	P4
Broadcast Cartridge Service	2304	M2
Broadcast Electronics Inc. (BEI)	309	C2
Camera Mart	555	K3
Collins Transmission Systems Division, Rockwell International	315, 2102	C4
Fidelipac	351	E4
Harris Corporation	303	B2,3,4
3M, Magnetic A/V Products Div.	439	G3
Micro-Trak Corp.	391	F3
Nortronics Company Inc.	345	E3
Panasonic Company	481, 483	H2
Tentel	395	F3
Telex Communications Inc.	357	E2
United Research Lab Corp.	375	F3
Capitol Magnetic Products	361	E1
Garner Industries	415	F1
Memorex Corporation	485	H3
Taber Mfg. and Eng. Co.	459	G1
Tape, Video & Accessories		
AF Associates	2411	N5
Agfa-Gevaert, Inc.	2821	P4
Bosch Fernseh	330	F5
Camera Mart	555	K3
Fuji Magnetic Tape	402	J6
3M, Magnetic A/V Products Div.	302	C5
Nortronics Company Inc.	345	E3
Panasonic Company	481, 483	H2
Tentel	395	F3
TV Equipment Associates	364	G5
Chyron Telesystems	382	J5
Garner Industries	415	F1
Memorex Corporation	485	H3
The Video Tape Co.	527	J3
Teletext Equipment		
McMartin Industries Inc.	317	D4
Telegen/SOFRATEV	2221	M6
Time Base Correctors		
Camera Mart	555	K3
Consolidated Video Systems	400	J5
Digital Video Systems	2708	M6,7
Edutron Inc.	2603	O2
The Grass Valley Group Inc.	308	C8
International Video Corp.	346	G7
Merlin Engineering Works	412	K6
Micro Consultants	404	J7
Philips Broadcast Equipment Corp.	314	D7
Adda Corp.	2104	L3
Microtime, Inc.	2305	M,N5
Sony Corporation	380	H5,6,7
Time Code Generators		
Accurate Sound Corp.	2103	L2

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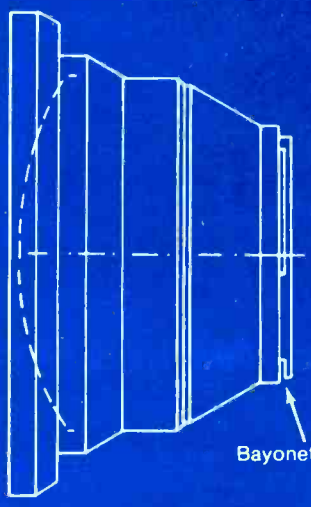
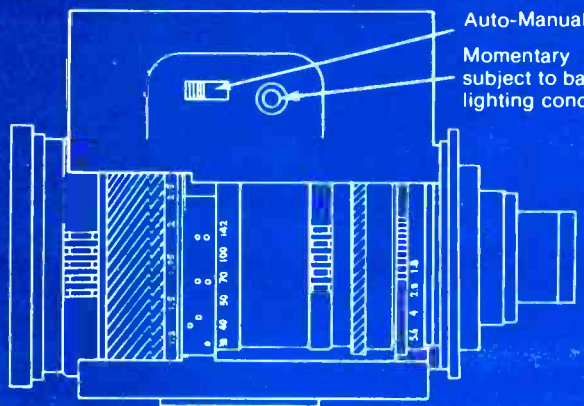
angēnieux's 15x system

simplicity in engineering = reliability of performance



Bayonet mount.

Retrozoom: Front bayonet mount. Maximum horizontal angle: 70° Changes focal length to 7 — 105mm retaining f/1.8 aperture. Retains full zoom capability. M.O.D.: 0.30 meter (1 foot).

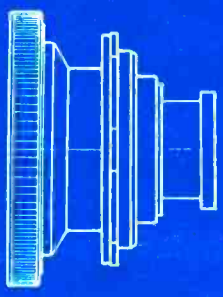


Auto-Manual Iris switch

Momentary Auto Iris button for subject to background differential lighting conditions.

VTR Switch

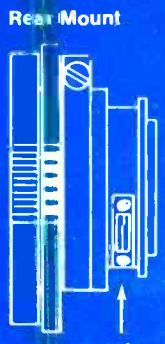
Servo/manual zoom switch enables either servo or manual zoom operation.



Range Extender

1.6X Range Extender changes focal length to 15 — 225mm, f/2.9

Second Range Extender (1.6X) may be mounted in tandem providing 2.56X factor, changing focal length to 24 — 360mm, f/4.7

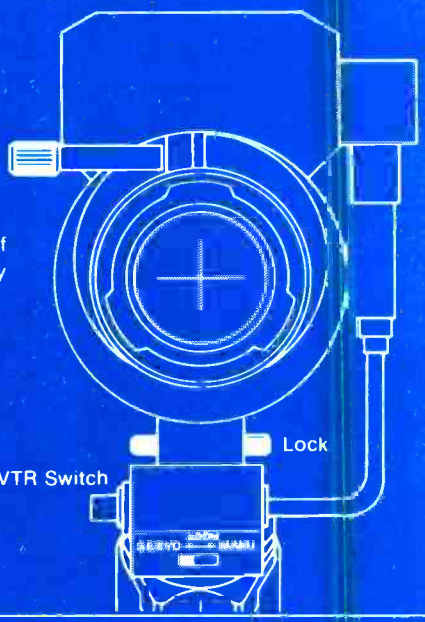


Rear Mount

Adjustable back focus mount with indicator

Servo zoom rate/direction thumb control. Maximum speed: 1.5 seconds.

Note: Location of controls may vary with model of camera



Lock

VTR Switch

Detachable **Pistol Grip.** Adjustable forward and back for proper balance of camera on shoulder. Accessory bracket available for adjustable angular rotation.

angēnieux corporation of america

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13381 BEACH AVE., VENICE, CALIFORNIA 90291 • (213) 821-5080
4 HAVEN HILL SQ., AGINCOURT, ONT. M1V1M4 • (416) 291-2363

Circle (46) on Reader Service Card

SPECIFICATIONS	BASIC LENS	WITH RETROZOOM 0.76X	WITH TELE-ATTACHMENT 1.66X	WITH ONE RANGE EXTENDER 1.6X	WITH TWO RANGE EXTENDERS 2.56X	WITH TELE-ATTACHMENT AND ONE RANGE EXTENDER 2.66X	WITH TELE-ATTACHMENT AND TWO RANGE EXTENDERS 4.25X
Focal Length	9.5-142mm	7-105mm	40-240mm	15-225mm	24-360mm	25-375mm	41-615mm
Continuous Zoom Range	15X	15X	6X	15X	15X	15X	15X
Maximum Aperture	f/1.8-f/2.6	f/1.8-f/2.6	f/1.9-f/2.6	f/2.9-f/4.2	f/4.7-f/6.7	f/2.9-f/4.2	f/4.7-f/6.7
Minimum Object Distance	0.30m 1 ft.	0.30m 1 ft.	1.50m 5 ft.	0.80m 3 ft.	0.50m 2 ft.	1.50m 5 ft.	1.50m 5 ft.
Weight of Total Package. lens, iris/zoom, servoes, pistol grip, mount and attachments	2.5 kg 5.5 lbs.	3.8 kg 8.4 lbs.	4 kg 8.8 lbs.	4.1 kg 9.0 lbs.	3.8 kg 8.4 lbs.	4.2 kg 9.3 lbs.	4.5 kg 10.1 lbs.

15 x 9.5 FOR 2/3" PRISM COLOR CAMERAS

NAB BOOTH NO. 318

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
The BTX Corporation	2409	N4
CMX Systems	350	G8
Commercial Electronic Inc. (CEI)	398	J5
Consolidated Video Systems	400	J5
Datametrics Inc.	2813	P2,3
Datatron Inc.	491	H3
Electrohome Ltd.	535	K2
Glentronix (U.S.) Inc.	2609	O3
Philips Broadcast Equipment Corp.	314	D7
QSI Systems Inc.	2800	P3
Scully Recording Instruments	355	E3
Shintron Company Inc.	410	K7
United Media, Inc.	2711	P6

Additional categories

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Cases		
Anvil Cases	2507	O3
Cases, Inc.	2105	L3
Thermodyne International Inc.	2408	N6
Exciters		
CCA Electronics Corp.	305	B1
Comark Communications Industries, Inc.	2203	M2
Harris Corp.	303	B2,3,4
LPB Inc.	383	F1
NEC America Inc.	2404	M,N3
McMartin Industries Inc.	317	D4
Philips Broadcast Equipment Corp.	314	D7
Philips Test and Measuring Instruments	314	D7
QEI Corp.	435	G4
Rockwell International, Collins Division	315	C4
Wilkinson Electronics Inc.	347	E4
Film and Film Processing Equipment		
Victor Duncan Inc.	2515	O5
Industrial Sciences Inc.	531	K4
Research Technology Inc.	539	K1
Eastman Kodak Co.	473	G4
Jingle and Music Production		
Jam Creative Productions, Inc.	2510	N6
Tuesday Productions	2205	M3
Modular Studio Staging System		
Uni-Set	396	J5
Radio Programming for Automation		
Century 21 Programming Inc.	371A	E4
Syndicated Music Sales and Production Aids		
Century 21 Productions	371-A	E4
DeWolfe Music Library, Inc.	2605	O2
William B. Tanner Co.	2206	L4
Thomas Valentino, Inc.	441	G3

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Transmitters, AM & FM		
Bayly Engineering Ltd.	425	F3
Cetec	307	C1
Continental Electronics Mfg. Inc.	331	D4
Alan Gordon Enterprises Inc.	2501	O1
HM Electronics Inc.	2604	O4
Harris Corporation	303	B2,3,4
LPB Inc.	383	F1
NEC America, Inc.	2404	M,N3
Micro Communications Inc.	513	J3
Rockwell International, Collins Div.	315	C4
Sintronic Corp.	387	F1
Wilkinson Electronics Inc.	347	E4
CCA Electronics Corporation	305	B1
McMartin Industries, Inc.	317	D4
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Ikegami Electronics (USA) Inc.	406	J8
Transmitters, TV		
Comark Communications Inc.	2203	M2
Electronics, Missiles & Communications Inc.	328	E5
Harris Corporation	303	B2,3,4
Marconi Electronics Inc.	322	E6
Micro Communications Inc.	513	J3
NEC America Inc.	2404	M,N3
Philips Broadcast Equipment Corp.	314	D7
Soll Inc.	505	J2
CCA Electronics Corp.	305	B1
EMCEE	328	E5
Ikegami Electronics (USA) Inc.	406	J8
RCA Broadcast systems	300	A5,6,7,8 B5,6,7,8
Turntables & Accessories		
Gotham Audio Corp.	423	F1
Harris Corporation	303	B2,3,4
LPB Inc.	383	F1
Logitek Electronic Systems	2111	L4
McCurdy Radio	321	D1
Micro-Trak Corp.	391	F3
Panasonic Company	481, 483	H2

Continued on page 86

Use the map locator number following each company listing to find their booth on the No-Nonsense Map, page 49.

The ultimate audio distribution system. ADM® quality throughout.

The DA16/CH20 is the broadcaster's answer to audio distribution. It offers a *unique* and *versatile* solution to this age-old problem.

- Each amplifier is a one-input, six-output plug-in card with +24 DBM input and output capability.
- The input is transformer coupled and each of the six outputs is individually transformer-isolated.
- Amplifiers have individual front panel gain adjustments and individual test points for both power and audio.
- The CH20 rack frame has redundant power supplies with automatic changeover.
- The DA16/CH20 system is designed and built to demanding Audio Designs and Manufacturing quality standards.

There are many more features. For complete information, contact us today.

AUDIO DESIGNS AND MANUFACTURING, INC.

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Special Edition: Equipment directory

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
QRK Electronic Products Inc.	389	F2
Ramko Research Inc.	409	F1
Rockwell International, Collins Division	315	C4
Russco Electronics Mfg. Inc.	427	F3
Shure Brothers Inc.	371	E4
Stanton Magnetics Inc.	363	E1
Translators		
Acrodyne Industries	479	G1
Electronics, Missles & Communications (EMCEE)	328	E5
Harris Corporation	303	B2,3,4
Ikegami	406	J8
Marconi Electronics	322	E6
Scientific-Atlanta	477	G2
Television Technology Corp.	2306	M3
Tape Duplicators		
Accurate Sound, Inc.	2103	L2
Garner Industries	415	F1
Otari	405	F3
Two-Way Radio Equipment		
Bayly Engineering, Ltd.	425	F3
Tape to Film Transfer		
Image Transform Inc.	2309	M6
Warren R. Smith Co.	338	F6
Time Code Equipment		
The BTX Corp.	2409	N4
Central Dynamics	344	G6
CMX Systems	350	G8
Datatron, Inc.	491	H3
Dynasciences	497	J3
EDCO Products	359	E1
ESE	403	F3
Electro and Optical Systems Ltd.	2803	P1
Glentronix	2609	O3
Recortec Inc.	336	F8
Scully Recording Instruments	355	E3
Shintron Co. Inc.	410	K7
Skotel Corp.	2827	P5
Tektronix, Inc.	306	C6
Studer ReVox America, Inc.	453	G1
Tape and Film Storage and Cases		
Storeel Corp.	469	G4
The Winsted Corp.	2601	O1
Vans & Ladder Vehicles		
E.N.G. Mfg. Co. Inc.	2402	N2
Farinon Video	374	G8
Microwave Associates Inc.	340	G5
Soll Inc.	505	J2
Wolf Coach/Television Eng. Corp.	503	J1
Van Ladder Inc.	2804	P4
Video Signal Enhancement & Correction Equipment		
Broadcast Video Systems Ltd.	2823	P4
Camera Mart	555	K3
Cohu Inc.	471	G4
Consolidated Video Systems	400	J5
Digital Video Systems	2708	M6,7
Dynasciences	497	J3
3M Company — Video Products	302	C5
Merlin Engineering Inc.	412	K6
Micro Consultants	404	J7
NEC America, Inc.	2404	M,N3
Philips Broadcast Equipment Corp.	314	D7
Tektronix Inc.	306	C6
TeleMation	342	G5
Telemet	333	D3
Microtime, Inc.	2305	M,N5
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Thomson CSF Laboratories	324	E8
Yves Faroudja, Inc.	412	K6
Video Components, Tubes & Hardware		
Calvert Electronics Inc.	2117	L5
Panasonic Company	481, 483	H2
Thomson-CSF Electron Tubes	2110	L5
Boston Insulated Wire and Cable	358	G6
Ceco Communications	431	F4
EEV, Inc.	326	E5
RCA Electro Optics and Devices	300-A	A6
Varian Associates (Division Eimac)	487	H4
Video Associates Labs	2809	P2
VTRs		
AF Associates Inc.	2411	N5
Bosch Fernseh	330	F5
Camera Mart	555	K3
Hitachi-Denshi	334	F7
International Video Corp.	346	G7
Marconi Electronics Inc.	322	E6
Merlin Engineering Works	412	K6
NEC America, Inc.	2404	M,N3
QSI Systems Inc.	2800	P3
Panasonic Company	481, 483	H2
Philips Broadcast Equipment Corp.	314	D7
Ampex Corporation	301	A1,2,3,4
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Recortec, Inc.	336	F8
Sony Corp.	380	H5,6,7
US JVC Corp.	408	K8
Videoprompters		
Listec Television Equipment Corp.	465	G2
Q-TV/Telesync	332	E6

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Video Animation		
Computer Image Corp.	457	G1
Video Detectors, Touch Tone		
Di-Tech Inc.	2403	N2
Velocity Compensators		
Computer Magnetics	529	K4
Video Discs & Products		
Arvin/Echo Science Corp.	390	J8
Weather Instruments, Radar & Accessories		
Arvin/Echo Science Corp.	390	J8
Enterprise Electronics Corp.	2710	O4
Technology Service Corp.	467	G3
Gorman Redlich Mfg. Co.	337	E1
Antenna Heater Controls		
CCA Electronics	305	B1
Cetec Broadcast Group	307	C1
Micro-Trak Corp.	391	F3
Monitors, Antenna		
Belar Electronics	367	E2
CCA Electronics	305	B1
Delta Electronics	365	E1
Gorman Redlich Mfg. Co.	337	E1
Harris Corporation	303	B2,3,4
Micro Communications	513	J3
Potomac Instruments	377	F3
Audio Delay		
Wang Voice Communications, Inc.	2112	L5
Cartridges and Tone Arms		
Micro-Trak Corp.	391	F3
Shure Brothers	371	E4
Stanton Magnetics	363	E1
Loggers		
CCA Electronics	305	B1
Cetec Broadcast Group	307	C1
Harris Corporation	303	B2,3,4
LPB Inc.	383	F1
Nagra Magnetic Recorders	525	J3
QSI Systems	2800	P3
Scully Recording Instruments	355	E3
Sono-Mag	397	F4
Studer ReVox	453	G1
Chroma Keyer		
American Data Corp.	312	D8
Broadcast Video Systems	2823	P4
Central Dynamics	344	G6
Computer Image	457	G1
Dynasciences	497	J3

COMPANY	BOOTH NUMBER	MAP LOCATOR NUMBER
Glentronix	2609	O3
Grass Valley	308	C8
Ikegami	406	J8
3M Company	302	C5
Marconi Electronics	322	E6
Panasonic	483	H2
RCA Broadcast Systems	300	A5,6,7,8 B5,6,7,8
Shintron Co.	410	K7
Telemet	333	D3
Thomson-CSF Labs	324	E8
Vital Industries	316	D5
Electronic Slides		
ADDA Corp.	2104	L3
Eigen Video	557	K3
Ampex Corp.	301	A1,2,3,4
RCA Broadcast	300	A5,6,7,8
Encoded Chroma Keyer		
Shintron Co. Inc.	410	K7
Generators, FM Stereo		
Bonneville Broadcast Consultants	563	L3
CCA Electronics	305	B1
Cetec Broadcast Group	307	C1
Harris Corporation	303	B2,3,4
McMartin Industries	317	D4
Moseley Associates	329	D3
Orban Associates	429	F4
Philips Test & Measurements	314	D7
RCA	300	A5,6,7,8
Rockwell International, Collins Div.	315	C4
Wilkinson Electronics	347	E4
Generators, Pattern Signal		
Asaca	2503	O2
Digital Video Systems	2311	M6,7
Harris Corporation	303	B2,3,4
Leitch Video	561	K1
Lenco	372	G7
Marconi Electronics	322	E6
Philips Test & Measurement	314	D7
Tektronix	306	C6
Telemet	333	D3
High Speed Audio Tape Duplicators		
Accurate Sounds Corp.	2103	L2
Otari Corp.	405	F3
Diplexers		
Comark Industries Inc.	2203	M2
EBS Equipment		
Gorman Redlich Mfg. Co.	337	E1

BC

Special Edition:

The size of the NAB equipment exhibit continues to grow each year, both in sheer numbers and in importance to the broadcast community worldwide. Broadcasters from around the world will turn to Dallas *this* year to find out what the state of the art will be *next* year and in the *coming* years.

With more than 300 companies exhibiting their products, the NAB is taking two levels of the Dallas Convention Center to provide adequate space. And with only four days to attend the sessions and get an update on the new technologies, the convention attendee must plan his schedule well.

The following is an alphabetical listing of the companies exhibiting at NAB '79. Included is a rundown of their products lines, with special emphasis on new products being introduced for the first time at the convention.

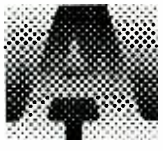
Many companies will showcase products designed to improve the state of broadcasting — both for radio and television. This year's exhibit will find digital video and audio equipment; a new generation of microprocessor-based products; the introduction of teletext to the U.S. market; new switchers and editors; ENG/EFP cameras and accessories; transmitters; and more. The continuing impact of the computer industry will also be evident, as "automation" remains the password to enter several booths.

If an exhibitor advertised in this issue, there will be a running line beneath the company's listing which says "See ad on page _____." To get a better idea of the company's product line, turn to that page and you'll probably be able to decide whether or not to visit that booth.

This section combined with the NAB Equipment Directory and the No-Nonsense Map provides all you need to know about the convention. It *is* the "Complete Guide to the 1979 NAB Convention."

Use this guide before the trip to Dallas to help you plan your way through the four-day convention. And keep it with you once you arrive to help you keep on schedule.

EXHIBITORS



A.F. ASSOCIATES INC. — Videotape and accessories; VTRs; systems engineering. **Introducing: Vertical and horizontal blanking meters with digital readout and optional video monitor character display; 525 NTSC 3M Mincom colour drop-out compensators.** BOOTH 2411.
SEE ADS ON PAGES 69, 101

ACCURATE SOUND CORPORATION — Audio components, tubes, and hardware; cart machines, carts, and accessory equipment; audio consoles; encoders and decoders; film chain equipment; audio heads and refurbishing services; headphones, speakers/intercoms; lights and lighting accessories; limiters and compressors; microphones; noise reduction systems; processing and equalising equipment; audio reel-to-reel recorders; audio special effects equipment and generators; audiotape and accessories; time code generators; high-speed duplication systems. **Introducing: Starbird microphone boom; high-speed tape duplicating equipment.** BOOTH 2103.
SEE AD ON PAGE 100

ACRODYNE INDUSTRIES — TV transmitters; TV translators. **Introducing: 10 kW VHF TV transmitter; 10 kW UHF TV transmitter; 2.5 kW type-accepted VHF transmitter.** BOOTH 479.

ADDA CORP. — Frame store synchronisers; electronic still processor. **Introducing: A new lower-cost electronic still processor that stores up to 200 frames from live camera, VTR, film, network or satellite feeds.** BOOTH 2104.
SEE ADS ON PAGES 3, 11

AGFA-GEVAERT INC. — Audiotape and accessories; videotape and accessories. BOOTH 2821.
SEE AD ON PAGE 45

ALLIED TOWER COMPANY — Antennas, transmission lines, towers and lights. BOOTH 2100.

AMCO ENGINEERING CO. — Audio consoles; video consoles. BOOTH 393.

AMERICAN DATA CORPORATION — Amplifiers, pre-amps, and DA's; video consoles; routing switchers; video special effects equipment and generators; video switchers. **Introducing: New studio and remote video production systems; modular amplifiers and distribution switching systems.** BOOTH 312. Hospitality Suite: Dallas Hilton.
SEE AD ON PAGE 9

AMERICAN TELEPHONE AND TELEGRAPH — BOOTH 2511.

Continued on page 88

The First Frame Store We'd Put Our Name On

From the industry's first standalone Time Base Corrector through the innovative 2020 Series Signal Processor, MICROTIME has combined its highly creative design capability with advanced technology to provide the highest quality products for the Video Industry. MICROTIME's goal has always been simplicity, reliability, and low cost, while maintaining the best performance standards available. For that reason, the 2525 Video Signal Synchronizer is the first Frame Store we'd put our name on.

The 2525 includes:

- Line Error Detection
- A new RS-170A Sync Generator for improved lock-up and easy interfacing with any switcher
- Field 1, Field 2, or Frame Freeze for digital video effects applications
- Auto Freeze or Black selectable
- H Phasing for output timing control
- Output H Sync and Burst Level Control
- Unique HETROCOLOR™ Processing for optimum performance for color under signals

The 2525 will correct VTR signals from no-lock or V/H lock, synchronous or non referenced, direct or heterodyne, ½" helical through 2" quad. It passes VITS with the same processing as active video, can be remotely controlled, and is transparent to input signals from any source—and all with MICROTIME's proven reliability and ease of operation.

Find out more about the 2525 Video Signal Synchronizer. Write or call today to arrange for a demonstration.

See us at NAB

Available through MICROTIME's worldwide distributor network.

MICROTIME

Microtime, Inc.
1280 Blue Hills Avenue
Bloomfield, Conn. 06002
(203) 242-0761 TWX 710-425-1165

Circle (48) on Reader Service Card

Exhibitors

AMPEREX ELECTRONIC CORPORATION — Studio cameras and accessories; ENG cameras and accessories. **Introducing: ⅔-inch Plumbicon® TV camera tubes; high-resolution diode guns for EFP and ENG cameras.** BOOTH 310.

AMPEX — Studio cameras and accessories; ENG cameras and accessories; video editing equipment; audio reel-to-reel recorders; routing switchers, VTRs; cassette recorders; still store system. BOOTH 301.
SEE AD ON PAGE 109

AMPRO BROADCASTING — Cart machines, carts, and accessory equipment; audio consoles. **Introducing: The Microtouch series rotary and linear fader audio consoles, five and eight channels.** BOOTH 369.
SEE AD ON PAGE 13

AMTRON CORP. — Video monitors. BOOTH 412A.

ANDREW CORPORATION — Antennas, transmission lines, towers and lights; earth station equipment and services. **Introducing: 12-meter earth station antenna.** BOOTH 360.
SEE AD ON PAGE 91

ANGENIEUX CORP. OF AMERICA — Lenses and lens services. **Introducing: Broadcast zoom lens for ⅔-inch cameras.** BOOTH 318.
SEE ADS ON PAGES 77, 83, 181

ANTON/BAUER INC. — BOOTH 2121.

ANVIL CASES INC. — Studio camera accessories; ENG camera accessories; accessory equipment for cart machines; lighting accessories; ATA transit cases. BOOTH 2507.

ARVIN/ECHO SCIENCE CORPORATION — Earth station equipment and services; frame store synchronisers; video remote controls; slow motion replay equipment; weather instruments, radar and accessories; frame-store stop action; disc products. **Introducing: Slow motion and freeze frame disc recorders; controllers and accessories for news, sports and weather broadcasting.** BOOTH 390.
SEE ADS ON PAGES 40-41

ASACA CORPORATION — ENG cameras and accessories. **Introducing: Portable switcher; camera registration meter; MPX TV sound generator; TV test signal generator; VTR jitter meter.** BOOTH 2503.
SEE AD ON PAGE 121

AUDI-CORD CORPORATION — Cart machines, carts and accessory equipment. BOOTH 419.
SEE AD ON PAGE 160

AUDIO DESIGNS AND MFG. — Amplifiers, pre-amps, and DA's; audio consoles; limiters and compressors; noise reduction systems; processing and equalising equipment. **Introducing: Stereo AM production consoles; stereo AM on-air consoles; associated equipment.** BOOTH 414.
SEE ADS ON PAGES 15, 23, 85

AUDIO AND DESIGN RECORDING LTD. — Amplifiers, pre-amps, DA's; limiters and compressors; noise reduction systems; processing and equalising equipment. **Introducing: The "Express" Limiter, a multi-ratio compressor with peak limiter and low-level expanded for single-ended noise reduction (to the highest specifications); "Paragraphic" Equaliser, 12-section mono or six-section stereo combining the advantages of a graphic equaliser with the flexibility of parametric equalisation; additions to the SCAMP Card Module System, including the S02 transformerless microphone pre-amplifier; the S23 pan effects module for sensational panning effects, the S24 time shape module-analogue delay.** BOOTH 2215.

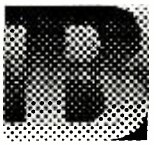
AUDITRONICS — Audio consoles. BOOTH 379.
SEE AD ON PAGE 73

AUTOGRAM CORP. — Audio consoles. **Introducing: 8-channel dual/stereo mono/audio console.** BOOTH 2114.

AUTOMATED BUSINESS CONCEPTS INC. — Computer-based management system. **Introducing: Audience Data System; reach and frequency, cost-per-thousand, cost-per-point, ranking and competitive newspaper and television data.** BOOTH 545.

AUTOMATION ELECTRONICS, Autotron Systems Division. Radio and business computer systems. **Introducing: Totally in-house minicomputer system designed for sales, traffic, management controls, and receivables for radio broadcasters.** BOOTH 2208.

AUTOMATED PROCESSES INC. — Audio automation systems; amplifiers; pre-amps, and DA's; audio components, tubes and hardware; audio consoles; audio monitoring, measuring and timing equipment; audio special effects equipment and generators. **Introducing: Audio consoles for AM, FM, TV — on-air and production; intercom systems — programmable, digital control; audio processing modules; automated audio production consoles.** BOOTH 373.



THE BTX CORPORATION — Time code generators; SMPTE time code synchronisers; readers; video displays. **Introducing: SMPTE tape controller providing multi-recorder programmable control, preview, and editing functions from a single keyboard location.** BOOTH 2409.
SEE AD ON PAGE 106

BARDWELL & McALISTER INC. — Lights and lighting accessories; grip equipment. **Introducing: Grip equipment, including Century stands, Gobo heads, grip heads, combostands, flags, scrims, etc.** BOOTH 559.

BAYLY ENGINEERING LIMITED — AM and FM transmitters; AM stereo generators; limiters and compressors; microwave, STL and remote control equipment; two-way radio equipment; portable audio mixers. **Introducing: A line of short, medium, and long wave PDM transmitters operating on the new PANTEL modulation technique (Pulse-duration ANode modulation TELefunken).** BOOTH 425.

BEAVERONICS INC. — Video switchers; precision master clock systems. **Introducing: A new line of three video production switching systems with various options, designed to satisfy the requirements of the small studio or mobile unit as well as the large production unit.** BOOTH 369A.

BELAR ELECTRONICS LABS INC. — AM stereo generators; audio monitoring, measuring, and timing equipment; video monitoring, measuring, and timing equipment. BOOTH 367.
SEE AD ON PAGE 185

BERKEY COLORTRAN INC. — Lights and lighting accessories. **Introducing: 1 kW and 2 kW focusing scoops, incorporating a new low-cost design featur-**

Continued on page 90

Did you know . . .

That Andersen's SAW vestigial sideband filters are being delivered world wide in production quantities to the leading manufacturers of TV transmitters, TV translators, TV transponders, CATV modulators and CATV processors.

The reasons are clear:

Superior Selectivity

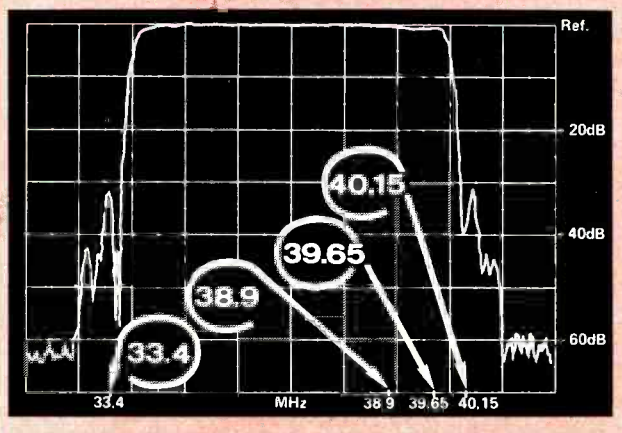
K factor less than 1.5% Without Equalization

Inherent Linear Phase

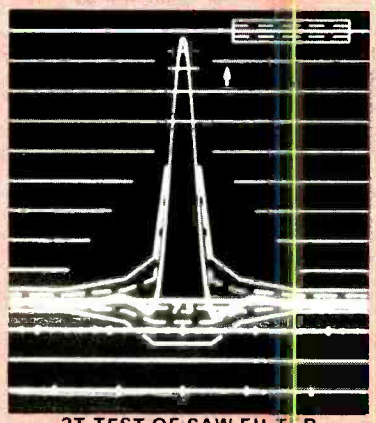
Adjustment Free— No tuning

Mil. Spec. Reliability

Compact PC Mount Package .4 in^3



AMPLITUDE VS FREQUENCY RESPONSE



2T TEST OF SAW FILTER WITHOUT DELAY EQUALIZATION

Andersen's family of Surface Acoustic Wave vestigal sideband filters are readily available for the following international television standards; **B/G, M/N, D/K** and **I**. Limited quanties of filters are available for delivery from stock. Larger production quantity shipments will commence within 30 to 90 days.

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TWX 710-425-2390

ing a high-efficiency 15-inch reflector and easy sliding focus control to adjust beam from medium to full flood; the 2 kW unit features a 2000-watt socket for maximum intensity requirements. BOOTH 370.

BESTON ELECTRONICS — Character generators; film chain equipment. BOOTH 376.
SEE AD ON PAGE 82

BIRD ELECTRONIC CORP. — RF watt meters loads, and filters. **Introducng: RF wattmeter models and RF terminations.** BOOTH 519.

BLOOMINGTON BROADCASTING CORP. — Computer systems for radio. **Introducing: Enhanced software for radio sales, traffic, billing, general accounting, payroll, and management information.** BOOTH 2308.

BOGNER BROADCAST EQUIPMENT CORP. — Antennas, transmission lines, towers and lights. BOOTH 2202.

BONNEVILLE BROADCAST CONSULTANTS BOOTH 563.

BONNEVILLE DATA SYSTEMS — Computerised broadcast traffic/accounting system for radio and television. **Introducing: Smaller version of the company's current system, offering better performance and cost efficiency for small and medium market stations.** BOOTH 2206A.

BOSCH FERNSEH — Studio cameras and accessories; ENG cameras and accessories; film cameras and projectors; cart machines, carts, and accessory equipment; character generators; video editing equipment; fiber optic links and lines; video monitors; slow motion replay equipment; video special effects equipment and generators; videotape and accessories; VTRs. BOOTH 330. Hospitality Suite: Fairmont.

BOSTON INSULATED WIRE — Cable, connectors, and cable assemblies. **Introducing: Cable, connectors, and cable assemblies for portable camera to remote control unit applications, and portable camera-to-camera control unit applications.** BOOTH 358.

BROADCAST CARTRIDGE SERVICE — Cart machines, carts and accessory equipment; audiotape and accessories. BOOTH 2304.

BROADCAST ELECTRONICS INC. — Audio automation systems; amplifiers, pre-amps, DA's; cart machines, carts, and accessory equipment; audio consoles; encoders and decoders; limiters and compressors; audiotape and accessories. **Introducing: "Econo Control 16," an economy version of Control 16 programme automation system; "InteLog" intelligent high-speed programme logging system.** BOOTH 309.

BROADCAST PROGRAMMING INTERNATIONAL — BOOTH 411.

BROADCAST VIDEO SYSTEMS LTD. — Encoders and decoders; video monitoring, measuring, and timing equipment; video monitors; video special effects equipment and generators; video signal enhancement and correction equipment. **Introducing: Plug-in rotary wipe unit; VTR leader clock; blanking width measuring unit; colour balance corrector.** BOOTH 2823.
SEE AD ON PAGE 184

CCA ELECTRONICS CORP. — Audio consoles; exciters; AM and FM transmitters; TV transmitters. BOOTH 305.

CMX SYSTEMS (Orrox) — Video editing equipment; time code generators. BOOTH 350.
SEE AD ON PAGES 6-7

C.S.P. INC. — Antennas, transmission lines, towers, and lights; lights and lighting accessories; phasors and branching equipment; RF components. BOOTH 543.

CABLEWAVE SYSTEMS — Antennas, transmission lines, towers, and lights. **Introducing: High-power, low-loss transmission line and associated products.** BOOTH 381.

CALVERT ELECTRONICS — Audio tubes and hardware; video components, tubes, and hardware. BOOTH 2117. Hospitality Suite: Sheraton Dallas.

CAMERA MART — Studio cameras and accessories; ENG cameras and accessories; character generators; audio consoles; video consoles; video editing equipment; frame store synchronisers; lights and lighting accessories; microphones; video monitors; noise reduction systems; video switchers; audiotape and accessories; videotape and accessories; time base correctors; video signal enhancement and correction equipment; VTRs. BOOTH 555.

CANON USA INC. — Lenses and lens services. **Introducing: ENG lens with 13X zoom ratio, f/1.6, built-in extender; studio-type lens with 12X zoom ratio, built-in extender and built-in pattern projector (PP); studio-type 18X zoom lens with new PP system.** BOOTH 493.
SEE AD ON PAGE 103

CAPITOL MAGNETIC PRODUCTS — Cart machines, carts, and accessory equipment. **Introducing: AA-3 stereo phased broadcast cartridge.** BOOTH 361. Hospitality Suite: Dallas Hilton.

CASES, INC. — Shipping, carrying, and storage cases. **Introducing: A complete line of cases for all types of equipment.** BOOTH 2105.

CECO COMMUNICATIONS — Transmitting and camera tubes. BOOTH 431.

CENTRAL DYNAMICS LIMITED — Video automation systems; amplifiers, pre-amps, DA's; video editing equipment; encoders and decoders; routing switchers; video special effects equipment and generators; video switchers. **Introducing: CAP — a computer-assisted production accessory which plugs into any CD480 production switcher. It will memorize all crosspoint, mode, and potentiometer settings on one SFX system with a memory capability of 32 events which can be accessed randomly or sequentially.** BOOTH 344.

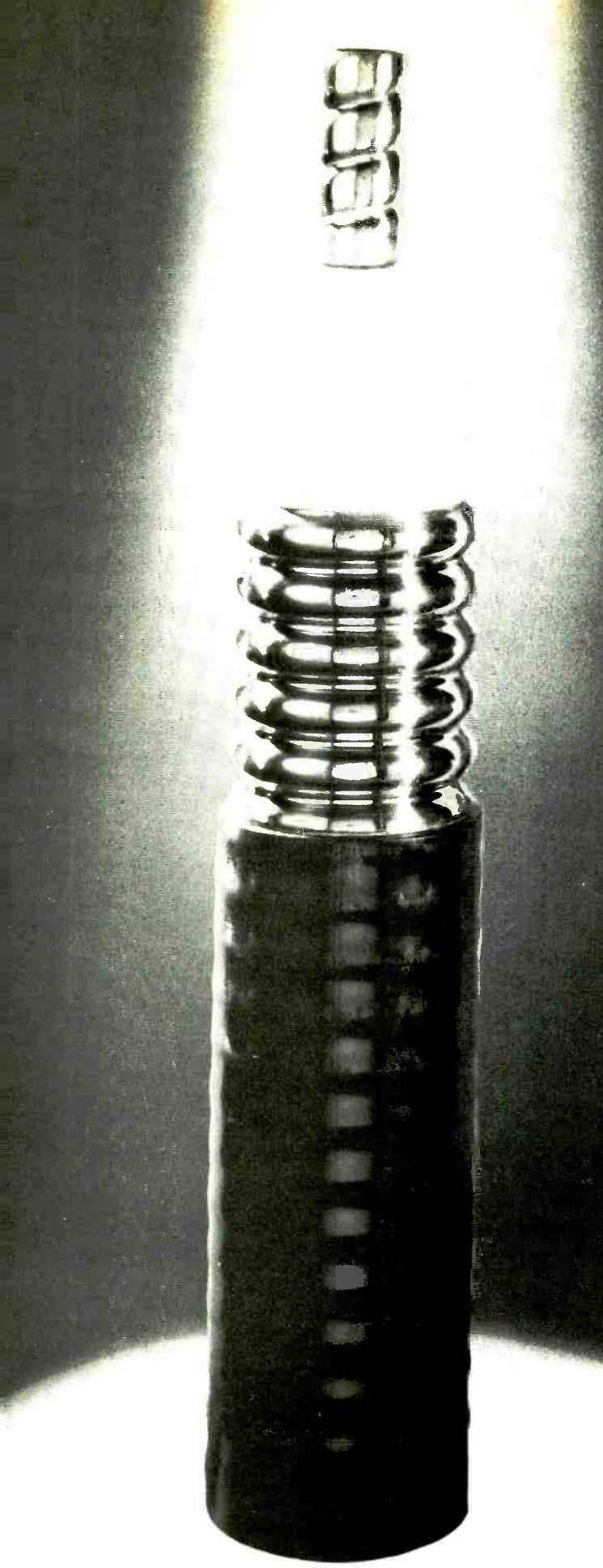
CENTRO CORP. — BOOTH 2406.

CENTURY 21 PROGRAMMING — Radio programming for automation. **Introducing: Radio programming for automation (and live assist) in disco, album rock, and beautiful music.** BOOTH 371A. Hospitality Suite: Fairmont.

CETEC — Audio automation systems; antennas; transmission lines, towers and lights; audio consoles; AM and FM transmitters. **Introducing: Level II software on automation systems. debug card.** BOOTH 307.

CETEC ANTENNAS — Antennas, transmission lines, towers, and lights. BOOTH 499.

Continued on page 92



Introducing... Another Outstanding Performer

NEW 1-5/8" FOAM-DIELECTRIC HELIAX® COAXIAL CABLE TYPE LDF7-50

From VLF through the 2 GHz microwave bands, this cable is an outstanding performer. The new low-loss foam dielectric reduces attenuation almost to that of air-dielectric cable.

Specially designed connector "O"-ring seals, in conjunction with annular corrugations, provide a positive longitudinal moisture block.

New patented self-flaring connectors allow superior electrical contact, high resistance to pull-off and twist-off, moisture seals, and low VSWR through cable cut-off frequency.

We invite you to contact your Andrew Sales Engineer for more information. LDF7-50 will give you performance you won't want to miss.

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ANDREW

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CHANNELMATIC, INC. — Audio automation systems; video automation systems; amplifiers, pre-amps, and DA's; earth station equipment and services; video remote controls; DTMF tone control equipment; real-time controllers; VCR automation systems; TVRO automation systems. **Introducing: TVRO automation systems; DTMF tone telephone line remote-control equipment; microprocessor-based real-time controllers; videocassette machine automation; tone-controlled audio and video switching, time-of-day controllers; video presence detectors; audio and video distribution amplifiers; channel identification and time character generators.** BOOTH 2517.

CHRISTIE ELECTRIC CORP. — ENG batteries, battery packs, chargers and accessories. **Introducing: New replacement battery for Sony BVU 50.** BOOTH 2600.

CHYRON TELESYSTEMS — Character generators; videotape and accessories. **Introducing: A new election-results reporting system.** BOOTH 382.

CINE 60 INC. — Battery systems; Sun-Guns; snaploks; shoulder pods; and power cables for ENG/EFP cameras and VTRs. **Introducing: High-capacity battery systems; combination 12V and 30V Sun-Gun kits, complete and ready for use in one portable carrying case with a 30V/12V Sun-Gun, 30V and 12V powerbelt and powerpack, 30V 150W, 250W, 350W lamps and 12V 100W lamp, dichroic filter, cables, and charging system, plus long handle and short handle for Sun-Gun.** BOOTH 2700.

CINEMA PRODUCTS CORP. — ENG cameras and accessories; film cameras and projectors; cart machines, carts, and accessory equipment; film chain equipment; audio reel-to-reel and one-inch cartridge recorders; 16mm film editing equipment. **Introducing: Ultra-lightweight one-inch helical format "D" cartridge VTR and its "matching system" studio/mobile van counterpart, manufactured by NEC, Japan; portable 16mm film-to-tape transfer system; studio/field production system with portable production CCU or with 19-inch rack-mounted teleproduction CCU; portable 16mm editing console; 16mm camera with quick-change cassette-type coaxial magazines; newest model of the Steadicam video/film camera stablising system.** BOOTH 2217.

SEE ADS ON PAGES 64, 65

COHU INC. — Encoders and decoders; film chain equipment; video monitors; video signal enhancement and correction equipment. **Introducing: Monochrome monitors; encoder/enhancer auto balance unit.** BOOTH 471.

COLORADO VIDEO — **Introducing: Slow scan TV equipment and frame freezer.** BOOTH 523.

SEE AD ON PAGE 60

COMARK INDUSTRIES — Antennas, transmission lines, towers, and lights; modulators and demodulators; diplexers. **Introducing: VSWR meter which measures mismatch throughout system.** BOOTH 2203.

COMMERCIAL ELECTRONICS — Studio cameras and accessories; ENG cameras and accessories; time code generators. **Introducing: Broadcast EFP colour camera similar to the CEI-310 except the camera head can be separated from its electronics unit by 2500 feet utilising miniature cable or TV-81; SMPTE time code generator built into the CEI camera's electronics.** BOOTH 398.

COMPUCAN — BOOTH 2617.

COMPUTER IMAGE CORP. — Computerised electronic video animation. **Introducing: new animated video commercials, station ID's, and logo's produced on Scanimate and CAESAR computerised electronic animation machines.** BOOTH 457. Hospitality Suite: Hyatt Regency.

COMPUTER MAGNETICS CORP. — Audio heads and refurbishing services; video heads and refurbishing services; processing and equalising equipment; velocity compensators; auto equalisers; video discs. BOOTH 529.

COMPUTER MANAGEMENT SYSTEMS — **Introducing: Broadcast Management Information System (BMIS) — Sales, traffic billing, and accounting systems for radio and TV.** BOOTH 2212. Hospitality Suite: Dallas Hilton, room 1565.

COMREX CORPORATION — Remotes audio equipment; low frequency extenders; RF microphone systems; RF cueing systems; TV aural monitors. **Introducing: Low-frequency extenders; the News-Pac Diversity System.** BOOTH 541.

SEE AD ON PAGE 181

COMSEARCH, INC. — Earth station equipment and services; STL frequency assignments. **Introducing: Satellite earth station placement; frequency coordination and RFI measurements; STL band microwave; point-to-point microwave frequency coordination; computer systems software development.** BOOTH 2110.

CONCEPT PRODUCTIONS. BOOTH 2106.

CONRAC DIVISION, CONRAC CORPORATION — Video monitors. BOOTH 304.

CONSOLIDATED ELECTRONIC INDUSTRIES — BOOTH 311.

CONSOLIDATED VIDEO SYSTEMS — Video editing equipment; frame store synchronisers; noise reduction systems; time base correctors; time code generators; video signal enhancement and correction equipment. **Introducing: Digital frame synchroniser with optional compressor/positioner, DOC and DNR; 520 16 H window option.** BOOTH 400.

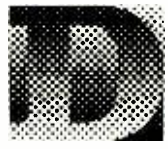
SEE AD ON PAGE 117

CONTINENTAL ELECTRONICS MFG. CO. — AM transmitters. BOOTH 331. Hospitality Suite: Ramada Inn Convention Center, rooms 619-20.

CONVERGENCE CORPORATION — Video editing equipment; video remote controls, video special effects equipment and generators; video switchers. **Introducing: Superstick editing control systems.** BOOTH 378.

SEE AD ON PAGE 75

CROSSPOINT LATCH CORP. — Video consoles; processing and equalising equipment; video special effects equipment and generators; video switchers. BOOTH 2801.



BILL DANIELS CO. — Custom catalogs and brochures. BOOTH 2417.

DATA COMMUNICATIONS CORP. — BOOTH 339.

DATAMETRICS INC. — Time code generators. **Introducing: Edit time code unit that is a generator and "reader"; in either mode the unit will insert time characters into programme subject video (character generator).** BOOTH 2813.
SEE AD ON PAGE 22

DATATEK CORP. — Amplifiers, pre-amps and DA's; video monitoring, measuring, and timing equipment; processing and equalising equipment; routing switchers; video switchers. **Introducing: New video and audio routing switchers.** BOOTH 521.
SEE AD ON PAGE 61

DATATRON, INC. — Character generators; video editing equipment; time code generators. BOOTH 491.

DELTA ELECTRONICS — Microwave, STL, and remote-control equipment; audio monitoring, measuring, and timing equipment; RF measurement and test equipment. BOOTH 365.

DELTA GROUP INC. — BOOTH 2606.

DeWOLFE MUSIC LIBRARY INC. — Music and sound effects libraries. **Introducing: Three hours of new light contemporary, electronic, and fully orchestrated music useful in production, logos, and promos.** BOOTH 2605.
SEE AD ON PAGE 186

DIELECTRIC COMMUNICATIONS — RF loads and wattmeters; RF switches; RF waveguide. BOOTH 509.

DIGITAL VIDEO SYSTEMS — Frame store synchronisers; time base correctors; video signal enhancement and correction equipment. **Introducing: Frame store synchroniser; special effects system.** BOOTH 2311.

DI-TECH INC. — Amplifiers, pre-amps, DA's; audio monitoring, measuring, and timing equipment; routing switchers; video switchers; video detectors; touch tone. BOOTH 2403.
SEE AD ON PAGE 1

DOLBY LABORATORIES — Noise reduction systems. **Introducing: Audio noise reduction applied to VTRs.** BOOTH 385.

DRAKE-CHENAULT ENTERPRISES INC. — BOOTH 2123.

VICTOR DUNCAN, INC. — Studio cameras and accessories; ENG cameras and accessories; film cameras and projectors; video editing equipment; film and film processing equipment; lenses and lens services; lights and lighting accessories; video monitors. **Introducing: HMI (metal halogen) lamps and lighting equipment, giving approximately four times the lumen output of conventional quartz-halogen lighting; daylight colour.** BOOTH 2515.

DYNAIR ELECTRONICS — Modulators and demodulators; routing switchers; video switchers; DA package with sync generator and genlock. **Introducing: 10x10 to 1000x1000 routing switcher with multi-level switching and versatile control, and automatic logging; 10x10 routing switcher with multi-level switching and remote party-line control.** BOOTH 368.
SEE AD ON PAGE 81

DYNASCIENCES — Amplifiers, pre-amps and DA's; character generators; video editing equipment; processing and equalising equipment; video signal enhancement and correction equipment. BOOTH 497.

DYTEK INDUSTRIES INC. — Video editing equipment; routing switchers; video switchers. BOOTH 2301.

EEV INC. — Video components, tubes, and hardware; camera and transmitter tubes. **Introducing: New character display tubes (not CRT) which are addressable through a keyboard.** BOOTH 326.
SEE AD ON PAGE 27

E G AND G — Antenna lights. **Introducing: Rack-mounted controller for high-intensity obstruction lighting systems.** BOOTH 2302.

ENG HELICOPTER — BOOTH 2313.

E-N-G MFG. CO. — Routing switchers; vans and ladder vehicles. **Introducing: ENG/EFP vans and suburbans; ENG/EFP equipment carts; ENG/EFP switcher.** BOOTH 2402.

ESE — Audio monitoring, measuring, and timing equipment; video monitoring, measuring, and timing equipment. BOOTH 403.
SEE AD ON PAGE 161

Continued on page 96

OUR MICROWAVE ASSOCIATES SYSTEM GIVES US TOTAL CONTROL FOR INTERFERENCE-FREE LIVE ENG COVERAGE.

We have better control of our ENG feed quality than we ever had before... thanks to our complete Microwave Associates system.

Everybody around here breathes easier now because Microwave gives us a big competitive edge with such things as the new Adjustable Polarizer. With this unique feature we can continuously adjust our antennas by remote control to help overcome multipath reflection, low signal level, adjacent channel rejection and other types of interference. Now we can put our news teams where the action is and get the story on the air live, first and fast.

The new high gain Disc-Array™ and Disc-Rod™ antennas have also helped us increase our coverage range. The equipment is lightweight and rugged, built to take it in the real world of ENG. And we know we can rely on Microwave. They've been in ENG since the beginning and have more equipment in use than anybody else. Dependability is a major factor in this business. That's why we went with a Microwave Associates system. If you're interested in a system solution to your ENG requirements, contact Microwave Associates, Communications Equipment Group, 63 Third Ave., Burlington, MA 01803 (617) 272-3000.

SEE ALL THAT'S NEW IN ENG FROM MICROWAVE. BOOTH 340 NAB '79, DALLAS.

Field Sales Offices: Atlanta, GA (404) 455-3815, Dallas, TX (214) 234-3522, Kansas City, MO (816) 891-8538, Sunnyvale CA (408) 734-8777, Seattle, WA (206) 232-3550, Honolulu, HI (808) 537-3991, Edina, MN (612) 831-3920, Columbus, OH (614) 451-9844

Microwave Associates
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EASTMAN KODAK — Film and film processing equipment; technical assistance for optimum display or transfer for film via Telecine. BOOTH 473.

EDCO PRODUCTS — BOOTH 359.

EDUTRON INC. — Time base correctors. **Introducing: A TBC with gen-lock noise reduction video enhancement; a TBC with the above plus FCC proper blanking capability and a very wide window of correction.** BOOTH 2603.

EIGEN VIDEO — Slow motion replay equipment; electronic slides. BOOTH 557.

ELECTRO CONTROLS INC. — Lights and lighting accessories. **Introducing: Modular memory control system; Parellispsphere 220 long-throw lighting fixture.** BOOTH 2303.

ELECTRO IMPULSE INC. — ATS equipment; antennas, transmission lines, towers, and lights. BOOTH 417.

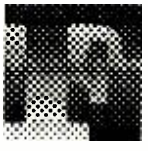
ELECTRO AND OPTICAL SYSTEMS — Encoders and decoders; video monitoring measuring and timing equipment. BOOTH 2803.
SEE AD ON IBC

ELECTROHOME LTD. — Modulators and demodulators; audio monitoring, measuring and timing equipment; video monitoring, measuring and timing equipment; video monitors; time code generators and readers. **Introducing: Multi-standard colour receiver monitors; ENG colour monitors.** BOOTH 535.

ELECTRO-VOICE — Microphones. **Introducing: A new shock mounted dynamic omnidirectional microphone designed for hand-held broadcast and high-quality sound reinforcement application; a new dynamic shock-mounted Variable-D™ super cardioid, a direct descendent of the popular RE 15 and 16 microphones, with added integral shock mount.** BOOTH 2504.
SEE AD ON PAGE 157

ELECTRONICS, MISSILES AND COMMUNICATIONS INC. (EMCEE) — TV transmitters; TV translators; ITFS transmitters; MDS transmitters. **Introducing: 5000-watt VHF television transmitter; 1000-watt UHF television transmitters.** BOOTH 328.

ENTERPRISE ELECTRONICS CORP. — Weather instruments, radar, and accessories. BOOTH 2710.



FARINON VIDEO — Amplifiers, pre-amps, DA's; microwave, STL, and remote-control equipment. **Introducing: New central ENG 2 GHz receiver with remote split channel selection; new models of mini-portable microwave in 2, 7 and 13 GHz frequency bands.** BOOTH 374.
SEE AD ON PAGE 133

FIDELIPAC — Cart machines, carts, and accessory equipment; lights and lighting accessories; audio monitoring, measur-
Continued on page 98

Built-In 2X Extender
9mm to 306mm

Introducing the world's lightest, longest, widest ENG/EFP zoom lens.

FUJINON'S new F/1.7 17x9 ... the One and Only.

The new FUJINON 17 x 9 ENG/EFP zoom is the **only** lens to meet all of these qualifications:

The longest: **306mm without attachments, 560 with the optional front extender.**

The widest: **9mm without attachments, 7mm with the optional adaptor.**

The lightest: **2.5kg**

Which makes the F/1.7 17 x 9 the **one** lens for every assignment. Simply put, it outperforms anything else on the market.

It's at home at any range. Normal zoom is 9mm to 153mm. Flip the built-in 2X extender, an exclusive FUJINON feature, and the range is 18mm to 306mm. The optional extender and adaptor give you even greater range.

Zoom and iris are servo controlled, or you can use the manual override. Adjustable back focus gives you faster lens changing and eliminates making internal camera adjustments. And to make the new 17 x 9 an even better investment, FUJINON offers a full list of accessories for studio conversion.

More information or a demonstration of any FUJINON lens, including the new "one and only", is yours for the asking.

For your new cameras, for your existing cameras...specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

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See the One and Only at the NAB Annual Convention, in Dallas. Booth 515.

Special Edition: Exhibitors

ing, and timing equipment; audiotape and accessories. **Introducing: A completely new hand-held audio and video tape eraser.** BOOTH 351.
SEE AD ON PAGE 177

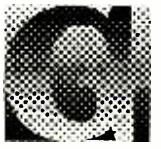
FILMWAY PRODUCTIONS — BOOTH 2423.

FLASH TECHNOLOGY CORP. OF AMERICA — Antennas, transmission lines, towers, and lights. **Introducing: Self-contained 300mm high-intensity beacon.** BOOTH 547.
SEE AD ON PAGE 102

FREZZOLINI ELECTRONICS INC. — Amplifiers, pre-amps, DA's; film cameras and projectors; lights and lighting accessories; battery belts and battery packs for ENG cameras. **Introducing: New lightweight six-pound belt for RCA camera, line isolated with built-in transformer charger.** BOOTH 2415.

FUJI MAGNETIC TAPE DIVISION — Videotape and accessories. **Introducing: High-density one-inch videotape.** BOOTH 402. Hospitality Suite: Marriott.

FUJINON OPTICAL INC. — ENG camera accessories; lenses and lens services; ENG and studio camera optical systems. BOOTH 515.
SEE ADS ON PAGES 97, 99



GTE SYLVANIA — Lights and lighting accessories. BOOTH 320.

GARNER INDUSTRIES — Audio reel-to-reel tape duplicator; audio and video bulk erasers. **Introducing: Bulk eraser for two-inch quad videotape with unique belt drive that cleanly erases tape in six seconds.** BOOTH 415.

GENERAL ELECTRIC — Lights and lighting accessories. BOOTH 2509.

GLENTRONIX (U.S.) INC. — Amplifiers, pre-amps, DA's; video consoles; video editing equipment; video heads and refurbishing services; microphones; video monitors; routing switchers; video special effects equipment and generators; video switchers; time code generators. BOOTH 2609. Hospitality suite: Marriott, room 321.
SEE ADS ON PAGES 22, 39

ALAN GORDON ENTERPRISES, INC. — Headphones, speakers/intercoms; microphones; AM and FM transmitters. **Introducing: Swintek dB-S wireless microphone system using compander in transmitter, expander in receiver (with exclusive noise gate in receiver); full-stereo cassette recorder with separate lead for recording crystal sync pulse or external pilotone sync.** BOOTH 2501.

GORMAN REDLICH MFG. CO. — Weather instruments, radar and accessories. **Introducing: NOAA weather receiver.** BOOTH 337.

GOTHAM AUDIO CORP. — Microphones; audio monitoring, measuring, and timing equipment; noise reduction systems; audio reel-to-reel recorders; turntables and accessories. **Introducing: Neumann shotgun condenser microphone — a new microphone featuring uniform frequency response both on and off the axis of the microphone; Telcom c4 noise-reduction system which offers 30 dB dynamic range enhancement.** BOOTH 423.

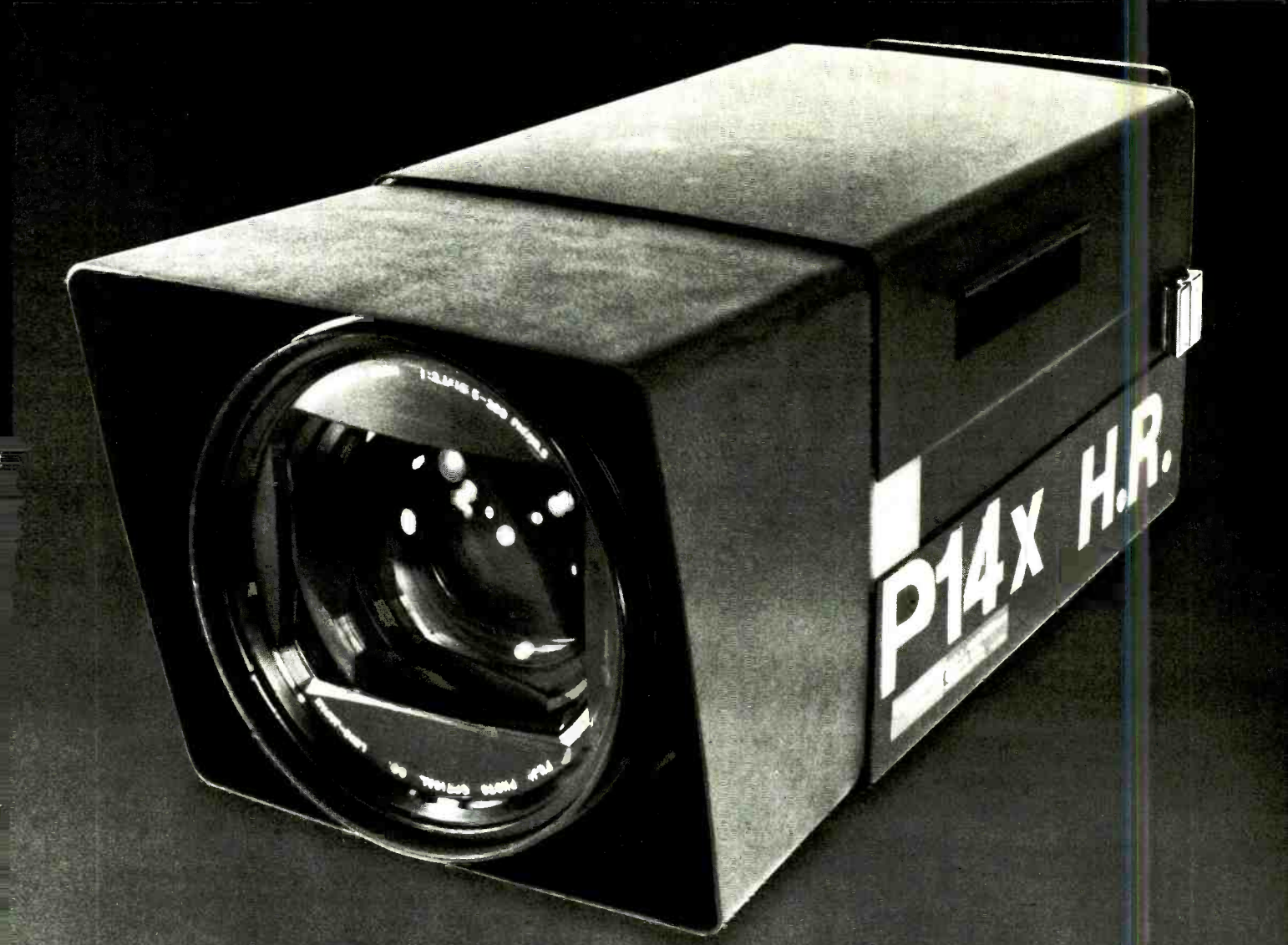
THE GRASS VALLEY GROUP — Video automation systems; amplifiers; pre-amps, DA's; video consoles; frame store synchronisers; processing and equalising equipment; routing switchers; video special effects equipment and generators; video switchers; time base correctors; effects memory system (E-MEM). BOOTH 308.
SEE AD ON PAGE 5

THE GREAT AMERICAN MARKET — Lights and lighting accessories. **Introducing: Starstrobe™ curtain strobe for special effects; Greatmark HMI lights.** BOOTH 2708.

GREGG LABORATORIES — Limiters and compressors. **Introducing: Broadcast audio processing equipment for AM, FM, and TV, featuring precision gain control in three bands and peak limiting function in separate packages.** BOOTH 2118.
SEE AD ON PAGE 78

GROTON COMPUTER INC. — Automated logging and billing systems. BOOTH 2204.

Continued on page 100



Introducing the first ultra high resolution zoom lens for computerized cameras.

FUJINON presents the Over Achiever.

Ultra high resolution — 40% higher than other tv lenses — sets a new standard in quality productions. And gives you the finest first generation tapes you've ever seen. A built-in test pattern projector provides for even faster, more accurate computerized camera set up. These are two of the achievements of FUJINON's new 1¼ inch format P14X16.5 Ultra High Resolution Zoom Lens. Here are more of its unprecedented performance characteristics:

P14X12.5 Ultra High Resolution Zoom Lens 1-inch format

- **Ultra high resolution (1300 tv lines) for incredible sharpness and detail at all focal lengths.**
- **Unique lens design (taking lens moves with the zoom) delivers precise color convergence at all times.**
- **Constant F/2.1 aperture in all ranges for zooming and focusing.**
- **MTF exceeds 90% — not only in green, but in red and blue, as well.**

If you're out to improve your image, see what FUJINON's new 14X Ultra High Resolution Zoom Lenses can do for you. For your new cameras, for your existing cameras...specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

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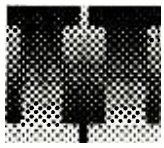
See the over achievers at the NAB Annual Convention, in Dallas, Booth 515.



HM ELECTRONICS INC. — Microphones; remotes audio equipment; AM and FM transmitters. **Introducing: Wireless microphone with dynamic expander (95 dB dynamic range); flat pac portable receiver with dynamic expander.** BOOTH 2604.

HALLIKAINEN AND FRIENDS, INC. — Audio automation systems; audio consoles; microwave, STL, and remote-control equipment. **Introducing: An adapter for converting Moseley PBR-30s to digital metering with a local digital display at the transmitter site. Also, a combination mike-line level audio mixer/switcher which can be controlled manually or by the tallies from a video switcher; the system comes in rack-mount modules of six inputs each, and as many as six modules can be combined to form a 36 input mixer.** BOOTH 2312.

HARRIS CORPORATION Audio automation systems; ATS equipment; antennas, transmission lines, towers, and lights; amplifiers, pre-amps and DA's; studio cameras and accessories; cart machines, carts, and accessory equipment; audio consoles; exciters; AM stereo generators; headphones, speakers/intercoms; lenses and lens services; lights and lighting accessories; limiters and compressors; audio monitoring, measuring and timing equipment; processing and equalising equipment; audiotape and accessories; AM and FM transmitters; TV transmitters; turntables and accessories. **Introducing: 10kW medium-wave transmitter; 25kW FM transmitter; 300-watt solid-state transmitter; Harris 9000 Program Control with Multi-File™ programme memory; Harris 9100 Facilities Control; live colour camera.** BOOTH 303.
SEE AD ON PAGE 71

HIGH-LITE CORP. — BOOTH 2802.

HITACHI-DENSHI — Studio cameras and accessories; ENG cameras and accessories; VTRs. **Introducing: New convertible studio colour camera; new professional black and white and colour monitors; a new VTR; new camera accessories.** BOOTH 334.
SEE AD ON PAGE 131

IGM/NTI — Audio automation systems; cart machines, carts, and accessory equipment; encoders and decoders; video remote controls; remotes audio equipment; audio special effects equipment and generators; video switchers. **Introducing: An alternate version of the Instacart which may be accessed (each cartridge) directly by telephone, for the playback of pretaped information; unit can be used in a radio station for off-air commercials**

Continued on page 102

We said it to AMPEX

VR-2000 & VR-1200

Now we're saying it to RCA!

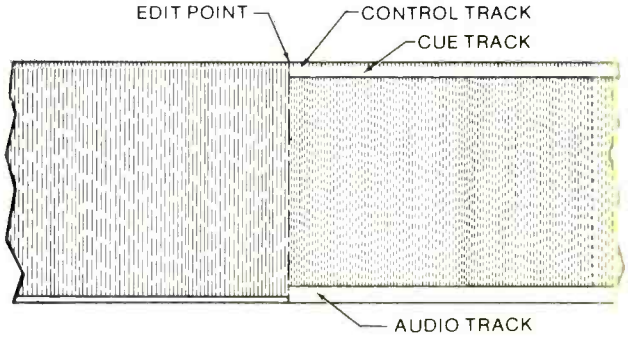
TR-70 & TR-60

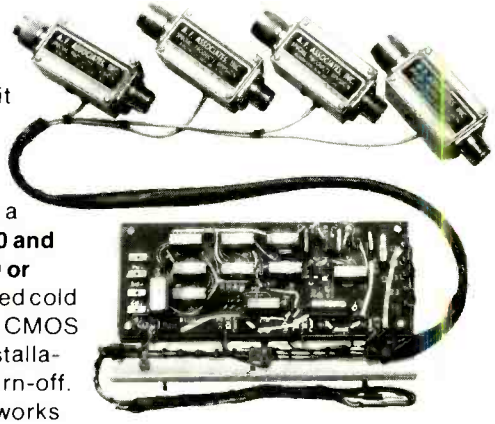
See us at Booth 2411 NAB

AFA says:

BUZZ OFF!

to the 960 Hz. tone in your video only edits





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

Buzz tone during video only edits on a **VR 2000 or VR 1200 and now on RCA TR 70 or TR 60** can be stopped cold with this all-digital, CMOS module. Simple installation, RF turn-on, turn-off. Used by major networks and post production operations.

For information, call or write: A.F. ASSOCIATES, INC.

AFA A.F. ASSOCIATES, INC.

100 Stonehurst Court, Northvale, NJ 07647 ■ (201) 767-1000

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

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to supplement on-air commercials. BOOTH 343.

IKEGAMI ELECTRONICS (USA) INC. — Studio cameras and accessories; ENG cameras and accessories; film cameras and projectors; film chain equipment; lenses and lens services; video monitors; video switchers. **Introducing: New high-quality ENG camera remote control units; medium-priced ENG cameras; studio camera with triax cable; studio/field camera with triax cable and diode gun plumbicons; high-quality portable production camera.** BOOTH 406. Hospitality Suite: Ramada Inn, room 1121.

SEE ADS ON PAGES 57, 58, 59

IMAGE TRANSFORM, INC. — Videotape-to-film transfer service. **Introducing: Tapes made through ITM telecine, transforming negatives to tape.** BOOTH 2309.

IMAGE VIDEO LIMITED — Audio automation systems; video automation systems; routing switchers; master control switchers. **Introducing: 10x1 self-contained audio, video AFV routing switcher; broadcast master control switcher customised to the customer's specifications and requirements; machine assignment switchers.** BOOTH 2819.

INDUSTRIAL SCIENCES, INC. — Amplifiers, pre-amps, DA's; audio consoles; video consoles; film and film processing equipment; processing and equalising equipment; video remote controls; routing switchers; audio special effects equipment and generators; video special effects equipment and generators; video switchers. BOOTH 531.

SEE AD ON PAGE 174

INNOVATIVE TELEVISION EQUIPMENT — Studio cameras and accessories; ENG cameras and accessories; dollies, tripods, pedestals, and heads. **Introducing: Lightweight tripods and accessories for ENG cameras; lightweight studio camera pedestals; and heavy-duty fluid pan/tilt head for camera loads to 125 pounds.** BOOTH 388.

INOVONICS INC. — Audio automation systems; limiters and compressors; noise reduction systems; processing and equalising equipment; audio reel-to-reel recorders. **Introducing: MAP-II — a multiband audio processor for AM/AM stereo; dual-channel automation system; tape preamplifier.** BOOTH 2103.

SEE AD ON PAGE 161

INTERAND — BOOTH 2703.

INTERNATIONAL TAPETRONICS CORP. — Cart machines, carts, and accessory equipment; audio reel-to-reel recorders. **Introducing: Series 99 "New Generation" audio tape cartridge machine; 1K library storage and playback system, which stores and plays 1024 tape cartridges in any pre-programmed format, and with an on-board computer that manages all 1K functions (mechanical and electrical) and inter-**

Continued on page 104

THE BEST EJ/EFP LENS SYSTEM JUST GOT 2X BETTER.

Take the world's most versatile 13X zoom lens. Add a built-in 2X range extender. Plus a modular accessory package that gives you the widest range of options. And the result is the most versatile lens system ever offered for electronic journalism and field production use.

The lightweight, compact J13X9B IE has a broad zoom range of 9mm to 118mm to start. But with our new built-in 2X range extender, it goes all the way to 236mm at a remarkably-sensitive f/3.8. Flexibility you may often need when there's no time to add a separate adapter.

But a built-in extender is just the beginning. For low-light situations, our 13X offers a wide f/1.6 aperture. For close-ups, a short 0.8M (31.5") M.O.D. All, of course, with the superior image quality and ruggedness Canon has been known for.

For even greater versatility, consider Canon accessories. Like our no-light-loss 0.75X wide-angle attachment, which gives you a 6.75mm focal length lens with full auto-iris capabilities. A 1.5X telesize converter for even greater focal length extension with no light loss. Remote focusing and zoom — manual or motorized. And that's still only the beginning.

To find out what the best EJ/EFP lens system can do for you, contact us for a demonstration, or specify the Canon J13X9B IE when ordering your new camera.

Canon®

Canon U.S.A. Inc. Head Office, 10 Nevada Drive, Lake Success, N.Y. 11040 (516) 488-6700 • 140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3071 • 123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000
Canon Optics & Business Machines, Canada, Ltd., 3245 American Drive, Mississauga, Ontario L4V 1B8, Can.
Canon Amsterdam N.V., Industrial Products Division De Boelelaan 8, Amsterdam, Netherlands

See us at NAB Booth 493

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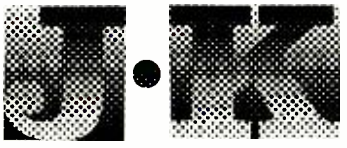
faces with a controller of the user's choice. BOOTH 319.
SEE AD ON PAGE 159

INTERNATIONAL VIDEO CORPORATION (IVC) — Studio cameras and accessories; video editing equipment; video heads and refurbishing services; time base correctors; VTRs. **Introducing: A new generation of IVC's 7000 Series studio and portable EFP cameras, with new pre-amps, new viewfinder, narrow horizontal blanking, and a choice of two-wire or four-wire intercom systems. The portable EFP camera has instantaneous beam correction and diode gun tubes to eliminate specular problems.** BOOTH 346.
SEE AD ON PAGE 167



JAM CREATIVE PRODUCTIONS — Jingles and commercial producers. **Introducing: Several new station image and jingle packages for radio and TV.** BOOTH 2510. Hospitality Suite: Fairmont, room 721.

US JVC CORPORATION — Studio cameras and accessories; ENG cameras and accessories; video editing equipment; VTRs. BOOTH 408.
SEE AD ON PAGES 24-25

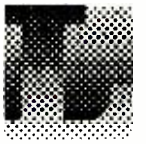
JEFFERSON DATA SYSTEMS — BOOTH 551.

KAMAN SCIENCES/BROADCAST COMPUTER SERVICES — Business automation systems. **Introducing: BCS Demo — new demographic search and avails submission programme, running entirely on in-station computer.** BOOTH 325.

KINGS ELECTRONICS — BOOTH 394.

KLIEGL BROTHERS — Lights and lighting accessories. **Introducing: Performer™, a compact, versatile lighting control console available in 32, 64 and 96 channels of control with either 100 or 200 memories.** BOOTH 366.

KNOX VIDEO PRODUCTS — Character generators. **Introducing: A programmable 350-page storage unit for Knox's present line of character generators which allows fully automatic execution of previously composed programme materials; a new graphics arts character generator featuring intermixed fonts, point sizes and colours, with options that allow custom fonts and logos to be programmed from the user's original artwork.** BOOTH 2706.
SEE AD ON PAGE 98



LPB INC. — Amplifiers, pre-amps, and DA's; audio consoles; headphones, speakers/intercoms; exciters; limiters and compressors; microphones; AM and FM transmitters; turntables and accessories. **Introducing: New series of lower cost 5-mixer mono and stereo consoles; 150-watt FM transmitter.** BOOTH 383.

L-W INTERNATIONAL — Film chain equipment; telecine slo-mo, freeze-frame projectors. BOOTH 338.

LAIRD TELEMEDIA — Film cameras and projectors; character generators; film chain equipment; video monitoring, measuring and timing equipment. **Introducing: New large-image multiplexer.** BOOTH 537.

LEITCH VIDEO LIMITED — Amplifiers, pre-amps, and DA's; processing and equalising equipment; television sync generators; test signal generators. **Introducing: 8-inch digital clock with illuminated face and sweep indication; PAL video processing amplifier.** BOOTH 561.
SEE AD ON PAGE 21

LENCO INC. — Amplifiers, pre-amps and DA's; encoders and decoders; video monitoring, measuring and timing equipment; video monitors; processing and equalising equipment; routing switchers; video switchers. **Introducing: High-resolution precision shadow mask colour monitors; new line of wave form and vector monitors.** BOOTH 372.
SEE AD ON PAGE 63

LIGHTNING ELIMINATION ASSOCIATES — Lightning elimination systems. **Introducing: Kleanline electronic filtering systems for total elimination of surges, transients, noise, RFI/EMI; guy wire dissipation chokes.** BOOTH 437.

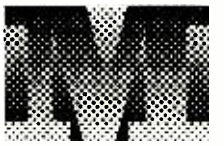
DAVID LINT ASSOCIATES — BOOTH 447.

LISTEC TELEVISION EQUIPMENT CORP. — Studio cameras and accessories; ENG cameras and accessories; video prompters. **Introducing: Three stages portable pneumatic pedestal, for studio and remote use; lubricated friction cam head for EFP cameras.** BOOTH 465.
SEE AD ON PAGE 185

LIVE SOUND, INC. BOOTH 2714.

LOGITEK ELECTRONIC SYSTEMS — Amplifiers, pre-amps, and DA's; audio consoles; encoders and decoders; turntables and accessories. **Introducing: Digital remote transmitter control and monitor; full line of audio power amps; digital clocks and timers.** BOOTH 2111.

LOWELL-LIGHT MANUFACTURING — Lights and lighting accessories. BOOTH 2506.



McCURDY RADIO — Amplifiers, pre-amps, DA's; audio consoles; headphones, speakers/intercoms; limiters and compressors; audio monitoring, measuring, and timing equipment; processing and equalising equipment; routing switchers; turntables and accessories. **Introducing: production consoles; audio DA's.** BOOTH 321.
SEE AD ON IFC

McMARTIN INDUSTRIES, INC. — Amplifiers, pre-amps, DA's; audio consoles; exciters; limiters and compressors; modulators and demodulators; audio monitoring, measuring, and timing equipment; processing and equalising equipment; remotes audio equipment; teletext equipment; AM and FM transmitters; SCA receivers; SCA multiplexers. **Introducing: 5kW AM transmitter; 100-watt FM amplifier/transmitter; SCA-Plus system for transmitting digital and audio information simultaneously over the same SCA channel.** BOOTH 317.
SEE AD ON PAGE 96

MCI INC. — Encoders and decoders; frame store synchronisers; video signal enhancement and correction equipment. BOOTH 401.
SEE AD ON PAGE 43

MBH ENTERPRISES — BOOTH 2523.

MPB TECHNOLOGIES, INC. — Character generators. **Introducing: Desk-top model of the Vista 80 character generator and graphics system.** BOOTH 2815.

3M — MAG A/V PRODUCTS DIVISION — Audiotape and accessories; videotape and accessories. **Introducing: Centr-Cart, a new radio cartridge system featuring unique cartridge plus recorder/players with reel-to-reel quality; new Scotch Hanger System for videocassette.** BOOTH 439.
SEE AD ON PAGE 147

3M COMPANY / VIDEO PRODUCTS — Character generators; processing and equalising equipment; routing switchers; video special effects equipment and generators; video switchers; video signal correction and enhancement equipment. BOOTH 302.
SEE AD ON PAGE 31

MACH ONE DIGITAL SYSTEMS — Video editing equipment. BOOTH 2505.

MARCONI ELECTRONICS INC. — Amplifiers, pre-amps, DA's; studio cameras and accessories; ENG cameras and accessories; film cameras and projectors; encoders and decoders; film chain equipment; audio monitoring, measuring, and timing equipment; video remote controls; video special effects equipment and generators; video switchers; TV transmitters; VTRs. BOOTH 322.

MARTI ELECTRONICS INC. — Amplifiers, pre-amps, and DA's; encoders and decoders; limiters and compressors; microwave, STL, and remote control equipment; microphones; remotes audio equipment. **Introducing: An aural STL for stereo FM and stereo AM which provides excellent stereo separation along with extremely low noise.** BOOTH 349.

MEMOREX CORPORATION — Audiotape and accessories; videotape and accessories. **Introducing: Memorex Shag — a gauge that will generate cost savings for ¾-inch video cassette users by detecting the primary cause of tape edge damage — improper spindle height alignment.** BOOTH 485.

MERLIN ENGINEERING WORKS — Video heads and refurbishing services; time base correctors; video signal enhancement and correction equipment; VTRs. **Introducing: Custom quad VTRs and accessories.** BOOTH 412A.

MICMIX AUDIO PRODUCTS — Audio special effects equipment and generators **Introducing: Dynaflanger special effects generator for flanging, doubling, doppler, and other effects.** BOOTH 421.
SEE AD ON PAGE 150

Continued on page 105

Exhibitors

MICRO COMMUNICATIONS INC. — Antennas, transmission lines, towers, and lights; AM and FM transmitters; TV transmitters. **Introducing: Switching combiner; TV channel combiner; circular polarized TV antenna.** BOOTH 513.

MICRO CONSULTANTS — Frame store synchronisers; noise reduction systems; video special effects equipment and generators; time base correctors; video signal enhancement and correction equipment; standard converters. BOOTH 404.

MICRO CONTROL ASSOCIATES — ATS equipment; microwave, STL, and remote-control equipment. BOOTH 311A.

MICROPROBE ELECTRONICS INC. (MEI) — Audio automation systems; audio reel-to-reel recorders. BOOTH 445.

MICROTIME — Video automation systems; earth station equipment and services; frame store synchronisers; noise reduction systems; time base correctors; video signal enhancement and correction equipment. **Introducing: A new digital video signal processing system.** BOOTH 2305.
SEE AD ON PAGE 87

MICRO-TRAK CORPORATION — Amplifiers, pre-amps, DA's; audio components, tubes, and hardware; audio consoles; remotes audio equipment; audiotape and accessories; turntables and accessories; antenna heater controls; studio furniture. **Introducing: Drop-in mono/stereo studio for AM conversion; six-channel audio console; distribution amplifiers; broadcast turntable; new studio furniture design.** BOOTH 391.
SEE AD ON PAGE 180

MICROWAVE ASSOCIATES INC. — Antennas, transmission lines, towers, and lights; ENG cameras and accessories; earth station equipment and services; microwave, STL, and remote-control equipment; vans and ladder vehicles. **Introducing: ENG antennas; earth station products; portable microwave systems.** BOOTH 340.
SEE AD ON PAGES 94-95

MOLE RICHARDSON CO. — BOOTH 384.

THE MONEY MACHINE — Programming services. **Introducing: The Wizard — a brand-new production library.** BOOTH 335.

MOSELEY ASSOCIATES INC. — ATS equipment; earth station equipment and services; limiters and compressors; microwave, STL, and remote-control equipment; remotes audio equipment; FM/SCA/TV audio limiter; stereo/SCA generators. **Introducing: Microprocessor remote control; telemetry return link; subcarrier main frame.** BOOTH 329.
SEE AD ON PAGE 135

MOTOROLA COMMUNICATIONS AND ELECTRONICS INC. — BOOTH 443.

Continued on page 108

"a professional studio recorder with a handle"

"ReVox new B77 is long o performance and short on Mickey Mouse features."

That's what Herb Friedman said about the ReVox B77 in Hi-Fi/Stereo Buyers' Guide.* If you do location recordings, you'll be interested in what Herb has to say.

In addition to evaluating products for magazines, Herb Friedman is Chief Engineer for Tridac Electronic Laboratories and a major New York radio station. As such, he produces taped programming and he knows the real differences between truly professional recorders and others that claim to have "professional features".

Differences like 18dB record headroom, flat response with no low frequency "head bumps", the highest usable dynamic range and the lowest noise of any portable recorder. Add to these such features as all-digital-logic-control of tape motion, large meters with LED peak level indication, self-contained tape splicer, and rugged 37-pound package with a handle and you've got the best location recorder in the world.

If you'd like to know what else Herb Friedman thinks about the B77, please circle reader service number or write to us for complete information including a reprint of his article and a list of professional audio dealers where you may see and hear the ReVox B77 demonstrated.

REVOX

Studer ReVox America, Inc., 1819 Broadway, Nashville, Tennessee 37203 (615) 329-957
In Canada: Studer ReVox Canada, Ltd.

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MUSICWORKS INC. — Syndicated programming. BOOTH 2512.

MUTUAL BROADCAST SYSTEM — Radio network. **Introducing: Satellite distribution of radio network programming via small aperture terminals (SATs).** BOOTH 2200. Hospitality Suites: Hyatt Regency, rooms 2728, 2729.

NAGRA MAGNETIC RECORDERS — BOOTH 525.

NEC AMERICA INC. — ENG cameras and accessories; earth station equipment and services; exciters; frame store synchronisers; microwave, STL and remote control equipment; routing switchers; audio special effects equipment and generators; AM and FM transmitters; TV transmitters; video signal enhancement and correction equipment; VTRs. **Introducing: Digital strobe action, multifreeze.** BOOTH 2404.
SEE AD ON PAGE 47

NTI AMERICA INC. — BOOTH 2209.

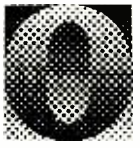
NETWORK RECORDING PRODUCTIONS — BOOTH 2807.

NEVE, see Rupert Neve Incorporated.

NORTRONICS COMPANY INC. — Audio heads and refurbishing services; audiotape and accessories; videotape and accessories. **Introducing: Broadcast cartridge head degausser; Pioneer RT701 conversion kit.** BOOTH 345.
SEE AD ON PAGE 183

FRED A. NUDD CORPORATION — Antennas, transmission lines, towers, and lights; monopoles. BOOTH 2310.

NURAD INC. — ENG microwave TV systems. **Introducing: 30-inch counterpart to the Superquad™ receive antenna system; Quadrod™, 7 GHz counterpart to the Goldenrod™; Slimline™, 2 GHz low-profile antenna; dual-band (2 + 7 GHz) Superquad™ receive antenna system.** BOOTH 533.



OAK COMMUNICATIONS — Encoders and decoders. **Introducing: Total STV systems, including encoders, decoders, exciters, and computers.** BOOTH 2223.

O'CONNOR CREATIVE SERVICES — BOOTH 2122.

O'CONNOR ENGINEERING LABORATORIES INC. — Studio cameras and accessories; ENG cameras and accessories; camera support equipment. BOOTH 2500.

OKTEL CORPORATION — Slow motion replay equipment. BOOTH 2125.
SEE AD ON PAGE 33

THE OLESEN CO. — BOOTH 2607.
Continued on page 110

OPEN WIDE AND SAY "AMPEX."

Ampex U-matic format videotape cassettes are the finest tapes you can buy.

Specially formulated for helical video color recording and reproduction, these tape cassettes will give you pass after pass of clear, vivid performance.

And the rugged plastic case provides extra protection when you mail your recordings. Even an accidental fall to the floor won't wreck your tapes.

Next time you order videotape cassettes for your U-matic format recorder, do what more and more perfectionists are doing... open wide, and say "Ampex."

AMPEX

Ampex Corporation, 401 Broadway, Redwood City, California 94063, 415/367-2011
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AMPEX MOSCOW 1980
OFFICIAL SUPPLIER'S VIDEO RECORDERS AND MAGNETIC TAPE XXII OLYMPIAD

Exhibitors

ORBAN ASSOCIATES INC. — Limiters and compressors; processing and equalising eqiupment; audio special effects equipment and generators; FM stereo generators. **Introducing: a parametric equaliser with graphic EQ controls; a dynamic sibilance controller.** BOOTH 429. Hospitality Suite: Adolphus, room 1008.
SEE AD ON PAGE 113

ORROX CORPORATION — BOOTH 350. (See CMX Systems and Videomax.)

OTARI CORPORATION — Audio reel-to-reel recorders; high-speed audio tape duplicators. BOOTH 405.
SEE ADS ON PAGES 137, 139, 141, 143

PACIFIC RECORDERS AND ENGINEERING CORP. — Audio consoles; limiters and compressors. **Introducing: Input broadcast console; Tomcat cartridge player.** BOOTH 416.

PACKAGED LIGHTING SYSTEMS INC. — Lights and lighting accessories. BOOTH 2611.

PANASONIC CO., VIDEO SYSTEMS DIVISION — Studio cameras and accessories; ENG cameras and accessories; video editing equipment; microphones; video monitors; videotape and accessories; video special effects equipment and generators; video switchers; VTRs. **Introducing: Professional series microphones; ENG/EFP video cameras; programmable ½-inch VHS cassette recorders; ½-inch VHS editing system; high-resolution monitors.** BOOTH 483.

PANASONIC CO., TECHNICS DIVISION — Amplifiers, pre-amps, DA's; audio components, tubes and hardware; headphones, speakers/intercoms; audio reel-to-reel recorders; audiotape and accessories; turntables and accessories. **Introducing: A new turntable and new speakers.** BOOTH 481.

PERROTT ENGINEERING LABS, INC. — Battery belts for cameras; battery chargers; battery packs for VTRs. BOOTH 2704. Hospitality Suite: Fairmont.

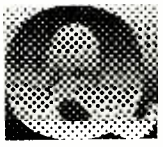
PHELPS DODGE COMMUNICATIONS COMPANY — Antennas and transmission lines. **Introducing: Superpower FM antennas.** BOOTH 353.
SEE AD ON PAGE 79

PHILIPS BROADCAST EQUIPMENT CORP. — Studio cameras and accessories; ENG cameras and accessories; audio consoles; video consoles; video editing equipment; exciters; film chain equipment; headphones, speakers/intercoms; microphones; video monitoring, measuring, and timing equipment; video monitors; noise reduction systems; video remote controls; video special effects equipment and generators; video switchers; time base correctors; time code generators; TV transmitters; video signal enhancement and correction equipment; video components, tubes, and hardware; VTRs. **Introducing: Automatic dynamic noise reducer providing automatic (hands off) noise reduction in television transmission.** BOOTH 314. Hospitality Suite: Hyatt Regency, Duncan A and B.
SEE AD ON PAGE 32A

PHILIPS TEST AND MEASURING INSTRUMENTS INC. — Video automation systems; encoders and decoders; exciters; AM stereo generators; modulators and demodulators; video monitoring, measuring and timing equipment; video signal and pattern generators; RGB meters; VITS analysing equipment. BOOTH 314.

POTOMAC INSTRUMENTS — ATS equipment; audio monitoring, measuring, and timing equipment. **Introducing: Automatic transmission system for directional antenna standard broadcast stations.** BOOTH 377.
SEE AD ON PAGE 183

POWER OPTICS INC. — BOOTH 2407.



QEI CORPORATION — ATS equipment; exciters; limiters and compressors; audio monitoring, measuring, and timing equipment. **Introducing: All-new, second-generation FM, stereo, SCA monitor with many new features, including switchable spectrum analyser outputs.** BOOTH 435.

QRK ELECTRONICS PRODUCTS — Audio consoles; turntables and accessories. **Introducing: Galaxy turntable with new DC motor and LED direct speed readout; digital production-timing clock; disco mixer.** BOOTH 389.

QSI SYSTEMS, INC. — Character generators; video editing equipment; video monitoring, measuring, and timing equipment; time code generators; VTRs. **Introducing: Colour bar identifier; video back timer.** BOOTH 2800.

Q-TV/TELESYNC — VideoPrompTers. **Introducing: A new, lightweight prompter for mounting on all television and film cameras.** BOOTH 332.

QUICK-SET INC. — Pedestals. BOOTH 495.

RCA BROADCAST SYSTEMS — BOOTH 300.

RCA AMERICAN COMMUNICATIONS INC. — Satellite broadcast capabilities for nationwide or regional transmission to thousands of small receive earth station antennas, providing broadcast distribution quality signals to television and/or radio stations. Point-to-point audio and TV are also provided via the RCA Americom satellite system. BOOTH 300B.

RCA ELECTRO OPTICS AND DEVICES — BOOTH 300A.
SEE AD ON PAGE 119

RF TECHNOLOGY INC. — ENG cameras and accessories; microwave, STL, and remote-control equipment; microphones. **Introducing: 2 GHz portable microwave system.** BOOTH 2410.

RTS SYSTEMS INC. — Amplifiers, preamps, and DA's; audio consoles; headphones, speakers/intercoms. BOOTH 2115.

RAMKO RESEARCH — Amplifiers, preamps, and DA's; audio consoles; limiters and compressors; audio reel-to-reel recorders; routing switchers; turntables and accessories. **Introducing: An**

audio router (switcher)/amplifier; portable audio mixing console; low-noise turntable preamp; solid-state LED "VU" meters. BOOTH 409.
SEE AD ON PAGE 68

RANK PRECISION INDUSTRIES — Fibre optic links and lines; film chain equipment; lenses and lens services. **Introducing: High-quality zoom lenses for use in EFP production, studio and remote locations; film chain equipment with Digiscan for flicker-free operation.** BOOTH 348.
SEE AD ON PAGE 165

RECORTEC — Video automation systems; video editing equipment; video monitoring, measuring, and timing equipment; video remote controls; VTRs. **Introducing: High-band ¾-inch cassette recorders that have the picture quality of 1-inch and 2-inch VTRs and better audio quality.** BOOTH 336.
SEE ADS ON PAGES 180, 181

GORMAN REDLICH MFG. CO. — Weather instruments, radar and accessories. **Introducing: NOAA weather receiver.** BOOTH 337.

RE: DB COMPANY (Division of Pierce Industries) — Audio heads and refurbishing services. BOOTH 2811.

RESEARCH TECHNOLOGY INC. — Film and film processing equipment; film editing equipment. **Introducing: High-speed film editing equipment with microcomputer programme timing and out-take timing.** BOOTH 539.

ROCKWELL INTERNATIONAL, Collins Transmission Systems Division — Audio consoles; earth station equipment and services; exciters; microwave, STL, and remote-control equipment; audiotape and accessories; AM and FM transmitters; turntables and accessories. BOOTHS 315 and 2102. Hospitality Suite: Adolphus Hotel, suite 2600.

ROCKWELL SCIENTIFIC/S.A.F.E. — BOOTH 2102.

ROHDE AND SCHWARZ CO.— Video monitors. BOOTH 386.

ROSCO LABS INC. — Lenses and lens services; lights and lighting accessories. **Introducing: Complete line of diffusion for TV; complete line of Kobold HMI lights including soft lights; Deco Reflex panels.** BOOTH 2211.

ROSS VIDEO INC. — Video switchers. BOOTH 2508.

RUPERT NEVE INCORPORATED — Amplifiers, pre-amps; DA's; audio consoles; limiters and compressors; noise reduction systems; processing and equalising equipment; audio reel-to-reel recorders. **Introducing: NECAM computer-assisted mixing system with applications in television post-production sweetening and dubbing; equipment can be used in conjunction with the latest LYREK multitrack tape machine. Also, a new range of radio broadcast consoles for medium-market stations.** BOOTH 507.

RUSSCO ELECTRONICS MFG. INC. — Amplifiers, pre-amps, DA's; audio consoles; turntables and accessories. **Introducing: 8-channel consoles; radio broadcast phono tone arm; variable-speed servo motor drive turntable.** BOOTH 427.

SWR INC. — BOOTH 2702.

SCIENTIFIC-ATLANTA — Earth station equipment and services; modulators and demodulators. **Introducing: Receiving system for MetSet — receives satellite weather pictures directly.** BOOTH 477.

SCULLY RECORDING INSTRUMENTS — Audio reel-to-reel recorders; time code generators; broadcast loggers. BOOTH 355.
SEE AD ON PAGES 144-145

SERVO CORP. OF AMERICA — Video editing equipment. **Introducing: A portable self-contained editing system ideal for ENG and other off-line applications, with built-in SMPTE time code readers and memory with CMOS integrated circuitry; interfaces with most VTRs.** BOOTH 2716.

SESCOM INC. — Amplifiers, pre-amps, DA's; audio components, tubes, and hardware; processing and equalising equipment. **Introducing: New headphone system for stage and field use; four-channel, low-impedence balanced microphone mixer semi-kit for broadcast and PA use.** BOOTH 443.

SHARP ELECTRONICS — ENG cameras and accessories; video monitors. **Introducing: 3 Saticon tube, self-contained portable colour camera.** BOOTH 2400.

SHINTRON COMPANY — Amplifiers, pre-amps, and DA's; character generators; video special effects equipment and generators; video switchers; time code generators; encoded chroma keyer. **Introducing: New colour receiver monitor; new 12-input colour switcher with 10 basic wipe patterns, soft and border wipe, RGB-type chroma keyer, and built-in luminance keyer with internal and external keying.** BOOTH 410.

SHURE BROTHERS INC. — Amplifiers, pre-amps, and DA's; audio components, tubes, and hardware; audio consoles; headphones, speakers/intercoms; limiters and compressors; microphones; audio monitoring, measuring, and timing equipment; turntables and accessories; high-fidelity cartridges and tone arms. **Introducting: High-performance studio condenser microphone.** BOOTH 371.

SINTRONIC CORPORATION — AM and FM transmitters. **Introducing: 5-kW AM and 27.5-kW FM transmitters.** BOOTH 387.
SEE AD ON PAGE 176

SKIRPAN LIGHTING CONTROL CORP. — Lights and lighting accessories; lighting control equipment. **Introducing: Multi-channel solid-state dimmer chassis for standard EIA rack mounting.** BOOTH 2625.

SKOTEL CORP. — Video editing equipment; SMPTE time code generators and readers. BOOTH 2827.

ELMER SMALLING — BOOTH 2800B.

WARREN R. SMITH CO. — Lenses and lens services; telecine film-to-tape transfer. BOOTH 338.

SOLL INC. — Antennas, transmission lines, towers, and lights; TV transmitters vans and ladder vehicles; installation consulting. **Introducing: Automatic RF switching systems with video colour graphic displays.** BOOTH 505.

SONO-MAG CORPORATION (SMC) — Audio automation systems; cart ma-
Continued on page 113

chines, carts, and accessory equipment. BOOTH 397.

SONY CORPORATION — Studio cameras and accessories; ENG cameras and accessories; microphones; video monitors; time base correctors; VTRs. **Introducing: Improved type-C VTR, (BVH-1100) with Dynamic Tracking Option, which offers noise-free playback video on-air, ¼-speed in reverse through still through twice forward speed, programme jog function, and confidence head; digital time base corrector; camera with 5-inch viewfinder and low light capability, along with capability for two camera control units for studio use; heterodyne monitor designed for portable use with the BVH 500, giving colour correcting capability in the field; professional broadcast monitor; wireless microphone transceiver featuring six channels with no interference.** BOOTH 380.
SEE AD ON PAGES 66-67

SOUND TECHNOLOGY — Audio monitoring, measuring, and timing equipment. BOOTH 2405.

SPINPHYSICS INC., A Kodak Company — Hot-pressed ferrite quad video head refurbishing services. BOOTH 473.

STAINLESS INC. — Broadcast support structures. **Introducing: Anti-guy galloping device.** BOOTH 2109. Hospitality Suite: Adolphus Hotel.

STANDARD PACIFIC LTD. — Amplifiers, pre-amps, DA's; audio components, tubes, and hardware; audio consoles; headphones, speakers/intercoms; routing switchers. BOOTH 2108.

STANTON MAGNETICS — Amplifiers, pre-amps, and DA's; headphones, speakers/intercoms; turntables and accessories; cartridge and styli. **Introducing: a disco sound cartridge featuring the Stereohedron™ stylus tip, which is applicable for both professional and home usage. The Stereohedron™ has a far larger bearing radius resulting in increased record groove contact.** BOOTH 363.

STATION BUSINESS SYSTEMS — Computerised billing, accounting, and traffic systems. **Introducing: Computer system for major-market television business automation, including billing, accounting, and traffic.** BOOTH 327.

STOREEL CORPORATION — Space-saving storage systems for television and radio. **Introducing: New mobile set-up truck.** BOOTH 469.

STRAND CENTURY INC. — Lights and lighting accessories; lighting control equipment. BOOTH 475.

STUDER-REVOX — Audio reel-to-reel recorders; SMPTE synchroniser. BOOTH 453.
SEE AD ON PAGE 107

SYSTEM CONCEPTS — Character generators. **Introducing: Three new models of the Quantafont™ production titler (a microcomputer-based production titler for studio, remote and ENG applications); product models range from low-cost monochrome systems to cost-efficient colour systems, all featuring high character resolution and extensive character manipulation. Many models offer extensive automatic programming.** BOOTH 517.
SEE AD ON PAGE 108

TABER MFG. AND ENG. CO. — Audio heads and refurbishing services: video heads and refurbishing services; bulk type eraser; audio recorder electronics. BOOTH 459.
SEE AD ON PAGE 185

WILLIAM B. TANNER CO. — Syndicated music sales; sales aids; production packages. **Introducing: "The Campaigner," a money-making service for sales-minded general managers; three new ID packages.** BOOTH 2206. Hospitality Suite: Fairmont, room 1121.

TAYBURN ELECTRONICS INC. — Antennas, transmission lines, towers and lights; microwave, STL and remote control equipment; video remote controls. **Introducing: Airborne electronics; autotracking pedestal; associated radios and controls (ground based); helicopter airborne antennas.** BOOTH 2502.

TM PRODUCTIONS/TM PROGRAMMING — Programming services. **Introducing: Radio and television ID's; "Someplace Special," a coordinated marketing plan for multi-media; new automated disco format. Also, TM Special Projects will introduce a new AOR special, "Album Greats: A History of Album Rock."** BOOTH 2307. Hospitality Suite: Fairmont.

TECHNOLOGY SERVICE CORP. (Development Labs Division) — Weather instruments, radar, and accessories. BOOTH 467.

TEKTRONIX INC. — Video automation systems; encoders and decoders; modulators and demodulators; audio monitoring, measuring, and timing equipment; video monitoring, measuring, and timing equipment; video monitors; noise reduction systems; video remote controls; video signal enhancement and correction equipment. **Introducing: a tunable down converter for UHF and VHF precision demodulator.** BOOTH 306.

TELE-CINE INC. — Studio cameras and accessories; ENG cameras and accessories; lenses and lens services. **Introducing: New lenses.** BOOTH 392.

TELECOMMUNICATIONS INDUSTRIES LTD. — BOOTH 449.

TELEGEN/SOFRATEV — Teletext equipment. **Introducing: The Antiope teletext system, a data transmission system using television, radio, or telephone links for communications. The system on display will include a variety of data banks, vertical interval digital data insertion equipment, display colour monitors, and receivers all equipped with Antiope teletext decoders and control units that can be operated by visitors to the booth.** BOOTH 2221.
SEE AD ON PAGE 26

TELEMATION, A Division of Bell and Howell — Audio automation systems; video automation systems; amplifiers, pre-amps, and DA's; character generators; encoders and decoders; film chain equipment; noise reduction systems; processing and equalising equipment; routing switchers; video switchers; video signal enhancement and correction equipment. **Introducing: Machine-control option for distribution switcher; graphics compose/animation option and expanded smart-switcher page call-up for character**

Continued on page 114

OPTIMOD-AM: NOT FOR EVERYONE

The successful Optimod-AM station

- has the desire to sound like "the other band" on common auto, kitchen, and beach-blanket radios; and

- is willing and able to feed Optimod-AM with FM-quality audio (because Optimod-AM —and your listeners—know the difference); and

- has a transmitter and antenna that operate to high technical standards.

Optimod-AM is not for everyone. If crude, raw loudness is all you want, other manufacturers can give it to you cheaper.

But if you want loudness and coverage along with a stunning "almost high fidelity" sound that lights up your spot on the dial with punch, presence, and impact, then Optimod-AM is the way to get it. And it's AM stereo ready.

Fight the FM challenge. Find out how Optimod-AM can make your AM the brightest, cleanest, loudest sound on the dial.

Available through selected broadcast dealers. Or contact us directly.

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generator; image enhancement (H and V) freeze frame, chroma delay corrector, and remote-control options for TDF-1 digital noise filter. BOOTH 342.

SEE AD ON PAGE 123

TELEMET — Amplifiers, pre-amps, and DA's; encoders and decoders; fibre optic links and lines; modulators and demodulators; processing and equalising equipment; video switchers; routing switchers; video signal enhancement and correction equipment. BOOTH 333.

TELESCRIPT INC. — BOOTH 356.

TV EQUIPMENT ASSOCIATES — Headphones, speakers/intercoms; audio monitoring, measuring, and timing equipment; video monitoring, measuring, and timing equipment; processing and equalising equipment; videotape and accessories; microphones. **Introducing: Two-wire amplified intercom systems.** BOOTH 364.

TELEVISION TECHNOLOGY — FM rebroadcast translators; TV rebroadcast translators. **Introducing: 100-watt UHF translator; FM translator.** BOOTH 2306. Hospitality Suite: Ramada, 719-20.

TELEX COMMUNICATIONS INC. — Amplifiers, pre-amps, DA's; cart machines, carts, and accessory equipment; headphones, speakers/intercoms; microphones; audio reel-to-reel recorders; audiotape and accessories. BOOTH 357.

TENTEL — Audio monitoring, measuring, and timing eqiupment; video monitoring, measuring, and timing equipment; audiotape and accessories; videotape and accessories. BOOTH 395.

SEE AD ON PAGE 182

TERRACOM — Microwave, STL and remote control equipment. **Introducing: System for providing programme channels; ENG links.** BOOTH 2401.

THERMODYNE INTERNATIONAL LTD. — Shipping and carrying cases. **Introducing: Rack-mount cases; camera and monitor cases.** BOOTH 2408.

THOMSON-CSF LABORATORIES — Amplifiers, pre-amps, and DA's; ENG cameras and accessories; character generators; frame store synchronisers; limiters and compressors; noise reduction systems; video special effects equipment and generators; video signal enchancement and correction equipment. **Introducing: One- and two-piece Microcam configurations with new 4½-inch viewfinder and remote-control package for EFP applications; production version of the new one-piece Microcam; Digital Video Processing (DVP) system — digital noise reducer, frame synchroniser, 4 x 1 input switcher, and a freeze frame, all operating at 4x subcarrier sampling.** BOOTH 324. Hospitality Suite: Hyatt Regency.

SEE AD ON PAGES 28-29

THOMSON-CSF ELECTRON TUBES — Audio components, tubes, and hardware; video components, tubes, and hardware. Introducing: New UHF tetrodes and UHF cavity. BOOTH 2210.

TIME AND FREQUENCY TECHNOLOGY INC. — Encoders and decoders; microwave, STL and remote control equipment; audio monitoring, measuring and timing equipment. **Introducing: A new low-cost microprocessor alarm and logging system; studio to transmitter link; routing switches remote control.** BOOTH 341.

SEE AD ON PAGE 35

TIMES WIRE & CABLE — BOOTH 2519.

TOSHIBA INTERNATIONAL — Studio cameras and accessories; ENG cameras and accessories. **Introducing: A new line of colour television cameras, including ENG/EFP cameras and studio cameras incorporating the latest digital technology.** BOOTH 2701.

SEE ADS ON PAGES 17, 18, 19

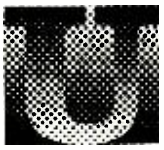
TRACK AUDIO — Processing and equalising equipment. **Introducing: 5-channel Mic Mixer (remote on-location audio mixer); audio compressor/limiter; peak programme meter.** BOOTH 2712.

SEE AD ON PAGE 184

TROMPETER ELECTRONICS INC. — BOOTH 511.

TUESDAY PRODUCTIONS — Radio and TV jingle and music production. BOOTH 2205.

TWEED AUDIO (USA) INC. — Amplifiers, pre-amps, and DA's; audio consoles; limiters and compressors; audio monitoring, measuring, and timing equipment; processing and equalising equipment; audio mixing consoles. **Introducing: Production console; 12-channel mixer.** BOOTH 2207.



UMC ELECTRONICS — Audio automation systems; cart machines, carts, and accessory equipment; audio consoles. BOOTH 407.

U.S. TAPE AND LABEL CORP. — Advertising bumper strips, window labels, and t-shirt iron-ons. BOOTH 2201.

UNARCO-ROHN, Division of Unarco Industries Inc. — Antennas, transmission lines, towers, and lights; lights and lighting accessories. BOOTH 373-A.

UNI-SET (Division of Kniff Woodcraft Corp.) — Modular studio staging system. BOOTH 396.

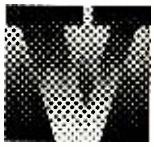
UNITED MEDIA INC. — Video editing equipment; encoders and decoders; time code generators. **Introducing: Complete new line of SMPTE time code computer-assisted electronic video generators, featuring the Commander I and II; SMPTE time code generator and reader with user bits; video character generator for SMPTE and user bits; SMPTE/user bit time code generator/reader with auto sync.** BOOTH 2711.

UNITED PRESS INTERNATIONAL (UPI) — News services. **Introducing: GOES-FAX, a facsimile receiver of picture transmission from geostationary operational environmental satellite.** BOOTH 2300.

UNITED RESEARCH LABS CORP. — Audio heads and refurbishing services; audio reel-to-reel recorders; audiotape and accessories; replacement parts for professional tape recorders. **Introducing: Ball-bearing, self-aligning pinch rollers for tape and video machines.** BOOTH 375.

UTAH SCIENTIFIC — Routing switchers; video switchers. BOOTH 2707.

UTILITY TOWER COMPANY — Antennas, transmission lines, towers, and lights. **Introducing: Actual tower material.** BOOTH 323.



THOMAS VALENTINO INC. — Music library service and sound effects service. **Introducing: New releases to music and sound effects libraries for producers in both radio and TV.** BOOTH 441.
SEE AD ON PAGE 186

VAN LADDER INC. — Microwave antenna carriers. **Introducing: Van-mounted microwave antenna carrier, and control and origination platform for ENG vans.** BOOTH 2804.
SEE AD ON PAGE 179

VARIAN ASSOCIATES (EIMAC DIVISION) — Audio components, tubes, and hardware; video components, tubes, and hardware. BOOTH 487.

VERSA COUNT — BOOTH 2120.

VIDEO AIDS CORP. OF COLORADO — ENG cameras and accessories; video editing equipment; modulators and demodulators; audio monitoring, measuring, and timing equipment; video monitoring, measuring, and timing equipment; video special effects equipment and generators. **Introducing: New Edit-Aid controller; new VIRS inserter.** BOOTH 553.
SEE AD ON PAGE 2

VIDEO ASSOCIATES LABS — Modification equipment for ¾-inch VTRs. **Introducing: Full broadcast servo system to update the current tach lock system in ¾-inch machines.** BOOTH 2809.
SEE AD ON PAGE 176

VIDEO DATA SYSTEMS — Character generators. **Introducing: New titlers.** BOOTH 2419.

VIDEOMAGNETICS — Audio heads and refurbishing services. **Introducing: New material processing technique for quad video heads which provides enhanced performance and extended life without increased cost.** BOOTH 2705.
SEE AD ON PAGE 169

THE VIDEO TAPE COMPANY — Videotape and accessories; videotape stock and videotape duplication and distribution. **Introducing: New videotape duplication and distribution services; master broadcast videotape; ¾-inch videocassettes.** BOOTH 527.

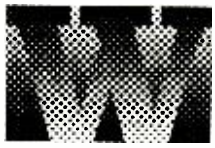
VIDEOMAX (Orrox) — Video heads and refurbishing services. BOOTH 350.

VIDEOMEDIA INC. — Video automation systems; video editing equipment. **Introducing: Computerised microprocessor-based editing system; control track editing system.** BOOTH 2825.
SEE AD ON PAGE 20

VIDEOTEK — Modulators and demodulators; video monitors. **Introducing: TV/tuner demodulator; 8-inch professional AC/DC colour monitor (portable); 12-inch professional colour monitor (rack-mount).** BOOTH 2602.
SEE AD ON PAGE 164

VITAL INDUSTRIES — Video automation systems; routing switchers; video special effects equipment and generators; video switchers. **Introducing: New production package — Squeezoom switcher, PSAS; automation package; digital special effects; frame synchroniser.** BOOTH 316.

VITEX CO., Division of Vital Industries — DA's; video consoles; routing switchers; video special effects equipment and generators; video switchers. **Introducing: Video production switchers; master control systems; on-air switching systems; routing switcher systems and terminal equipment.** BOOTH 2219. Hospitality Suite: Dallas Hilton.



WANG VOICE COMMUNICATIONS INC. — Audio delay equipment. BOOTH 2112.
SEE AD ON PAGE 105

WARD-BECK SYSTEMS INC. — Amplifiers, pre-amps, DA's; cart machines, carts and accessory equipment; audio consoles; headphones, speakers/intercoms; limiters and compressors; audio monitoring, measuring and timing equipment; processing and equalising equipment; routing switchers. **Introducing: Intercom amplifier; intercom matrix amplifier; distribution amplifier.** BOOTH 489.
SEE AD ON BC

THE WEBSTER GROUP — A/V sales presentations and media research systems. **Introducing: "Personal" computers adapted to sophisticated media research systems (radio, television, and newspapers) for stations and agencies as well as clients.** BOOTH 2621.

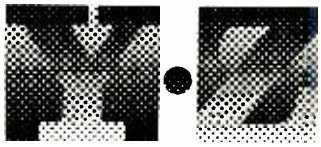
WESTERN UNION TELEGRAPH — BOOTH 549.

WILKINSON ELECTRONICS INC. — Audio consoles; exciters; limiters and compressors; AM and FM transmitters. **Introducing: 25 kW dummy load and 80 kW dummy load.** BOOTH 347.

THE WINSTED CORP. — Cart machines, carts, and accessory equipment; video consoles; video editing equipment; space-saving tape and film storage systems. **Introducing: Television consoles designed for digital editing systems and portable production consoles that offer new flexibility in working arrangements for ¾-inch and 1-inch formats.** BOOTH 2601.

WOLF COACH/TELEVISION ENGINEERING CORP. — Amplifiers, pre-amps, DA's; studio cameras and accessories; ENG cameras and accessories; vans and ladder vehicles. BOOTH 503.

WORLD VIDEO — Headphones, speakers/intercoms; video monitors. **Introducing: Portable professional colour monitor for ENG applications which can be AC or DC powered; "Nova-Com" multi-station intercom system, interconnected by four conductor wire.** BOOTH 501.
SEE AD ON PAGE 171



YVES FAROUDJA, INC. — ENG cameras and accessories; encoders and decoders; video monitors; noise reduction systems; video signal enhancement and correction equipment. **Introducing: Portable record booster for ¾-inch ENG equipment; combination NTSC decoder/enhancer; plug-in comb filter board for NTSC monitors.** BOOTH 412B.
SEE AD ON PAGE 175

ZEI-MARK CORP. — BOOTH 2521.

ON LOCATION *Broadcast Communications'* video production editor goes on location to cover the latest developments in broadcasting.

HMI lighting challenges the standards

By Ron Whittaker

Established standards are hard to change. This is especially true if large industries have grown up around them and have made substantial investments in them.

The 3,200°K incandescent light has been a standard of the film industry since movies were first shot indoors under artificial light. The same is true for television.

But since daylight averages 5,600°K and is much bluer than incandescent light, this has meant that there have been two lighting standards to plague film and television production. And, even though this has been an accepted fact of life for several decades, it nonetheless has caused (and continues to cause) many problems for lighting directors, cameramen, and makeup artists.

An artificial light source has now arrived on the scene which has exactly the same colour temperature as sunlight: the HMI light. (By the way, HMI stands for hydragyrum-medium-iodide, which explains why the lights are simply referred to as HMI.)

But beyond offering the possibility

Continued on page 118

Ron Whittaker, Video Production Editor, is the coordinator of television and film at Pepperdine University, Malibu, California. He is also a member of the American Society of Lighting Directors.

Since HMI lights are smaller, easier to operate, and much more efficient than arc lights, they are finding wide acceptance in exterior film and video work. They are especially suited to the move to film-style, one-camera production (shown here at left). *(Photos by Ron Whittaker)*

Better video–digitally–for any TV standard

PAL/SECAM

CVS-517 Digital Time Base Corrector

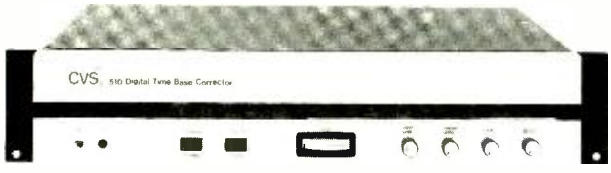
Broadcast quality (SECAM optional), L. Lock and V. Lock. SECAM option also provides PAL/SECAM bi-directional standards conversion. Features: 2h + window, Gen Lock, DOC, Vel Comp, Proc Amp. Options include: SECAM, Image Enhancer/Noise Reducer, 16h window.

PAL-M

CVS-515 Digital Time Base Corrector

Broadcast quality; has NTSC to PAL-M standards conversion. Features: 2h+ window, Gen Lock, DOC, Vel Comp, and Proc Amp. Image Enhancer/Noise Reducer and 16h window optional.

NTSC

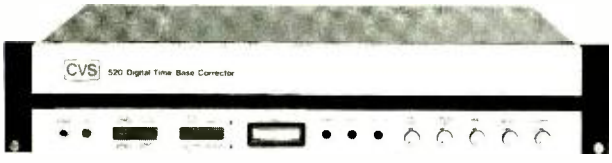


CVS-510 Digital Time Base Corrector

Ideal for CCTV and CATV; monochrome or heterodyne color. Features include: 1h + window, DOC, Proc Amp, Color Interlace.

CVS-516 Digital Time Base Corrector

Broadcast quality, specifically designed for heterodyne VTRs. Features: 2h+ window, Gen Lock, DOC, Vel Comp, Proc Amp. Options: Image Enhancer/Noise Reducer, 16h window.

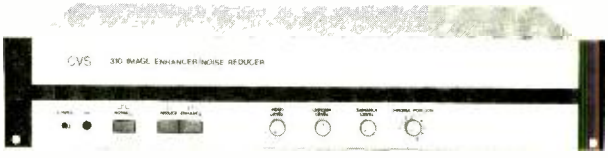


CVS-520 Digital Time Base Corrector

Broadcast quality for every VTR: segmented or nonsegmented. Only TBC with 9 bit 4x subcarrier digital processing. Can update mono quad to color; has DOC, line-by-line Vel Comp and digital outputs.

CVS-504B Digital Time Base Corrector

Broadcast quality, monochrome, direct and heterodyne color, (L. Lock and V. Lock). Includes: 3h window, Gen Lock, Proc Amp. Options: Vel Comp, Heterodyne Phase Corrector.



CVS 310 Image Enhancer/Noise Reducer

Reduces luminance & chroma noise 6 dB; enhances horiz. & vert.; minimizes fine grain noise, moiré & streaking; reduces chroma-to-luminance crosstalk by 20 dB; corrects chroma/luma delay errors.

EPIC™ Computer Aided Editor

A complete, software-based system for on or off-line use with multiple VTRs—from quad and 1" to ¾" cassette types. With EPIC, functions that, before, required separate, costly hardware—like time code generation—are now in software. As a result, total system cost is reduced while versatility and convenience are increased.

Want to know more about TBCs?
Ask for our free booklet, the "What, Why and When of Time Base Correction"

CVS is making digital technology work for video users worldwide. To keep up to date on our new product developments call or write.

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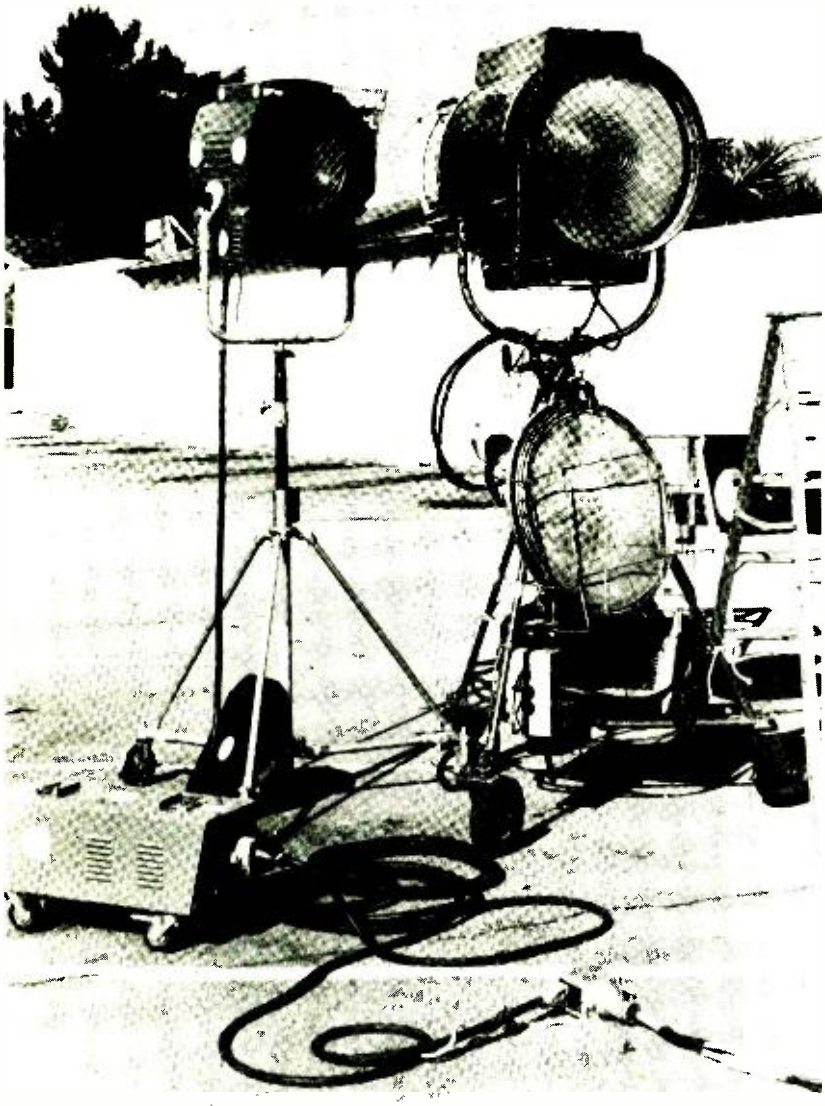
Circle (66) on Reader Service Card

of one colour standard, HMI lights have a number of other important advantages. They are much more efficient than incandescent or tungsten-halogen lights, and therefore take substantially less energy to operate. HMI generate much less heat. Thus, air conditioning costs for studios are reduced, along with the preparation and makeup problems which normally plague on-air talent. (John Wayne reportedly asked while doing a recent commercial with HMI lights, "Where have these been all my life?")

HMI lighting instruments are smaller and more portable than tungsten halogen or arc lights of comparable intensity, so labor costs in moving and setting up lights are significantly reduced. This is especially true in exterior film production where large arc lights have been the norm. And since power requirements are significantly less, electrical hook-up problems are reduced or even eliminated. (You can often just plug the units into a wall outlet and get light intensities which formerly required special power hookups, or, in the case of on-location film production, cumbersome and noisy DC generators.)

So what's the catch? Well, HMI represents a totally different kind of light with a special set of characteristics and considerations. And, if you don't understand them, you may get into trouble. This is especially true in motion picture work. Interestingly enough, even though the units were originally developed for television, they have been much more widely accepted to date in film production.

With all this as a quick background, let's now turn to some of the details surrounding the newest development in lighting.



Even though the light output of this 4,000-watt HMI Fresnel rivals the 225-amp arc light on the right, you will note that there is considerable difference in the size. The balast for the HMI light, which is discussed in the text, is shown at the bottom left of the picture.

This new light source was developed in Germany about a decade ago to meet the needs of television cameramen for a small, intense fill light for exterior work; a light which would at the same time, not present the power problems of existing light sources. A tall order. What was needed was a totally new concept in lighting.

Everybody knows that incandescent lights generate mostly heat; in fact, about 80 percent of the energy they use is translated directly into heat. Light is only a by-product. With tungsten halogen lights the figures are a little better: 65 percent of the power is translated into heat; still a very wasteful light generator.

With so-called "discharge" lighting devices — primarily fluorescent lights — most of the electrical energy is translated into light. But fluorescent lights have problems. They are of comparitively low intensity and they exhibit "broken spectrum" characteristics, which means that weird and unpredictable things often happen to colour when you light with fluorescents. The answer was in the development of a new type of discharge device, a tube filled with mercury and argon and a few rare earth metals to round out the light energy spectrum — HMI. High electrical voltage applied to the ends of the HMI tube result in an arc of extreme brilliance. The tube is fused silica, or quartz.

The physical design of the HMI lamps, including their thickness and electrode size, makes them capable of withstanding shock, even while in operation.

In order to avoid blackening of the tube, the lamp contains bromides; and

Continued on page 120

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a tungsten-bromide cycle is introduced which prevents tungsten from being deposited on the inner surface of the tube — a major problem with the old incandescent-type lamps. HMI lamp electrodes are molybdenum foil. The bases are nickel-coated brass.

At normal wattage the lamp emits a 5,600°K light (plus or minus 300°) with an energy distribution very close to sunlight. For each hour of operation, the colour temperature drops 1°K. But, unlike incandescent or tungsten-halogen lamps, voltage drops result in an increase in colour temperature rather than a decrease. However, since vapour pressure of the halides changes almost equally with temperature, a constant energy distribution tends to be maintained despite minor power changes. This represents a kind of self-correction feature.

But, unlike DC-powered carbon arcs, HMI lights are a discharge light source and are subject to the pulses of alternating current. (Pulses occur at twice the line frequency.) Initially this caused flicker or dark frame problems in film production. Formulas were worked out to synchronise film camera shutter speeds and shutter opening angles to line frequencies. In 50 Hz countries shutters were set at a positive 172.8° at 24-fps, or 180° at 25-fps. In 60 Hz countries tolerances are reduced, but the problem is covered with a 144° shutter setting at 24-fps. These settings provide two light pulses per frame.

Even though the new generation of HMI studio lights have power supplies which now eliminate dark frame problems, there are many industrial HMI lights which do not have the additional output-smoothing power supply circuits and these lights can cause problems to unsuspecting cinematographers. However, shutters which can be adapted to or set at the previously-mentioned values will take care of the full-range of HMI lights.

Because of their natural image-retention properties, television cameras do not suffer from HMI flicker problems.

HMI lights, which are also referred to as metal halide lights, require special ballast or choke power supplies with a high-voltage ignition circuit. Their major disadvantage centers on power supply and lamp ignition requirements.

A power supply for a 4-K HMI light is shown. Because of the stepup transformer required (in 120-volt countries) and the ballast, this unit is not something that you easily transport by tucking it under your arm and walking away. However, compared to the backup hardware required for an arc light (which is the only thing in its light output class) the size and weight of the backup power supply is a small price to pay.

HMI lights have efficacies of 85 to 102 lumens per watt at 5,600°K, which is more than twice the output of standard studio lamps at 3,200°K. When the latter is brought up to 5,600°K through filtration (which reduces the output by 50 percent) the output per watt is reduced to a factor of as much as one-sixth of that of HMI. Even when HMI lights are brought down to 3,200°K by filters, they are still twice as energy efficient as tungsten-halogen lights.

According to Ron Dahlquist of the Keylite Rental Co. Inc. of Burbank, California, a 4-K HMI light gives off more usable light than two 10-K tungsten-halogen lights when the latter are brought up to 5,600°K. Dahlquist, who recently joined Keylite from Paramount Pictures, also said that a 4-K HMI light for exterior work has virtually replaced the 225-amp brute arc light, which was widely used in West Coast film production. (The two lights are shown in a photo. What is not shown is the large DC generator which usually accompanies the arc light.)

A special circuit in the base of the HMI light housing supplies the one-second time-controlled ignition voltage required to initiate the arc. A warm-up time of about one minute brings the light up to 90 percent of maximum output. After three minutes there is full stabilization of colour temperature.

Since HMI lights represent a type of arc, it is not possible to dim them with electrical dimmers. But scrims offer the same intensity control which has been widely used with incandescent lights. And, George Dibie, a Hollywood-Los Angeles-based lighting consultant and director of photography, has had considerable success in controlling intensity with mechanical shutters.

Before joining Keylite, Ron Dahlquist headed the electrical department of Paramount Pictures. While there, he and George Dibie conducted an extensive study of HMI lights produced by various manufacturers. Last May, Dibie and Dahlquist took all of the available designs onto a sound stage and

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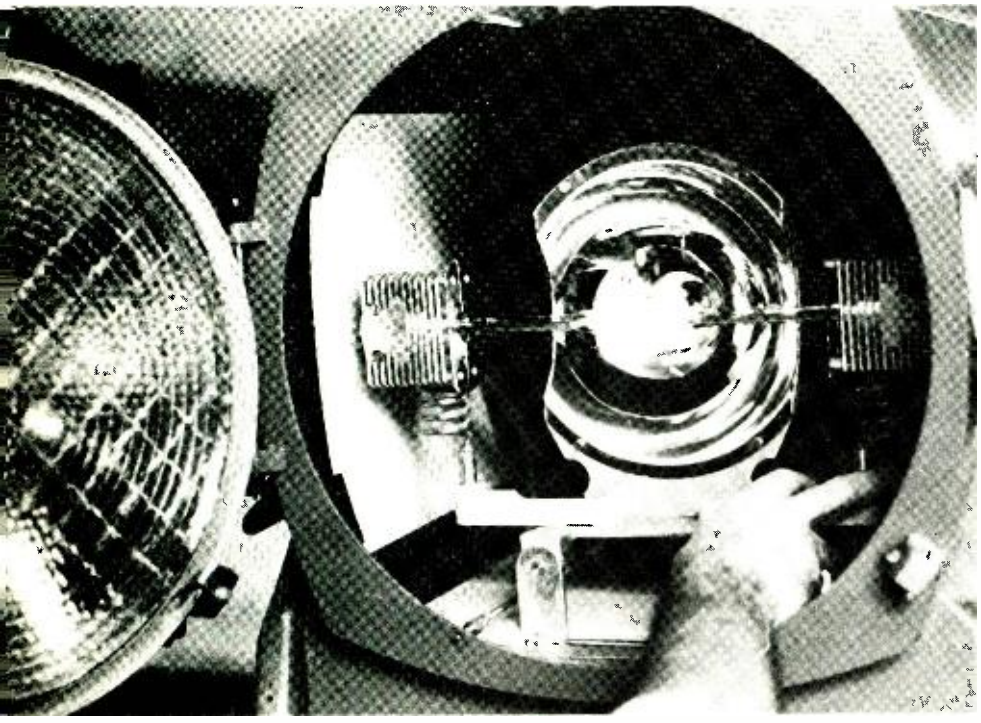
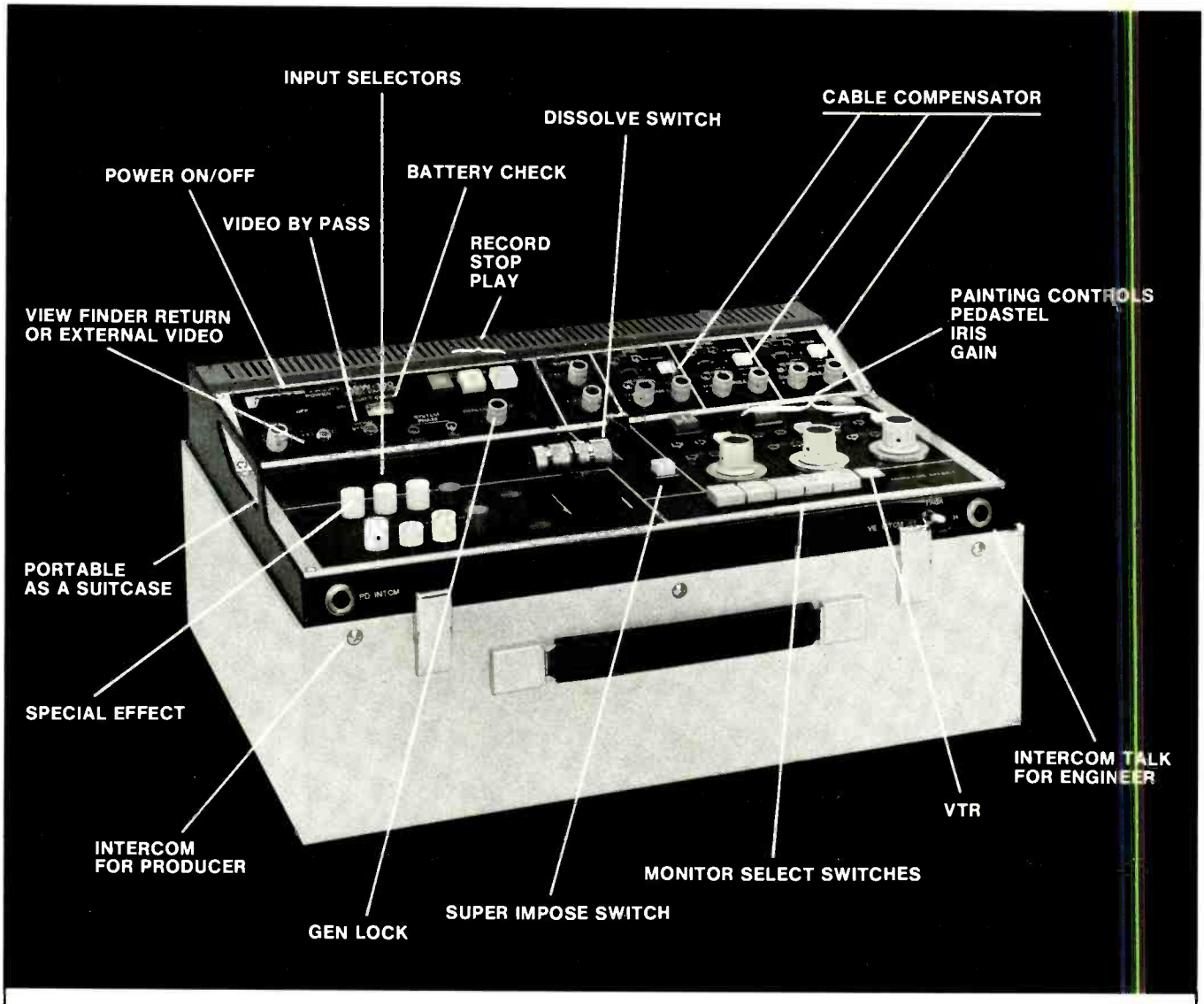


The internal design of this HMI-type light varies considerably from a conventional tungsten halogen light. The special shape of the reflector is important in eliminating double-edged shadows. Changes were also made in the glass used for the Fresnel lens (on the left).



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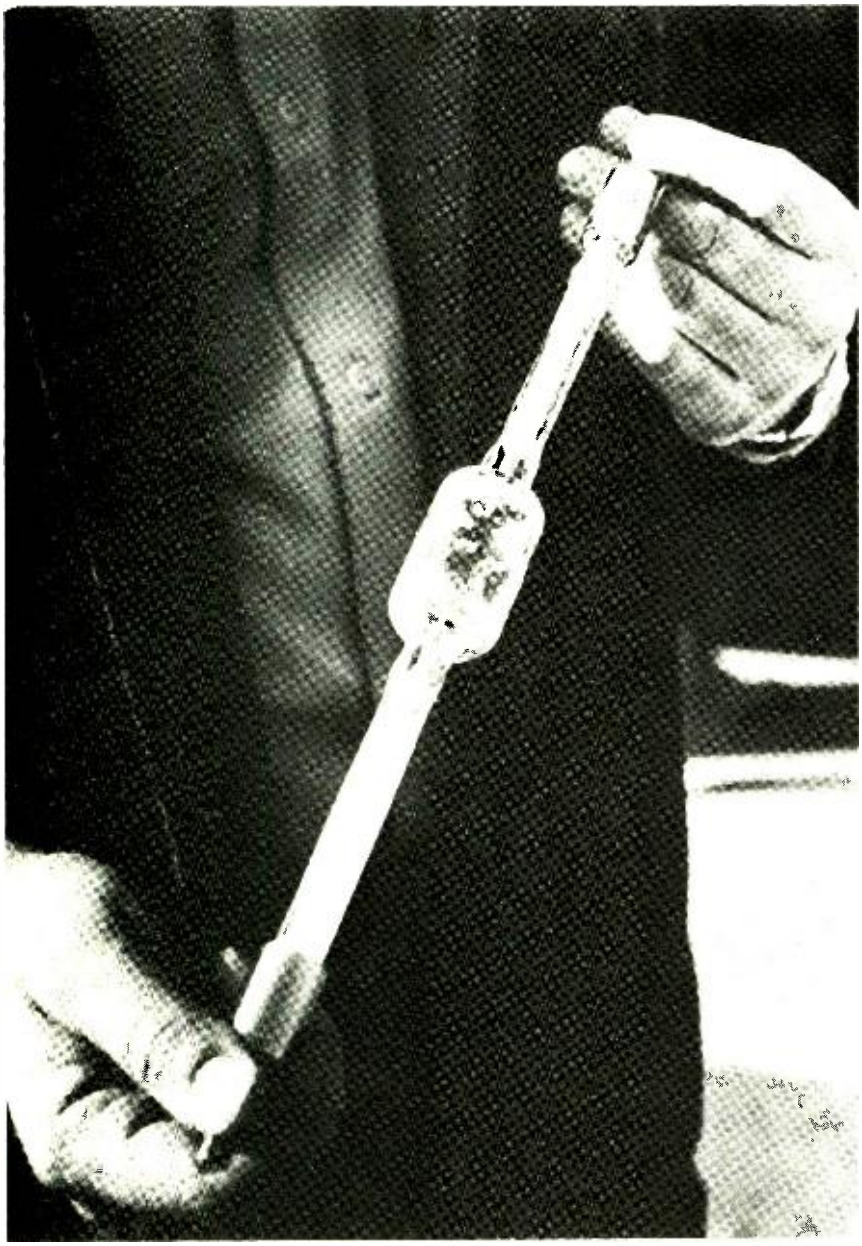
directed each unit toward a blank background from a distance of 35 feet (11 meters). Careful measurements of intensity and evenness of light distribution were made. Power supplies were even switched around to see if this would have any effect on results.

Dahlquist gave the HMI units an extensive test recently when he and Keylite set up 36 units along a parade route in Hollywood for TV station KTLA. Since the lights had to be hidden from cameras, they were directed down on the parade route from buildings. Even though the whole event took place at night, Dahlquist was able to provide an even 150 fc (1,400 lux) along the parade route.

The American Society of Lighting Directors was so impressed with one manufacturer's HMI design that they presented the manufacturer with an award of excellence at their October 28th awards banquet in Hollywood. The award was the first given to a manufacturer in the 12-year history of ASLD.

Edward Carlin, the owner of Keylite, the largest supplier of HMI-type lights in the U.S., has seen his HMI business go from zero one year ago when he started handling the units to a point of where they now meet a lion's-share of exterior lighting needs. The film studios were the first to "go-HMI" for on-location work. Now television production facilities are following.



A 4,000-watt HMI lamp is held by Ron Dahlquist of Keylite Corp. The output per watt of the HMI or metal halide lamp is many times greater than tungsten halogen lamps; and they generate far less heat.

The United States got off to a slow start with HMI. This was due in part because the units were first introduced in Europe and in part because the 120-volt standard of the U.S. does not readily lend itself to the 220-volt power required by most of the HMI lamps.

Now that HMI instruments have been introduced in the United States which meet the standards of the American Society of Lighting Directors and major film and television studios, the question is whether HMI will now gradually take over and eliminate the "double standard" for lighting. As in most things, the answer to that question will be based primarily on economics. With an investment of millions of dollars in incandescent lighting — some studios have been using the same lights for 50 years — the change will have to be helped along by economic necessity.

Because of the special requirements of HMI lamps, attempts at converting existing studio lighting instruments have not proven satisfactory. Therefore, an approach similar to the one used to convert incandescent lights to tungsten-halogen doesn't appear to be possible. This will mean that conversion to HMI in studios would be quite costly.

The chief consideration which may soon offset HMI's considerable initial investment will be soaring energy costs. Related to this is labor costs. HMI lights have been known to shrink manpower requirements as much as two-thirds for exterior film production. (And you have to add to this the time savings for crew and talent in not having to periodically shut down to make required adjustments when using arc lights.)

With an HMI takeover for exterior production work now well underway, will interior lighting for TV and film studios be next? Although a limited move to HMI can also be noted here, a widespread move to one-standard lighting will undoubtedly rest on two basic considerations: economic necessity and reduced HMI ballast size and weight. Right now prospects of significant change in both areas seem imminent. BC

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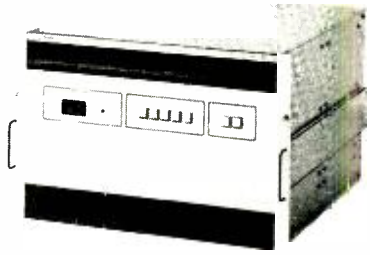
KPLR-TV, St. Louis, Missouri



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ON LOCATION *BC*'s international video editor visits the Ampex plant to get an inside look at the latest development in digital VTRs.

Ampex unveils digital VTR at winter SMPTE meeting

By Joe Roizen

The Ampex digital VTR as shown at the SMPTE Television Conference in San Francisco was put through a rigorous sequence. Test signals and picture material were replayed with flawless performance. An incredible 60 dB signal-to-noise ratio and virtually 0% DG and 0° DP were the measurements quoted on the test tape. The transport and housing are nearly identical to the Ampex AVR3 quadruplex recorder; however, the circuitry and head structure are quite different. The details of this experimental all-digital VTR were explained by Joachim Diermann and Maurice Lemoine, the authors of the paper presented at the conference. *(Photo by Donna Foster-Roizen)*

Like the Sword of Damocles, the all-digital VTR has hung over the television industry for the last few years, creating a basic apprehension that some technical breakthrough in this area would suddenly obsolete all existing broadcast VTRs and render the huge investments in them practically worthless.

A digital VTR is inevitable, but no one would say just when. That was the message from a spate of papers on the subject; and a panel of experts convened immediately after, to discuss this hot topic at the recent SMPTE Television Conference in San Francisco.

The fascination is with a recording technique that renders endless generations, with a picture quality indistinguishable from the original. This has tended to mask the practical aspects of current video recording activities, which depend as much on convenient editing, relative size, weight or price of the machine, tape consumption, and ease of maintenance, to name a few.

The all-digital VTR has been on the horizon for some time now. A BBC research team under the able guidance of Peter Rainger, now deputy director of engineering, showed a working digital VTR using a longitudinal tape transport many years ago. The machine made acceptable colour pictures at the IBC in London during their 1974 meeting and was the subject of considerable interest.

The digital video recorder itself was a 42-track data recorder with a longitudinal tape speed of 120 IPS. Each data channel handled digital information at a

Joe Roizen is the International Video Editor and President, Telegen.

2.6 M bits/sec. rate and the multiplexed output provided a PAL colour picture. The maximum-sized reel of one-inch tape that this transport could handle gave eight minutes of playing time. This was enough to prove feasibility and test out the various coding and decoding theories being proposed at that time.

The BBC made no claim as to the potential practicality of this experimental recorder, and showed it only in support of the technical papers on digital video recording presented by them at the conference.

Britain was not the only country in which digital VTR developments were taking place. The Centre Commun d'Etudes de Television et Telecommunications (CCETT) television research laboratory in Rennes (France) acquired an Ampex FR2000A in early 1975, and Dominique Nasse started a project to convert it to digital video imagery.

This instrumentation machine records 28 longitudinal tracks on one-inch tape, and the tape transport is capable of 135 IPS of linear speed.

According to Nasse, 18 of the tracks were used for digital data recording with a two-dimensional redundancy that involved the tracks themselves and the adjacent track. This provided a safety factor of about 22% and proved adequate. No concealment techniques were involved; instead, an error correction method was applied to the all DPCM recording.

The SECAM analogue colour signal was divided into its basic components, luminance and line sequential chroma, and these were converted to digital signals at 50 M bits per second. Any 625-line source could be used. And the machine also had input ports for analogue RGB signals if these were available. In about 18 months, Nasse had a working digital VTR making good colour SECAM images on a 13-minute-capacity reel.

The experiments were considered successful from the standpoint of learning to record digitized colour TV signals, and Nasse indicated that future work in Rennes would probably be done on rotary head machines currently available.

It should be pointed out that the basic difference between the English and French approach to a digital VTR came from the fundamental dichotomy of the PAL and SECAM colour coding methods. This is why the U.K. experiments leaned toward composite techniques and the French toward component methods of analogue-to-digital conversion. It was evident in separate papers given by Rainger and Nasse (at the SMPTE Television Conference) that this

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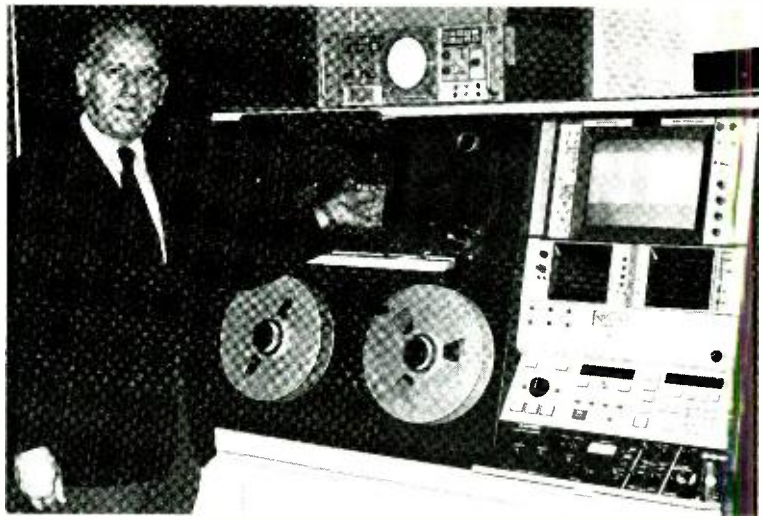

Maurice Lemoine shows ultimate faith by rocking video head female guide during colour bar playback. No visible deterioration appeared on the monitor screen. *(Photo by Donna Foster-Roizen)*

Ampex demonstrates DVR for BC

Fourteen years with Ampex have not removed his soft French accent, the last vestige of an early Parisian domicile and a Sorbonne education. He has always tackled jobs that seemed impossible, condensing a quad VTR into a backpack machine (VR-3000) in the mid sixties, developing digital TBCs in the early seventies (before they were commercially available from anyone), and now pioneering the DVR that will be the machine to look out for in the early eighties.

Maurice Lemoine is currently a senior staff engineer with Ampex, the highest position they promote their creative engineers to. I'm sure we will be hearing a lot more about his engineering developments as the digital VTR moves from the laboratory into the marketplace.

Lemoine participated in a private demonstration of the Ampex DVR that was hosted by Bill Carpenter, product manager of the Video Tape Recorder Group. The demo was set up in their development lab so we could more closely examine the characteristics of this experimental DVR, and shoot some pictures of its performance.

Lemoine explained that the concept for this machine dates back about seven years, and that he actually started working on it three years ago.

During our discussions, several interesting facts about the DVR were revealed. First, the machine has a digital field store built into it. This is part of several error correction or concealment systems. Second, while this recorder did not have a working digital audio system on it, the principle has been tested out and it's more than just theory. The concept has been proven.

Lemoine, like most engineers, is uncomfortable with numbers like zero degrees differential phase and zero percent differential gain. He prefers that the specifications say "virtually" no gain or phase degradation, and he points out that these factors are dependent on the precision of the A/D-A converter and the accuracy of the quantizing function. Nevertheless, he had a precision vectorscope set up on the DVR (the built-in unit), demonstrating colour bars that measure out identically with the input generator.

As the ultimate measure of confidence in the DVR, Lemoine rocked the guide position while the colour bars were replaying . . . and without the slightest indication of this drastic action on the colour monitor screen. In fact, it wasn't until the signal envelope began to collapse that any visible impairment appeared.

Maurice Lemoine and his colleagues are to be congratulated on the achievements they have already made in this field. It should prove interesting to continue to track the progress of digital VTRs in the future.

difference of opinion still exists.

Both the BBC and CCETT digital VTRs proved feasibility and established some parameters about coding and decoding that were useful, but neither machine was considered anything more than an experimental test bed without direct commercial application.

The IBA research centre at Crawley Court has also been engaged in digital television development work for many years. In fact, that's where DICE was created by John Baldwin and his team of engineers.

Baldwin approached the development of a digital VTR from a more pragmatic viewpoint. He adapted existing rotary head VTRs with the intention that the resulting product could be licensed to manufacturers for duplication in their format. The first machine used was a segmented scan IVC 9000 recorder modified with digital electronics.

By late 1976, a demo of a quarter size image in PAL colour was made to an EBU group. In the course of this development, the sampling rate was reduced from 4 *fsc.* to 2 *fsc.* And after the 1977 Montreux Symposium, arrangements were made to obtain a modified BCN type B helical recorder for further experiments.

Various milestones were crossed as half- and finally full-screen colour pictures were made by the BCN-based digital VTR. At the last IBC show in London (September '78), there were repeated demonstrations of full-screen moving images coming from the modified type B machine. While the pictures showed some impairments, the use of a one-inch helical with low tape consumption made this development potentially very interesting from a user standpoint, since further signal processing advances could be expected. In addition, Baldwin stated in an interview at the SMPTE Atlanta Winter Conference (1978) that they were converting a type C machine to digital operation, and he saw no reason why that would not work as well.

The secret of the IBA digital VTR is to double the rotational speed of the head while using very narrow video tracks (60 microns) with a 40 megabit recording rate. In non-segmented recorders, Baldwin predicted the use of parallel tracks made by multiple headed drums also operating at the 40 megabit rate. Undoubtedly, the next Montreux Symposium will witness the latest developments in digital VTRs patterned after the IBA approach. IBA has already made licensing arrangements for their digital VTR technology with several major manufacturers of videotape recorders.

Notwithstanding all of these digital VTR developments, manufacturers continued to maintain a very low profile with regard to their own digital VTR development work. The papers on this subject at the last three major technical conferences, prior to the latest SMPTE meeting in San Francisco, were mainly tutorial in nature. They repeatedly pointed out the problems still unresolved with regard to digital video and audio recording on magnetic tape. It seemed almost as though the opponents to digital video recording were determined to lengthen the time scale before a practical digital VTR became a reality. It was also logical because both manufacturers and users were just getting started into a full-scale changeover from quad to one-inch helicals. No one was too thrilled with the idea of yet another format (if not a whole new technology) to worry about.

Pressure to adopt a public posture on an all-digital VTR by the major producers of current analogue machines kept mounting, and the Ampex response embodied in the machine they just demonstrated, is the result.

From the outside it looks like an AVR3. It uses two-inch tape running at 15 inches per second like its analogue counterpart, and even the familiar whine of the high-speed head rotation is there when the machine is running. But, of course, the similarity to a standard quad soon ends. The differ-

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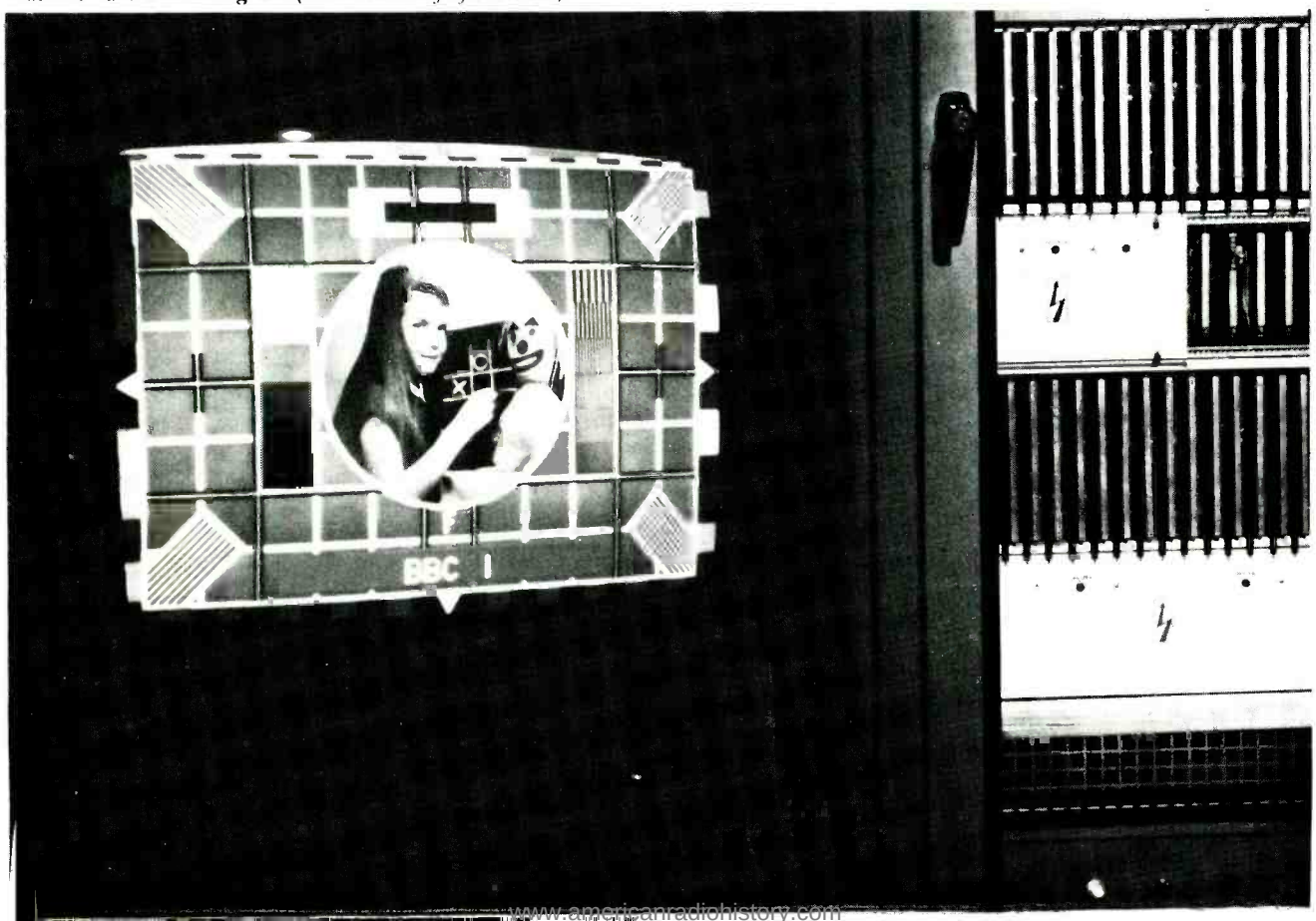
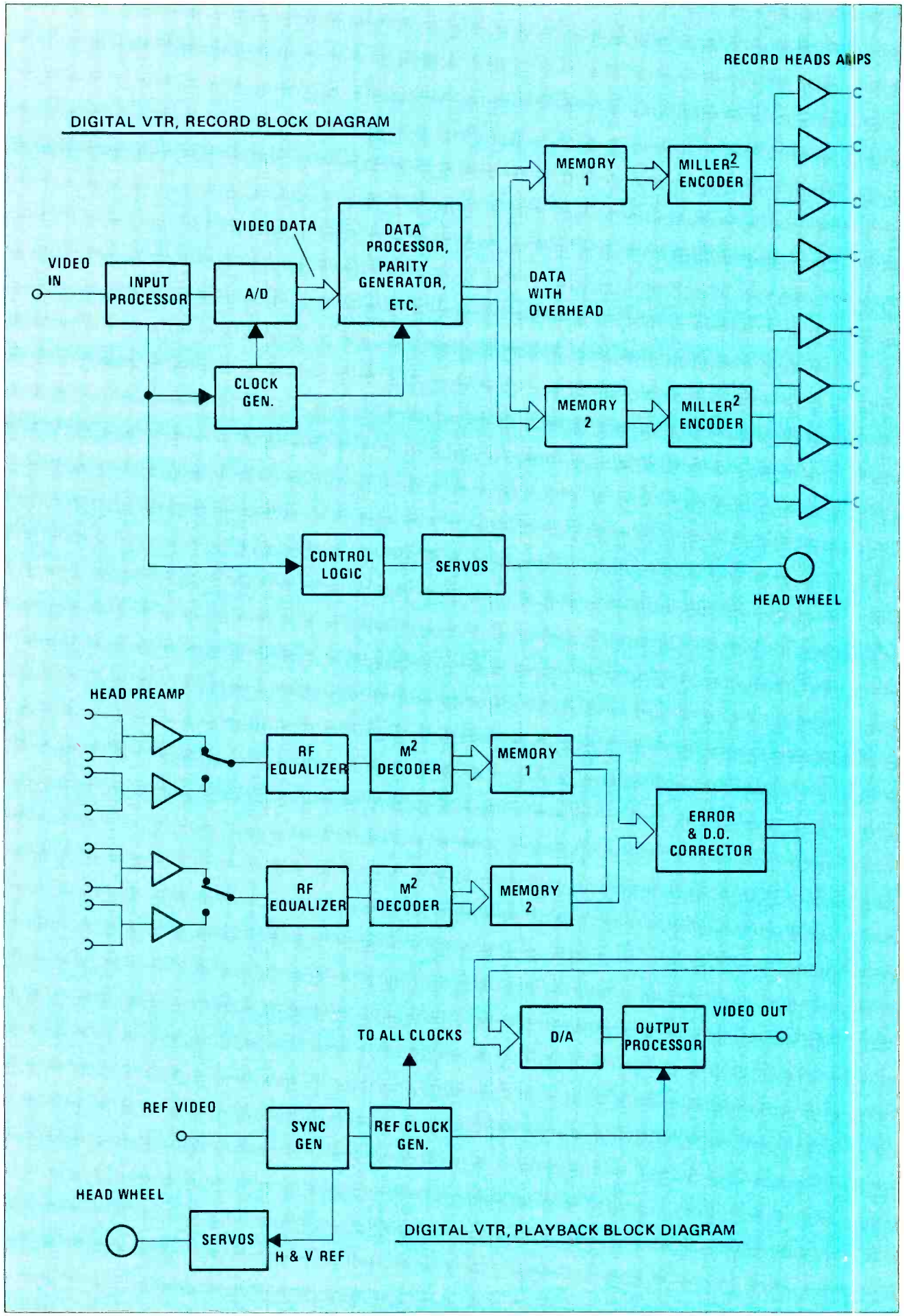
The full image coming from the BBC's digital VTR is shown next to the card racks which handled the 42 signal channels needed to make this machine handle video signals. *(Photo courtesy of the BBC)*





ences needed to make this all-digital machine turn out superb pictures with 60 dB signal-to-noise ratios become apparent.

The video head drum now has eight transducers on it, each with a 5 mil wide writing gap. The pattern on tape is a parallel set of tracks with 2.5 mil guard bands at near right angles to the edge of the tape.

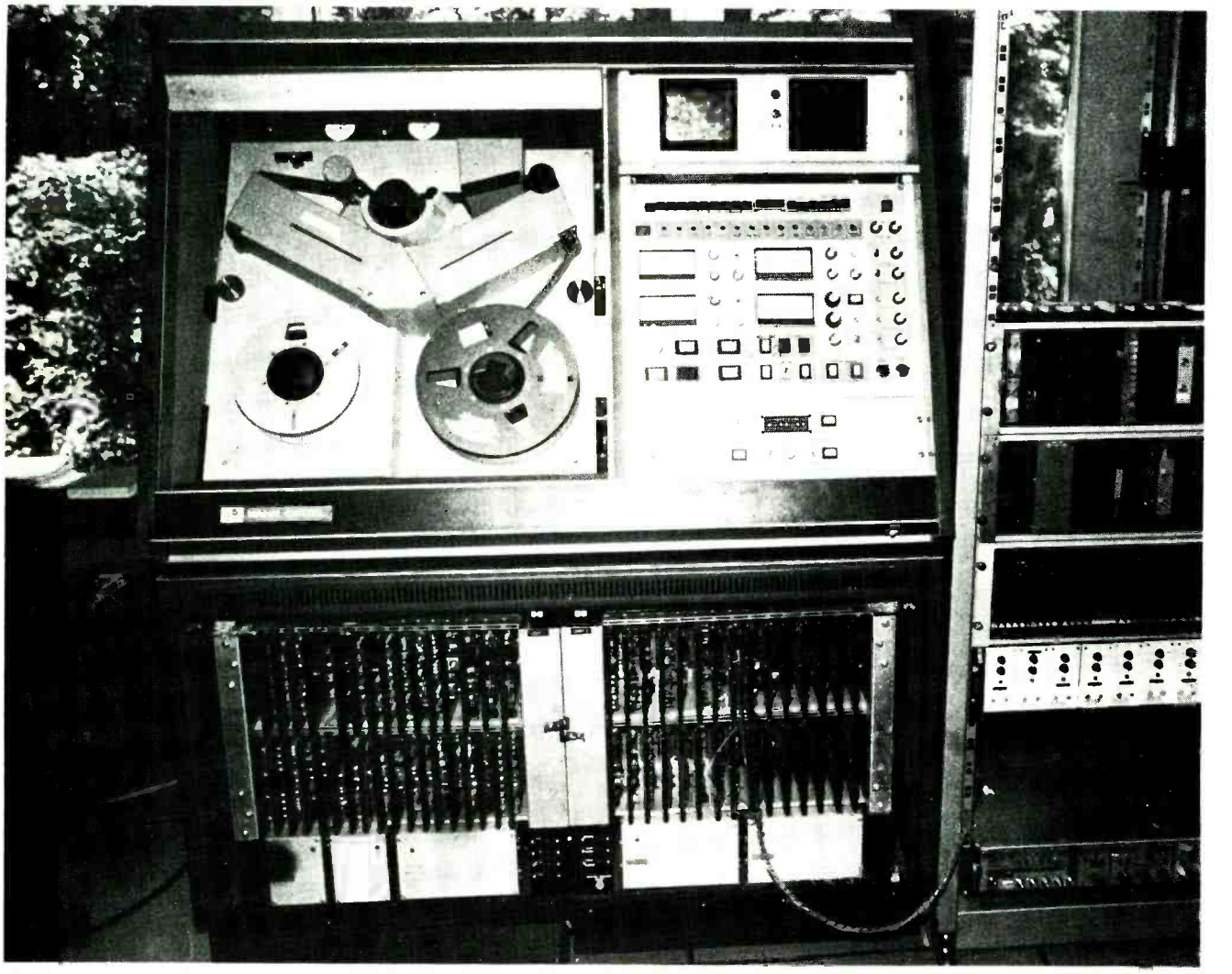
Three normal longitudinal tracks are provided for analogue audio at the top of the tape, and for time code and control track at the bottom (see Figure 1). The video heads record or scan 16 lines of picture information, and the last 200 mils of each video head swipe is dedicated to a sequence of digital audio signals which contain four independent audio channels. As the audio channel data streams are recorded with 100% redundancy, they provide a very high immunity to any dropout problems that might occur.

The "octoplex" recording system has two of the eight heads actively reading or writing at any given time. The two parallel heads and the recording channels each carry one half of the bit rate (43 M bit/second) and the head writing speed is approximately 1600 IPS, slightly higher than quad machines. The dual-channel operation also provides certain advantages with regard to dropout compensation and a digital technique known as error concealment.

The overall operation can be described from the record and replay block diagrams shown. A composite NTSC signal enters the machine and is used to generate timing signals for both the head servos and the digital data. An analogue-to-digital converter operating at a sampling rate of three times the colour subcarrier frequency (3 *f*sec.) converts the analogue NTSC into the digital signal representing the video information (video data).

The Data Processor following A/D conversion adds error detection bits and identification signals which will help to optimize the playback sequence. Since two parallel recording channels must be fed, the composite digital signal (data with overhead) is applied to two buffers which act as storage devices (Memory 1, 2). The buffers feed their data bit streams in a sequence dictated by head rotation, with a Miller[2] encoding technique being applied before the paired heads actually scanning the tape receive their drive signals through record head amplifiers.

In the playback mode, the two parallel tracks are recovered simultaneously by the dual head pair and are channeled to a pair of RF equalisers, Miller[2] decoders, and buffer memories. The decoded signals may contain skew or time base errors, and may suffer from tape dropouts. All of these are corrected by using both the identification and timing signals



The first IBA digital VTR was built on an IVC/Rank Cintel 9000 frame which was modified by John Baldwin's Development Group. The digital circuitry is in the adjacent rack. *(Photo by Donna Foster-Roizen)*

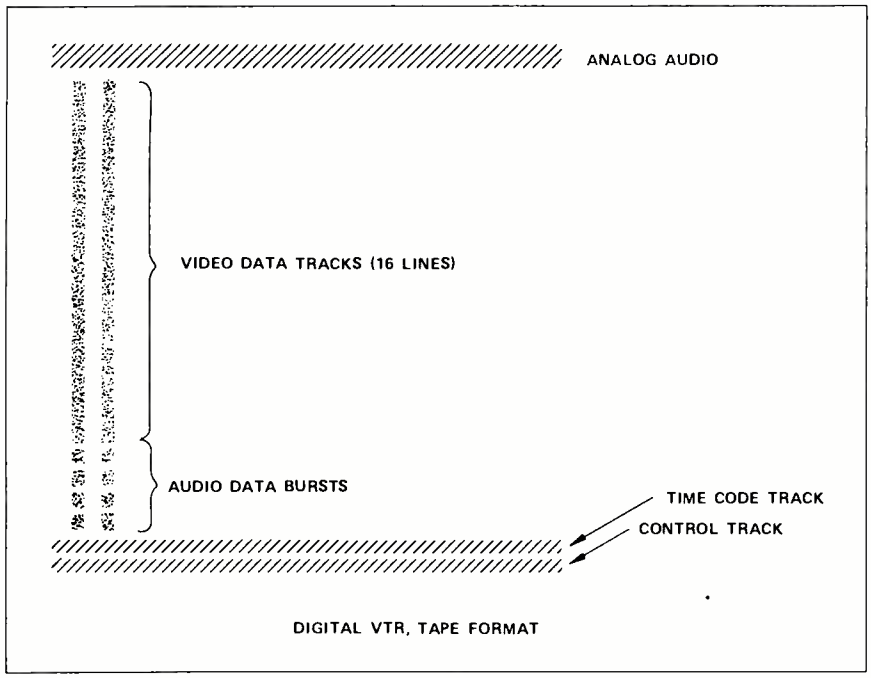


Figure 1

that were prerecorded, and by a masking system which restores the picture area where dropouts have occurred. After error and dropout correction, the digital signal is converted back to analogue and put through an output processor which performs the usual functions.

While the Ampex DVR did not demonstrate audio capabilities at its first public showing in San Francisco, the approach described in the technical paper by Lemoine and Diermann looks promising.

In keeping with objectives for digital video where multi-generation copies yield very little degradation, the audio is also digitized. Using the video channels which already have adequate bandwidth, a 50 kHz sampling rate is applied to four independent audio inputs. With a resolution of up to 16 bits per sample, the audio signal quality can be very high, and four channels seems adequate for any multi-track applications of audio with video.

Memory circuits in the audio channels store the digital audio information and are gated to apply the signals to the video heads when they are scanning the last 200 mils of the video track. Since the audio signals are recorded twice (once per track), there is adequate immunity for dropouts. An error detection system is used to check the accuracy of the signal samples and to correct any faults that occur.

There are, in addition to the four digital audio channels, three longitudinal tracks operating in normal analogue function as shown on the track layout diagram. These can handle the normal needs for cueing messages and editing time codes.

The Ampex DVR is a very impressive machine which performs to video specifications previously unattainable. At the SMPTE conference, the consensus of many television engineers during the post-session demonstrations was that they were favorably influenced by the picture performance they saw close up.

The major comments were in appreciation of the 60 dB signal-to-noise ratio with 0° D.P. and 0% D.G., making the recorder virtually transparent to the video signal. The slightly noticeable K factor degradation (estimated at about 0.5%) may be due to the 3 *f*sc. sampling rate. This would not seriously affect subsequent generations, if dubbing were done digital-to-digital, rather than video-to-video.

While Ampex Vice-President Don Kleffman stated emphatically that this is not a marketable product, it's conceivable that those post-production houses and major network production centres, who would give their eye teeth to have a mastering VTR without multi-generation degradation, would pay a premium price for a few units in house. As a result, a few dozen Ampex DVRs could indeed find themselves in operation in the next few years, while development work goes on to reduce complexity, cost, size, and operational requirements.

As several of the video experts interviewed reiterated, it's hard to look at a superb quality image, coming from what looks like a quad, and not be impressed by the utter lack of all of the deficiencies we have become accustomed to: banding, first line hue shift, etc. It's even harder to ignore 60 dB video S/N. It just makes you want to get your hands on a machine and take it back to your facility to see what you can do with it. Well, for a quarter of a million, Ampex may just let you do it! BC

The BBC digital VTR used a 42 channel longitudinal recorder with one-inch tape running at 120 IPS. It was described in a paper by Jones and Bellis of the BBC research department at the 1974 IBC in London. *(Photo courtesy of the BBC)*

Engineering Notebook:

There's more to earth-station construction than placing an order

Part 2/By Raymond Meyers

Receive-only earth station applications are reasonably simple. And although there is no standard FCC form available to apply for an earth station, most U.S. operators have been sufficiently exposed to the kind, type and order of information required by the FCC to be able to follow these examples and be successful on the first attempt.

To aid you in completing an application of this nature, the FCC in 1975 prepared a release called an "Earth Station Processing Document." It is available by requesting FCC mimeo 75-932 August 8, 1975. The FCC address is 1919 M Street, N.W., Washington, DC 20554.

This model application is designed for cable TV operators, but the TV station application is quite similar. The major difference between the two lies in how the received signals will be further used.

All applications should start with a cover page, and this one is no exception. Figure 1 represents a typical cover page and should be followed closely.

In addition to the cover page, a second page should include the city or location of the proposed facilities along with a statement of purpose. A table of contents indicating the location of supporting material used in the application and a checklist of required entries are also part of this page.

How the public interest will be served should appear in a declarative statement along with the exact use of the earth station and how it will meet existing FCC rules and policies. Figure 2 represents a typical example of these statements.

All applications to the FCC must show the applicant's legal qualifications. You should keep in mind that since the FCC's Common Carrier Bureau will process the application and not the Broadcast Bureau, a simultaneous filing of FCC form 430 is required. FCC form 430 is a common-carrier qualification form and is used even when the applicant is not intending common-carrier offerings. A typical legal statement is shown in Figure 3.

Another usual part of any application is the financial qualifications. Construction cost, operating cost, and the ability to cover these costs are the looked-for statements. Figure 4 illustrates such statements. Of course any contractual arrangements should be carefully spelled out.

The technical qualifications of the applicant comes up next. Here the operator will find it necessary to seek out the services of a consulting engineering firm

Continued on page 132

SAMPLE
BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

In re application of	)
XYZ Cable Corporation	) File No.
111 Main Street	)
Centerville, Kansas	)
For authority to Construct,	)
Own and Operate a Domestic	)
Communications Satellite	)
Receive-Only Earth Station	)
at Centerville, Kansas	)

To: The Common Carrier Bureau

Figure 1

Raymond Meyers is the Satellite Editor.

In a recent issue of *Satellite Communications* magazine, attorney Grover C. Cooper of the law firm Fisher, Wayland, Southmayd & Cooper in Washington, D.C., set forth a step-by-step procedure for filing for an earth station in the U.S. With the permission of Mr. Cooper and *Satellite Communications*, this procedure is being reviewed by Satellite Editor Raymond Meyers. The example application used in Grover Cooper's article is quite complete, and his cooperation is appreciated.

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The 1979 Hitachi Hard-to-Top Convertible.

APPLICATION FOR RECEIVE-ONLY EARTH STATION

XYZ Cable Corporation (herein "XYZ Cable") hereby applies for authority to construct, own and operate a domestic communications satellite receive-only earth station to be located at Centerville, Kansas. The purpose of the proposed earth station is to receive programming, relayed by satellite, for distribution on the applicant's cable television system serving Centerville, Kansas. The application is filed pursuant to the requirements of the Communications Act of 1934, the rules and policies established as a result of action in Docket 16495, and section 0.291 of the Commission's Rules.

CONTENTS OF APPLICATION

I. Nature of Proposal and Public Interest Considerations
II. The Applicant's Legal Qualifications
III. The Applicant's Financial Qualifications
IV. Technical Qualifications of Applicant and Technical Aspects of the Earth Station
V. Environmental Issues
VI. License Application Certification

I. Nature of Proposal and Public Interest Considerations

XYZ Cable owns and operates a CATV system serving Centerville, Kansas plus other systems located throughout Kansas, Missouri, Oklahoma, and Nebraska. The proposed receive-only earth station will be located at the headend of the applicant's Centerville system. The station will receive programing via satellite through common carrier channels to be provided by RCA Global Communications, Inc.

The purpose of the earth station is to enable XYZ Cable to obtain and provide HBO pay cable programming to its pay cable customers. In addition, XYZ Cable will obtain the signals of WTCG, Channel 17, Atlanta, Georgia, thus permitting it to offer an additionally independent TV station to its regular cable subscribers. The HBO programming will be provided pursuant to a contract which has been entered into with Home Box Office, a subsidiary of Time, Inc. Channel 17 will be provided pursuant to arrangements with Southern Satellite Systems, Inc., a resale common carrier offering WTCG under tariff on file with the FCC.

It is submitted that the proposal is in, and will serve the public interest. XYZ Cable is entitled under FCC rules to carry an additional independent TV station; however, there are no such stations available off-the-air and the obtaining of an independent TV via terrestrial microwave would be prohibitively expensive. By construction of an earth station this programming can be made available reasonably and quickly to XYZ's approximate 9,000 subscribers.

In addition, the earth station will make possible the obtaining of HBO programming, this including first run movies, encore movies, sports, and children's programming not otherwise available. It is estimated that 10% to 20% of our regular cable subscribers would be interested in such programming.

Attached hereto as Attachment A are letters from HBO and Southern Satellite Systems authorizing carriage of their respective programming.

We submit that this proposal is fully consistent with FCC Rules and Regulations and with the policies and objectives expressed in the various decisions in Docket 16495. In this docket, the FCC stated its commitment to a flexible ground environment including private ownership of earth stations. We submit that the proposal is the most efficient and economical means for XYZ Cable to obtain additional programming for its cable customers, and that such additional programming is consistent with FCC rules and policies, and that the proposal is in the public interest.

Figure 2

II. The Applicant's Legal Qualifications

The applicant, XYZ Cable Corporation, is a privately owned company, incorporated under the laws of the State of Kansas. The applicant's main office is located in Centerville, Kansas, 111 Main St., Centerville, Kansas, 66442. In accordance with the suggestions contained in the FCC's Earth Station Processing Procedures release, issued August 8, 1975, the applicant has completed the applicable portion of FCC Form 430, thus providing all relevant legal information about itself. That Form is attached hereto as Attachment B.

Figure 3

III. The Applicant's Financial Qualifications

The complete construction, equipment and related costs for the earth station proposed here are as follows:

Equipment, Shipping & Installation	$30,000
Site Preparation	1,500
Professional Fees & Miscellaneous	2,500
Sales Tax	900
TOTAL	$34,900

The applicant has the financial ability to meet this expense as follows:

(Example #1)

The applicant's current balance sheet (no older than 90 days) a copy of which is submitted as Attachment C shows cash and liquid assets in excess of current liabilities (owed in one year) in an amount sufficient to meet the $34,900 earth station cost.

(Example #2)

The applicant has received a line of credit from its local bank extending credit in an amount sufficient to cover the $34,900 earth station costs. Note that the line of credit is sufficiently high to insure that the first year repayment on the loan can be made and applicant will still have enough to meet its commitment on the earth station cost.

(Example #3)

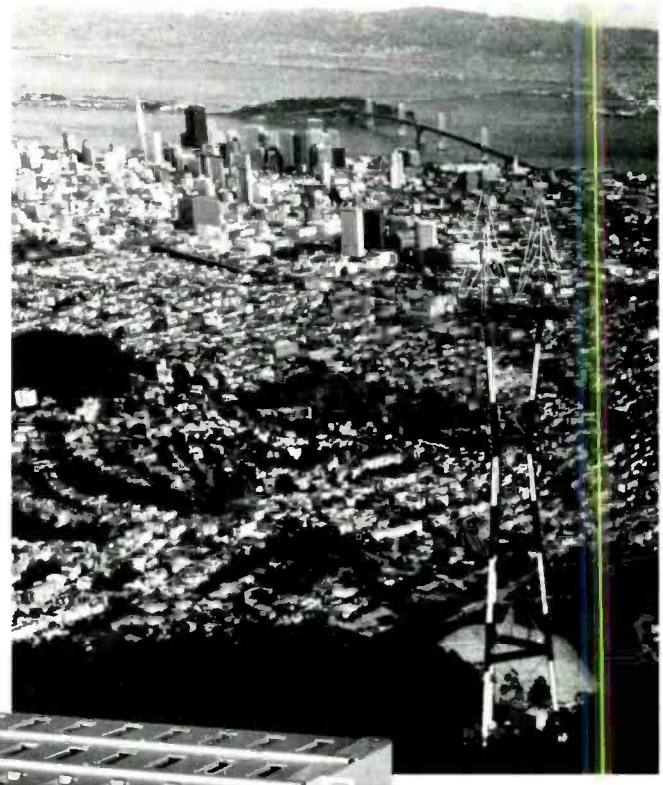
(Could be a combination of the above or indeed any other cash, credit, or financial arrangement demonstrating that you can cover the cost of the earth station and related costs.)

Figure 4

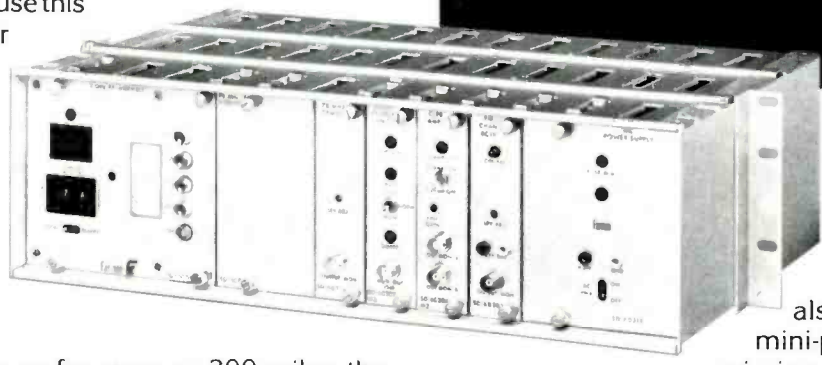
specialising in earth station technology. Along with frequency coordination studies, the technical layout and operation of the station must be described. Statements showing this information should be attached as exhibits. This is of particular importance if the CATV operator wishes to use an antenna size less than nine meters. TV stations are not given this option and therefore must specify nine meters or greater, so this is not a problem. In Figure 5, a typical technical statement that should accom-

Continued on page 134

Our new receiver couldn't care less where your ENG crew goes.



With Farinon's new FV2CR Central Receiver, you can now send your ENG crew to wherever the action is. And minimize the problems of weak signals and distortion. That's because this outstanding receiver has an unsurpassed 82-dB dynamic range. When signal strengths vary due to different transmission distances, the FV2CR compensates automatically to assure optimum performance.



For transmissions as far away as 300 miles, the FV2CR can operate with a minimum system fade margin of 20 dB. And with the ENG crew as close as 1/8 of a mile, the receiver's front end won't overload and cause distortion like other receivers.

The FV2CR provides 21 synthesized channels in the 2-GHz band. By instantaneous phase-lock loop, the channel you select (manually or remotely) is the channel you get. And the receiver's unique, extremely sharp IF SAW filter provides excellent selectivity of at least −45 dB with maximum half-channel rejection. Also its noise figure of only 3 dB is tops in the industry.

Now you'll have a new degree of freedom in news coverage. So you can send your ENG crew wherever the action is. And Farinon's new FV2CR Central Receiver couldn't care less where they go.

Farinon Video also offers portable and mini-portable video transmission systems, STL microwave radios, FM transmission channel systems, as well as video baseband treatment units and ancillary equipment.

For information, contact Farinon Video today.

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Phone: (514) 636-0974; Telex: 05-82-1893;
TWX: 610-422-4122

See Farinon's new FV2CR Central Receiver and other ENG video equipment at NAB, booth 374.

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pany the application is shown.

Further data in the technical section should include all information required by the August 8, 1975, processing document. Sketches showing antenna size and elevation as well as a functional block diagram are standard.

The next item refers to environmental impact. Since most applications will be for nine-meter antennas, the environmental statement becomes a decisive factor. The example used here was for a 4.5-meter antenna and was a minor action. Nine-meter and larger antennas require more extensive studies, particularly if the antenna is in or near a historic or environmentally sensitive area.

The environmental statements must be certified. One statement will come from the person responsible for the technical portion; another, more general statement must come from a person handling the legal actions for the company. Dates in the certificate from the technical study should reflect an earlier date than that of the general statement.

Finally, if the applicant expects to construct the earth station within 90 days, he should file a 403 form (application for license) at the same time he files the construction permit application. Thus when the grant is made, both CP and license will be granted together, reducing or avoiding starting date delays. If delays arise, a 701 form can be filed for an extension. Figure 6 demonstrates these details.

Applications for both receiving and transmitting differ primarily in the information required by the FCC concerning the transmitting operations. Information such as the signals to be sent, what satellite, what transponders on the satellite, who will receive the signals, and whether or not the intended usage constitutes a common-carrier activity, must be shown along with fully justified reasons for the need of a transmit facility. Where a request for transmitting authorisation is desired, professional help is strongly recommended. This should not serve to discourage those individuals who wish to originate programmes for distribution via satellite, but rather prepare them to approach the problem in a more realistic way.

Since the saturation of earth stations is on the rise, it is advised to get applications prepared as soon as the decision to "GO" is made. It won't be long before the FCC form writer has added his touch to this area and who knows what may be asked next. BC

IV. Technical Qualifications of the Applicant and Technical Aspects of the Earth Station.

XYZ Cable is owner and operator of the 9,000 subscriber system in Centerville, Kansas, plus a number of other systems in Nebraska, Oklahoma, and Missouri. In addition, the applicant, through its own or related companies, is licensee of a number of CARS microwave stations. The applicant accordingly has ample technically qualified personnel to assist in the construction of the earth station and to insure its maintenance and continued satisfactory operation of the station. In the event a problem arises which the applicant cannot solve, the manufacturer or an independent consultant will be obtained.

The complete technical showing regarding the earth station installation proposed herein is attached here to as Attachment D.

TECHNICAL CERTIFICATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's Rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge.

XYZ CABLE CORPORATION

By _____
Harold P. Hooper
Chief Engineer

Figure 5

V. Environmental Issues

Since the earth station proposed is only 4.5 meters in size, this will be a "minor" action within the meaning of Section 1.1305 of the Commission's Rules. The Commission is also advised that the facility will not be located within any of the areas set out in Section 1.1305(a)(6) of the Rules, i.e., it will not be in an officially designated wilderness area, or where such designation is being considered; it will not be located in an officially designated wildlife preserve or in an area which such designation is pending; its construction will not affect districts, sites, buildings or objects significant in American history, architecture, archaeology, or culture which are listed in the National Register of Historic Places or which are eligible for listing; it will not be located in an area recognized nationally or locally for special scenic or recreational value; it will not involve extensive change in surface features by wetland fill; deforestation or water diversions.

(Earth Dishes 30 feet in diameter and larger are major actions and require a more extensive showing.)

VI. License Application

The applicant plans to commense construction of the earth station immediately upon receipt of the construction permit and will complete same within 90 days. Accordingly, it is requested that a license be issued simultaneously with the CP. FCC Form 403 for license accompanies this filing.

VII. Notification

Communications regarding the application should be directed to:

(Attorney Name and Address)

with copies to:
Robert I. Smith, President
XYZ Cable Corporation
111 Main Street
Centerville, Kansas

Figure 6

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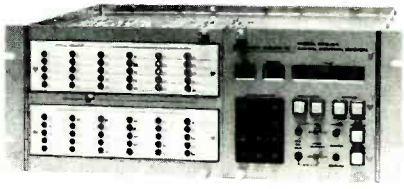

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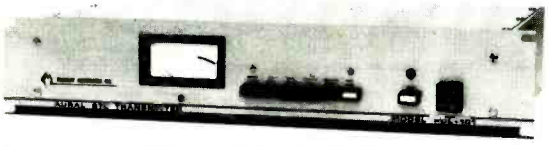


Stereo-AM and FM STL

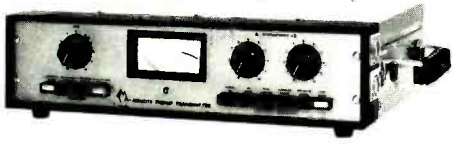
Model SCG-9 **Stereo Generator**
Model SCG-8 **SCA Generator**

"The Combos"

Model TFL-280 **Audio Limiter for FM Stereo/Quadraphonic, FM Mono, SCA, TV Aural**

Models RPL-3A, 4A, 4B

150 MHz
450 MHz
bands



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FCC Type Accepted Remote Pickup Links

Models TCS-1, TCS-2, TCS-2M

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Antenna system investment prepares WMAQ for AM stereo

By Ken Steininger and Robert A. Jones

WMAQ is the first Chicago-area AM station to leap into the 1980s by broadbanding its antenna system now. And as far as the authors know, this is the first U.S. 50,000-watt station to so modify its RF plant. Of course, after 43 years with no major changes, anybody would say it's about time.

There were really three key reasons for making these improvements. WMAQ wanted to prepare for AM stereo, to improve their overall fidelity, and to achieve maximum level of average modulation.

WMAQ began operation from the present transmitter site in 1935 with its maximum power. The station, however, is the second oldest in Chicago, having originally gone on the air in April 1922, then licensed as WGU. The original power was a mere 250 watts.

Prior to this major renovation, the system consisted of two towers: the main tower (748 feet high) and a standby or

Continued on page 138

Robert A. Jones, Radio Station Editor, heads up a consulting group in La Grange, Ill. Ken Steininger is the transmitter supervisor at WMAQ, Chicago.

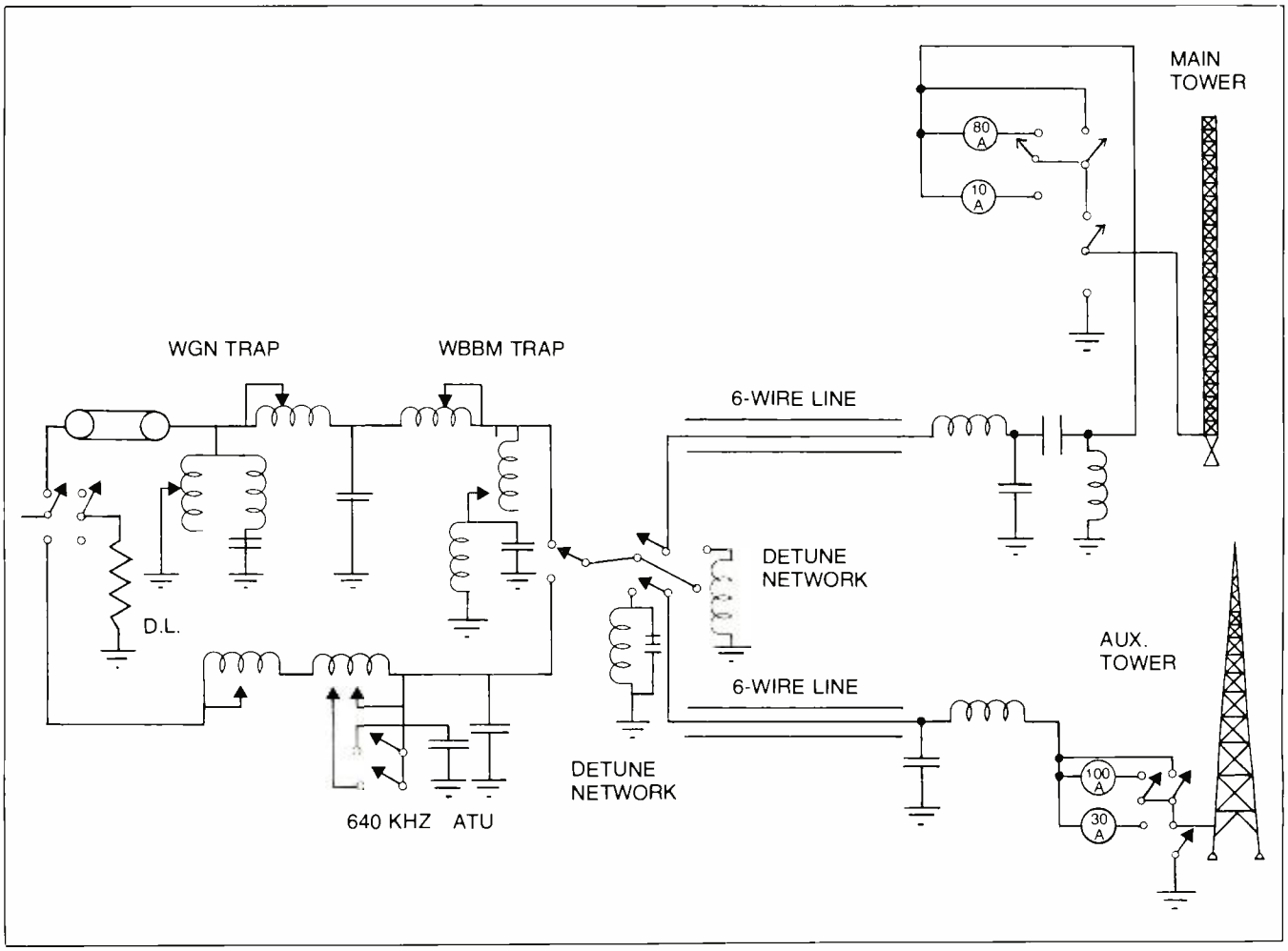


Figure 1

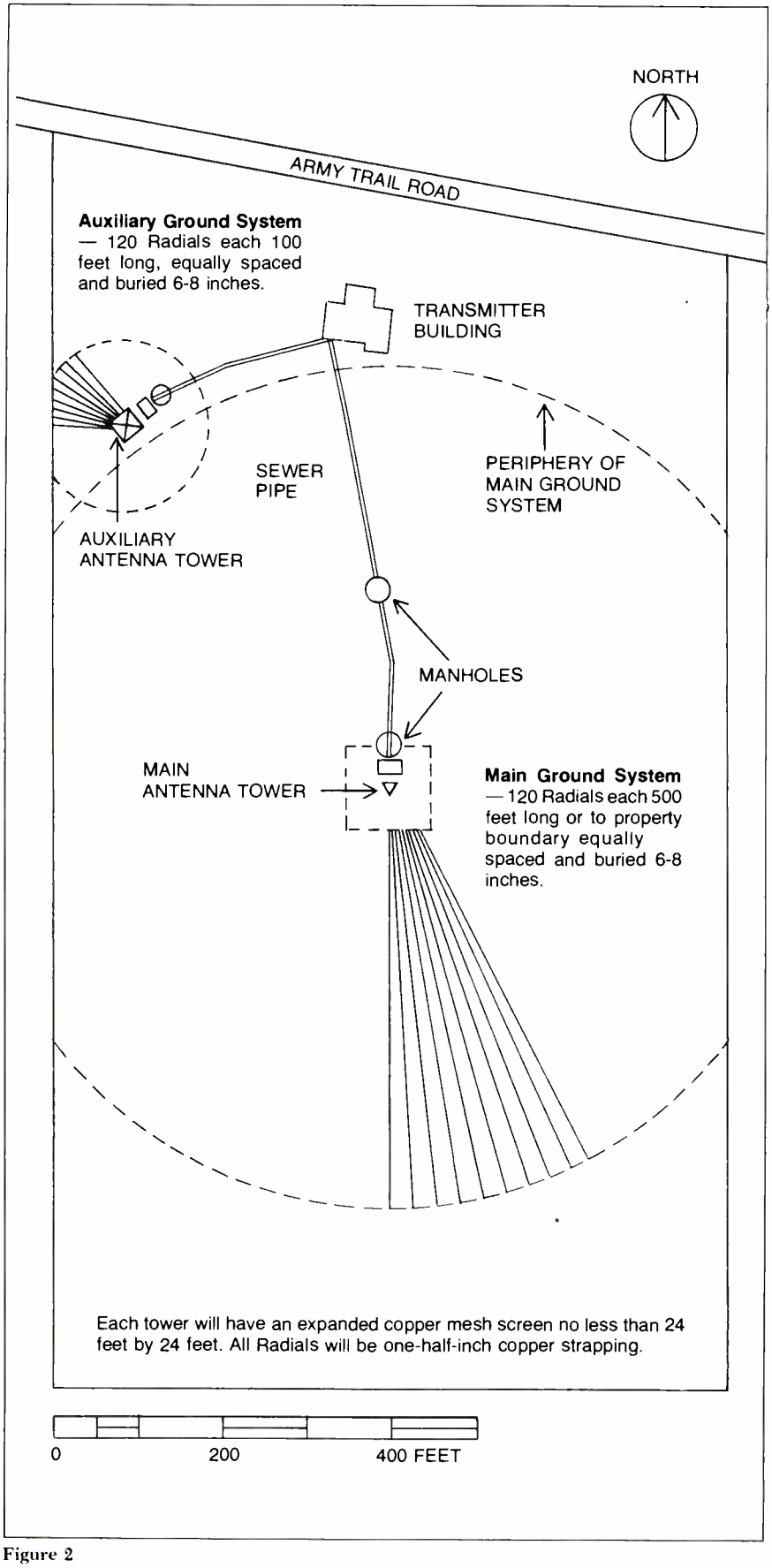


Figure 2

auxiliary tower (300 feet high). The main is a guyed tower while the other is a self-supporting tower. Both towers were fed with 230-ohm open-wire transmission lines supported on metal poles approximately 10 feet above ground. Since the two WMAQ transmitters came with 50-ohm output impedances, it was necessary to have impedance-matching networks at each end of the transmission lines.

Figure 1 shows the basic layout of the old WMAQ system. Two special features should be noted. One is the by-pass network which was used to tune the system to 640 kHz for the old CONELRAD operation; the second was the need for two filters, tuned to reject energy present in the antenna from nearby clear-channel stations WGN and WBBM.

Figure 2 shows the transmitter site layout for WMAQ. The ground system for the main tower is typical, whereas that of the auxiliary tower is somewhat

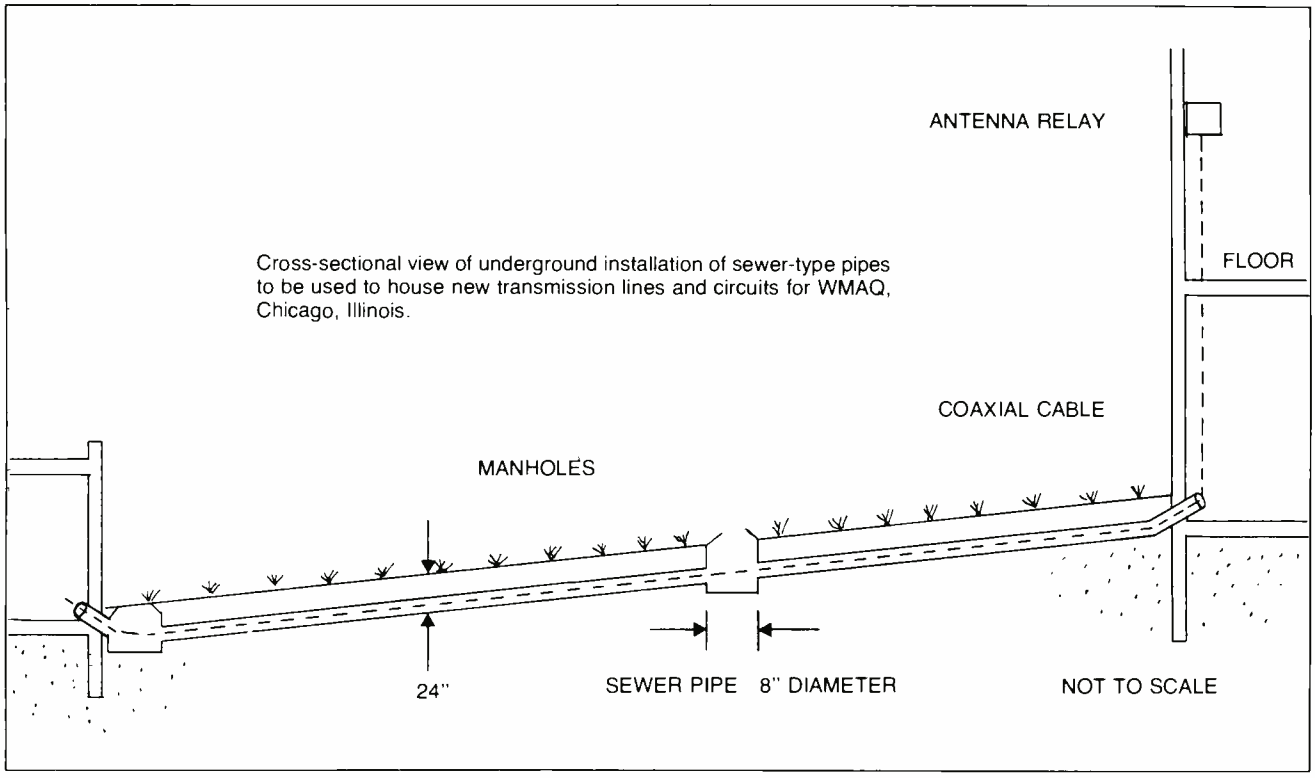


Figure 3

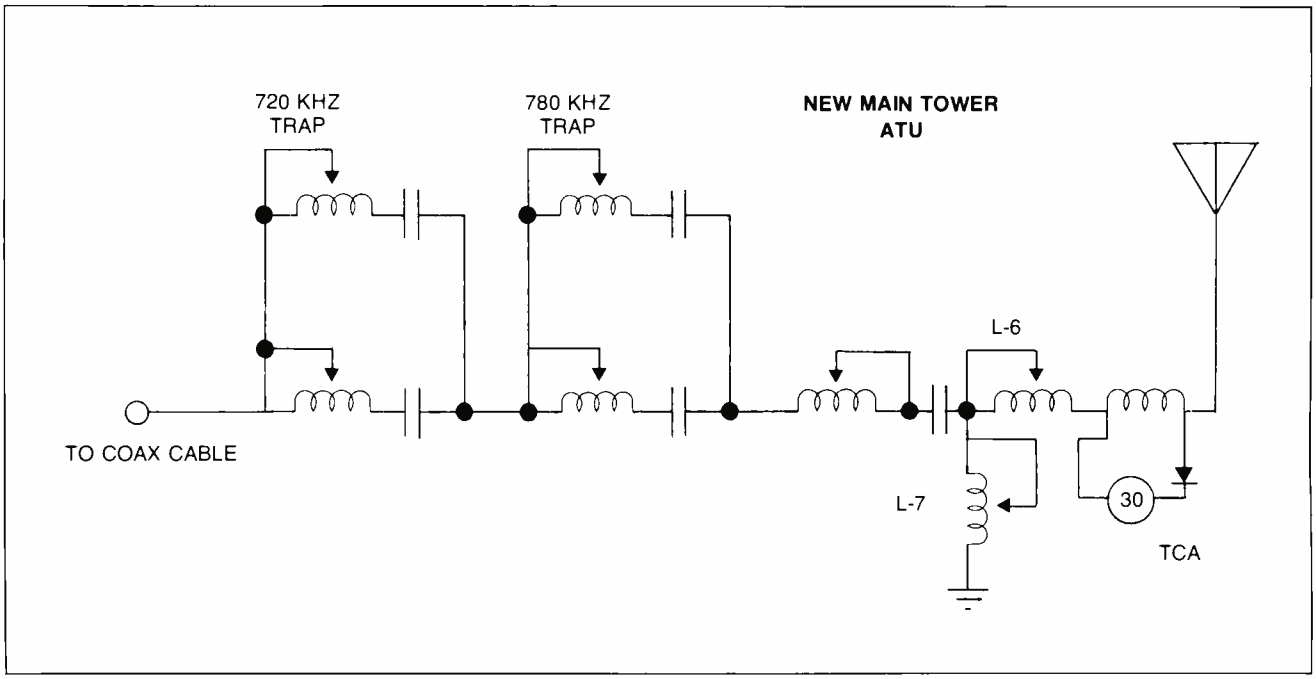
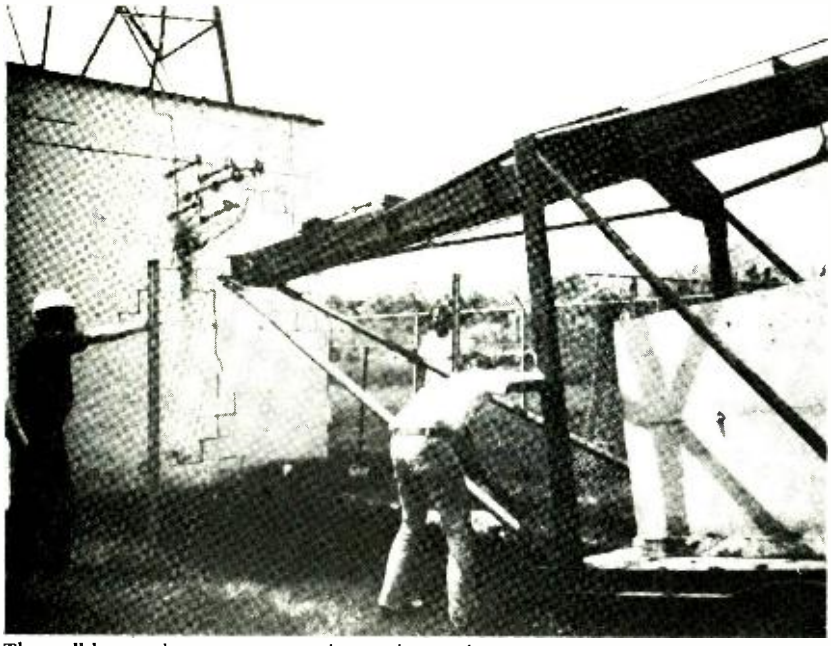


Figure 4

abbreviated due to the lack of land and the fact that it is seldom used.

Graph 1 is a plot of the base resistance and reactance of the main WMAQ tower. As you can see, it exhibits a rather steep slope with frequency. The fact that our normal, natural base value of "R" was 146 ohms, with a reactance of



The pull box at the main tower is lowered into place.

−j311.9 ohms, makes it not unusual. The fact that the resistance curve slopes +21.9% and −17.3% within 30 kHz, and the fact that the reactance curve likewise deviates +10.3% and −10.6%, makes it difficult to design a network that will be flat with frequency.

The auxiliary tower, with its 10.48 ohms, was not so much of a problem because the pitch or degree of flatness was considerably less. The transformation from 10.48 ohms up to 230 ohms line impedance did result in a rather bad transmitter load. The change to 50-ohm coaxial cable resulted in an easier transformation.

Graph 2 gives an idea of the load *vs.* frequency seen by the WMAQ transmitter with the former antenna system. Of particular significance is the fact that the slope of the resistance curves for the auxiliary antenna is very steep and decreases with "f". The resistance curve of the main transmitter peaks at "f", but falls off to either side. The reactance curves present opposite slopes. Even the most casual observer can see that the transmitter is not faced with a satisfactory load impedance within the modulation bandwidth. The bottom of Graph 2 shows the transmitter loads of the new ATU, with the improvements quite obvious.

At this point you might ask why we didn't just upgrade the old system. We would still have had the two impedance transformations, and we would still have had the coupling between the open-wire lines and the towers. What's more, we would have that high 20:1 ratio for the auxiliary tower.

The new system was designed to meet specific requirements in addition to our three goals. It was to be installed underground to eliminate coupling between the towers and the lines, to eliminate ice problems in the winter, and to reduce the opportunities for vandalism.

Considerable thought was given to installing two transmission lines between each tower and the transmitter building. This would have given WMAQ full redundancy. It was concluded that the probability of failure of a given line is very slight. The cost for the second line was not justified, if means could be taken to afford speedy repair to the original line. Also, by installing new lines to the auxiliary tower we would have a degree of redundancy anyway. This is protection enough, and this way we saved half the cost of transmission lines.

Figure 3 shows the basic layout of the underground pipes with the three pull boxes. Or, if you will, sewer boxes. Yes, that's correct, WMAQ used pre-cast cement sewer boxes for termination of the cables and for pulling same. In the

Continued on page 140

Installing the 4⅛-inch coaxial cable.

pipe between the transmitter and the auxiliary tower there was no need for a pull box except at the tuning house. In the pipe run to the main tower, it was necessary to have a pull box at approximately the mid-point. This was because of the 500-foot length of 4⅛-inch coax. Based upon our experience, up to 300 feet or so of this size cable could be accommodated without an extra box.

The advantage of a half-way pull box should be obvious. It affords a means of repairing the coax, without the necessity of withdrawing all the cable. The photographs show some of the details of installation. Actually two pipes were laid between the towers and the transmitter house. The larger pipe is eight inches in diameter. The smaller one is a four-inch pipe. Each is a common PVC pipe.

Within the smaller pipe we ran the remote control circuits, remote meter circuits, relay wires, etc. The larger pipe was used for the 4⅛-inch coaxial cable. We realized that 3⅛-inch coax would hold 50,000 watts, and we could have used 6-inch PVC, but at WMAQ we be-

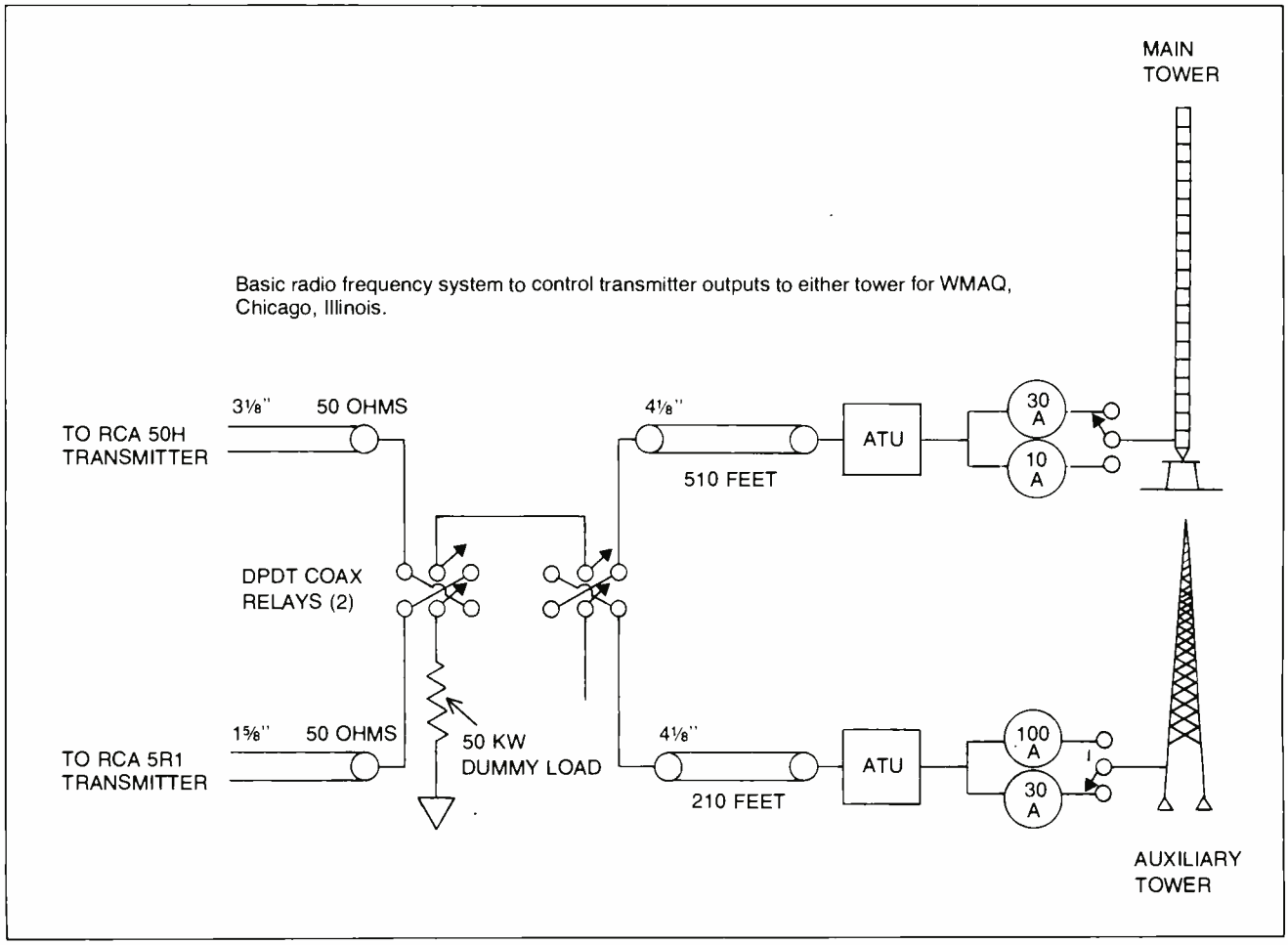
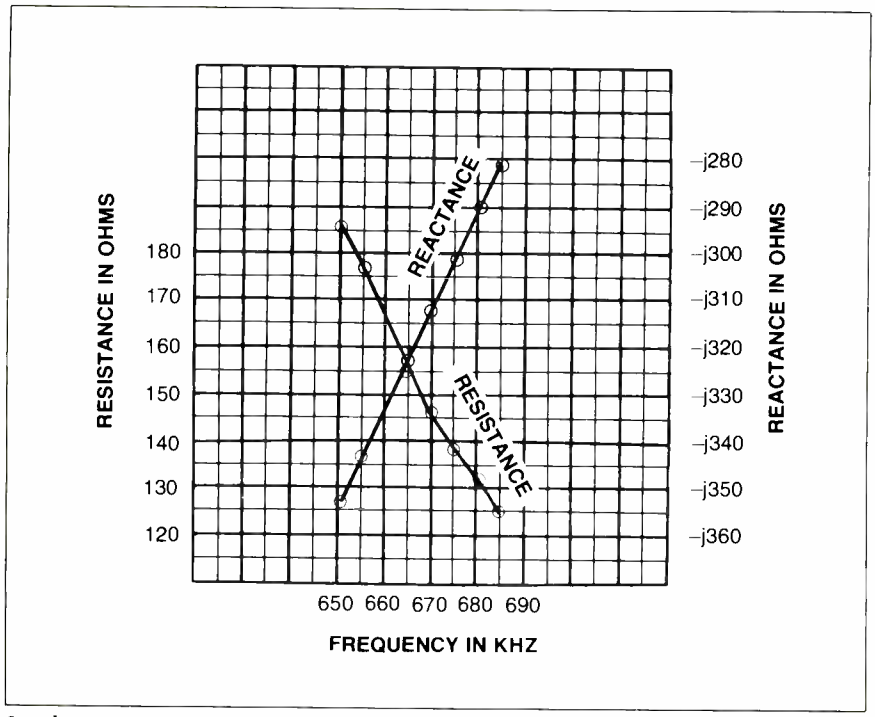
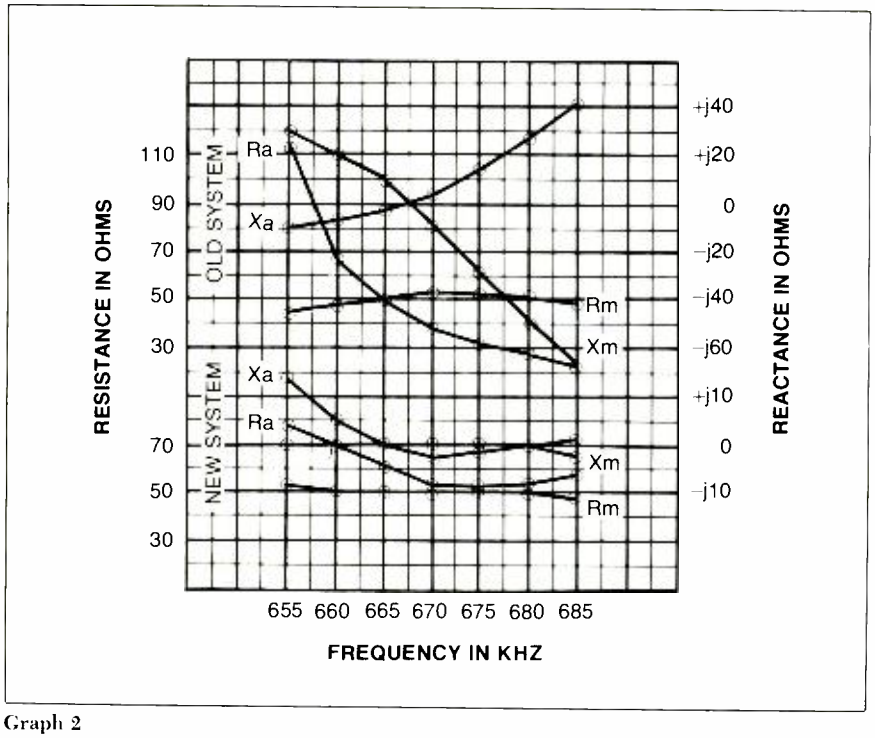


Figure 5



Graph 1



Graph 2

lieved the extra safety factor justified our choices.

We began the PVC pipe installation by trenching a 36-inch-deep trough between each doghouse and the transmitter building. A back-hoe was used to excavate for the sewer boxes. The depths of these three holes were 48 inches, since we had used a standard box having dimensions of 48"x48"x72". The holes in the side walls of the sewer boxes had been cast into them at the time the boxes were made. Each joint in the PVC pipe was cemented together and waterproofed, as were the holes into and out of each sewer box. This way we achieved a tight waterproof system.

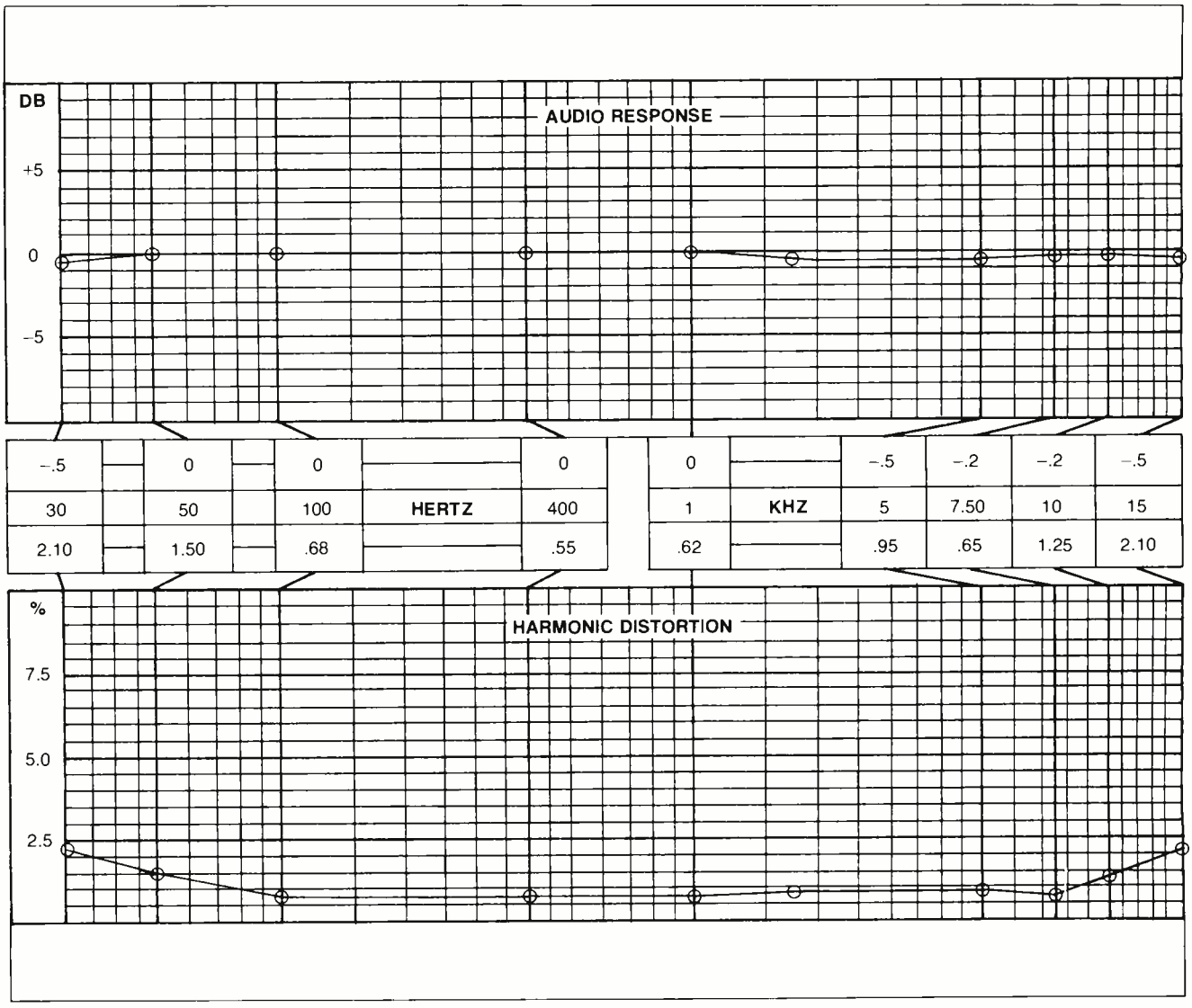
The new ATUs were designed by the Harris Company with the approval of the NBC engineering

Continued on page 142

group and the authors. In each case it was our desire to produce a flat load at both the transmitter as well as at the ATU inputs. It should be remembered that in addition to accounting for the impedance transformation, we also had to build in the WGN and WBBM traps.

Theory says you can design a pass-reject trap that will work at the carrier frequency without significant influence. But at the sideband frequencies there will be some effect. In this case the carrier frequencies of both WGN and WBBM are higher than WMAQ's frequency. This resulted in the influence of each of the two filters compounding at our sideband frequencies. In our case this came out to about +21 ohms and −19 ohms, respectively. Ideally it would have been great if one of the traps had been higher and one had been lower, since the effects would have tended to cancel. But they didn't.

Dave Pierson (right) supervises the placement of the pull box.



Graph 3

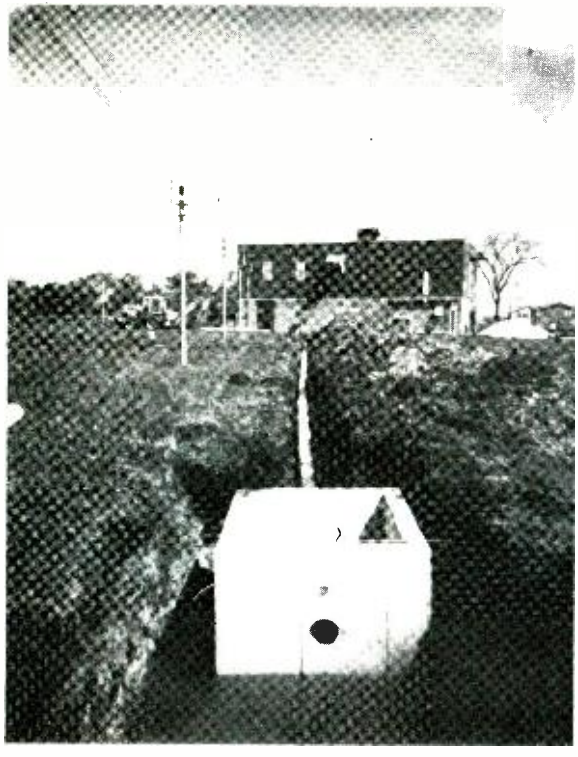
What we designed for in this case was a flat load at the transmission line input, not at the input to the actual ATU elements. The final "new" circuit for the main tower is shown in Figure 4. This circuit is a modified TEE with about 78° phase shift. A negative reactance slope was mated with a mirror image reactance slope in order to create zero reactance slope over the 30 kHz pass band. Inductors L-6 and L-7 present a direct DC path to ground to eliminate static discharges. This way, potential lightning damage is reduced and carrier interruptions are virtually eliminated.

Figure 5 is an overall block diagram of the WMAQ RF system as constructed. The actual tuning of the system was quite simple. By using an RF bridge, we could verify the electrical adjustment of each element, as well as the input adjustment versus frequency. By small corrections to compensate for stray couplings, etc., we were able to achieve the loads shown in Graph 2. Either Smith Charts or rectilinear paper could have been used to plot the results.

The WGN and WBBM traps were tuned before the final "flatness" adjustments were made. This was obvious. To determine that maximum adjustment to 720 and to 780 kHz had been achieved, we coupled a field strength meter across the transmission line at each doghouse. First the instrument was tuned to 720 kHz. The parallel resonance element was adjusted to produce the very minimum signal reading.

The meter was then tuned up to 780 kHz and the process repeated with the WBBM trap. It should be noted that we did not use the loop on the field intensity meter, but used the shielded RF input jack. We could have used a scope in place of the field intensity meter as a device to register minimum pickup from WGN and WBBM, but it would have been more difficult to do.

Proper adjustment of the traps plus the control of phase shift is critical if you want to achieve a dramatic reduction in audio high frequency distortion. Graph 3 is a plot of the frequency response and the percent harmonic distortion obtained on the main tower. You should note that this test was from 20 Hz through 15,000 Hz, or well beyond the standard frequencies established by the FCC.



Center manhole to the main tower.

The effectiveness of all these efforts is borne out in what the WMAQ listeners say. John Bailie, director of technical operations for WMAQ, states that from all reports WMAQ is now the loudest, cleanest AM signal in the Midwest.

These RF improvements were not all that was new at WMAQ this past year. Complete new studios and major changes in audio processing concepts were also implemented. These changes will be carried in a future article in *Broadcast Communications*. BC

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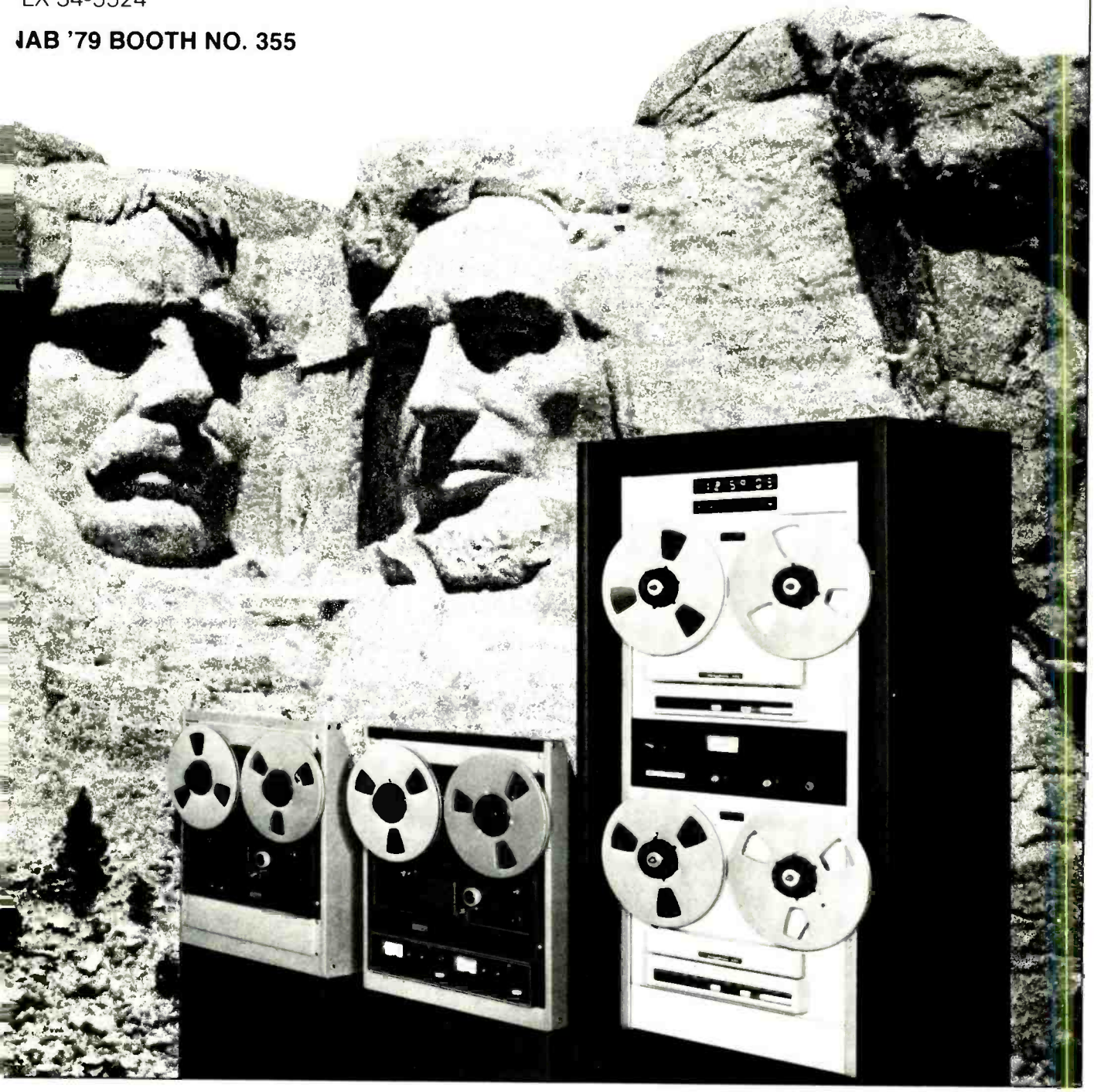


In South Africa...

Automation and teamwork strengthen SABC expansion

By Douglas Mills

Shortwave broadcasts intended for internal and external targets are merely one facet of the South African Broadcasting Corporation (SABC) activities. In order to get them into perspective, and perhaps to understand the successes that the SABC may have been able to achieve, it is necessary to look at the total picture of activities and not only the shortwave service.

At the present time the SABC's total staff is approximately 4,100. These people are all concerned with running 10 radio studio centres, one television studio centre, and the associated transmitters. The transmitter and studio centres are distributed throughout the country. While the television programme is only on the air for about five hours a day, the radio services create more than 460 hours of programme each day. Seven of the radio programmes are on the air 24 hours a day, seven days a week.

The television channel uses two languages, while internal broadcasts of 18 programmes in 14 different languages are conducted. Externally, 10 different languages are presently being broadcast.

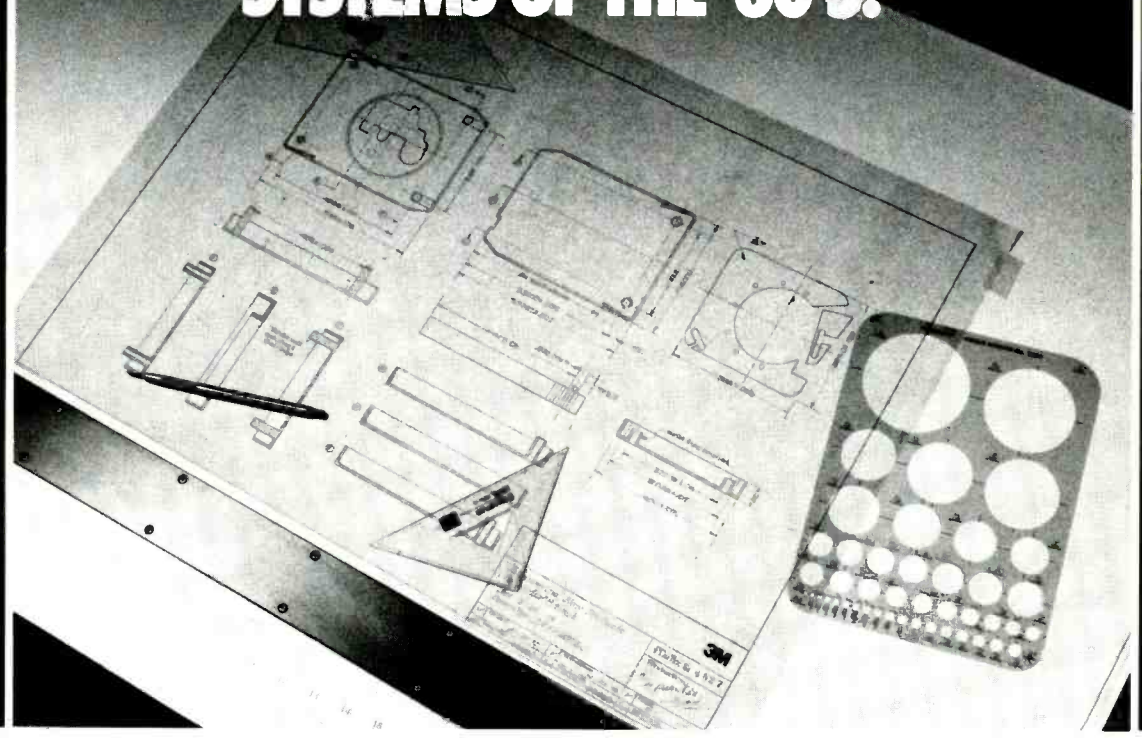
More than 570 transmitters are needed to distribute all the programmes of the SABC, and these transmitters operate from more than 170 different transmitting stations. It is fairly obvious from these statistics that a very large measure of any

Continued on page 148

Douglas Mills is the director of technical services, Radio South Africa (RSA).

An interview being conducted in one of the studios of Radio RSA.

IT'S ABOUT TIME SOMEONE REINVENTED THE RADIO CARTRIDGE SYSTEMS OF THE '60'S.



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success achieved by the SABC is due to the enthusiasm, devotion to duty, and dedicated hard work of the staff.

The technical staff concerned with the shortwave external services is about 20. There are four 250 kW and three 500 kW transmitters used for this service. In addition to this operational and maintenance transmitter staff, the aerials and masts and considerable grounds are kept in order by approximately 40 people. The total programme staff associated with the external services is about 100. The languages used for the services are English, Afrikaans, French, German, Dutch, Portugnese, Swahili, Chichewa, Lozi, and Tsonga. The prime target areas are Africa, Europe, North America, and the Middle East.

When *Broadcast Communications* asked us to submit an article "telling how RSA stays up to date technically," we didn't quite know how to approach this question. I think the things that have been mentioned previously about enthusiasm, devotion to duty, and hard work are the basic and most important ingredients. There is, of course, the question of competence and experience. And in these hard times we are reasonably fortunate in being able to generate and maintain a reasonable level of technical competence.

In order to countenance the tremendous rate of expansion which has been maintained since the early 1960s, the SABC has had to look at an increasing use of automation and other systems for conserving the precious skilled labour force. Most of the activities, as far as automation is concerned, have made people more productive and released them from the boring and sometimes soul-destroying function of waiting for something to go wrong. This is particularly true when the system being supervised is inherently very reliable. Of course, automation has also allowed slicker and more trouble-free presentation to take place.

Masts and aerial arrays at the H.F. Verwoerd transmitting station from where the external services are broadcast.

Inevitably the use of labour-saving devices and techniques does indeed save labour, but the labour that remains has to be more competent and much better than it would otherwise have had to be. It is unfortunately a fact of life that the most superb machinery will still not produce the goods: it is the

Continued on page 150

Radio RSA listens to listeners

Radio South Africa (RSA) first broadcast on May 1, 1966, and so is now well into its second decade on the shortwaves. The past 12 years have been exciting and rewarding, as RSA enjoys a close relationship with its listeners. Last year RSA received more than 60,000 letters, and its Jubilee Competition some years ago attracted more than 50,000 entries.

A very important aspect of RSA's broadcasting is the dissemination of news: nine language services broadcast daily a total of 42 news bulletins. The bulletins are written by news department specialists working exclusively for Radio RSA; and these specialists are able to utilise the full resources of the South African Broadcasting Corporation. These resources include the output of five international news agencies, regional news offices within South Africa and South West Africa, and a network of correspondents within and without the country.

RSA newsmen are therefore able to give wide coverage of international events and of South African and African happenings. The coverage and impartiality of their bulletins has won them wide credibility. One fact bearing this out was established by an independent survey run by a leading South African newspaper when it discovered that more than three-quarters of the Black African delegates to the United Nations listen regularly to Radio RSA news bulletins.

In sheer numbers of staff and transmitters, hours of broadcasting, and size of budget, Radio RSA is outgunned by many shortwave stations. However, it does have successes. For several years the German Service figured in second place in a yearly poll conducted by the German Speakers Shortwave Listeners Club; last year the Service was awarded first place out of more than 40 stations. The French Service this year also was selected as the top French broadcasts to Canada. For the last few years in an international rating, Radio RSA has never been out of the top ten.

Facts and figures by themselves are cold and radio is by its nature a lonely business. Stripped of its glamour, radio becomes a matter of one person and a microphone and a constant striving to communicate significantly. If this were all, nobody in his senses would stay in radio. What transforms the situation is the fact that one is not broadcasting into a vacuum but to fellow human beings; and, although reaction takes longer in external broadcasting than for domestic stations, Radio RSA is fortunate in its listeners. Letters and telephone calls keep it in touch with many of its listeners, and RSA responds on the air or by mail.

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The tape cartridge is a handy little device. Unfortunately the sound quality of programming varies noticeably between "live" and "canned."

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Besides "un-canning" carts, the dbx system extends the useful life of old reel-to-reel machines, quiets audio tracks on VTR's, and even cleans up full-frequency telephone lines and microwave links. Because it prevents noise from coming between you and your listeners—and you and your advertisers—it just may be the most important investment you will ever make.

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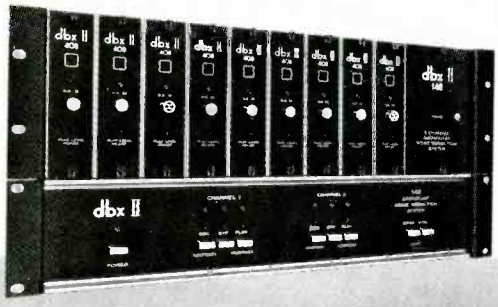
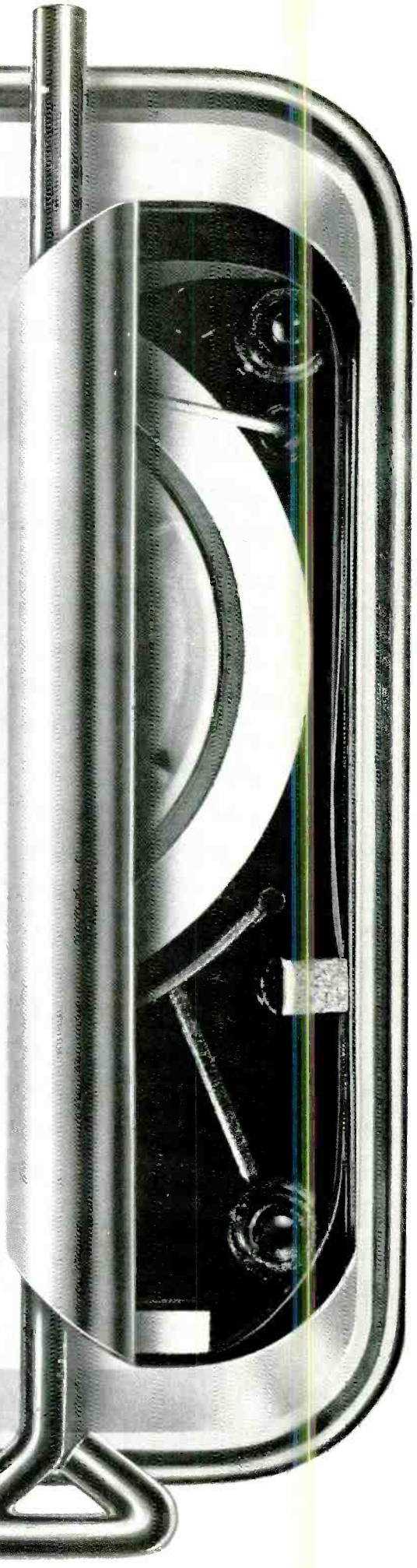




Circle (72) on Reader Service Card

people who create the material to be fed into the system and those who keep the system operational that are the be-all and end-all of everything. The SABC has good people, and the success of its projects is due largely to them.

The studio centre creating programmes for Radio RSA is situated in Johannesburg; it is an extremely large radio studio block which contains some 100 studios. These range in size from a large music studio, which will hold an audience of about 150 and an orchestra of 100, to a series of music, drama, variety, etc., studios, down to packaging or presentation suites consisting of a single studio being used entirely independently or in combination with a control room. These studios were planned some years ago and only came into operation in 1976.

It can, therefore, safely be assumed that the equipment in the studios is the latest and we think the best compromise between economy and technical excellence. The studios used for presentation of Radio RSA programmes are dedicated to that service, whereas the larger studios are used by all services.

I would like to emphasize once again that the technical excellence of the facilities would not help one iota if poor material is fed into the system, and it is most important that we appreciate the efforts of the programme makers and presenters.

RSA's transmitter station is some 50 kilometres away from the studio centre and houses the 500 kW and 250 kW transmitters. This sort of power does not help you very much if you feed it into an ineffective aerial system, and the aerial "farm" extends to some 140 masts. Once again the aerials used are a compromise between economic, technical, and purely functional considerations, always bearing the target areas in mind. The transmitter station is kept operational with a very high rate of plant availability; this is due to it being in the capable hands of Colin Taylor and Bob Swandale.

Another aspect of this service is to be found in the frequency planning. Some 30 kilometres on the opposite side of Johannesburg to the transmitting station is a place called Panorama. This is an international monitoring station with Pieter Martins in charge. Pieter and his crew form a vital link in the chain since, if the frequencies are badly planned, no matter how excellently the transmitters and associated gear are maintained, and no matter how good the programmes are, they will not help anyone if they don't reach the target area. Pieter and his team, therefore, fulfill an extremely important function with remarkable success.

The receiving station of necessity is in a quiet area; and hence, one's impression could quite easily be that of a quiet pastural scene. However, one should not be deceived by this, since underneath this outer calm is a highly efficient, hardworking bunch of people.

These, then, are the three elements of our external services. The studios, the transmitters, and the monitoring station. The three groups are totally interdependent and the success of the whole operation is equally due to the efforts of the people in the three teams. BC

ON LOCATION *BC*'s audio editor goes to the United Kingdom to talk with a leading British audio engineer.

Tracking the state-of-the-art in U.K. recording techniques

By Dennis Ciapura

In many ways, audio in Great Britain is reminiscent of an earlier time in the United States. Not because the equipment is older or the methods obsolete, but because the air sound of the British broadcasting stations is relatively unprocessed and open, which is the way it was in the United States before the great loudness race began.

Dennis Ciapura is the Audio Editor.

As U.S. broadcasters compress, expand, equalise, clip, and clutter a little more each year in a seemingly endless battle to match our neighbor's loudness level, it is easy to lose track of the cumulative effect on the programme material. In Great Britain this has not happened, and perhaps it never will.

Although competition between the BBC and the independents is keen, there are relatively few stations on the dial at any geographical location and one's selection of which to listen to is more likely to be determined by programme content than anything else. Therefore, British engineers are more

Continued on page 156

John Gregory conducts the Cascading Strings orchestra during a recording session.

concerned with the audio quality than with all-out loudness. The modulation levels are high enough to insure adequate signal coverage, but extreme processing simply is not used.

The result is that the stations are a delight to listen to and even reports of the proceedings of Parliament and local councils are done with good audio practice and often in stereo. Even the stations transmitting rock programmes leave the dynamic range essentially unaltered.

This situation is a delight to the home recordists, who are able to make excellent tapes from broadcast. However, one of the most surprising byproducts of this attention to good audio reproduction is the fact that small radio audio quality is noticeably better as well. Many Americans would be surprised to find that the typically "overdriven" sound of small receivers in the U.S. is very often simply a case of the receiver rather accurately reproducing a highly processed audio signal.

Beverly Campion gives cues from the control room.

Another interesting aspect of radio in Great Britain is the fact that a great deal of music is composed, arranged, and recorded specifically for radio airplay. The British listener is regularly treated to new arrangements of old favorites and new compositions that would not have otherwise been heard elsewhere. This system has the effect of bringing together two technical entities which usually remain apart in the U.S. For instance, the BBC does quite a lot of live recording and there are several BBC orchestras scattered about the country. Studio recording in England is alive and flourishing, and many artists and record companies come to Great Britain to take advantage of the talents of some of the world's best arrangers and engineers.

WGAY in Washington, D.C., recently employed the services of John Gregory and the Cascading Strings to produce a number of new arrangements for that station and several others in the U.S. The 16-track recording and mixdown was done at the studios of Pye Records in London and engineered by John Timperley, who is undoubtedly one of the best recording engineers in the United Kingdom.

I thought that *BC* readers might be interested in John's point of view on music production for broadcast, so, the following is a candid conversation with Timperley. His background is a colorful one indeed, starting back in 1959 when he began recording at IBC. Over the years he has recorded at various other British studios including Olympic, Rymus, and Chappell. And he has recorded with many successful artists including Cream, Sonny and Cher, Tony Bennett, Bing Crosby, Shirley Bassey, Petula Clark, Emerson, Lake and Palmer, and the Beatles. Our conversation begins in a small utility room full of various tape recorders during intermission of a John Gregory mix-down session.

BC: I understand that you spent a few years in Switzerland as well. Can you tell us a bit about the recording arrangements there?

J.T.: *Our recording studio there was a casino actually, where the jazz festival was held and the studio control room could pick up some 65 odd music lines from the casino concert hall. We were involved in live recording, which is something that I enjoy doing, although I wouldn't say that I really overly enjoyed the jazz festival because most of the material that we did was done with no sound check at all.*

BC: This was the material which was broadcast live as the multi-track was recorded?

J.T.: *Yes, and as I used to freelance for the BBC Television with the American big bands like Count Basie, Buddy Rich and so, I had done a series of special shows on multi-track, which was remixed onto the video. And so I was used to well-organised television people around me with some authority, discipline and sound checks. I think Montreaux could have been so much better if it had been better organised.*

BC: How long were you there in Switzerland?

J.T.: *Well, I was there until mid-1977. I did, in fact, three jazz festivals. But we also did some very interesting recording of various bands that came over there such as Emerson, Lake and Palmer, and Yes.*

BC: And that takes us back to your returning to Great Britain and freelancing.

J.T.: *Yes, I decided to freelance and I am in fact consulting on a major studio project in London, which is going to be in a church in Islington and that is obviously where I will be based.*

BC: In the United States one of the problems that broadcasters have is that of getting a clean disc, even at times of major groups, to the point that we very often will assemble four or five discs and use the one that sounds the best. This is especially true on material where circulation has gone into the millions. Do you have the same problem here?

J.T.: *Yes, we do. I have just finished a three-album project and we cut every side twice because the factory had accidents in the processing, but even now the results are not totally satisfactory. The cuts are good; there was some very fine cutting done at CBS.*

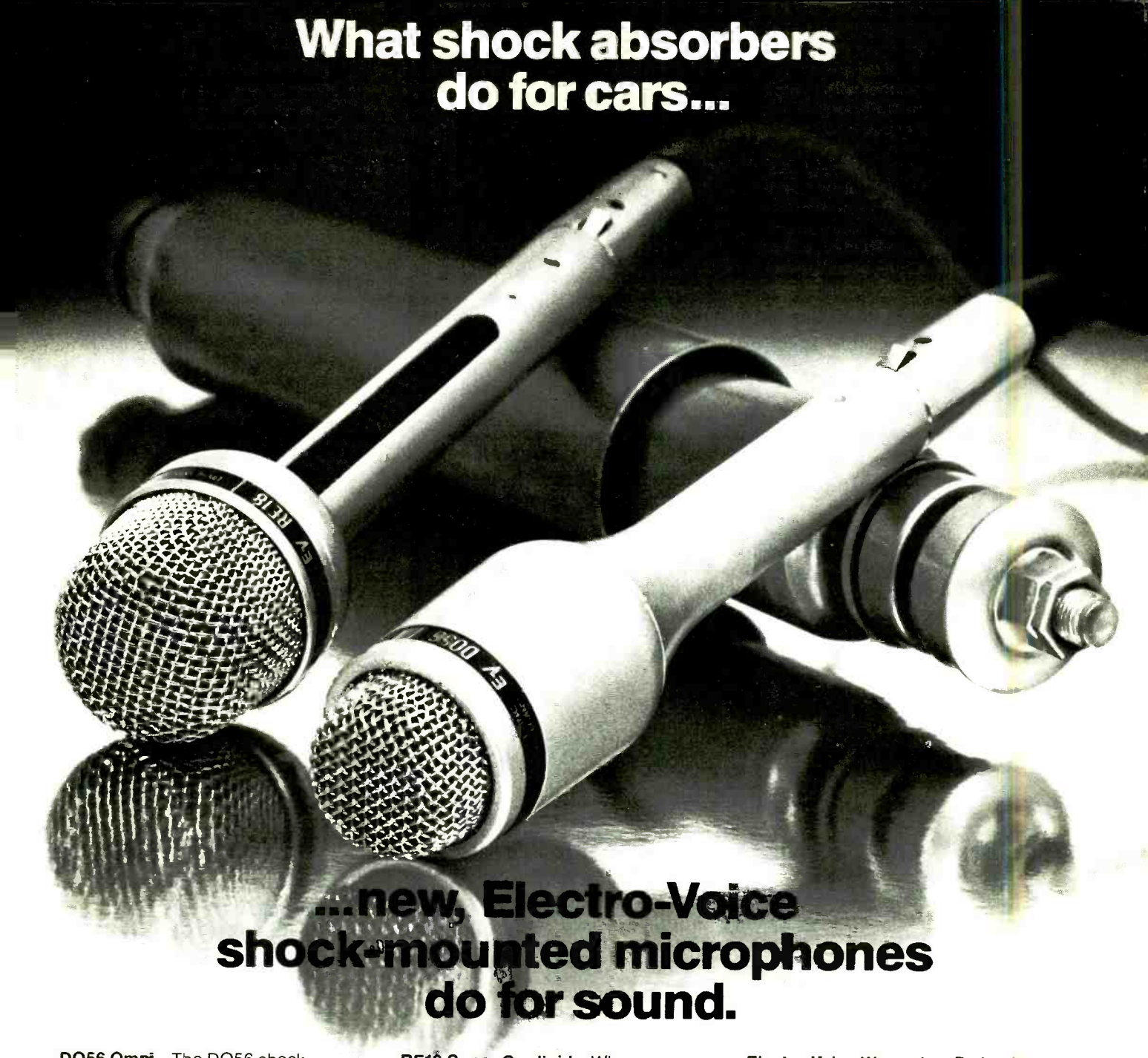
BC: Anticipating very heavy sales, do you ever produce multiple tapes from the very beginning to support extensive disc mastering without deterioration?

J.T.: *Well, I worked on one of the Yes albums which was recorded in Switzerland, and I mastered the mix-down at 30 inches with Dolby, all at Ampex operating level and I immediately made a 30 to 30 dup backwards with Dolbys out. In fact, the first 30-inch master was used so much it started to deteriorate and so a second copy was brought into use. Copying that way you couldn't really hear the difference between the two, particularly as the master was played back on an ATR (Ampex) onto a Studer.*

BC: Do you know if the record companies here distribute to the broadcast services from the first batch?

Continued on page 158

What shock absorbers do for cars...



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J.T.: *I assume they do, yes.*

BC: They are supposed to be doing that in the U.S. as well, but judging from what you hear, one sometimes wonders.

J.T.: *But in actual fact you do hear bad quality pressings on radio and I definitely think that the quality of pressings is not as good as it was five or ten years ago. There is some stuff that I recorded for Decca in the late 60s and early 70s where the pressing quality is superb.*

BC: We also find what seems to be a difference in the quality of the plastic, the potential for surface noise is higher than for the old stuff.

J.T.: *That is right. They are definitely using a coarser mix in the guns that they press with. And record companies do tend to treat the classical recordings in a far better way because they imagine that the pressing quality should be much better for classic, which is wrong because rock and roll and middle of the road is equally as dynamic and you're just as likely with a rock band to have a long passage of semi-classical or classical piano. These pressings require an equal standard. In other words, the record companies think that the classical has to be totally silent and the rock and roll not because it doesn't matter, which is not the case at all.*

BC: That presents another problem to the American broadcasters where the stations are so competitive that some degree of compression is used by most rock stations; so, those low passages are brought up so the surface noise due to vinyl quality really sounds quite bad, where the classical stations rarely compress it all and the surface noise remains down where it was on the disc.

J.T.: *However, when you are making something for the gramaphone record, that is just what you are making, and if you try to think when you make the record of all the processes it is going to go through, you really wouldn't know what to do. You know, it is the catch 22; you solve the problem for one thing and it is not right for the other. If you made it with restricted dynamic range for the radio, it wouldn't sound that hot for the record. Maybe some things would, but a lot of things wouldn't. I think you have got to say, "Well, we are making a record and that is what you have to do."*

BC: That brings us to a very interesting point. The Auratone 5-inch monitor speakers are almost universally switched in to doublecheck the mix in almost all studios these days, and everyone goes to mono on a single Auratone to insure mono compatability for the smaller equipment. So, to put things in perspective, would you say that modern music is recorded for optimum results on good equipment but carefully checked to be sure that everything shows up on a small set?

J.T.: *I would say that applies to everything that is mixed, certainly in Europe. Absolutely.*

BC: So, the first priority is still to the ultimate quality on a big system, with a final check for small radio and mono compatability.

J.T.: *One main priority, whether it is for record or radio, is the mono. It has got to sound good in mono; it has to. When I'm mixing stereo, I'm mentally monoing all the time. I have just driven myself to do that now. It took me some years to find that out and it is still not a perfect system, for ideally you should have separate mono and stereo mixes. In fact, we used to do that.*

We pause at this point as the door opens and a smiling gentleman walks in looking for a tape, whom John introduces as Malcolm Davies, one of the world's best cutting engineers. John remarks that Malcolm has been in the business about as long as he has and started at Abbey Roads Studios around

Continued on page 160

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1959. We exchange pleasantries and Malcolm departs posting something on the door while John and I continue our discussion.

BC: Of course, you don't experience the degree of signal processing in radio broadcasting here that we do in the United States, but do you attempt to compensate at all for the probable loss of highs when the material is broadcast by equalising a little brighter while recording?

J.T.: *No, so far as I'm concerned, I try to make it musically correct on the disc because most broadcasting organisations alter high end anyway; and if you make the thing too bright, they will either roll it off or make it sound hard as nails on transmission. So, I just go for whatever everybody decides is the right sound for that particular album, or that particular stamp of character, if that is what is wanted.*

BC: I notice that here in Great Britain there seems to be more talk about recording outside the studio and even news programmes here exhibit very good audio quality.

J.T.: *Yes, the Parliamentary transmission quality is remarkable; the speech quality, I think, is excellent. But you're dealing with the oldest broadcast organisation in the world and if they decided to do something they do a superb job at it.*

Engineer John Timperley at the console during a recording session.

BC: Are you engaging in more out-of-studio recording?

J.T.: *Yes, I'm trying to record as much as I can outside. I enjoy it and I think if you have the right combination of music and acoustic place you get the best results. It is really a question of having the nerve and the courage to do it.*

BC: Aren't you currently working in a church?

J.T.: *Yes, I am currently working on a project in a church and I am hoping to do some recording with John Gregory there*

and experimenting to see what kind of sound we get. When you listen to instruments playing in this church, they sound so fantastic, you can't believe it. If you can get some of that on tape and onto the final disc, I think you have got a superior result rather than just doing it in a studio where life might be a bit easier. But you have to cope with things like thunderstorms, if they arrive, traffic and so forth. It is not quite as easy as in a studio.

BC: Is the church still used for services?

J.T.: *Yes, and that can cause problems because you are very restricted in your time there. But we also have some very fine townhalls and most of the classical recording in England is done in them.*

BC: Are you able to totally eliminate electronic tape delay and echo plate reverb when recording in these halls?

J.T.: *Well, that depends. Walthamstowe is absolutely clean. But generally, very little artificial echo is required.*

BC: What is the most difficult project you have ever recorded?

J.T.: *I think Yes was perhaps one of the most difficult things.*

BC: Why was that difficult?

J.T.: *Because they rehearsed and recorded at the same time and they tended to want to use a lot of tracks. If we had another 16 tracks on top of the 24, it would have solved the problem, but you know they are very good musicians and they are very professional people to work with. That was perhaps the most demanding thing I have done for awhile in terms of equipment demand and effect demand.*

BC: Another thing that I have noticed is that the TV audio seems to be very good.

J.T.: *It is AM in the States, isn't it.*

BC: No. it is FM.

J.T.: *Is it? It never sounds like it when I hear it over there.*

BC: My point exactly.

J.T.: *The TV audio here is excellent.*

BC: When material is recorded for TV in Great Britain, is it given the same attention as it would be if it was for disc?

J.T.: *Absolutely. I did lots of prerecording for BBC Television and they went to a lot of trouble to record it properly and when the guy transmitted it, he transmitted it very carefully. They didn't fiddle with it or anything. It went out on a decent tape machine into the console and out. The quality was superb. The only limitation on that is the videotape machine, but you have to live with that.*

As we leave, we notice, for the first time, the DO NOT DISTURB sign that Malcolm Davies had posted on our behalf and smile lightly as we get back to the business of fitting 32 musicians onto a two-inch strip of magnetic tape. **BC**

A techniques review of "sample and hold"

By Harold Ennes

One of the most exacting sections of digitized audio or video equipment is the analogue to digital converter (ADC) unit. Review for a moment the block diagram of Figure 9 (Session 4) and note that the conversion of the analogue signal to a digital signal is done in three steps:

1. The signal is sampled at a rate higher than twice the highest important signal frequency; this original signal frequency range being limited by a low pass filter of proper design. The signal is now in pulse amplitude modulated (PAM) form.

2. At the instant of sampling, a hold occurs so that a flat (unchanging) pulse top occurs during which time a voltage level is assigned by a voltage comparator or other means. This action is termed "quantizing" the signal. The flat top provides the proper time interval for the conversion process in step 3.

3. Each instantaneous voltage level from step 2 above is converted to a corresponding binary code during the hold interval by means of a logic circuit. This is termed pulse code modulation (PCM), which is the technique most suitable for either digitized audio or video. Once in PCM digital form, the signal is largely immune from the effects of the analogue world.

Harold Ennes, Digital Editor, is the author of several digital texts, and radio and television maintenance textbooks.

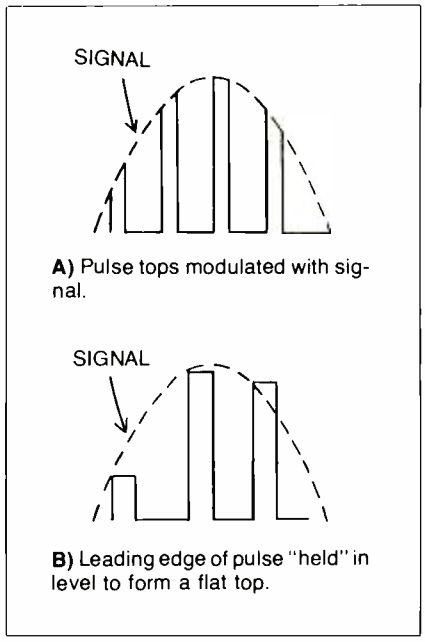

Figure 12 Two basic types of PAM.

Why "Sample and Hold"? There are two basic types of PAM as illustrated by Figure 12. No "hold" arrangement is used in Figure 12A so that the pulse tops become modulated by the signal. In this case, the pulse top is continually changing with the signal, and an accurate fixed voltage level for this sample would be hard to come by.

In Figure 12B, the value of the leading

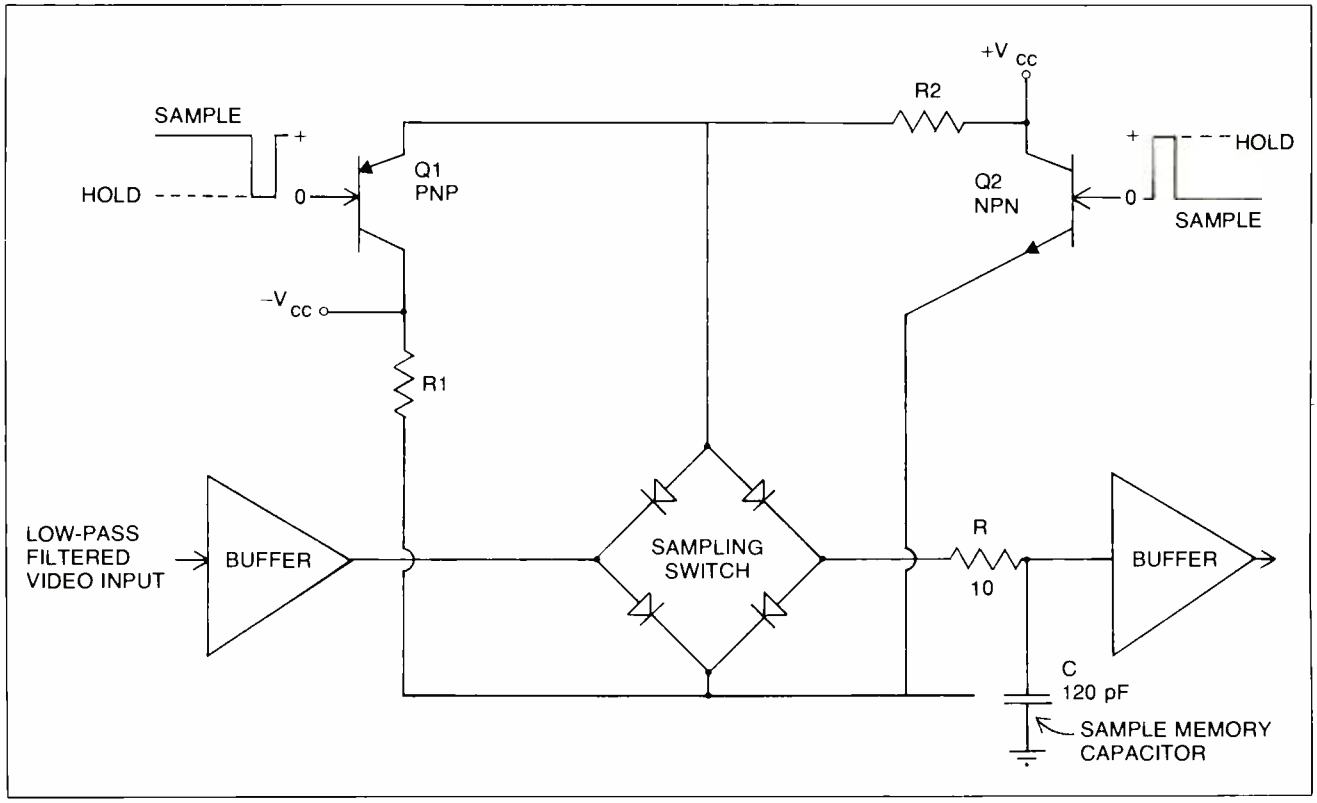

Figure 13 Simplified example of sampling circuit for video signals.

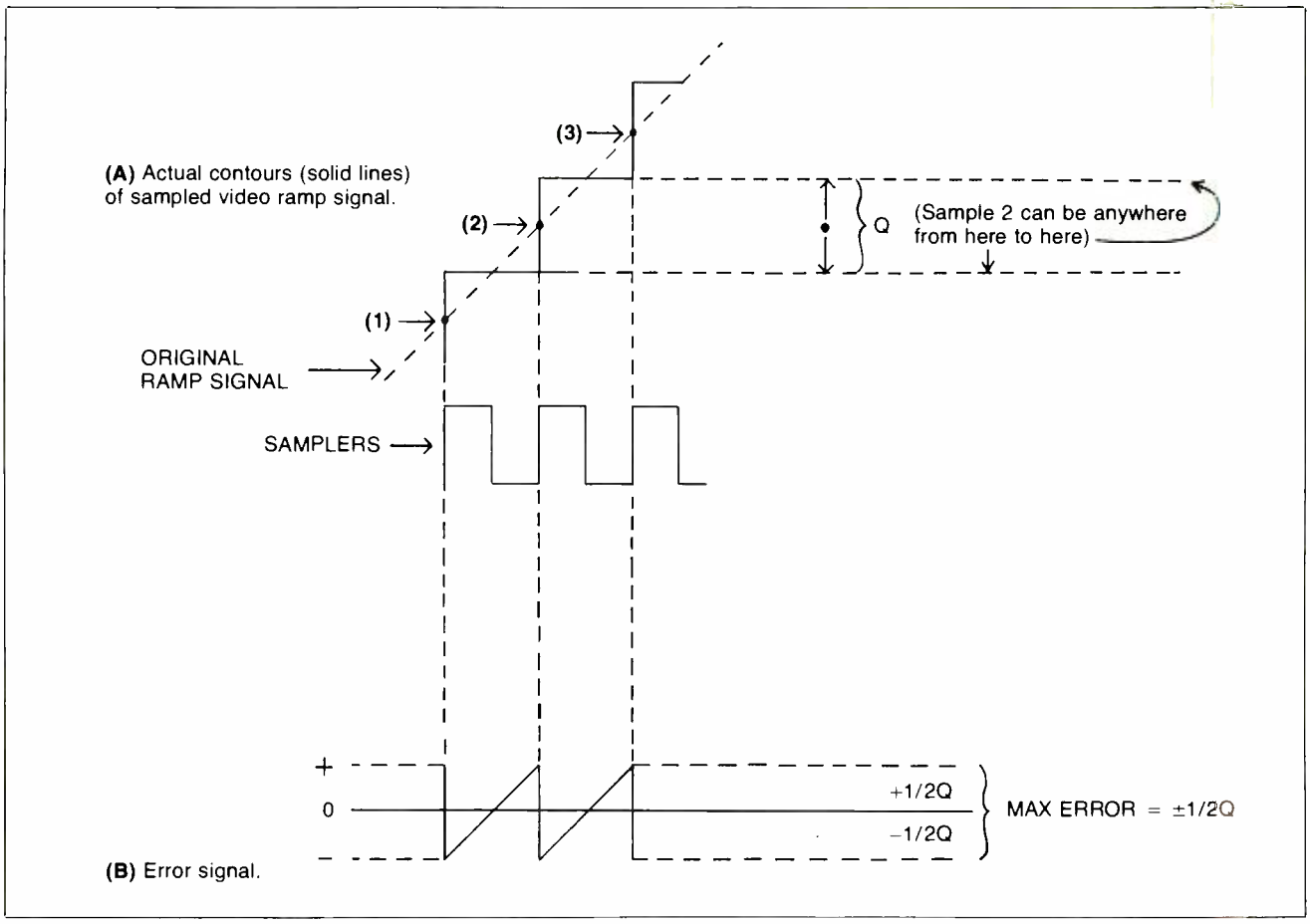

Figure 14 (A) is the combined original and contoured signal formed from quantization. (B) shows that maximum error is ±1/2Q on the error excursions possible in sampling and quantizing.

edge of the sample pulse is held for the duration of the pulse. Thus a fixed voltage level can be assigned by the quantizer, and enough time allowed to form a pulse code for that level by a logic circuit. The sample and hold circuit must provide both fast and glitch-free operation for reliable ADC function.

The Sample and Hold Circuit. Figure 13 shows one example of a commercial sample and hold circuit. A diode quad acts as a sampling switch which is either open or closed. Note the opposite-type transistors Q1 and Q2, and the opposite polarity sample pulses as might be obtained from a pulse transformer. With Q1 and Q2 both cut off (this occurs during sample time), all diodes are conducting from the forward bias current through R1 and R2. The analogue signal input is allowed to pass through this closed switch (gate is open) charging the memory capacitor during this time. When the opposite polarity sample pulses occur, the diodes are reverse-biased, opening the switch (closing the gate) so that the charge on the capacitor is "held" at the level sampled for the duration of the pulse. This is the "hold" duration of the sampling interval. When this interval is completed, the switch again closes (gate opens) to allow the sampling capacitor to follow the signal excursions. The values of R and C shown in the sample memory circuit are typical.

Effect of Rectangular Sampling. The "sample and hold" technique results in a rectangular sampling pulse, or a square wave pulse for 50% duty cycle. If the samplers were extremely narrow, as represented by Figure 10C (Session 4), we would have not only extremely low energy output (due to the extremely short energy level) but also a harmonic response approaching infinity as the pulse narrows. For practical sampling, we have a pulse of more reasonable width for better efficiency, but an added problem.

What we have essentially is a rectangular pulse modulated carrier. From spectral analysis, the amplitude of the various spectral components follows a sin x/x response. Basically it results in a loss in the high frequency response of the system. The distortion here is known as "aperture effect" because of the similarity to the variation of transmission caused by the finite size of the scanning aperture (beam) in television cameras.

Continued on page 164

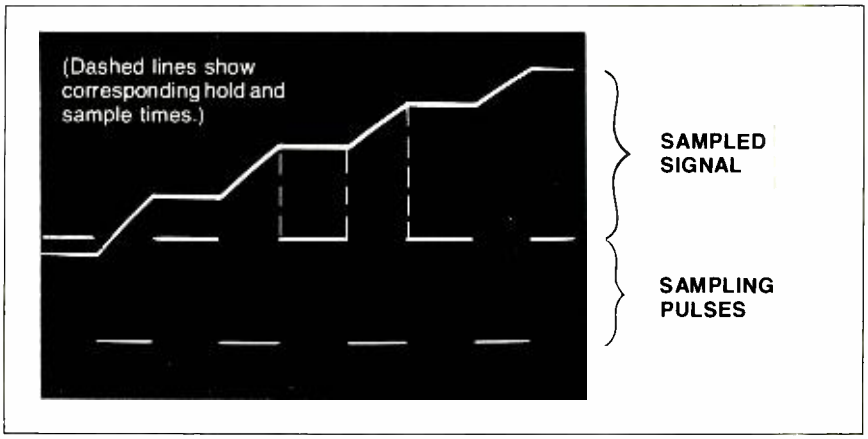

Figure 15 Waveform of sampled video ramp signal before quantization. Sampling rate in this instance was just 10 times the horizontal line frequency, to make the steps (contours) readily visible.

"Sample/Hold"

For digitized video, we have a loss due to the aperture effect alone as follows:

- At 10.7 MHz sampling rate: 2.3 dB down at 4.2 MHz.
- At 14.3 MHz sampling rate: 1.3 dB down at 4.2 MHz.

This tells you that in any digital video system, a certain amount of video equalisation must be used. In practice, manufacturers vary as to whether this equalisation should occur prior to or after encoding-decoding.

Sampling Error. Contrary to what you might expect from PAM, you will not observe actual pulses that start at ground potential and vary in height as the signal varies. The dashed line of Figure 14A represents our familiar video ramp signal being sampled at a given rate. The held levels (leading edge of "hold" pulse) are at points 1, 2 and 3 on the ramp. The solid lines represent the actual signal contour of the quantized signal. (Quantization is the voltage level represented by each sampled point and is discussed in our next session.)

We looked at the signal first at point 1, then not again until point 2, and not again until point 3, etc., during which time the memory capacitor has recharged to a new value. This alters the original ramp signal to a stairstep signal where each step is termed a **Quantum**, represented by Q. The height of these steps depends upon the number of bits defining each level; an 8-bit code means that each step (Q) is 1/256th of unity. For any given analogue signal amplitude, the quantizer generates a signal amplitude equal to the midpoint of the corresponding increment (Q) of analogue voltage.

Figure 14B represents the error voltage of the quantizing process. If this signal was added to the signal of Figure 14A, the original ramp signal would result. Note that, since correct amplitude is ½ of each step, the maximum error is plus or minus ½Q. This is shown on Figure 14A where sample (2) could represent anywhere from the bottom to the top of the quantum (±½Q). Thus if you have a 0.714 volt (714 millivolt) video signal, a quantum is 714/256 = 2.8 millivolts. Then ½Q = 1.4 millivolts maximum video amplitude error. Just try to read this on your IEEE scale!

The raw sampled signal as it goes into the quantizer is illustrated in Figure 15. This is how the sampled signal looks on experimental equipment in the writers' laboratory, with a very short time base on the oscilloscope.

In Session 6 we will explore quantizing methods and have an introduction to the generation of PCM from the various voltage levels of the quantized signal.

BC

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Microprocessor Workshop

Microprocessors have capacity to expand station services

By Peter Burk

It seems like any more the word "computer" gets pasted on anything that contains a microprocessor or even a lump of digital logic. With that in mind, you might take a glance at Heath's new weather station and wonder if the "computer" label is justified. After a more thorough study, though, you'll be convinced that the unit is truly more than a digital weather station.

The Heathkit model ID-4001 provides all of the features you'd expect in a broadcast digital weather station (wind speed and direction, temperature, barometric pressure, etc.), but goes a step farther. All measurements are available in any of the standard measurement systems. Wind, for instance, can be measured in miles or kilometers per hour, or knots. Pressure is available in inches of mercury or millibars; and, of course, temperature comes in the standard varieties, F and C.

But that's just the beginning. The wind speed and temperature information are combined in the microprocessor to produce a display of wind chill factor. All measurements are compared against the previous maxima and minima; and, if they exceed the old values, the new maximum or minimum is stored for later reference, along with the time and date that the value was reached. (Oh yes, there's a six-digit clock and four-year calendar built in, too.)

What makes the ID-4001 an ideal candidate for the Microprocessor Workshop is that it is a classic design example using microprocessor technology. (Additionally, the unit was designed with broadcasters in mind. RF testing was done at WHFB in Benton Harbor and at Channel 22 in South Bend.)

The design of the 4001 goes back about 18 months. First drafts were based on discrete integrated circuit designs. As the number of chips grew, more consideration was given to using a microprocessor. A four-bit processor, the TMS 1000, was the first candidate, but after studying a number of other possibilities, the 3870, a one-chip version of the F-8, was chosen.

The 3870 provides the CPU (central processing unit), 2048 bytes of read-only memory, and a 64-byte scratchpad memory, in addition to a few other conveniences. For the 4001, more random access (read/write) memory was needed, so an additional RAM was added. This permits storage of maxima and minima for all functions, time and date information, and a nifty wind-averaging scheme. Each time the wind speed is entered into storage, it gets pushed onto a 15-byte stack. To figure the average wind speed, all 15 readings are averaged by the microprocessor.

The microprocessor provides a significant amount of comutational power. At power-on, for instance, the microprocessor checks to see if the line frequency is 50 or 60 Hertz. This enables the unit to automatically determine the proper scalar for the built-in digital clock, among other things. The processor also does all of the unit conversions so that calibration is only necessary in one measurement system.

Calibration is also much simpler than earlier digital designs. Anyone who has calibrated a digital thermometer using two baths (one hot, one cold), can attest to the beauty of a single-point calibration. In the ID-4001, the temperature sensor produces a voltage that is proportional to the absolute temperature (referenced to absolute zero). The slope of the amplifier is adjusted by using the microprocessor as a digital volt meter. Once this is adjusted, the intercept can be easily moved up and down to match the temperature of the bath (32 degrees, Fahrenheit). This technique really exploits the capabilities of the microprocessor.

Another example where the versatility of a micro comes in handy is the barometric pressure transducer. The pressure transducer produces a very small sample voltage. In order to extract useful information, voltages under a tenth of a millivolt must be accurately measured. This is no challenge for the micro. The sampling time is just made much longer. Instead of making an a/d conversion every second, the processor waits 10 seconds before reading the count. Presto! An instant 10-fold improvement in precision.

Once a project has been committed to a microprocessor design, there are frequently some serendipitous benefits that weren't really counted on. In the case of the 4001, at least two of the features weren't part of the original design, but were incorporated because there was sufficient space left over in the programme memory. A button on the front of the unit allows the operator to select "rate of change per hour" for the barometric pressure. Additionally, the inclusion of the four-year calendar was not originally planned, but space in programme memory made it easy to implement.

The 4001 is just one example of a good, sound microprocessor design that provides features that would otherwise be too expensive to implement. Hopefully, more products will appear that solve real problems in an intelligent manner. It's nice to know that microprocessors are good for something besides playing TV blackjack and storing household recipe files! Meanwhile, if you'd like more information on the 4001, just circle number 98 on the Reader Service Card in this issue. BC

Peter Burk, BC's Radio Editor, is the chief engineer at WKBW Radio, Buffalo, New York.

Naji: on location with IVC's 7000P portable studio camera.

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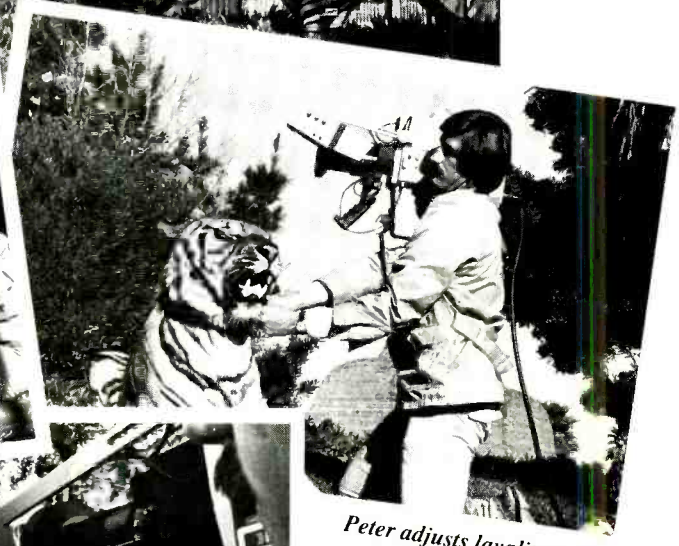
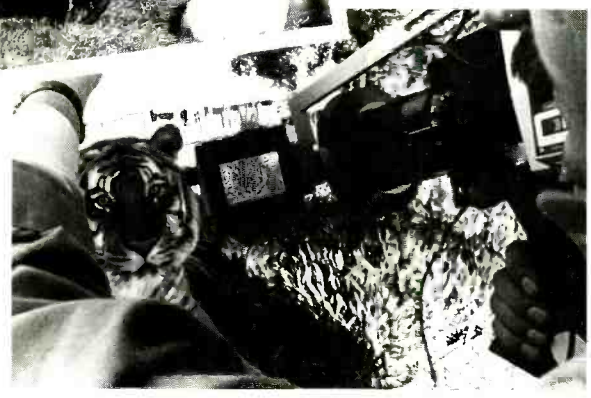


Peter adjusts lavalier mike. Look Ma . . . no hands.



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UNITED STATES

WARC: Problems are growing

By Arthur Thompson

The upcoming WARC conference will cover a number of major issues affecting international broadcasting.

The Report and Order has been issued concerning the present United States position on the 1979 World Administrative Radio Conference (WARC-79). This effectively terminates four years of work done by the Federal Communications Commission (FCC) on behalf of the public interest in the United States.

This Report and Order includes the U.S. position as determined by the FCC and the National Telecommunication and Information Agency (NTIA). Canada and other countries have likewise completed their preparations for WARC-79. Actually, these are tentative position papers since much will be done in coordinating the differing positions of each administration prior to the 10-week conference beginning in September.

These tentative position papers have been distributed among the WARC participating administrations in anticipation of compromises being made prior to the actual conference. Such a procedure is a necessary move toward the goal of making WARC-79 successful. Without this preliminary international exchange and compromise prior to the conference, there would be no hope of completing the work assigned for a 10-week conference. Every band, every channel, between 10 kilohertz and 300,000,000 kilohertz (300 gigahertz) will be up for discussion and reallocation.

Most European administrations and some Asian administrations have already adequately prepared themselves for the final negotiation work by defining their own requirements, as best they understand them. With the best of efforts, there appear to be problems for certain services such as AM broadcasters and international broadcasters.

Although this article refers occasionally to the present U.S. position, that position is typical of what other administrations are proposing.

AM broadcasters are involved in a long-standing debate about how to accommodate more broadcasters. The basis for the debate is that the FCC believes additional channels are necessary for minority and special-interest groups. Always of interest to U.S. public consideration is the influence of minority and special-interest groups. The National Association of Broadcasters is basically *for* some additional spectrum but *against* any change in the present channel spacing. The Association of Daytime Broadcasters is in favor of any expansion, in order to obtain night-time operation privileges for their member stations. Clear-channel licenses, although not directly involved in the WARC discussions, are involved in the debate because some of these extra channels will come from clear-channel allocations.

Band expansion is one alternative proposed for providing additional channels. Expansion of the AM band up to 1860 kilohertz has numerous implications.

What are the technical and propagation characteristics of that part of the band, compared to the present AM allocations? What are the economic considerations of such an expansion for both licensees and receiver manufacturers? Of significance, although a subtle implication at this time, is the proposed multiple shared service with a number of other services in a portion of this expanded band. Potential interference between and among the services needs to be considered, especially night-time sky wave-type interference. Further study needs to be done on this subject to better understand the alternatives.

AM band reallocation expansion cannot be unilaterally resolved because many nations are involved in this subject. Even in the limited area of North America, it is necessary to have the participants of NARBA, and especially Canada and Mexico, mutually agree to any band reallocation expansion.

An alternative to providing additional broadcast outlets is the proposed 9 kilohertz spacing between channels. The idea is based on the experience of broadcasters in Europe and Asia. The difficulty for the North American broadcaster is that the cost of conversion would be very high, while still maintaining the necessary antenna directionality. This is especially true for the many small-market, low-power stations that have been squeezed between existing larger-market, higher-power stations.

The problem is that the smaller the station, the more expensive such a change would be. Not directly related to the channel allocation discussion is the effect of reduced channel allocation on AM stereo operation. Reduced band width not only directly affects the frequency response of the transmitted signal, but also could affect the theoretical level of stereo separation, signal-to-noise considerations, and the practical operational stability of the AM stereo generator.

Changing AM broadcast channel spacing in the Western Hemisphere is not a minor suggestion. It is comparable to proposing a change in the Magna Carta. It is an interesting topic for theoretical discussion, but practically speaking, it could be an almost impossible task.

The U.S. position, at the time of this writing, appears to be that 9 kilohertz channel spacing is the most effective and efficient method of providing additional channels. It remains to be seen what the outcome of this part of the debate will be. Suffice it to say, there is a strong feeling in the United States that additional channels are necessary for minority groups interested in entering the broadcast media.

In addition to these considerations, there is the additional problem of Canadian objections to the proposed NTIA proposal.

Broadcast channel spacings do affect neighboring administrations such as Mexico and Canada. These administrations cooperate on a different scale via the North American

Continued on page 170

Arthur Thompson is the station manager of broadcast station WYFR. His WARC activities began about four years ago when he was invited to join a Special Working Group on International Broadcasting. This group was established to advise the FCC on the needs of the privately licensed international broadcasters. Aside from previous international station managerial duties, Thompson was an engineer with Trans World Radio for a number of years. On one of his assignments, he surveyed the land and documented the technical characteristics of the area to determine the best location for the TWR broadcast station that was constructed in Swaziland.

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Radio Broadcast Agreement. A change in channel spacing requires an NARBA-type agreement, otherwise unilateral change and modification would cause heterodyne havoc.

Following the WARC-79 agreement, and before any rules could be issued from Washington or Ottawa, a new or revised NARBA would have to be drawn up and ratified. This in itself is no small task that would fall on the administrations concerned. It appears that the functionaries and technocrats of all administrations will be kept busy for many years to come, based solely on the implementation of the proposed WARC.

If enough interest is shown by government and broadcasters, there could be a true renaissance in the development of some form of low-band, high-frequency domestic broadcasting. South America, Africa, and Asia have already developed these particular bands. It may be the opportunity for North American broadcasters to consider the alternatives for AM band expansion. This is a subject that needs to be developed further.

There is certainly no clear solution to the AM expansion proposal. A question that has not been discussed is the economic viability of the additional stations that will, within a relatively short time, come into existance. The idea is implicit in the NAB position, but the point needs to be explored further.

There could be an alternative that would satisfy minority and ethnic audience and their need for specialised broadcast coverage, while at the same time, providing the owner-licensee with an economically viable operation. It is necessary that broadcasters make a reasonable return on their investment, otherwise the surplus of station licenses within and without the expanded bands will produce deflationary effects on the value of a broadcast license. The net result could be that the minority services will not be serviced properly and completely. This could be a gross disservice to the very groups now interested in additional service.

The second area of contention and debate centers on the little understood, and less appreciated field of international broadcasting, where the listener is the target of a hundred political and philosophic ideologies.

The problem hindering clear international communications is that the proliferation of high-power international broadcasters has produced congestion and interference, decreasing reliability of service. Practical methods of spectrum conservation have been proposed to WARC-79, to more efficiently use the allocated spectrum. Yet these efforts are not adequate to provide enough additional channels.

There is little wonder that many administrations have, in recent years, permitted their organisations to operate out-of-band, effectively having a clear channel, while other broadcasters are required to operate within the allocated, albeit congested, portion of the band.

Recent news items have called attention to the disapproval of the proposed limited allocation increase for international broadcasting. It is felt by many experienced broadcasters that the present allocation of about 2,000 kHz has to be doubled to permit the free and easy flow of information between nations of the world. These broadcasters feel that it is not in the best interest of the free world to endorse a limited expansion.

International broadcasting has classically been a communications medium. International broadcasting is the only practical way for the free and easy exchange of ideas among the peoples of the world. This was the freedom guaranteed by the Helsinki agreement.

It was hailed by both East and West as opening new avenues to improved international understanding. International broadcasting, in the fullest sense of the word, is truly the means to disseminate information directly to the people of one country by the people of another country.

It can be shown that the expansion of the international broadcast bands is indisputedly necessary in order to carry out the accords of the Helsinki agreement. It is therefore possible that more credence should be given to the pleas from international broadcasters for additional spectrum.

There is a de-facto expansion of the international broadcast bands. A number of years ago, when the international broadcast band congestion began, there were two alternatives for broadcasters, short of just sitting in place and being overpowered. The first alternative was the power race that has developed huge complexes of super-powered HF transmitters. At today's cost for electric power, even governments find it difficult to justify the expense of operating this type of station.

Congestion and unreliability still are facts of live, leaving the other alternative: broadcast in bands allocated to other services, creating new bands. This operation effectively gives exclusive rights to a clear channel, at least for a while.

In recent years, increased congestion on the allocated bands has caused more administrations to permit their operating organisations to operate out-of-band. These out-of-band operations typically are immediately adjacent to existing bands, made available by the decrease in fixed service requirements. Some bands have expanded, on a de-facto basis, to the point where they are effectively 100 percent larger than the basic authorised international broadcast band.

The problem now develops with certain administrations, in which the broadcasters are not permitted entry into the de-facto area of the band. Hence these broadcasters are limited to only a portion of the spectrum used by the more independent broadcasters.

Recent developments have come to the attention of the media of the apparent disagreements within the administration of the United States. Representatives of the Board of International Broadcasting, which funds Radio Free Europe and Radio Liberty, and the International Communication Agency which operates the Voice of America, have voiced dissatisfaction with the present U.S. WARC position. The BIB/ICA see the present position as preventing them from gaining entry for their transmissions into other countries.

The present NTIA position provided for an expansion of about one-half of what the BIB and ICA believe is necessary for reliable communications. WARC positions now being considered in Washington, London, Moscow, and

other national capitals not only affect their own country, but by agreement, affect their ability to broadcast to neighboring countries as well as distant areas.

The Board for International Broadcasting and the International Communications Agency represent the interests of the U.S. government broadcasting, specifically Radio Free Europe, Radio Liberty, and the Voice of America. In considering their needs, it is necessary to appreciate that their transmissions are the most-often jammed services operating today.

The essence of jamming interference implies that not only is the co-channel service obliterated in the immediate target area, but also the two first adjacent channels are affected. Secondly, the jamming signals propagate great distances, causing extreme interference problems to other broadcasters, not just the intended reception area.

The private and public debates continue as to the allocation needs of international broadcasters such as RFE/RL. But the picture is clear that, lacking major expansion, including the de-facto spectrum already taken by certain international broadcasters, limited expansion would provide other broadcasters with relatively free access into all areas of the world, while denying access by American, Canadian, and certain European broadcasters to the recognised narrower allocations proposed in the present drafts.

Every service, whether broadcast, mobile, or amateur, would like to have exclusive allocations for its service. Under certain circumstances, exclusive allocations appear to be necessary. For instance, there is no possibility of sharing service with any other service on a standard frequency channel, whether it is WWV or CHU. Likewise, there is little practical possibility of sharing between high-power, long-distance international broadcasting on the higher bands because of the relatively high field strengths possible even on the third, fourth, and fifth hop.

Shared operation on lower bands between international broadcasters and other services could, with logic and a bit of ingenuity, be developed. Such a proposal could alleviate some of the congestion on some bands at some hours of the day.

The basic premise of any position presented to WARC-79 will be determined by the administration's interest to allow the free flow of information.

The implication of this position by the United States and other administrations influences other nations looking for a position to support at WARC. The international broadcast bands need to be expanded for the benefit of all international broadcasters.

Latin American, African, and Asian administrations will find that unless the international broadcast bands are significantly increased, their new-found international broadcast interests will be severely limited. This is a major consideration for many of these administrations who are not able to simply write off their investments.

The future of high-frequency broadcasting, especially international broadcasting, could look very good. Much depends on the effectiveness of a strong position for the dramatic expansion of international broadcasting. The effects and repercussions will be felt well beyond the limited and parochial boundaries of the international broadcasters' fraternity. BC

NAB: Products for everybody

For more information on products highlighted in this section, just use BC's convenient Reader Service Card.

First out of the hopper for "hit of the show" contention is the Ampex digital VTR. Sending shock waves through the industry some weeks ago, Ampex quietly pulled the trigger on the equipment surprise of the year. The new machine is covered in a special article elsewhere in this issue.

Frame synchronisers and time base correctors will be hot items at the NAB convention this year. They're not exactly new, but the prices have dropped almost to the irresistible level. But mostly what you'll hear is that more products are digital- and microprocessor-based.

Of particular interest to TV broadcasters is the tough competition among manufacturers of digital video effects systems. First introduced a few conventions back, these systems are growing in flexibility and creativity. The leaders are sure to exhibit systems live that truly execute effects previously only possible through optics.

Even lighting gets a facelift. HMI is featured in an article in this issue and will be joining other lighting innovations on the floor this year.

Of course digital audio will be a lot more obvious. 3M and Sony should be right up front. But if you're intent on staying in step with the technologies, look for a wide variety of innovations in both radio, television and audio products, as well as test equipment.

Whether you skip this convention or you're already packing your bags, this section offers you an opportunity to be certain you collect all the information you need for your station files. As you see a product that meets your needs or sparks new interest, mark that product's "circle" number on the Reader Service Card. This way, if you attend the convention, your literature load will be a lot lighter. And if you're not planning to attend, you can assemble a comprehensive file of this year's new products.

The same "circle number" system is used with most of the ads in this issue. If you want fast service, pull out the Reader Service Card and mail it today.

Meanwhile, let's get started down the aisle and see what will be introduced this year.

Synchroniser/TBC (Circle 196)

MCI/Quantel — Now available is a new digital synchroniser/time base corrector that can not only synchronise any non-synchronous NTSC TV signal, but can also time base correct direct record and non-phased videotape recorders.

The new DFS 1550, a successor to the DFS 1500, also includes a unique non-phase detection feature that enables it to switch modes automatically, depending on the input signal. Other standard features include look-ahead velocity compensator, sync pulse generator, drop-out compensator, diagnostic store analyser, and switch-selectable blanking of VITS and VIRS.

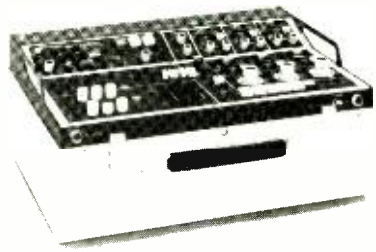
Keyboard (Circle 197)

CMX SYSTEMS (Orrox) — The new E/D keyboard improves the operation of the company's current line of editing systems. It incorporates a new approach to the logic of videotape editing sequence, which both adds functions and features to the system while actually reducing operational time.

All operational parameters are now directly accessible through the keyboard without the need of a lengthy initialisation dialogue. A separated left-side keypad deals uniquely with the decision list and auto assembly functions. Functions such as frame trim can be entered directly; even the minus or plus sign can go in before or after the time code entry, and the machinery does the rest.

Field production switcher (Circle 201)

ASACA CORP. OF AMERICA — The ASW-100 is a compact, multifunction unit capable of performing all required operations for a truly portable field production system.



It can be powered by its own battery-pack, from a 12V vehicle battery, or from 120-volt AC lines. When powered by a vehicle battery or AC line, it can furnish power to cameras and VTR.

Features of the ASW-100 include three camera inputs; camera operation by two 75-ohm coaxial cable, or by multi-conductor cables; full camera operating controls (for use with ACC-2000, optional); black burst provided for each camera input; internal sync generator; system gen-lock, used with a VTR; auto-phase control; character generator input with downstream mixing or keying; composite video switching with mix-fade and effect provision; audio interconnection; full tally and intercom systems; full video monitoring (optional); monitor switching; and remote VTR controls.

Audio router/switcher (Circle 180)

RAMKO RESEARCH — The ARA-1612 is a mono/stereo audio router (switcher) and amplifier with lighted status displays (LSDs) and BCD encoding. Plug-in modules allow up to 16 inputs to be routed to up to 12 different places simultaneously — all in one small 10-inch rack-mount package.

The ARA-1612 is designed specifically for the radio broadcaster to eliminate patch panels and all their attendant drawbacks. To do this, the ARA-1612 utilises CMPS switching and isolation buffer amplifiers.

In addition, the unit has LSDs which show at a glance which inputs are being fed to which outputs. Also, each output card (16 in by 1 out) has dual outputs for simul-feeds; and, each output card (up to 12, 16 x 1's in each rack) may be changed to 8 x 1.

Teletext system (Circle 186)

TELEGEN — The Antiope teletext system will be displayed at NAB by Telegen on behalf of SOFRATEV, the French company marketing this system outside of France. Antiope Teletext is a data transmission system using television, radio or telephone links for communication. The system on display at NAB will include a variety of data banks, vertical interval digital data insertion equipment, display colour monitors, and receivers, all equipped with Antiope Teletext decoders and control units that can be operated by visitors to the booth.

Deleter-added (Circle 187)

TELEMET — The VIT deleter-adder (model 3608) inserts a selected test signal from the 3538 system into the vertical interval of the composite picture sig-

nal. If the input already has an existing VIT signal from a remote source, the original VIT is deleted and replaced with a new VIT signal from the 3538 system. The 3608 allows preview of the inserted VITS before switching on air. Any or all of lines 17, 18, 19 and 20 may be used.

Microphone (Circle **183**)
SHURE BROTHERS — A new, lightweight, head-worn microphone with dual monitoring capability is designed for use in a variety of studio and remote professional broadcasting applications.

The new SM14 consists of a headband, unidirectional dynamic microphone, and two integral earphone assemblies to permit the monitoring of separate sound sources. Each of the twin earphone assemblies has its own transformer and phone plug. Besides enabling the user to monitor two separate sound sources, such as programme material and studio directions, the double receiver system helps prevent background noise interference. In addition, having two monitoring systems provides a reliable backup should one system fail.

Cartridge degausser (Circle **218**)
NORTRONICS — The QM-380 is a new broadcast cartridge degausser designed expressly to remove residual magnetism from the heads in broadcast cartridge machines.

The new unit develops a powerful magnetic field of 400 gauss which will completely degauss heads regardless of the type of material from which they are fabricated.

Digital audio mixer (Circle **185**)
SONY — The first all-digital mixer, the DMX-800, is designed specifically to mix 16-bit, professional-quality digital signals in real time, with no analogue process involved.

The mixer has eight input and two output channels. It can mix 16-bit linear-quantized digital signals (used by all other Sony digital studio equipment) and can be synchronised with either internal or external sampling-rate clocks. The internal clock offers switch-selectable sampling rates of 44,056 and 50,350 Hz; maximum external clock rate is 56 kHz.

The DMX-800 can also be used with conventional analogue equipment, interfaced via an A-D/D-A converter such as the Sony ADA-1601.

Programme control (Circle **193**)
BROADCAST ELECTRONICS — "Econo Control 16" is a new, economical version of the company's Control 16 programme automation line.

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The Econo Control 16 is a microprocessor system that 2,000 programme events and 10 repetitive compare times. Features include full data entry error sensing, four remote alerting relays, and completely interchangeable universal source cards.

The economy version is especially attractive to those broadcasters whose present needs do not justify the capabilities of the full Control 16, but who may want to expand to the full Control 16 monitor and main processor at a later date. The video monitor and main processor chassis are easily installed in the field by simply plugging them in, with no modifications required.

Dual-band VTR (Circle 150)

AMPEX — The AVR-3 dual-band videotape recorder/reproducer gives the broadcaster the ability to record and play back "live" quality pictures automatically through its Super High Band Pilot (SHBP) feature.

When equipped with SHBP, the AVR-3 virtually eliminates banding caused by velocity and saturation errors, according to Ampex. SHBP also provides continuous video error correction so that velocity and saturation problems are corrected before they can affect the displayed signal.

Standard on the AVR-3 are a digital time base corrector, editor, a new digital autotracking system, fully servoed reels, constant-tension tape servo, video head optimiser, and vacuum capstan.

Microwave antenna (Circle 151)

ANDREW CORP. — The UGX™ ultra gain antenna offers high gain and excellent cross-polarisation discrimination in the 10.7-11.7 GHz band. Mid-band gain is 49.0 dBi. High cross-polarisation discrimination (more than 35 dB at twice the 3 dB beamwidth) permits optimum frequency coordination and compatibility with digital transmission applications.

Lens system (Circle 152)

ANGENIEUX — The 25x features a continuous zoom range of 10 to 250mm; a very wide horizontal angle of view of 46°; a high relative aperture at the short focal length of f/1.4; and a minimum object distance of 3 feet (2 feet with a close-up lens).

The 25x becomes six different lenses when used with three accessory units: a 0.76x retrozoom attachment that expands the wide angle to 60°; a 1.66x telephoto attachment that allows the lens to have a focal length of 16-415mm; and a two-position range extender subassembly which allows the remote-controlled switching of 1.0x and 1.4x extenders. Of significance is that a long focal length of 580mm at f/4.0 can be achieved with the 1.4x extender in combination with the 1.66x tele-attachment.

Graphic equaliser (Circle 153)

AUDIO & DESIGN RECORDING — The E 950 Paragraphic® Equaliser brings to the conventional graphic equaliser all the flexibility of parametric equalisation. Colour-coded pots for "frequency" and "bandwidth" enable the E 950 to be set up as a straight forward graphic unit in either stereo 6-section format, or a 12-section mono system outputing on the unit's RH output connectors.

In the 12-section mode it gives an octave equaliser with two "floating" sections for use over the whole bandwidth (e.g., for tight notching).

U-format recorder (Circle 181)

RECORTEC — Now available is a high-band U-format recorder featuring 7-10 MHz high-band colour; quad quality without banding; two high-quality audio tracks; cassette convenience; full editing capability; and desk-top size.

The model HBU-2860 is a modified Sony VO-2860 recorder using standard

¾-inch videocassettes. Recortec has modified the VO-2860 by tripling its normal scanner speed and increasing the linear tape speed by the same factor. The original video heads are used, but an all-new signal electronics design processes the segmented video and provides enhanced audio.

Editing control systems (Circle 162)

CONVERGENCE — The ECS-100 Series Superstick Editing Control Systems will be demonstrated at NAB in a 40-foot by 40-foot island exhibit that will feature two Superstick Theaters and special "hands on" equipment demonstration areas.

New features being shown for the first time will include ¾-inch helical and one-inch Type C VTR interface. Other features include the "Superstick" cruise control; the proprietary CUT/LAP™ option; and Liplock®, which retains the

natural pitch of audio throughout a broad range of tape speeds.

Audio cart machinery (Circle **226**)
INTERNATIONAL TAPETRONICS CORP. — Two new products will be introduced at the convention: the ITC Series 99 and the 1K System. The Series 99 cart machine has a microprocessor to control all transport logic and motion sensing. It also controls the ELSA functions: cart erasure, azimuth (phase) adjustment, and splice location.

The 1K System stores, moves, and plays 1024 carts with back-to-back capability and reel-to-reel sound. It will accept up to four programme lists, each 32 events long. The 1K feeds up to four stereo audio channels simultaneously, permitting cross fades and overlaps, and grouping related events.

Power controller (Circle **164**)
DELTA ELECTRONICS — The model APC-1 automatic power controller automatically controls the antenna current of AM stations to insure that the power is kept within (U.S.) FCC limits. It also has provisions for controlling up to three power levels for operating modes.

Other features include a long-time constant circuit which minimises effects of modulation and carrier shift, and a meter which shows deviation from correct power level.

Microwave transmission equipment (Circle **165**)
FARINON VIDEO — The company will display microwave transmission equipment for ENG at the NAB convention. Included in the items to be shown are frequency-agile portable systems in the 2, 7 and 13 GHz bands; studio-transmitter link; FM transmission channel system; and a new, low-noise 21-channel 2 GHz ENG/EJ receiver.

Automatic changeover unit (Circle **169**)
LEITCH VIDEO — High reliability, low power consumption, and minimum space requirement (one rack unit) are featured in the model ACO-131 automatic changeover unit.

Amplitude sensing of all outputs from two master sync pulse generators is continuous. A 3 dB drop of any one signal activates visual and aural alarms and an automatic transfer to the alternate generator. Remote control, a positive manual override, and aural alarm defeat are provided. The ACO-131 is NTSC and PAL compatible.

Video bridging switcher (Circle **168**)
LENCO — Now available is a video bridging switcher with the capability to remotely operate multiple audio switchers. The model PSW-467 can switch video, audio, and SMPTE time code at the same time, or stereo audio and SMPTE time code. One PSW-467 video switcher can control 10 or more Lenco model PAF-467 audio switchers, should system requirements dictate.

The PSW-467 switcher offers 12 inputs and two outputs, and is capable of remote control operation, using the associated Lenco model PSR-467 remote control panel.

32-track recorder (Circle **172**)
MCI — A 3-inch, 32-track master recorder featuring all new electronics and microprocessor control is now available. The JH-32 is also available in 2-inch, 16- or 24-track configurations.

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The JH-32 includes the same advantages of MCI's JH-16 recorder: QUIOR (QUiet Initiation Of Record) circuitry; servo-controlled reel motors; phase locked capstan motor; real time counter included in the AutoLocator IV; manual velocity control; and reference selector.

The JH-32 has "Flux Track" capability with master control panel which permits variable or preset levels for Play, Record, Bias, etc. It has separate sync and repro equalisers; three speeds — 15, 20 and 30 ips; differential inputs and outputs; and completely transformless electronics.

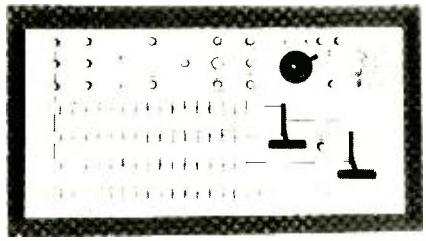
Medium-wave transmitter (Circle 167)

HARRIS — The new MW-10 10 kW medium-wave transmitter offers the same performance features of the Harris MW-50A and MW-5A. These include low distortion; excellent transient response; wide frequency response; and high positive peak capability for a loud, clear signal.

The MW-10 is the newest addition to the company's line of Pulse Duration Modulation (PDM) medium-wave transmitters. Other features of this transmitter are 125% positive peak modulation capability at 11,000 watts; no modulation transformer or reactor; easy accessibility to all components; and full performance ratings at 10,000 feet.

Production switcher (Circle 192)

AMERICAN DATA — The 2104 colour production switcher features 12 pattern special effects with joystick positioner, spotlight, modulator, presets, and softness control. The 2104 has full range control for adjusting pattern edges from hard to soft. The limits of the wipe pattern selected may be preset for any position in the raster.



The 2104 production switcher also features 10 clamped inputs including backburst and colour background; three input linear effects keyer featuring self, external, and optional chroma key (blink key, wipe key, and colour matte generator are included); single input linear mix key system, downstream from effects buses with self key or matte-fill. The switcher also has optional audio-follow-video capability.

Fluid heads and tripods

CINEMA PRODUCTS — The company is now the exclusive U.S. distributor of the Sachtler line of fluid heads and tripods for video and motion picture cameras weighing up to 33 pounds.

Manufactured in Germany, the Sachtler lightweight fluid heads feature an integrated counterbalance spring adjustable for "no-hands" balance in any desired position (even with displaced center of gravity) for any camera/lens combination up to 33 pounds; plus separate drag controls for tilt and pan.

For more information, please write to Cinema Products Corp., 2037 Granville Ave., Los Angeles, CA 90025; (213) 478-0711 or (213) 477-1971.

Retrieval system (Circle 199)

ADDA CORP. — The ESP-100B is a low-cost digital still frame storage and retrieval system designed for use by stations in small-to-medium-sized broadcast markets. The microprocessor-based system stores up to 200 digital stills on-line on a fixed disc. Stills can be accessed in one-half second and still sequence can be programmed in advance so stills appear automatically and in order. Recall and display of any still frame is non-destructive so that stored data remains unaltered during access and display operations.

The ESP-100B allows programming of up to 25 still sequences in advance. Sequences are played back automatically, in order, to coincide with the broadcast. It is also possible to change the still sequence while on the air, retrieving any stills from the 200 stored in the system within one-half second after command.

Lights (Circle 154)

BARDWELL & McALISTER — The SLIMLINE II is a lightweight, portable unit designed for broad fill and flood lighting applications — for TV or motion picture studios; in the studio or in the field.

This 2000-Watt Tungsten-Halogen "Quartz" light features complete "flo-thru" ventilation cooling design; one-piece reflector design which results in smooth, even, broad light pattern' spring-loaded hinges that prevent barn-door creeping; and equally effective barndoor control at both sides as well as top and bottom.

Sync generator (Circle 161)

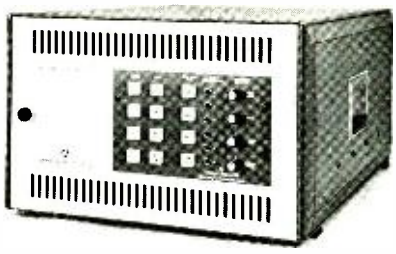
CONSOLIDATED VIDEO SYSTEMS — The AVA (Automatic Vertical Advance) is an automatic VTR advance sync generator that reduces the possibility of excess vertical blanking with broadcast-type time base correctors.

The AVA is designed as a stand-alone

accessory for most brands of broadcast TBCs. In operation, AVA automatically monitors off-tape vertical sync (V), compares it with TBC vertical sync, and generates a steering signal. After VTR lockup, the signal is used to align off-tape V with a preset point ahead of station V. Then, if tape V phase moves, AVA continuously adjusts itself to reduce vertical blanking errors. Front panel controls are provided so that users can override automatic operation and set VTR sync phase manually.

Digital video processing system (Circle 194)
THOMSON-CSF LABORATORIES — The new model 9100 Digital Video Processing (DVP) system will be introduced at this year's NAB. The system consists of the company's digital noise reducer, a frame synchroniser, a 4 x 1 input switcher, and a freeze frame, all operating at 4x subcarrier sampling.

The DVP provides selectable synchronisation and precise automatic timing for multiple picture sources without the need for conventional genlocking. Timing differences of remote signals are of no concern when routed



through the DVP 9100. Multiple remote video sources can readily be phases to studio sources.

Transmitters (Circle 155)
BAYLY ENGINEERING — A new line of Telefunken PDM (pulse duration modulation) short, medium, and long-wave broadcast transmitters, operating with power outputs from 100 kW to 650 kW, are being introduced to the North American market.

These transmitters use the PANTEL modulation method (PDM anode modulation system Telefunken) which increases the total efficiency of the transmitter by 10%. Other advantages of the PANTEL system are low tube costs, compact design with no extraneous components; and easy access to all components.

RF monitoring system (Circle 156)
BIRD ELECTRIC CORP. — The new, high-speed Wattcher® RF monitoring system offers protection of transmitters, transmission lines, antenna systems, filters, diplexers, etc., from damages due to high standing waves (VSWR).

The model 3171 monitoring system features a shortening of response time down to 200 microseconds and remote reset capability. The system can be reset remotely when false alarm or very brief disturbances leave transmission intact.

TV audio system (Circle 166)
HALLIKAINEN & FRIENDS — The TVA Series is an expandable audio mixing system designed to be controlled by a video switcher. The series combines audio-follow-video and manual control in a flexible audio system consisting of rack-mountable components which can provide for your present and future audio mixing requirements. The system is expandable to 36 balanced inputs in groups of six. It offers balanced audition,

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PRODUCT PREMIER

programme, and cue outputs plus two monitor channels.

Lubricated tape (Circle 157)
CAPITOL MAGNETIC — The Q17 high-output, low-noise (HOLN) back lubricated tape is specially designed to complement the new AA-3 broadcast cartridge. According to the company, the tape uses premium ferric oxide previously restricted to expensive cassettes and studio mastering tapes.

Radio automation (Circle 158)
CETEC BROADCAST GROUP — The System 7000 features the new Level II firmware, which adds significant new user flexibility to the system. User-definable programme codes provide selective access to the memory. Programme director, music director, or billing/traffic director can enter or call up (for CRT display) stored data for his or her segment of the format.

Battery system (Circle 159)
CINE 60 INC. — Featured at the NAB this year will be a high-capacity battery system: a combination 12-volt and 30-volt Sun-Gun kit.

TV transmitter (Circle 160)
CCI — The CTT-U-55 is a 55 kW UHF broadcast television transmitter using the new, high-efficiency EEV external cavity watercooled klystrons or Varian cooled external cavity klystrons. These klystrons are completely interchangeable.

The CTT-U-55 system makes use of two final kylstron amplifiers which are completely identical in every aspect, from metering and control logic, to water connection. These amplifiers are totally independent from each other and can either be flush mounted against the wall or stacked side by side.

Filtering system (Circle 170)
LIGHTNING ELIMINATION ASSOCIATES — The LEA MB-10 electronic power line filtering system is designed to protect electronic packages from unwanted electrical disturbances. These units are for use on balanced 120-volt, single-phase, 3-wire power lines, and are equipped with male and female connectors for simple plug-in installation. Features of the MB-10 include instant response; neon status indicator; and bi-polar/bi-directional protection.

Production switcher (Circle 203)
THE GRASS VALLEY GROUP — The new 1600 Series switcher features microprocessor memory. E-MEM — Effects Memory — remembers a complete news show chroma key with only the push of a button. E-MEM can memorise, then recall, a bordered wipe pattern with just one button. And E-MEM has a completely new production switcher technique: effects dissolve, which allows the user to create new and original wipes, move patterns on the screen, and zoom pictures to any point on the screen with digital video effects — with just one finger.

Graphics system (Circle 173)
MPB TECHNOLOGIES — Like the rack-mounting model of the VISTA 80 Graphics System, the desk-top model is a two-channel, microcomputer-controlled character generator and graphics system. It permits flexible keyboard control of eight-colour, multiple-style character displays, graphics, logos, etc., and their storage and recall from discette. The two channels can be used independently, or as preview and on-air channels; they also can be mixed to produce special overlay effects. Both channels can be controlled by a remote computer.

Sync generator (Circle 182)
SHARP ELECTRONICS — A new sync generator system (XSG-370) is capable of driving five independent cameras. The unit features four subcarrier and four horizontal outputs which are independently phase adjustable from the front panel. The horizontal outputs may be either sync or horizontal drive. A 14.3 MHz crystal-controlled oscillator determines the frequency of the system. Subcarrier frequency is 3.579545 MHz.

AM transmitter (Circle 174)
MCMARTIN INDUSTRIES — A new AM transmitter will be introduced at the NAB convention which is designed to be an addition to the 5 kW AM transmitter currently in the company's line.

The new transmitter, the BA-5K2, is a single-ended, three-tube model housed in a single cabinet. Based on McMartin's 10 kW AM transmitter (BA-10K), the BA-5K2 incorporates conventional high-level plate modulated circuitry providing high performance and high reliability at a reasonable cost. The new unit features excellent supermodulation capability, a 12-phase power supply, two crystal-controlled oscillators, LED status indicators, and full metering.

Remote control system (Circle 171)
LOGITEK — The DIMARC 30/15 is a broadcast remote control system providing 30 control functions along with 15 simultaneous metering functions, plus 40 on/off status indicators.

Each metering function is individually displayed at both ends of the system, so that calibration can be performed at the transmitter without voice communication with the studio. Calibration is accomplished by thumbwheel controls, minimising problems with noisy or temperature-variant calibration pots.

Camera platform (Circle 175)
O'CONNOR ENGINEERING — A new camera platform designed to fit the company's model 50-D fluid camera heads has been introduced. An adjustable balance feature allows the entire camera to be shifted back and forth on the head. This feature enables the user to locate the camera's precise centre of gravity, greatly improving the fluid head's performance. In addition, this new platform has a unique mounting plate which can be attached to the bottom of the camera in one of eight possible positions.

Equaliser (Circle 176)
ORBAN ASSOCIATES — The new Orban 672A is a cost-effective professional Quasi-Parametric equaliser with the convenience of graphic-type EQ controls. Wide range high- and low-pass filters with 12 dB/octave slopes are included for additional versatility. Each of the eight sections is monitored with a pulse-stretching overload indicator circuit.

Performance features include ±16 dB equalisation range; narrowband notching capability ideal for sound reinforcement; overload lamp that warns of clipping in the equaliser; front-panel gain control (12 dB gain available); eight bands, each with tuning and bandwidth control; and each band tunes over 3:1 frequency range.

Colour monitor (Circle 195)
VIDEOTEK — A new, eight-inch professional portable colour monitor can be operated on AC or DC. Drive controls, background controls, and gun switches are front-mounted for complete colour balance. A talley lite is supplied as a standard feature; pulse cross, underscan, and external sync are available as options.

Colour camera (Circle 179)
RCA — The TK-47 automatic colour TV studio and field camera features simplicity of operation and microprocessor-controlled functions. Automatic features controlling camera operation allow the camera operator to concentrate on picture composition and other creative aspects rather than on camera adjustments.

TK-47 automatics also extend to the normally complicated and time-consuming camera set-up procedure. Microprocessor-controlled systems provide computer-aided semi-automatic set up of the camera; or, optionally, totally automatic set up and pre-operational check, at the touch of one pushbutton.

Servo system (Circle 191)
VIDEO ASSOCIATES LABS — A full broadcast servo system is being introduced to update the current tach lock system in today's ¾-inch machines. This system will allow full frame synchronising of the television signal leaving the ¾-inch VTR and will stop all vertical blanking problems caused by the VTR. The servo system is a modification designed for the Sony VO-2860. According to the company, this modification will incorporate many of the features associated with quad recorders, such as: true vertical lock; H-lock stability mark output; non-standard tracking indicator; drum lock indicator; capstan framing

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Premier

with memory; and remotely programmable sync selection.

Test signal generator (Circle 177)
QSI SYSTEMS — The QSI CB 8000 Color Bar Identifer is a new device for television studios and mobile units that originates identified signals to prevent cross-feeds. The CB 8000 is a colour bar and character generator combined with an audio signal source to originate an identified television source from any location. Compact, it is ideal for mobile units, studios, or operations centres integrating many colour sources. For microwave transmission, the unit provides a final system check and identifies microwave links in compliance with (U.S.) FCC regulations.

Intercom systems (Circle 188)
TELEVISION EQUIPMENT ASSOCIATES — TEA's new two-wire amplified intercom system allows 20 headset units to be conferenced on the same line with hot microphones. The BCA system, which has separate transmit and receive amplifiers at each headset, also features 20 milliwatts of audio power to the headset for use in high ambient noise. The BCA system provides high-level broadcast quality intercommunications using existing intercom wiring.

Music library (Circle 189)
THOMAS J. VALENTINO INC. — More than 80 hours of production music is available for purchase from Thomas Valentino's production music and sound effects libraries. Available are over 3,000 selections of openings, closing, titles, bridges, and themes in 32 different categories ranging from rock to jazz and classical. There are now 157 LPs in the library to fit any of your production needs for music. The library is available on either disc or tape. Each album is a

high-quality controlled LP pressing and each tape is individually produced at 1-to-1 from the masters.

Van ladder (Circle 190)
VAN LADDER INC. — The model 2913BC van ladder has a height capability of 30 feet to bottom of bucket (based on six-foot van height). Rugged 24-volt electrical motors drive worm gear reduction for positive control and braking. Positioning controls are located in the bucket and on the platform. Extension time is 2-3 minutes. The power system is based on a 12-volt self-contained system supplemented by the vehicle's 12-volt battery. The 2913BC is a patented carrier for coax to microwave dish.

Turntable (Circle 198)
QRK ELECTRONIC PRODUCTS — Galaxy, a new DC turntable designed for the professional user, has a DC motor with an electronic speed control which provides for ±10% speed variation on both 33⅓ and 45 RPM. The turntable, which is instant starting, provides for slip cueing without a loss in speed, and it has back cueing with no motor drag.

Direct speed readout on LEDs of the RPM is located on the front panel. Switching is digital with remote start/stop for operator convenience.

Surveillance camera (Circle 200)
COHU INC. — The 2850C is the newest member of the company's environmental 2800 Series of monitoring and surveillance low light level television cameras.

The 2850C is environment-resistant, self-contained, and designed for continuous-duty operation in light ranges varying from bright noonday sun to dim moonlight. It contains a bright light limiter as a new standard feature;

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this is used to prevent deliberate or accidental "blinding" of the camera. A genlock, dual video outputs, and gamma correction are also standard features.

Compact console (Circle 209)

AMPRO BROADCASTING — A new line of moderately priced audio consoles is being introduced which features unique compact packaging and Microtouch electro-mechanical switching to replace old-fashioned lever key switches.

Compact packaging allows five channels in only 21" wide and eight channels in only 26". The unit is available with up to 21 inputs in five- and eight-channel rotary and linear fader configurations with dual-mono and dual-stereo outputs.

Radio cartridge system (Circle 208)

3M COMPANY — The "CentraCart" radio cartridge system is a new approach to endless-loop cartridge systems for radio stations. It consists of a special cartridge, new magnetic tape, and play/record equipment. CentraCart, to be unveiled at the NAB convention, is being called by 3M as "equal to reel-to-reel."

Distortion measurement (Circle 204)

SOUND TECHNOLOGY — The new Sound Tech 1701A Distortion Measurement System provides three metering circuit responses: average, rms, and peak. The 1701A has a distortion range of .001% from 10 Hz to 10 kHz. Overall distortion measuring capability continues superior over the full 10 Hz to 110 kHz range. Other features include automatic set level and intermodulation distortion options; balanced input circuit for measuring bridged amplifiers; and lower distortion tracked signal source.

Frame store (Circle 215)

MICROTIME — A new frame synchroniser/time base corrector, the 2525 Video Signal Synchroniser (VSS), passes VITS with the same processing as active video, can be remotely controlled, and is transparent to input signals from any source.

The 2525 includes line error detection; field 1, field 2, or freeze frame for digital video effects applications; a new RS-170A sync generator for improved lock-up and easy interfacing with any switcher; and unique HETROCOLOR™ processing to provide optimum performance for colour under signals. The 2525 will correct VTR signals from no-lock or V/H lock, non-synchronous or synchronous, direct or heterodyne, ½-inch helical through 2-inch quad.

Compact dimmer (Circle 212)

SKIRPAN LIGHTING CONTROL CORP. — Deliveries are now being made on the new Type K series of solid-state dimmers, designed for use in theatrical, architectural, and television studio applications.

The new units provide three or six 2000-watt silicon-controlled rectifier dimmers on one EIA Standard 19-inch rack-mounting chassis. This series provides compact packaging, easy maintenance, and lower cost. All fusing, primary circuit protection, adjustment controls, and electronics are available or on through the front panel.

Camera (Circle 210)

HITACHI DENSHI OF AMERICA — The SK-96 is a high-quality convertible camera featuring a rugged die-cast housing for extended durability. Several lens options are available for hand-held or studio use.

The SK-96 is ideally suited to equip a remote van for sports events by using a 22:1 zoom lens on the studio/field model, and a 14:1 portable lens on the hand-held configuration. In addition to ABO, linear matrix, genlock, auto white balance, and 600' multicore operation, the SK-96 also operates digitally.

According to Hitachi, this camera is the world's smallest colour camera with internal triax; it has the ability to send RGB, full remote control, and power over either triax or coax.

Power supply (Circle 213)

SPECTRA SONICS — Now in production is a new power supply (model 404RS) — the culmination of a research effort to produce a DC power supply that can withstand the hard use that is a part of "on the road" tours, with no maintenance.

The power supply is manufactured in

two configurations. The model 404RS provides 48 VDC (±24 VDC) at 8 amperes. The other model, 404RSD (Dual), can provide 16 amperes, bi-polar DC.

A heavily constructed steel chassis of the same physical size (5¼" x 19" x 6" deep) for installation in a standard electronic equipment rack is used in both configurations.

Video switching system (Circle 223)
VITEX — The model 700 is a digitally controlled video switching system for use in television studios, production centres, and other TV applications where professional standards are required. The 700 is available in NTSC, PAL, or PAL-M standards.

Features include 16 inputs, including colour black and colour background; 4 output buses — mix/effects A & B, programme and preview; on-air tally system; mixer/fader between programme and preview buses; and linear shadow keyer with 4 inputs and VARIKEY.

Cartridge (Circle 206)
STANTON MAGNETICS — The 881S cartridge is a stereo cartridge featuring the unique Stereohedron stylus for high performance. According to the company, the 881S has excellent flat frequency response; handles high-level complex music passages with complete freedom from mistracking; and gives superior signal-to-noise ratio from the phono preamp.

Colour monitors (Circle 207)
WORLD VIDEO — The CDR 8000 and CDR 8800 colour video monitors are especially suited for EJ/EFP applications. Both operate on AC or DC power and are available as a single or dual rackmount. Features include high voltage regulation; keyed back-porch clamp; underscan; pulse-cross; A-B inputs; internal and external sync; colour set-up controls; and modular circuitry.

Guy systems (Circle 202)
PHILADELPHIA RESINS — The company's dielectric guy systems feature Phillystran® to provide the strength of steel while being resistant to corrosion, UV degradation, and weathering. The non-metallic Phillystran eliminates RF interference or reflection. And no insulators are required.

Battery charger (Circle 224)
CHRISTIE ELECTRIC — The new ReFLEX-20 is a NiCad battery charging system for ENG, EFP, and video and film cameras. The ReFLEX-20 provides a full charge of completely discharged NiCad packs in 12 to 20 minutes at a 90 to 97% net charge efficiency which keeps

Continued on page 184

the battery cool and extends battery life up to 10 times that of conventional NiCads, and 50 times that of other rechargeable batteries. The new system is equipped with Christie's patented "Trough Voltage" sensor as well as multiple protection circuits. Battery state-of-charge is indicated by the flashing rate of one of the control panel LEDs.

Lighting control system (Circle **220**)
STRAND CENTURY — A new lighting control memory system allows lighting designers to programme six simultaneous, separately timed lighting actions in a single cue.

The six parts of the cue need not start or end at the same time, but all are activated with a single button. They may be up fades or down fades with separate times, delayed fades, or individual fades and a range in speed from instant on-off actions to very slow fades.

The new system, called Light Palette, also eliminates the need for written cue sheets. Two built-in display screens display all the information for any cue, as well as the complete running cue sheet and actual stage intensities. The operator has access to any cue in the memory at any time during, or prior to, the performance, and has full manual override control of all automatic functions.

Alignment gauge (Circle **219**)
MEMOREX — The Spindle Height Alignment Gauge is designed for use on ¾-inch VCRs. And, according to the company, this new gauge can check the alignment in just 30 seconds.

Cartridges (Circle **205**)
FIDELIPAC — The company has a full line of cartridges for AM, FM and TV. The model 300 is designed for use by AM broadcasters. For the broadcaster wanting the ultimate in performance, there is the Master Cart. And the model 350 is for use in stereo machines with inadequate tape guidance. The precision is provided by adjusting the cartridge. For extended play, the company has the model 600 and 1200.

Editing system (Circle **221**)
VIDEOMEDIA — The Z-6 microprocessor-based control editing system offers frame accurate editing and a 99 event memory with "micro-loc." According to the company, "micro-loc" obviates the need for SMPTE time code; it is absolutely "dead lock" accurate and does not require expensive readers and generators. Also, "micro-loc" does not require an audio track to operate; and, if necessary, can co-exist with SMPTE time code.

Features include play and record joystick shuttle arms for bi-directional search; programmable pre-roll and post-roll times; cruise control; full-function VTR remote control; and AB monitor select with auto lockout functions.

FM transmitter (Circle **184**)
SINTRONIC — The SI-F-25 is a 27.5 kW FM broadcast transmitter with a simple, rugged design and excellent accessibility for maintenance. Features include direct FM solid-state exciter; excellent stereo/SCA performance; grounded grid driver and power amplifier; no neutralization required; 12-pulse power supply design; solid-state control, overload, automatic recycling; and full remote-control capability.

Lighting control (Circle **216**)
KLIEGL BROTHERS — The PERFORMER™ is a compact, versatile lighting control console designed to bring the

sophistication of memory lighting control within the reach of modest budgets.

The system is available in 32, 64 and 96 channels of control with either 100 or 200 memories. It interfaces with any solid-state dimmer system presently in use, is field expandable with magnetic tape library storage option, and can be either permanently wired or completely portable.

Features include manual split dipless crossfader, two timed faders, 10 group master controls with grand master, display mimic, integral back-up matrix and loop, delay and auto follow functions. The system is programmed with a user-runnable set of self-testing diagnostics.

DC turntable (Circle 217)

QRK ELECTRONIC PRODUCTS — The Galaxy is a new DC turntable designed for the professional user. It has a DC motor with an electronic speed control which provides for ±10% speed variation on both 33⅓ and 45 RPM. The turntable, which is instant starting, provides for slip cueing without a loss in speed and it has back cueing with no motor drag.

Switching units (Circle 214)

DATATEK — The D-4300 series of video and audio switching units are intended for auxiliary switcher and small routing switcher applications meeting high-quality performance standards. These switching units may be used for input preselects to production switchers to expand their capacities; switching inputs to vectorscopes and monitors; adding preview busses to existing switchers; and VTR input selection.

The switching units are available as 6x1 video, 6x1 audio, 16x1 video/audio, 20x1 video, and 20x1 audio. They may be used for only a single output buss, or they may be stacked for multiple output busses by looping inputs between units.

All of the switching units have been designed for remote control panel operation, but local control is also available if desired. Control of the switching units is carried out by means of RG-59U coaxial cable with BNC connectors.

NOAA weather receiver (Circle 211)

GORMAN-REDLICH — A new NOAA weather receiver designed for broadcast station use will be displayed by the company. The receiver is offered in a rack mount configuration and is remotable.

Dubbed the model CRW, this receiver's crystal and ceramic IF filters, plus a double tuned dual gate MOSFET RF stage, have been designed for high sensitivity. Demuting and remote circuits alarms are initiated by a 1050 or 1650 Hz forecast update signal tone. BC

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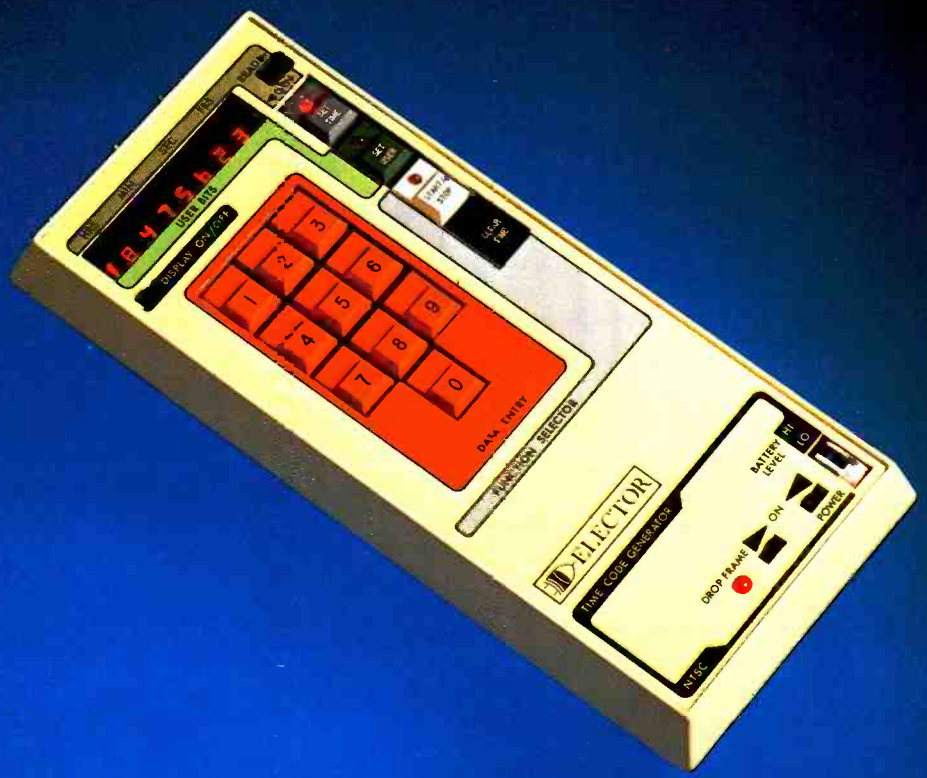

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