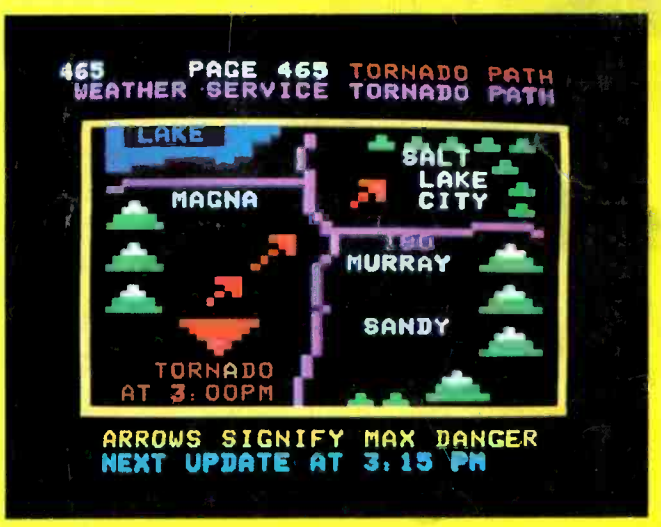
BROADCAST engineering

February, 1980/$3.00



Teletext Update

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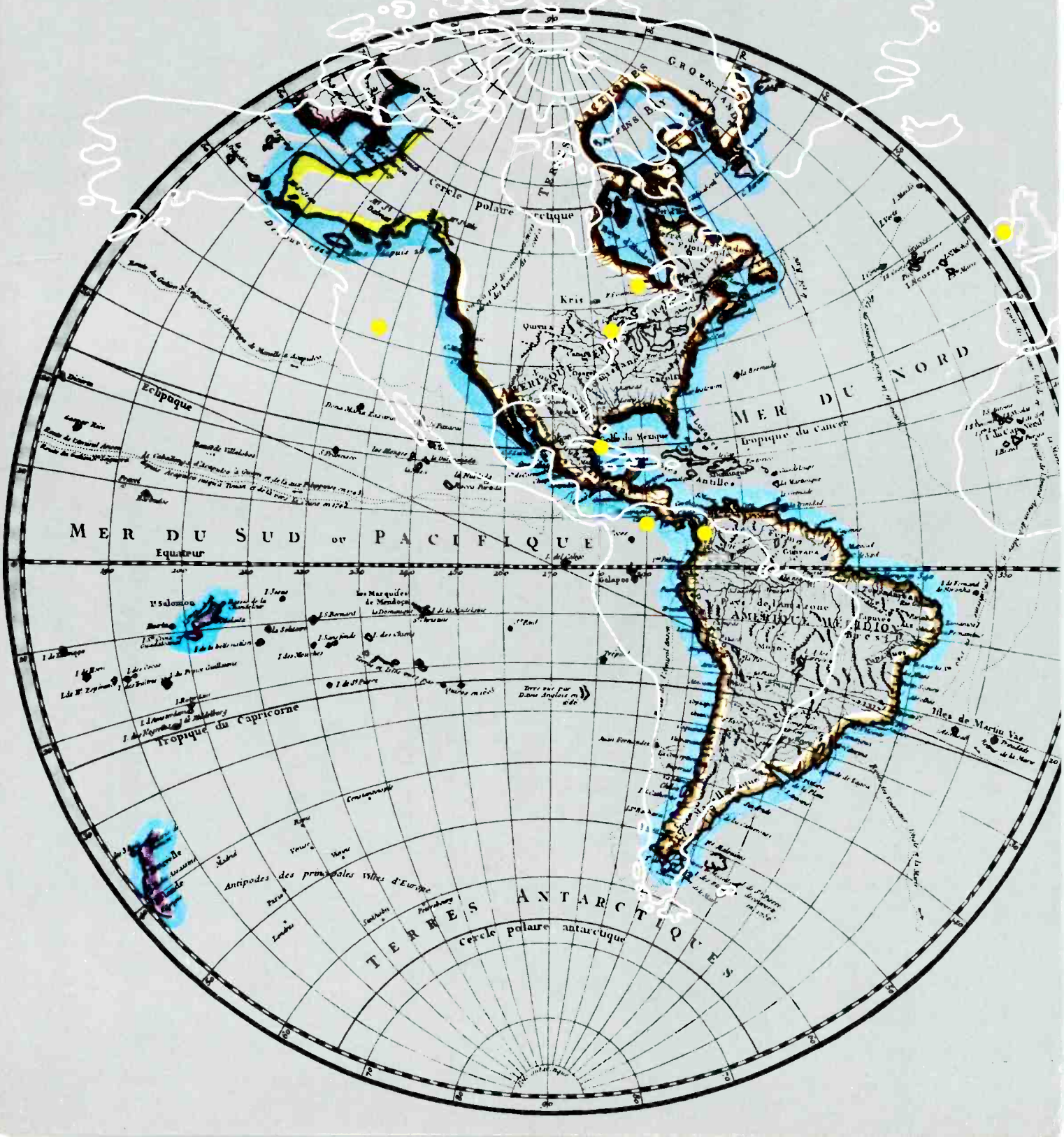

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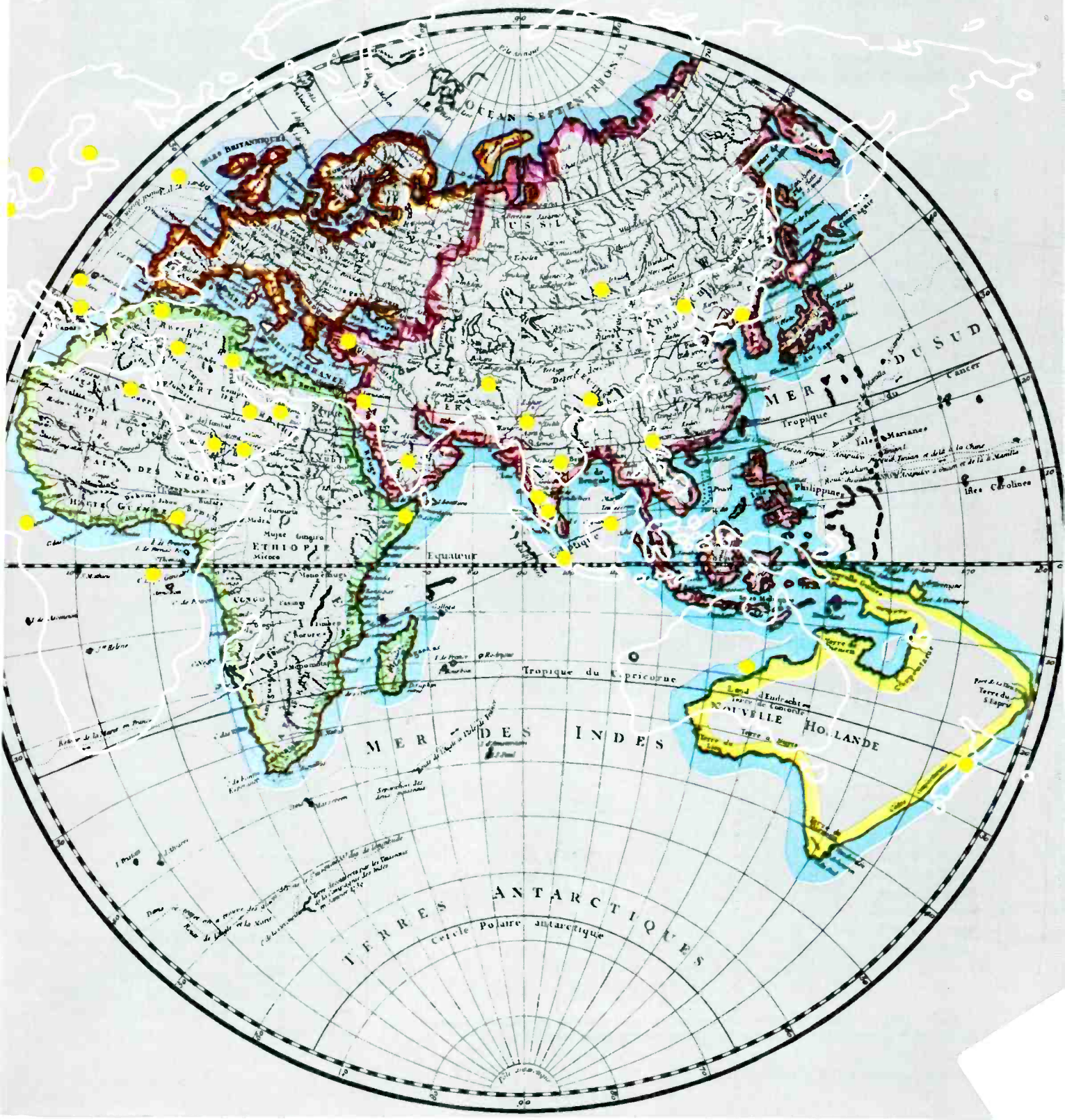
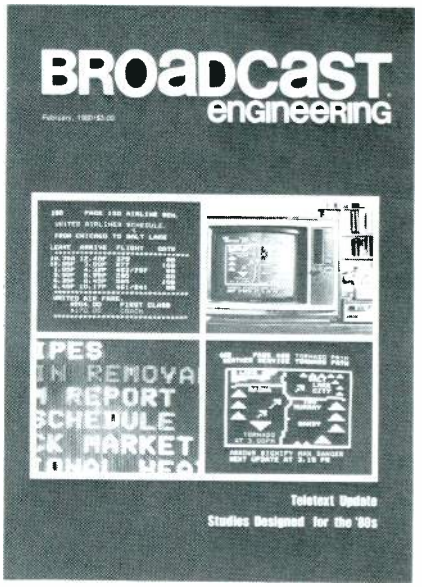


BROADCAST® engineering

The journal of broadcast technology

February, 1980 ☐ Volume 22 ☐ No. 2



THE COVER illustrates teletext experiments conducted at KSL-TV in Salt Lake City, UT. The photographs were provided by Bill Loveless, co-author of the teletext article beginning on page 22.

•The March issue is scheduled to be fully devoted to an extensive pre-NAB '80/Las Vegas convention coverage. Selected articles may be included, along with regular departments, where space permits.

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FCC update

February, 1980

Committee for Region 2

The International Telecommunication Union (ITU) will convene a 2-part Region 2 (the Americas) Administrative Radio Conference (RARC) on AM broadcasting beginning March 10, 1980, with a preparatory session followed by a plenary session in 1981. This conference will be empowered to develop agreements regarding the use of the AM broadcast spectrum by the administrations of Region 2. The US, as a signatory party to the ITU Convention and its attachments, including the Radio Regulations, will participate in the RARC.

The Advisory Committee on AM Broadcasting in Region 2 has been created in order to assist the FCC representatives responsible for participating in the Conference, with Charles H. Breig as chairman. The first meeting considered: organization of the committee and designation of its members; discussion of tasks to be assigned to the task groups; task group membership assignments and completion dates for reports.

Broadcast Bureau reorganized

The Commission recently approved the reorganization of its Broadcast Bureau. The bureau is charged with developing, recommending and administering policies and programs for the regulation of all radio and television broadcast industry services.

Bureau Chief Richard J. Shiben, architect of the new structure, stated that, "the reorganization will enable us to improve the management of the bureau and to increase our service and responsiveness to the public and the industry.

"This reorganization is especially important now because it gives the bureau increased capability for planning and developing policies in light of new and advancing technologies that tend to blur the lines between video, audio, cable, common carrier and broadcast."

Shiben outlined the reorganization as follows:

- Establishment of a Program Planning and Evaluation Staff within the Office of the Bureau Chief;
- Formation of the Technical and International Branch in the Policy and Rules Division;
- Creation of an Equal Employment Opportunity Branch within the Renewal and Transfer Division;
- Abolition of the Office of Network Study with the reassignment of its functions to the Policy and Rules Division, Legal Branch; and
- Extensive streamling of the Broadcast Facilities Division by: (1) Combining the functions of the Aural New and Changed Facilities Branch and the Aural Existing Facilities

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some veteran products do their job so well, for so long, for so little money it's a pleasure to reintroduce them.

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Branch and establishing separate AM and FM branches to handle the full array of applications and issues that affect each radio service. This arrangement will mirror the organizational design of the present Television Branch. (2) Renaming the Television Applications Branch as the Television Branch, and transferring all personnel who do not work on television matters into a separate Auxiliary Services Branch; (3) Establishing a new Auxiliary Services Branch that will handle all translator and auxiliary services applications; (4) Abolishing the Technical and Allocations Branch and reassigning its functions to the Policy and Rules Division in the newly established Technical and International Branch; and (5) Abolishing the Educational Broadcasting Branch and reassigning its functions to the Policy and Rules Division, Policy Analysis Branch, thereby expanding the scope of its activities to include educational rulemaking activities.

As part of reorganization, the processing of the public radio and television and other noncommercial educational FM, TV, and auxiliary services applications for new stations or changes in existing facilities will be assigned to specially designated staffs within the FM, Television, and Auxiliary Services Branches of the Division.

Monitoring point policy for AM directional stations relaxed

The Commission's Broadcast Bureau, in a letter to the Association of Federal Communications Consulting Engineers, announced major changes in its policy regarding assignment of monitoring point limits to AM directional broadcast stations. Bureau Chief Richard J. Shiben stated his hope that these changes would eliminate the need for many stations to conduct costly antenna proofs and file applications with the Commission.

The Bureau has adopted the use of a relaxed *direct ratio* method of assigning monitor point limits. These limits are used by AM directional stations to monitor adjustment of their radiation patterns. The Bureau also announced that it would cease lowering these limits based on *partial proof* measurements, a practice which often resulted in inadequate tolerances for wintertime operation. A suggestion which would have reduced the number of directions in which measurements are required when conducting antenna proofs was declined because it would adversely affect the Bureau's ability to accurately assess adjustment of radiation patterns.

Shiben stated that "...the current mandatory use of type-approved antenna monitors by directional stations and the widesspread use of approved sample systems permit these changes in policy at this time without endangering in any way the technical integrity of our AM broadcasting system. Nonetheless, because of the significance of these changes, we intend to proceed on an experimental basis for at least a year, gaining the benefit of practical experience, before permanently adopting them."

Station Totals for September 1979

The Commission has announced the following totals for broadcast stations on the air as of September 30, 1979:

- AM Radio—4551
- FM Radio—3151
- FM Educational—1037
- UHF Television (Comm.)—221
- VHF Television (Comm.)—517
- UHF Television (Educ.)—159
- VHF Television (Educ.)—105

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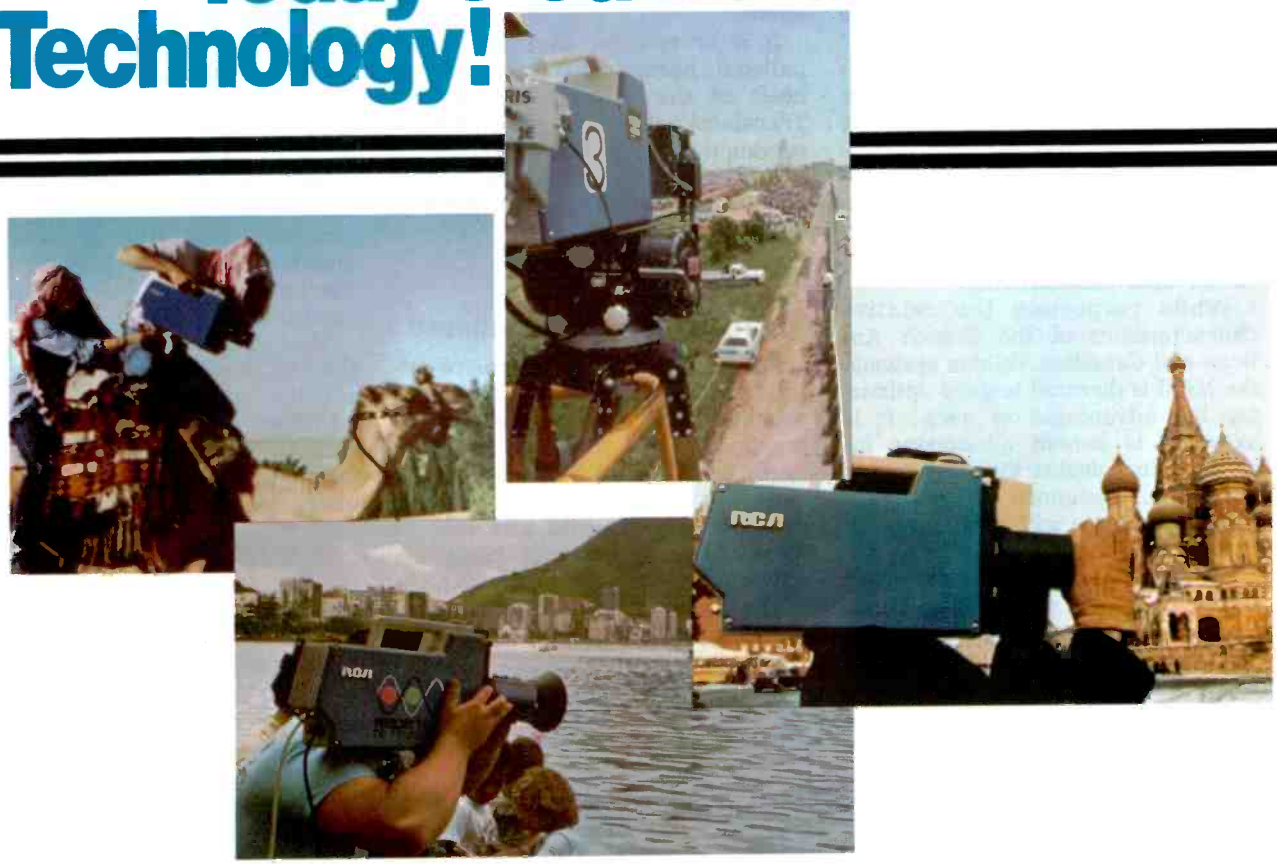

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Canadian/French agreement on videotex

On October 12, 1979, David MacDonald, Canadian Communications Minister, and His Excellency Xavier Daufresne de la Chevalerie, French Ambassador to Canada, signed a Memorandum of Understanding (MOU) on common research problems concerning videotex system design. This MOU is expected to increase cooperation between the two countries at the research level rather than commercially.

While respecting the relative characteristics of the French Antiope and Canadian Telidon systems, the MOU is directed toward optimizing the advantages of each. It is expected to benefit all nations interested in videotex by encouraging search for solutions to problems which may arise with these new information services.

Signatories to the MOU on behalf of the two countries are the Canadian Department of Communications and the French Secretariat d'Etat aux Postes et Telecommunications, as well as Telediffusion de France, the French government broadcasting agency.

It is noteworthy that this international agreement comes on the heels of the delivery of the first Translantic electronic newspaper, a service demonstrated at Telecom '79 by Telidon transmissions from Ottawa to the Canadian pavillion in Geneva.

SATCOM III search continued

RCA is continuing extensive efforts to look for the communications satellite which became lost at approximately 1:57 PM, EST, December 10, when the Apogee Kick Motor on SATCOM III was fired. A complete search could take several weeks. The company is being assisted in the search effort by NASA, NORAD and other satellite carriers.

RCA Americom is developing contingency plans should the search prove to be unsuccessful. The company is endeavoring to accommodate as many customers as possible by contacting other satellite carriers for capacity. The company said these plans include the continuation of service for existing customers on SATCOM I and SATCOM II. RCA Americom plans to announce the details of this plan as soon as discussions and studies are complete, and will do everything possible to provide service to the marketplace as quickly and as equitably as possible.

The company will also file with the FCC for authority to launch the satellite previously designated as SATCOM IV as a replacement for SATCOM III. The new SATCOM III, formerly SATCOM IV, is presently under construction, and a launch in June 1981 is planned.

RCA Americom will also file with the FCC for authority to launch the ground spare satellite as the new SATCOM IV, and for authority to

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build a new ground spare satellite. Every effort will be made to have the new SATCOM IV ready for launch by October 1981.

The cost of the satellite and launch services are completely covered by insurance.

COMSAT opposes additional government regulation

In comments filed on an FCC Interim Report and Notice of Inquiry concerning COMSAT's operations and structure, COMSAT noted many factors that led it to the conclusion that current federal regulation of its activities is "fully adequate" and that governmentally imposed changes in COMSAT's structure and operations are "neither required nor desirable."

In a letter to the Commission accompanying COMSAT's comments, Joseph V. Charyk, COMSAT's president and chief executive officer, noted that the Interim Report raises a variety of theoretical concerns about COMSAT's structure and operations, but that the report does not identify any abuse, misconduct or action by COMSAT contrary to the public interest.

Emmy Awards Committee

A new Emmy Awards Committee has been formed to re-evaluate the eligibility period, entry procedures and voting structure for next year's Emmy Awards. Hank Rieger, president of the Academy, has appointed Mel Sawelson to serve as co-chairman on the committee with Lee Schulman, who has served as committee co-chairman for many years.

The following Academy members have thus far been chosen to represent their respective branches on the committee: Production executives: Lee Schulman, Gary Nardino; Broadcast executives: Bob Lewine, Paul Masterson; Producers: Jaqueline Babbin, Marshall Flaum; Sports Programming: Howard Katz; Writers: Don Balluck, Tom Sawyer; Public Relations; Gail Cottman, Dick Winters; Music: Ken Welch, Bob Drasnin; Cinematographers: Howard Schwartz, Richard Lee Rawlings; Directors: Hal Cooper, Bob Butler; Electronic Production: Jim Smith, John Freschi; Art Directors: Seymour Klate, Hub Braden; Sound: Mel Sawelson, Dave Williams; Animation: Herb Klynn, Joe Siracusa; Editors: Axel Hubert, Larry Kaufman; Special Creative Arts: Howard Smit; Commercials: Linda Cooper; Children's Programming: Ted Field; Los Angeles Area: Walt Baker; Broadcast Journalism: Gerald Dheese, Thomas Caulfield; and Daytime Programming: Brian Pollack.

INTELSAT moves toward digital operation

The INTELSAT Board of Governors have taken the first steps towards the eventual conversion of the INTELSAT system to digital operation.

INTELSAT is the 102-member country organization that owns and operates the telecommunications satellites used by countries around the world for international communications, and, by a number of countries, for domestic communications.

Meeting in Washington, DC, the Board of Governors decided:

- to approve TDMA/DSI as an accepted modulation/access technique for introduction at the earliest practicable date to meet the operational requirements of the INTELSAT system;
- for the purpose of operational plans and future system studies, to assume the introduction of TDMA/DSI in the Atlantic Ocean Region in the 1983-1985 timeframe and in the Indian Ocean Region in the 1984-1986 timeframe.

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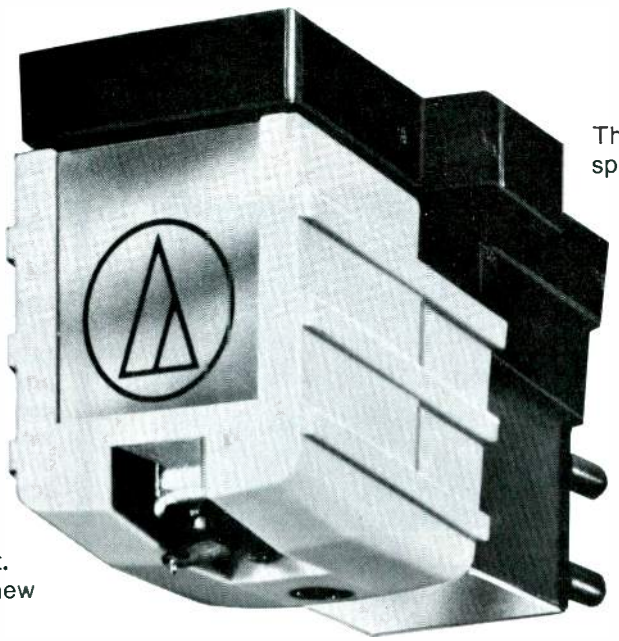

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Performer's royalty

The assistant general counsel of the NAB, James Popham, reiterated the Association's opposition to the establishment of a performance right in sound recordings. In a speech before the House of Representatives' subcommittee on courts, civil liberties and the administration of justice, he said there is no reason "to insert another layer of cumbersome, complex and costly governmental intervention into the process of providing broadcast program service to the public."

Radio/UHF cross-ownership

The FCC has been urged by the NAB to retain its policy of permitting radio ownership of UHF television stations on a selected basis because it is a "sensible and flexible" approach to balancing UHF growth and media diversity and competition.

Iranian crisis

President Carter's endorsement of suggestions aimed at showing American support for the release of the hostages in Iran is being supported by Vincent T. Wasilewski, president, NAB.

Political access ruling

The following is a statement issued by Erwin G. Krasnow, senior vice president and general counsel, NAB. The statement regards the FCC's refusal to reconsider its order requiring the networks to provide air time to the Carter-Mondale campaign committee.

"Commissioner Washburn called the FCC's action 'totally wrong and unfortunate.' We agree.

"Unless overturned by the courts, (ABC, CBS and NBC are appealing and NAB will file as a friend of the court) the Commission's decision will haunt broadcasters and future commissions for many years to come.

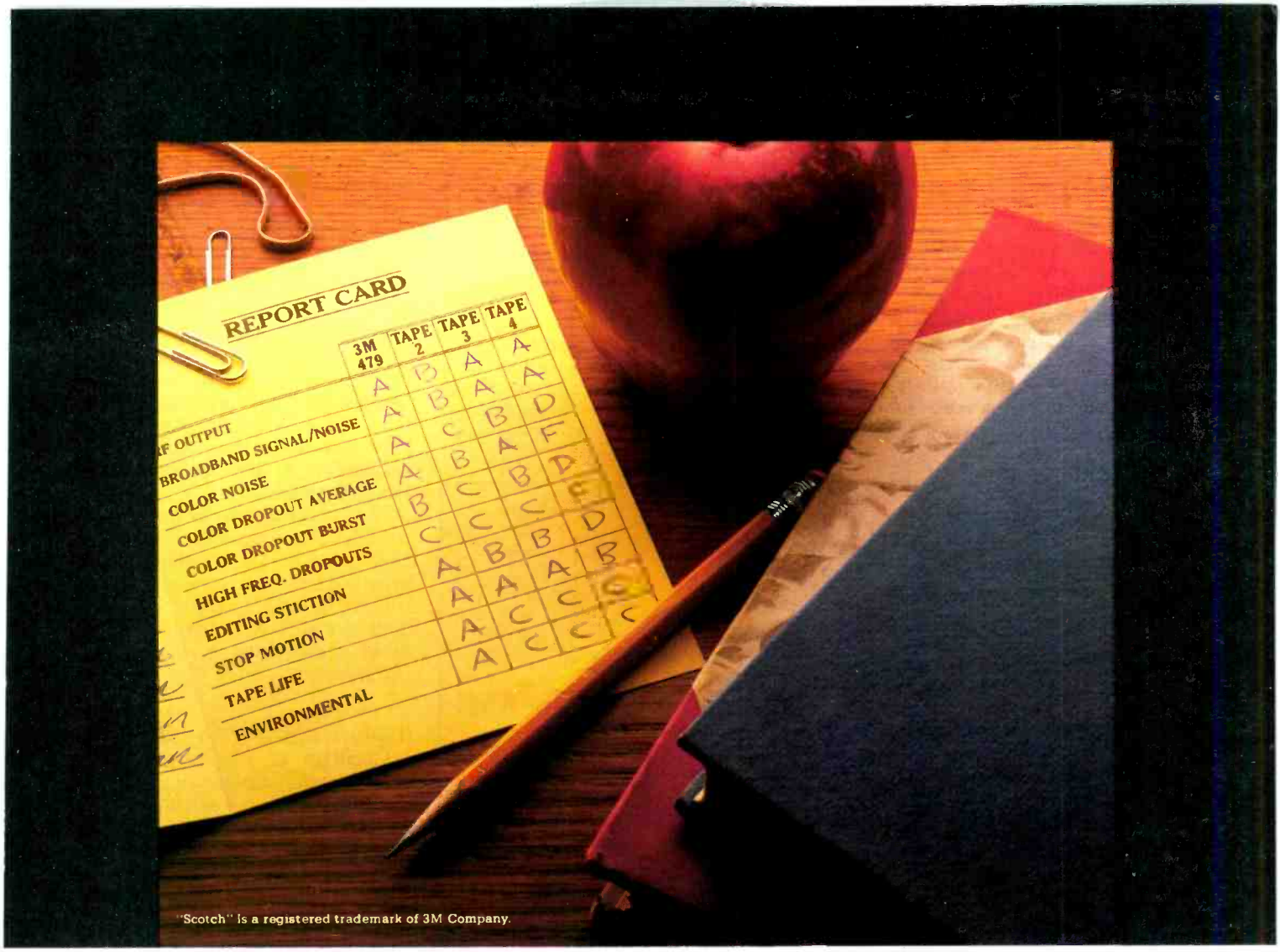
"The Communications Act and the First Amendment make clear that broadcasters are not common carriers and are empowered to make journalistic judgments without fear of government second-guessing and, indeed, government threats of license revocation. The FCC, however, has given birth to a new standard: 'The customer is always right.'"

Political candidate decision

The NAB has requested that the three television networks receive a favorable ruling in overturning the FCC's orders requiring them to provide air time to the Carter-Mondale presidential committee.

According to the association, the orders:

- Are inconsistent with the First Amendment and the Communications Act "and are otherwise arbitrary, capricious, unreasonable, abusive of discretion and not in ac-



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cordance with law."

- Take on added significance in that they will dictate the manner in which all radio and television stations must now conduct themselves under threat of license revocation.
- Do not preserve a delicate balance between the interests of broadcasters and candidates.
- Articulate a new policy which states that determination of "reasonable access" must be based primarily on the "needs" of particular federal candidates.
- Place new and substantial burdens on broadcasters as they attempt to schedule and accommodate political broadcast requests.

Research for radiation standards

According to the NAB, if federal safety and health standards are adopted to cover electromagnetic radiation, they should be based on sound research data, be implemented by agencies having jurisdiction in this area and not be more stringent than existing standards. NAB said that prior to implementation of procedural and practice standards by the Occupational Safety and Health Administration, the FCC should not act to implement such standard itself especially since the more expert agency has not chosen to do so.

Broadcast equipment for developing countries

The first shipment of broadcast equipment donated by American broadcasters is on its way to stations in the Caribbean, according to James H. Hulbert, NAB senior vice president for station services. The association is now soliciting additional donations.

The program is in cooperation with the Pan American Development Foundation and is designed to assist broadcasters in developing countries in providing better service to their nations. A program of technical assistance is also being planned.

Radio programming members

Members of NAB's 1980 Radio Programming Conference Steering Committee are Richard Verne, Dan Halyburton, Harvey Mednick, Denise Oliver, Warren Potash, Tom Rounds, Rick Sklar, William Stakelin and Carl Venters. The conference will be held August 24-27 at the Hyatt-Regency, New Orleans.

NAB objects to frequency extension for CB's

The NAB opposes the use of 928 to 947MHz frequencies for any new CB radio bands because it would create "intolerable interference" for some radio stations and would preclude assigning additional adjacent frequencies for studio-to-transmitters use. The FCC has asked for comments on assigning new bands for additional personal radio service.

Issue clarification

The NAB has urged the Federal Election Commission "to take expedited action that will make it clear to broadcasters they need not fear the threat of prosecution or investigation by the commission when they provide time and facilities for candidates." The National Public Radio and the Radio Television News Directors Association have joined the NAB in its comments to the FEC. NPR points out that even though it would not be affected by recently proposed rules by the commission, it believes the issues transcend immediate concerns.

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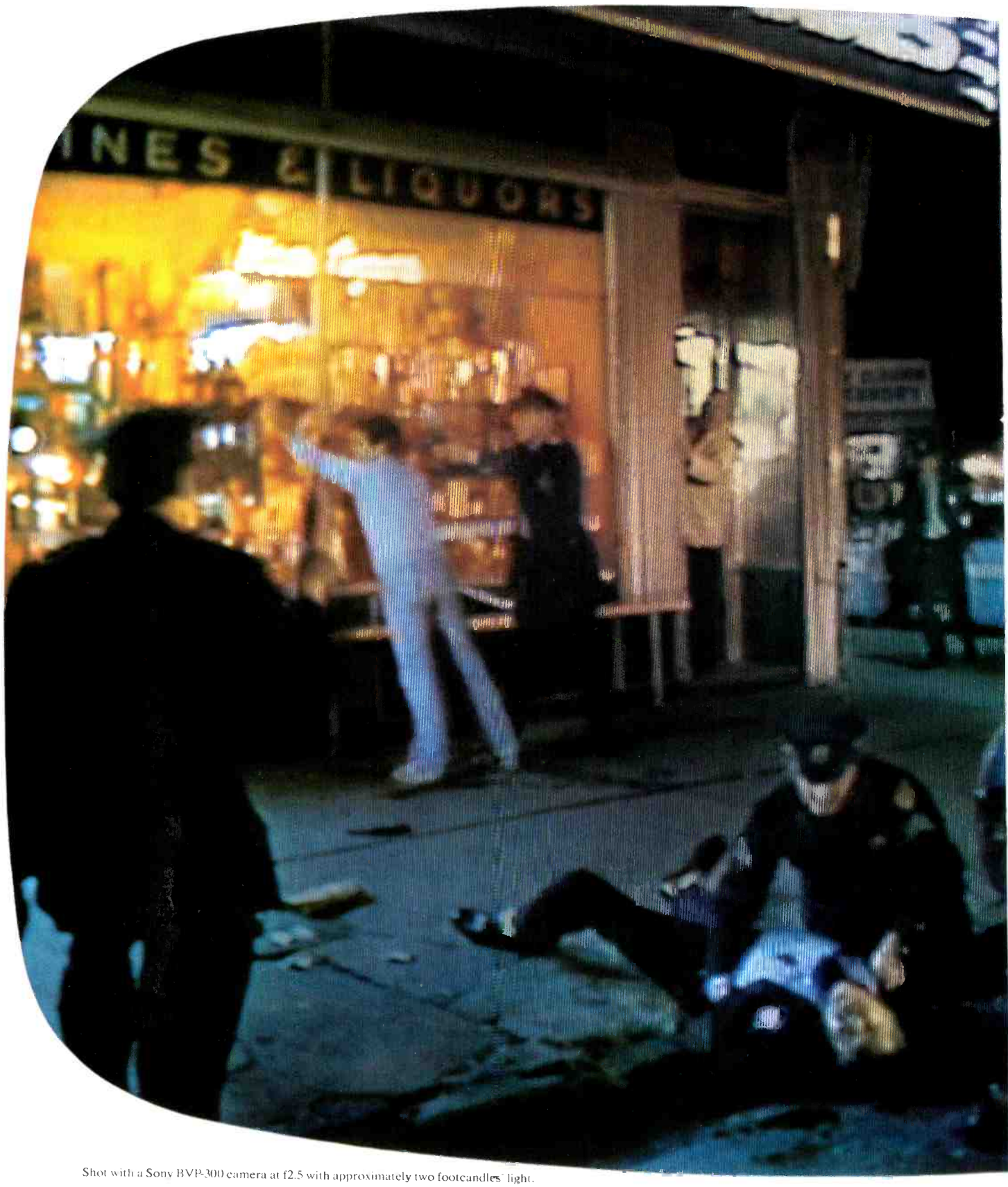
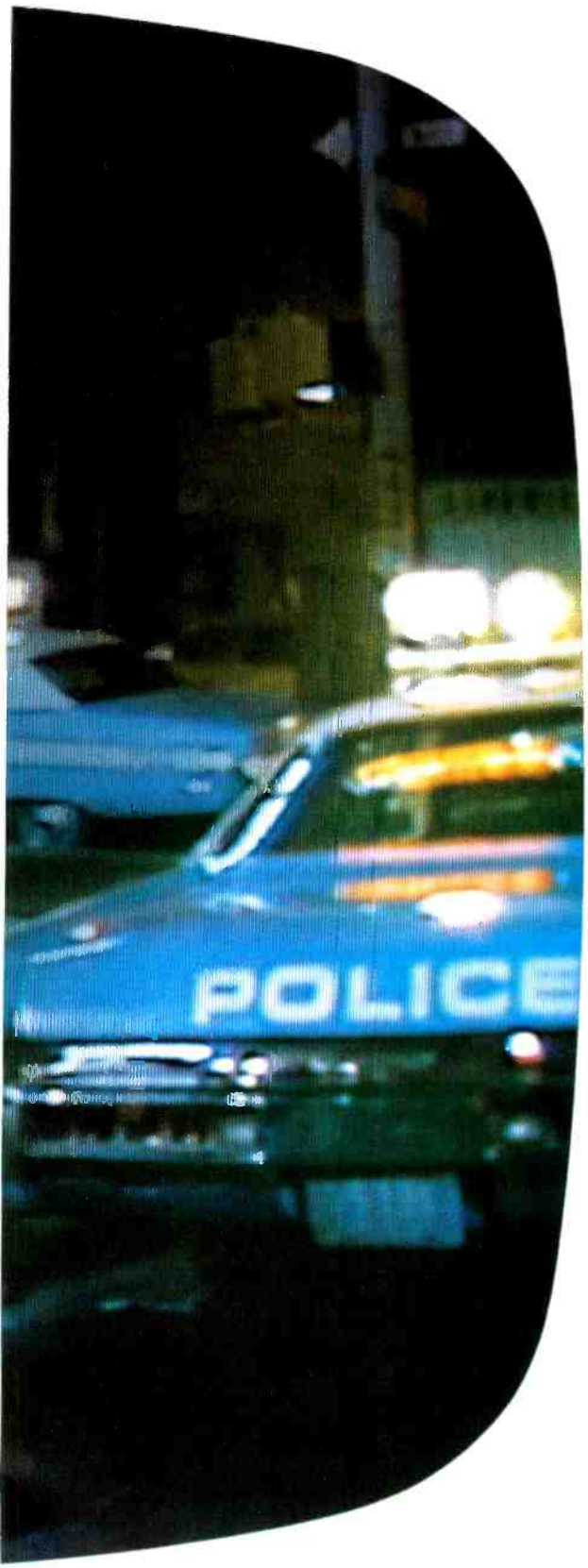


Shot with a Sony BVP-300 camera at f2.5 with approximately two footcandles of light.

DARK SIDE OF A CITY, YOU CAN'T WITH BRIGHT LIGHTS."

Henry Sheppard.
WCCO-TV, MINNEAPOLIS



"There are news-gathering and documentary situations where the use of artificial light is just too intrusive or difficult to achieve," says Henry Sheppard, Chief Engineer of WCCO-TV, the CBS affiliate in Minneapolis.

"That's why our Sony portable BVP-300 cameras are such a big plus. With them, we can shoot in low-light conditions and get a lot of detail other cameras might not pick up. We even get good pictures with as little as two footcandles of light."

WCCO-TV owns seven Sony BVP-300's, which the station's photographers use together with Sony BVU-50 recorders. The cameras are used to shoot public-affairs programs and segments of PM Magazine, as well as for ENG and documentaries.

"We're very particular about picture quality," says Sheppard. "And before we committed ourselves to Sony, we evaluated just about every portable color camera available.

"Sony's colorimetry is excellent, its signal-to-noise ratio is high, and it always turns out pictures that meet our standards. Many of our engineers find its quality comparable to studio cameras. And our photographers like the way Sony handles. For example, in a helicopter, they can cradle the camera on one shoulder to reduce vibrations and get a very steady picture.

"And with the Sony system, each photographer can operate independently, without a second person along to monitor sound."

When asked about Sony durability, Sheppard replied: "We don't coddle our cameras here. Each one gets handled by about 15 or 20 different photographers. They come in in the morning, grab their equipment, throw it into the back of the car, and they're off. Sony takes that kind of treatment remarkably well, and it's a good thing, because we can't afford to have our cameras down."

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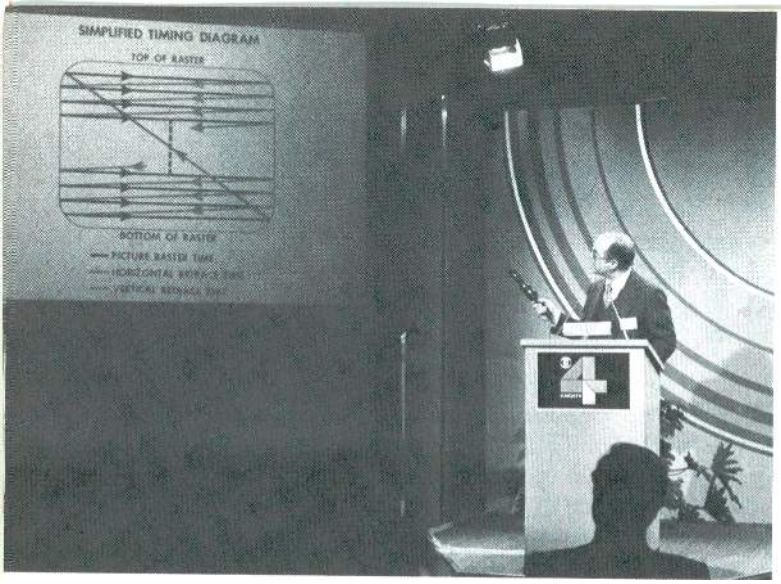

William G. Connolly, managing director, development, Engineering & Development Department, CBS Television Network, shown explaining Teletext basics at the KMOX-TV briefing.

John McKay, KMOX-TV vice president and general manager, points to teletext data in the vertical interval of the program signal. Receivers at the top left and right show actual teletext page information. McKay is holding the keypad controller for the French Antiope system.

Teletext: A growing world movement

By Bill Rhodes, **BE** editorial director

When CBS held its briefing on the teletext experiments underway at KMOX in St. Louis late last year (see **BE**, pp. 62-65, November, 1979), the excitement sparked by the data unveiled seemed to flash throughout the industry and the public with unprecedented speed. The kindled excitement is continuing to mount as other stations, notably KCET, and other countries investigate this advancing technology. This international movement is culminating in a first world conference and exhibition on computerized TV-based information education and entertainment, Viewdata '80, being held in London, March, 26-28, 1980.

In preparing this special issue on teletext, **BE** solicited articles from KSL-TV, KCET, CBS, BBC, and Antiope, covering their latest test data and results. The articles that follow, by Loveless and Robinson and by McIntyre, cover the KSL and BBC efforts. However, pressures of other commitments made it impossible for the other leaders and pioneers of teletext to respond for this issue. Consequently, notes below will comment on some of their latest results. In addition, the work at KSL intercompares systems and costs with exceptional clarity.

CBS/KMOX-TV advances

Nothing formally is available from CBS on its continuing teletext studies at KMOX-TV, St. Louis. However, William Connolly, managing director, development, Engineering & Development Department, CBS Television Network, told **BE** at the SMPTE meeting in Los Angeles in October last year that the number of sites for testing teletext in the KMOX area had grown significantly. The growth amounted to more than a threefold increase in site evaluations. When further details become available, **BE** will publish an update to the KMOX studies.

KCET

During the SMPTE conference in Los Angeles, October 21-26, 1979, the Antiope organization opened a hospitality suite to unveil the teletext experiments being conducted at KCET, Channel 28, Los Angeles. Thus, KCET became the first public TV station, and the first UHF station in the US, to experiment with this new technology.

While considerable interest was shown in this work by those attending the briefing, the demonstrations were not totally successful. Because of antenna-transmitter logistics and interferences from neighboring buildings, acceptable teletext reception was possible with no more than three people in the viewing room. However, this problem arose more from the haste in preparing for a demonstration in the Century Plaza Hotel rather than from equipment limitations. Attendees recognized this situation and were impressed with teletext technology.

The hardware for KCET's tests was provided by Antiope Videotext Systems (AVS) of France and Washington, DC. Pierre Gaujard, president of AVS, was on hand to explain the Antiope system and some of the Euorpean achievements, and to express pleasure with the cooperative arrangements with KCET.

The tests at KCET are proceeding under the attention of Richard Gingras, director of telecommunications, and Steve deSatnick, vice president of engineering and operations. Gingras informed **BE** that KCET is undertaking this preliminary examination of the hardware and software necessary to provide information services ancillary to KCET's basic program service and that KCET is looking for more sophisticated ways to tie teletext into its programming.

The experiments initiated during the SMPTE convention were exploratory, designed to get a sense of what might be done to more effectively demonstrate teletext's potential for broadcast TV. They utilize only five decoders, are limited in data expected, and have no public viewing participation.

According to deSatnick, conclusions from these first UHF tests on teletext cannot be drawn until a model test procedure has been established. KCET is attempting to conduct further field tests early in 1980 in concert with EIA and CBS. These results will be published when available.

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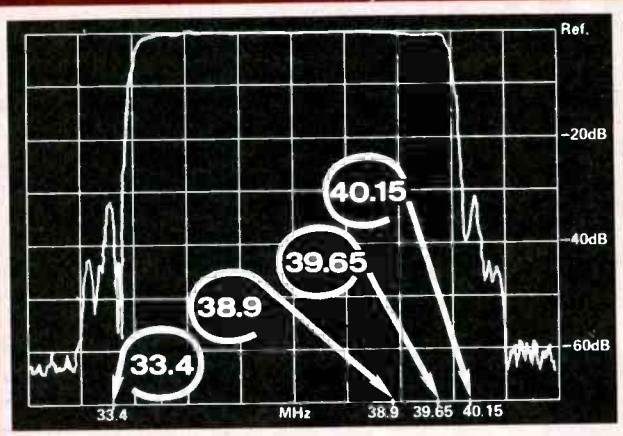

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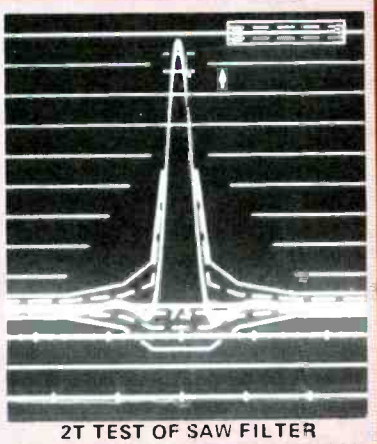

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KSL-TV TEST RESULTS AND NTSC BROADCAST TELETEXT STANDARDS*

By William Loveless and Gary Robinson,
Bonneville International, Salt Lake City, UT

Teletext is generating a vast amount of interest throughout the country. Various proposals from foreign countries have been presented in the hopes of obtaining a teletext standard for the US. Companies and groups are testing various teletext systems and collecting valuable data that will be needed for standards.

This paper reports results of the KSL tests and studies and discusses the major teletext proposals and related trade-offs. An attempt is made to present the facts so that system decisions can be made with full knowledge of the resulting trade-offs.

History

KSL-TV became involved with teletext in October 1976 after Bonneville president, Arch Madsen, witnessed a demonstration of CEEFAX at BBC. Upon his return, Madsen assigned his corporate engineering staff the project of developing a system to US standards. Texas Instruments agreed to build a teletext decoder, and the TV station encoder was designed and built by Bonneville engineers at KSL-TV.

By the summer of 1977, a closed-circuit system was operating, and a request for over-the-air test authority was filed with the Commission in November 1977. Authorized over-the-air testing has continued since June 15, 1978.

On September 4, 1979, the National Weather Service interfaced the KSL teletext computer to test and demonstrate an updated weather service. That agency's interest in becoming a teletext information provider, along with feedback from many other groups, has shown that broadcast teletext has a bright future.

Test results

Since testing began, KSL-TV has not received a single reception complaint regarding visual and aural interference due to the teletext signal which is inserted on lines 15 and 16. The viewing audience is not even aware that KSL-TV has added the extra signal to the TV programming.

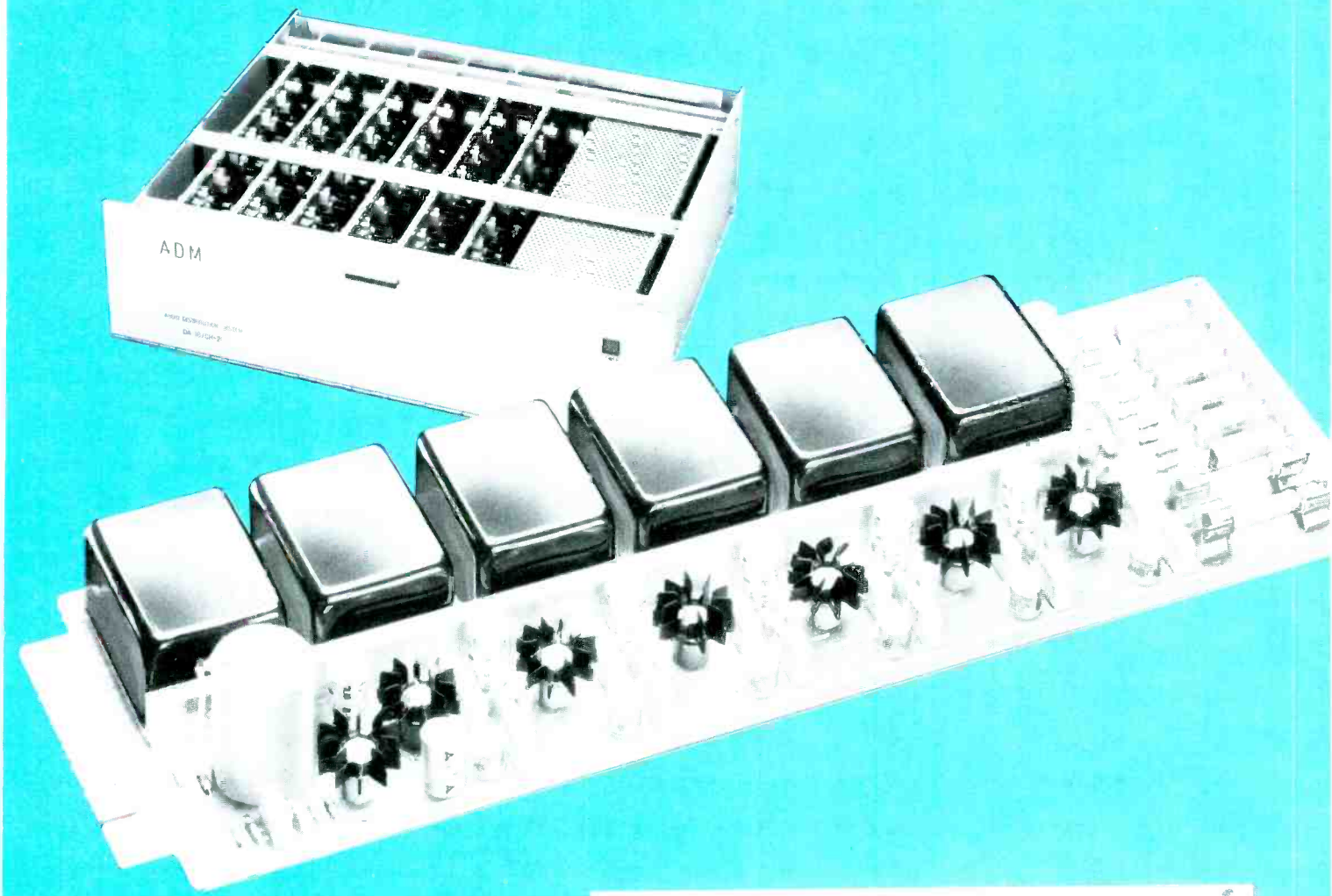
The reception of teletext in the Salt Lake valley has been favorable. Several teletext receivers have been placed temporarily in homes throughout the area using both rabbit ears and rooftop antennas. Problems do exist in the downtown area due to multipath from office buildings. As a rule, if the TV transmitter is visible at the antenna, the teletext signal is acceptable.

Because the KSL-TV signal is carried by 112 translators into six states, tests were performed at a few remote translator locations. The city of Richfield received a good TV signal but a 5% error rate was observed on teletext. Two translator stations along the 160-mile path translate the signal from Channel 5 to Channel 78 and then to Channel 7. The signal recieved from a 100W translator on Monroe Peak, 185 miles south of the KSL-TV transmitter, gave a 100% reliable teletext signal. The path is similar to the previous site except that final reception was on UHF Channel 65.

Since various CATV systems carry the KSL-TV signal north into Montana and Wyoming, testing was performed on two nearby cable companies. The results were not as favorable as with translators. The head end signal processing equipment used by the CATV system seems to limit the bandwidth of the teletext signals and increase the error rate significantly. These units are optimized for analog-video, not for digital signals. Optimum pulse alignment of the head end equipment may correct the problem.

All tests were performed on a Zenith TV receiver modified by Texas Instruments. Recently a specially modified Sony teletext receiver from Japan was received. Preliminary tests indicate that the Sony set, with its synchronous detector, is significantly better than previous receivers with envelop detectors. Some marginal sites now receive excellent teletext service. Extensive

* 1979 IEEE. Presented at the 1979 Annual Broadcast Symposium, Sept. 20-21, Washington, DC; to be published in the IEEE Transactions on Broadcasting. Reprinted with IEEE permission.



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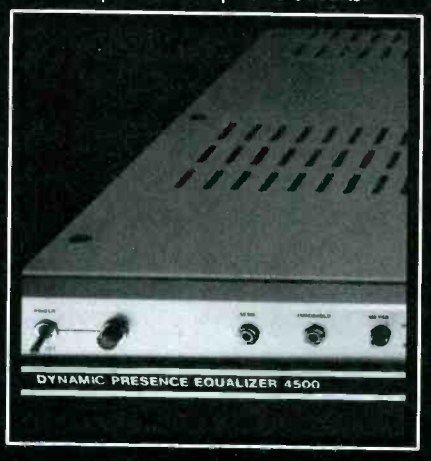

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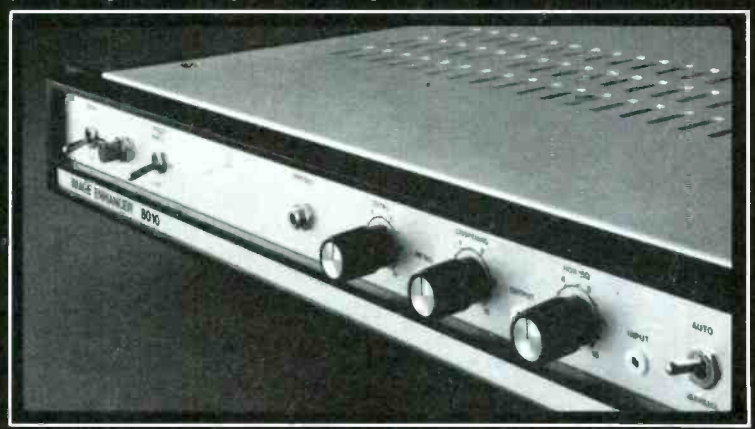

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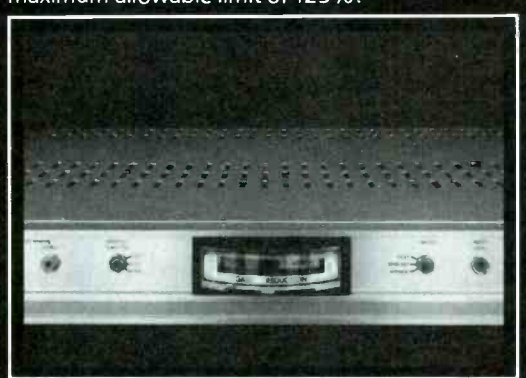

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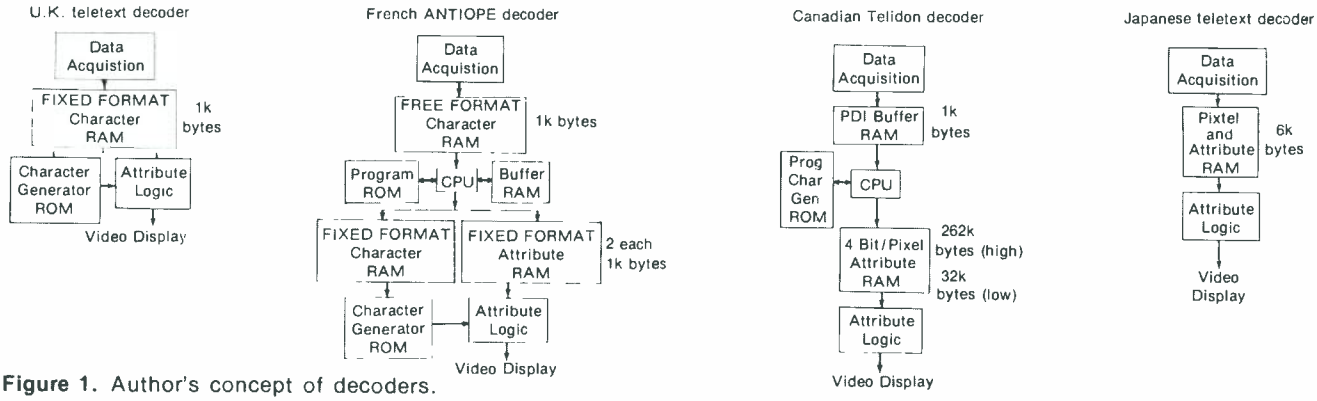

Figure 1. Author's concept of decoders.

tests with this improved Sony receiver have not yet been performed.

Field tests in Europe have determined that 95% of the viewing area can receive acceptable teletext signals.[1] Because noise is proportional to bandwidth, the NTSC system, which has a smaller bandwidth, will in theory have less noise. The NTSC teletext pulses are wider than those of Europe because of the reduced bit rate within the same 52 μs scan line. The US can expect results similar to those found in Europe. Tests by CBS are now taking place at KMOX-TV and are designed to determine the optimum bit rate for the US.*

*See **BE**, November, 1979, for details.

Major teletext systems compared

This section summarizes the decoder processing required by each of four teletext systems: UK Teletext, French Antiope, Canadian Telidon and Japanese Teletext. Figure 1 compares the memory size and hardware required for each of the four decoders.

UK TELETEXT—The fixed format data from the serial attribute character buffer is read in a repeating sequence into the character generator ROM and serial attribute logic to generate the video signal. Requires 1K bytes minimum RAM plus ROM; CPU not required.

FRENCH ANTIOPE—The CPU processes data under program control using data read in from the free format, serial attribute character buffer. After processing, the CPU writes fixed format data to the character display and attribute memories. During display, these two memories are read in a repeating sequence to the character generator ROM and attribute logic which generates the video signal. Requires 4K bytes minimum RAM plus CPU and ROMs.

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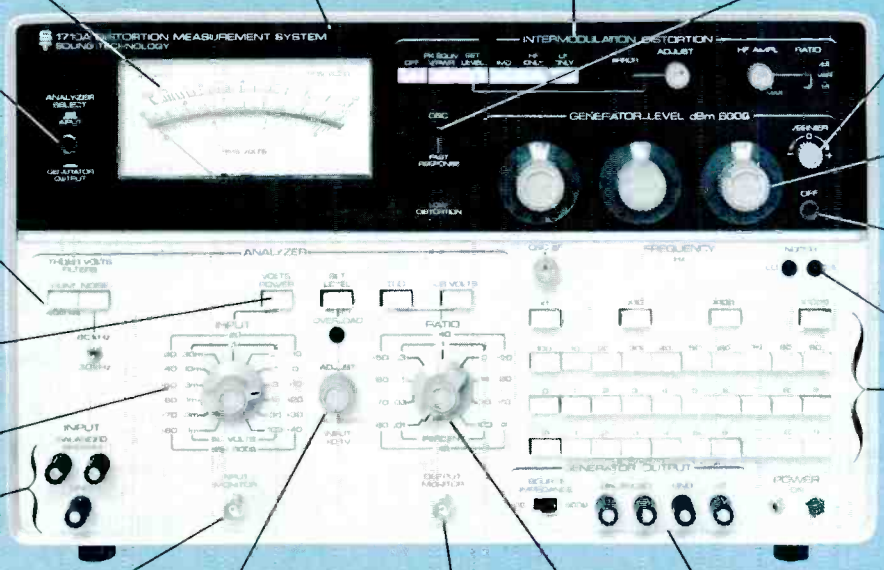

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processes data under program control using the PDI commands from the PDI buffer. The CPU computes the geometric shapes from the PDI commands and writes individual pixels into the 4 bit attribute memory and attribute logic. It requires 32K bytes (low) to 262K bytes (high) RAM plus CPU and ROMS.

JAPANESE TELETEXT—The video signal is generated directly from the pixel/attribute memory and logic and allows Japanese ideograms to be displayed; requires 6K bytes RAM; CPU not required.

Figure 2 shows the four teletext systems plotted on coordinates of memory size and decoder costs. These costs are based on a rough estimate of processing and memory required by each decoder system.

Figure 3 shows the results of the Teletext Market Survey by Wasatch Opinion Research Corporation for KSL-TV. The demand for teletext is related to the cost of the decoder as follows: 67% will purchase teletext at $50; 42% at $100; 15% at $250; and 4% at $500.

It is concluded that the UK teletext system is the best candidate for a mass media because of its low decoder cost. The primary function of teletext is to deliver information in text form. The simple mosaic graphics of UK teletext will enhance the text. The graphics should not be a determining factor if higher costs result in failure of teletext to achieve a mass market.

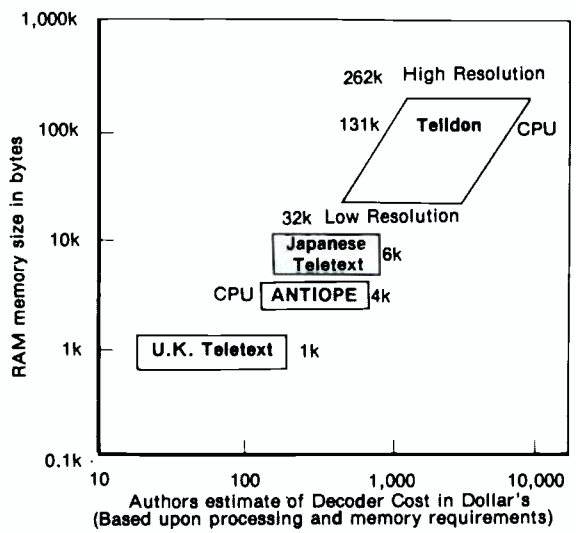


Figure 2.
Memory versus cost.

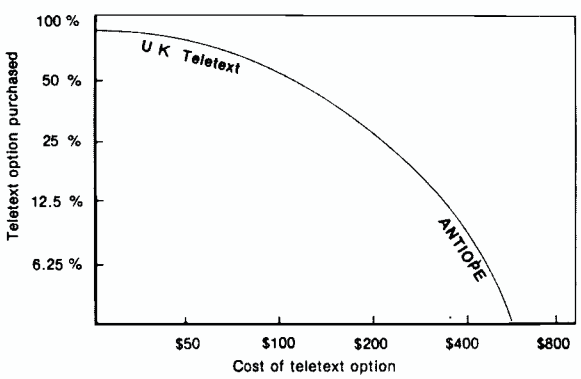
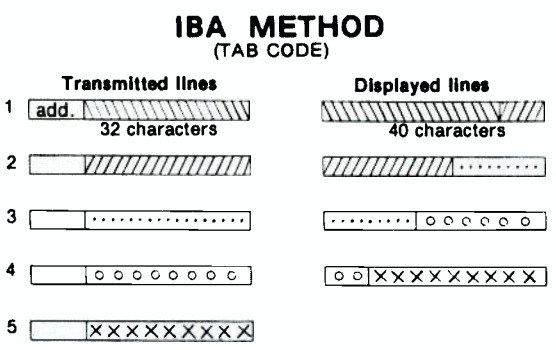


Figure 3.
Mass market potential.



Proposal to obtain 40 characters per row on an NTSC receiver

Figure 4.
Proposal to obtain 40 characters per row on an NTSC receiver.

Important factors

The page format is an important part of the teletext standard. Present proposals range from 30 to 40 characters per row and from 20 to 24 rows per page. The bit rate, wait time, and legibility are factors that will determine the best format.

Research has shown that for domestic viewing, the minimum typographic character height will be no less than 1/25th of the total picture height.[2] An expert on legibility states that space between rows of characters has an important effect on the legibility of type. Also, the total word form is important in perceiving words in lower case.[3]

Two methods have been proposed to produce 24 rows on an NTSC receiver. One method is to push up all lower case extenders and move rows closer together. This method violates the rules above and modifies the shape of the *word form*, causing reduced legibility. The option of displaying upper and lower halves of the screen separately will not solve this problem. The other method is raster compression. This reduces the character height, and forces viewers to move closer to the set. This method distorts the aspect ratio and affects the picture when using the update and captioning features, or when the mixed mode is selected.

The bit rate determines the number of characters sent on each 52 μs scan line. The NTSC system does not allow a bit rate high enough to obtain 40 visible characters per TV line. The KSL teletext system was designed with 32 characters per row and 20 rows per page. Two other proposals have been made which allow a fixed format system to obtain 40 characters per row.

The IBA method makes use of a *tab* code in the data stream (Figure 4). This *tab* code indicates the horizontal position on the page where the line of characters is to be positioned. If the previous displayed row is not yet completed, these characters are inserted in memory to continue to the end of the uncompleted and last-received row. At this point, the remaining characters on the current data line are inserted in memory on the row

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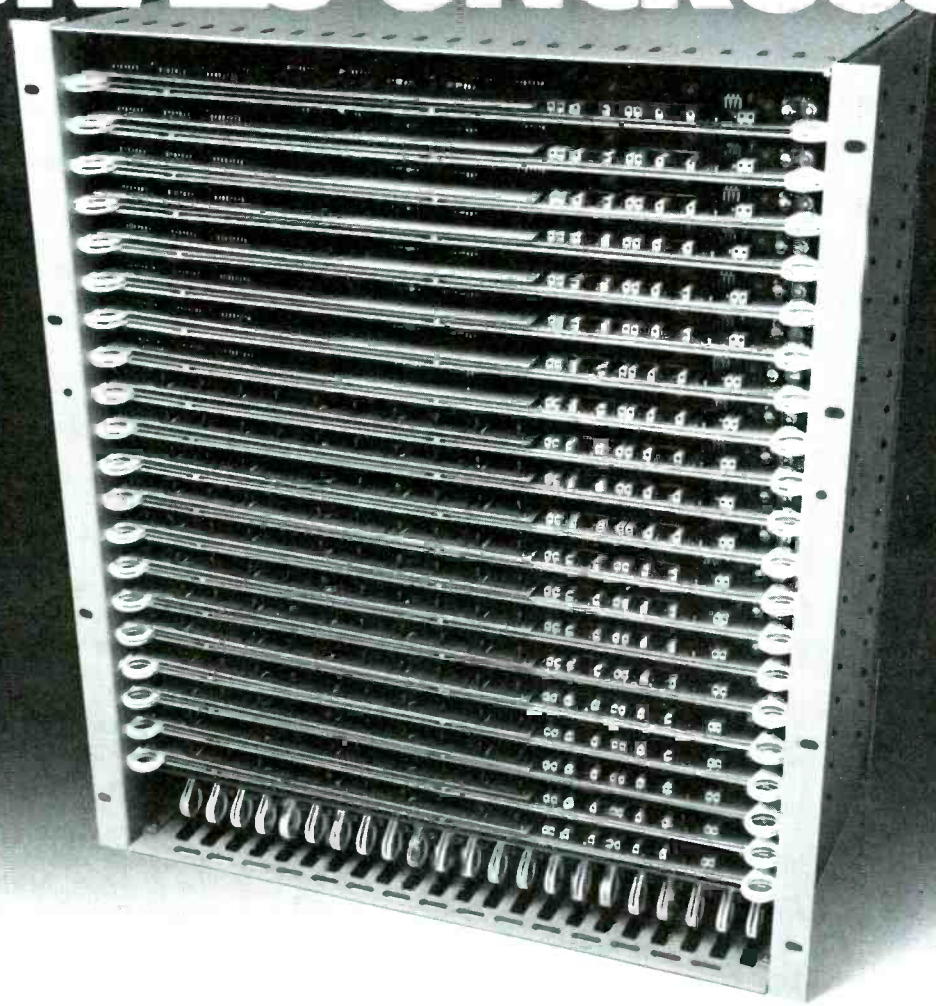

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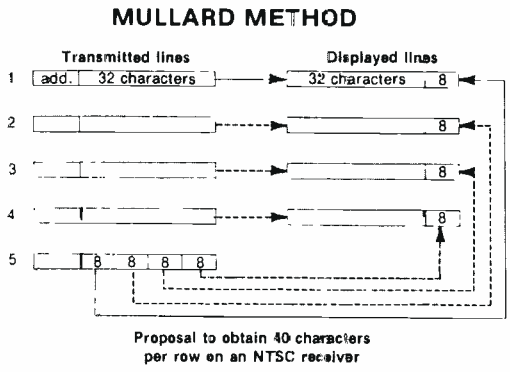

Figure 5.
Proposal to obtain 40 characters per row on an NTSC receiver.

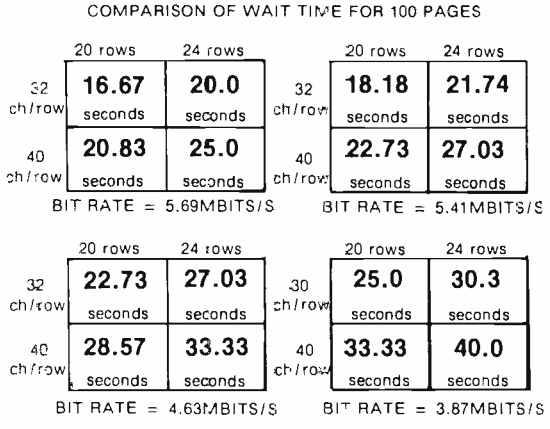

Figure 6.
Comparison of wait time for 100 pages.

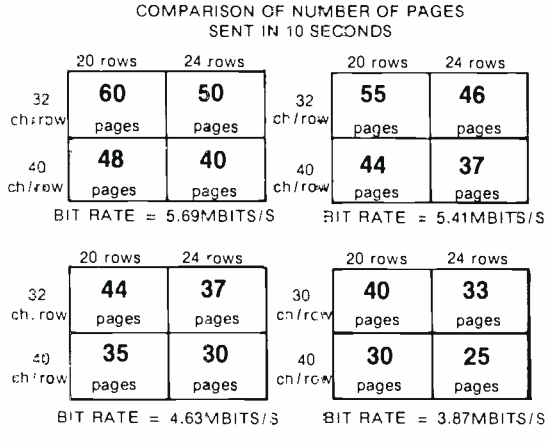

Figure 7.
Comparison of number of pages sent in 10 seconds.

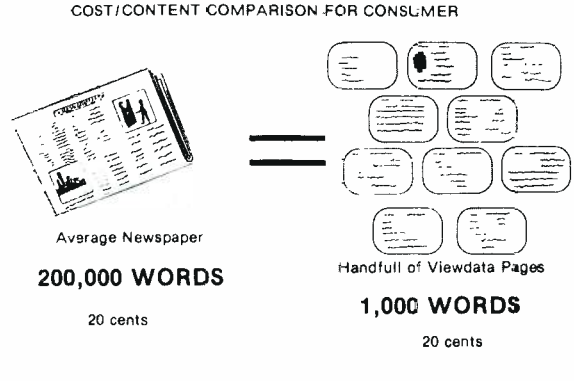

Figure 8.
Cost/content comparison for consumer.

corresponding to the row address of the currently received data line.[4]

The Mullard method transmits a portion of the 40-character display line which fills in the left side of the display (Figure 5). A few lines later, the remaining characters needed to fill previous lines are sent together and then properly inserted to fill up the 40 character lines.[5]

Wait time is a critical factor for teletext and is often overlooked. After demonstrating the Bonneville teletext system (one of the fastest) to a few thousand people, we have become very aware of this problem. It is desirable to keep the data base at about 100 pages in order to obtain a maximum wait time of 15 seconds. After a preliminary period, the limit of human impatience becomes a factor.

A choice of 40 characters per row will increase this wait time because higher bit rates are not possible and therefore, extra lines must be sent. Figures 6 and 7 show the trade-offs in wait time and the number of pages per 10 seconds for this choice. Using 24 rows per page will obviously increase the wait time over 20 rows (see appendix).

The most important trade-off decision is: Is information wanted on each page or more pages in a given wait time?

It is obvious that the higher the bit rate, the faster the page rate. KSL-TV tests at 5.54 megabits per second have proved to be satisfactory and slightly higher rates may be possible. Studies performed for the captioning project used a display of 32 characters per row and a character height of 5% of the display height. Using a 23-inch television set, viewers within 10 feet of the set reported that the character size was acceptable. Older people had the most difficulty. About 28% felt that the letters were too small.[6] KSL-TV uses a display format similar to the one tested.

Advice given to instructional television graphic designers is that having established the minimum type size and maximum line length does not leave the designer free to squeeze as many (characters) as possible into a line by closely packing the letters. Such a line would merely appear as an undifferentiated mass. Cramming lines together in the hope of increasing the amount of information would produce the same result.[7]

One of the arguments for a 40 by 24 page format is foreign compatibility. The US is estimated to control 80 to 90% of the total world in-

formational data bases available for commercial use. The bases are often marketed internationally.[8] If England or other countries desire to use this information in teletext form, it would be simple to take the 32 by 20 page format directly and add spaces to fill up their 40 by 24 page. This would be preferable to using one of the modified 40 by 20 methods and searching for the remaining out-of-sequence characters needed for each line.

Viewdata versus teletext

The opinion of many people is that teletext is limited to 1-way capabilities, while viewdata provides a low cost 2-way interactive system and, therefore, has more potential. This is not necessarily true.

Recent comments point out critical disadvantages of viewdata. The first is its interactive ability. A graduate student, after three months of hands-on experience at inputting material into the Prestel system, commented that it offers so primitive a form of interaction that it is barely deserving of the term.[9] The director of a major information provider to Prestel states that because Prestel is not encyclopaedic, and because it is not a sophisticated retrieval system, it may have difficulty satisfying rational and precise information-seekers.[10]

The second disadvantage is its cost to the user. One major information provider (IP) of Prestel believes that this pay-as-you-use system will considerably inhibit the residential user because of the psychological effect of having an open-ended, hard-to-control expense. The user will be reluctant to browse through the data base because he will be too conscious of the meter ticking up the pence as he goes from page to page. The average residential user will be paying about 10 pence (for each call), a price we consider too high to allow Prestel to become a regularly-used source of information in the home. After all, a local newspaper, which contains a lot more information that is immediately useful, costs only 10 pence."[11] (Figure 8).

Most IPs believe that the costs to the user, both for the modified TV sets and for using Prestel on a day-to-day basis, still threatens to stop the emergence of a truly mass medium.[12]

One IP suggested that a Viewdata system which charged the user only for the telephone call would be much more of a browsing

medium.[13] This is possible by using the touch-tone* teletext system proposed by KSL-TV. This system uses a standard telephone as the control device and a teletext TV set as the receiving device, but there is no connection needed between the two. This means that a station which begins by providing teletext only can add this hybrid service later at no additional cost to its viewers. Touch-tone teletext would provide large amounts of additional information to viewers beyond that available through the normal teletext system alone.

This type of system would not be limited to hybrid connections only, but would provide dial up ports to information-providers to input their data and dial up capability for viewers with home computers to tap information from the system (Figure 9). Touch-tone teletext provides many of the services of Viewdata and teletext at the low cost intended for teletext alone. The same concepts of the Viewdata system will be used, but the information is distributed in a more efficient manner, and more viewers will be able to benefit from this expanded service.

An engineer involved with the German teletext system states that Prestel, in attempting a degree of compatibility with teletext, has limited its own potential.[14] It appears that Prestel is too expensive for residential users and not interactive enough for specialized users. Viewdata could improve its potential by using special terminals with a full ASCII keyboard and better search methods, combined with improved graphics and higher density of characters per page.

We see no major reasons for making common carrier Viewdata compatible with broadcast teletext and, therefore, both can better achieve their potential. Teletext can provide free services to the general public at a low receiver cost, plus access to very large data bases using simple search methods. Viewdata, increasing its interactive abilities, could provide more specialized services to businesses, educators, doctors, lawyers and even those who need and will pay for this type of service in their homes. By providing word and text processors and electronic mail services, Viewdata could implement the office of the future. Systems of this kind exist today at a much lower cost than the present Prestel system (Figure 10).

*Touch-tone is a registered trademark of AT&T.

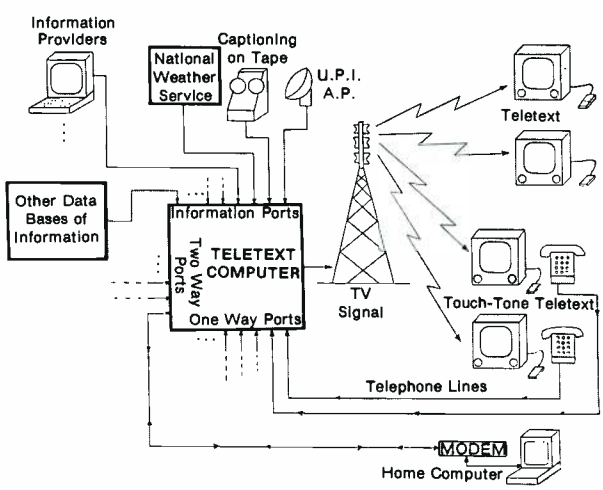

Figure 9. Author's concept of total teletext system.

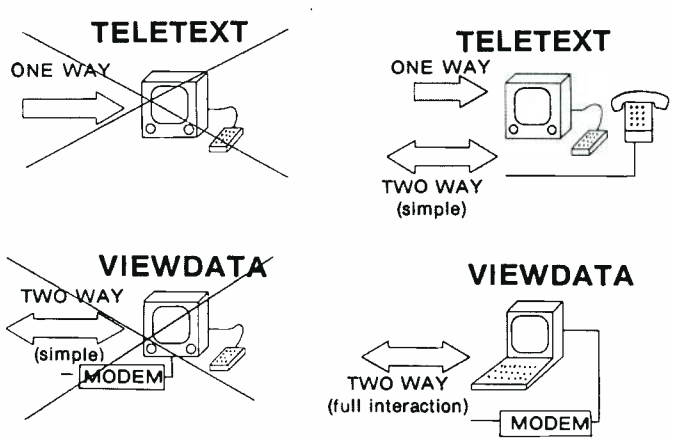

Figure 10. Traditional versus author's viewpoint of viewdata and teletext.

Proposal

Some observers believe teletext standardization is several years away, pending results from many varied tests. There are three main levels of standardization: (1) transmission standards, (2) display standards, and (3) system features.

Efforts should be made now to define the protection window that will allow digital signals without interference to regular programming. These other levels need not wait several years as predicted. Final testing should finish soon so that the process of standardization can be started. The need and interest for a teletext system is here now, and we need to fill it.

Teletext is a broadcast-oriented service included with the regular programming. If this technology is not exploited by the broadcaster, it is possible that the broadcaster may be required to make the channel capacity available to non-broadcast interest.

The rules and regulations that are finally determined for teletext should be loose and liberal, as are the existing rules for the Subsidiary Communication Authorizations on FM known as SCA. This would allow broadcasters to control the content and, therefore, better serve their various viewing audiences. It would also give control to broadcasters in cases where teletext is run by an outside party, because teletext would be part of the local broadcast license.[15]

Since wait time, error rate, and legibility are important factors, the fixed format with 32 by 20 page format appears, for now, to be the most desirable. This choice is based on our knowledge and understanding of existing systems and on the needs of broadcasters.

Broadcaster's use

Vast amounts of information can

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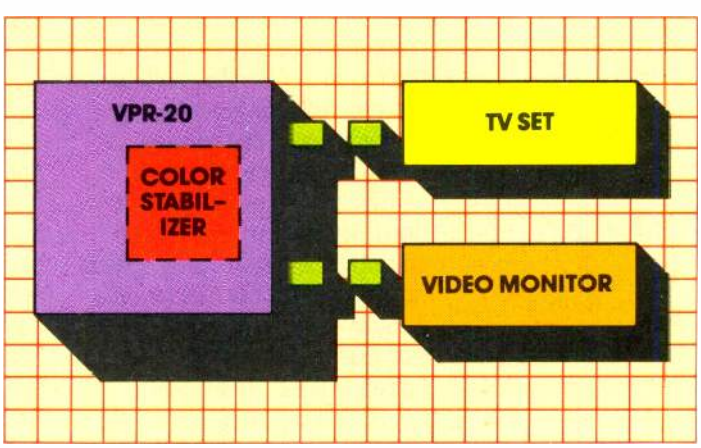

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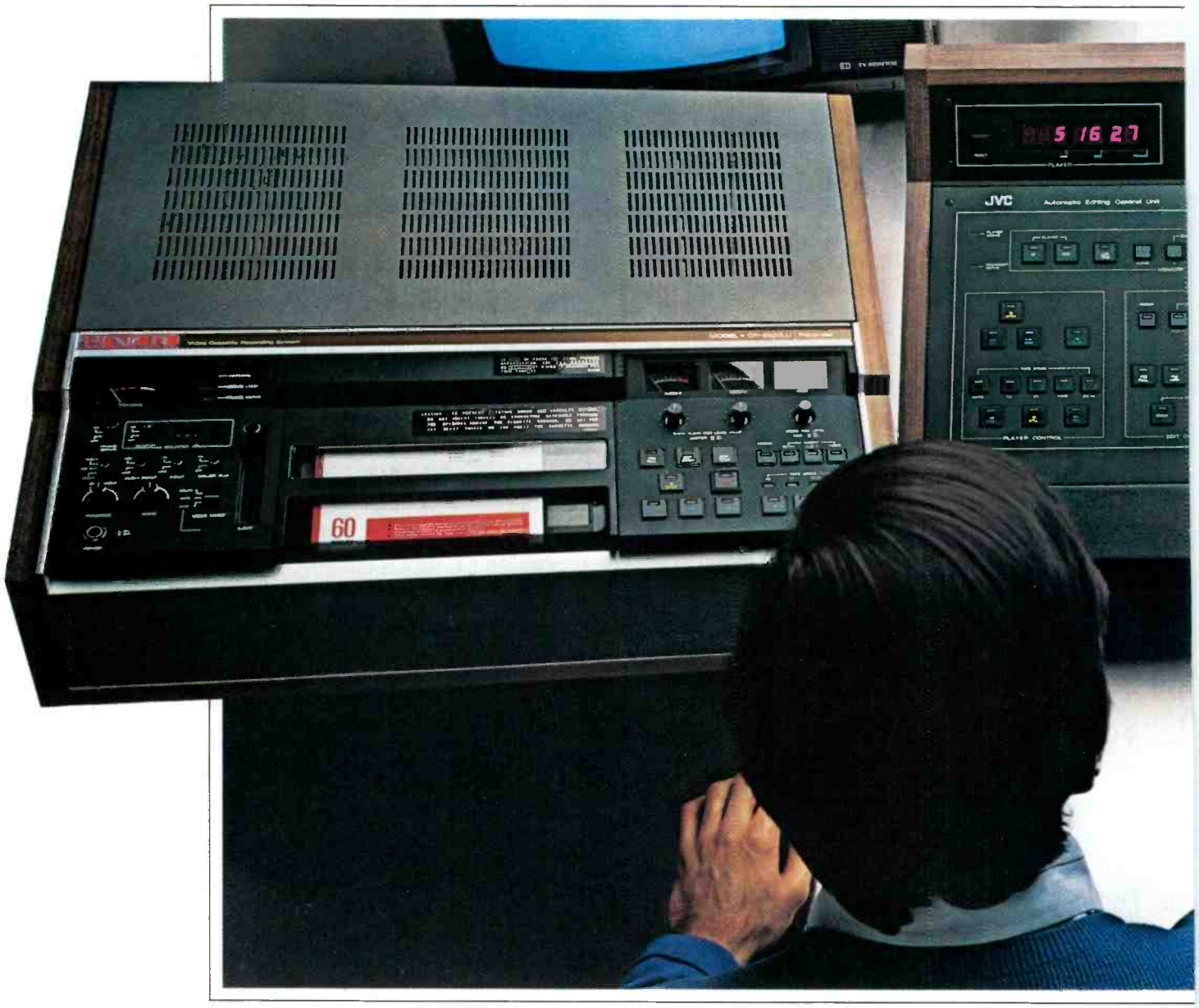

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be available to the home viewer with teletext. Today's public information is not always convenient to obtain or refer back to. The need for an information system in the home exists now, and interest from would-be information providers would support an advertiser-sponsored broadcast system.

Information that is continually changing and referred to often would be transmitted in the regular teletext cycle with an average access time of 10 seconds. The proper choice of information by the broadcaster would encourage viewers to tune in his station. Possible information providers are found in Figure 11.

Data would be changed or updated as often as needed by remote terminals. Local news departments and the wire services could provide the latest headlines or important updates. Airlines and buses could inform the viewers of delayed schedules or cancellations. Captioning would provide a service to the hearing impaired that has long been missing. The Travel Council and Visitors Bureau could inform tourists of activities or places to visit and, therefore, encourage them to stay longer. Viewers will be able to obtain the Stock Market reports, TV schedules, movie listings, weather updates, and any other information that is in great demand (see appendix).

Static or long-term information would be stored in the teletext computer but not transmitted in the cycle. Viewers will use the touch-tone system to request transmission of the information they need. Other data bases could be used to increase the available information. The types of possible information are restricted only by the imagination.

Teletext is not limited to be an information source only. The largest school district in Utah, Granite School District, plans to use teletext as an educational tool. Students could be given assignments, such as planning a trip from Chicago to Salt Lake City. By using teletext, they would plan their trip and determine flight times, accomodations, meals, etc., along with the cost involved. They could also be assigned to compare certain items for a period of time. This would teach students how to acquire information and use it.

Program enhancement is another valuable use of teletext. TV news programs are accused of being headline services. Time restrictions do not allow full reporting of stories, so they must be edited. TV newscasters would refer viewers to a particular page for the detailed story. Using the electronic news room, the story would be contained in the teletext computer so no extra effort is required by the news staff.[16]

Advertisers would also benefit from teletext. A typical example would be a local automobile dealer running a general advertisement and then telling viewers to consult a specific teletext page to see that day's specials. Similar advertising campaigns could be mounted by local retailers who have long avoided television because of the prohibitively high cost of updating commercials.[17]

The whole teletext system described can be run by a small staff at the local station. Information providers can input their own data from their own establishments. Much of the information put into the system will eventually be automated and, therefore, provide an efficient service in the home.

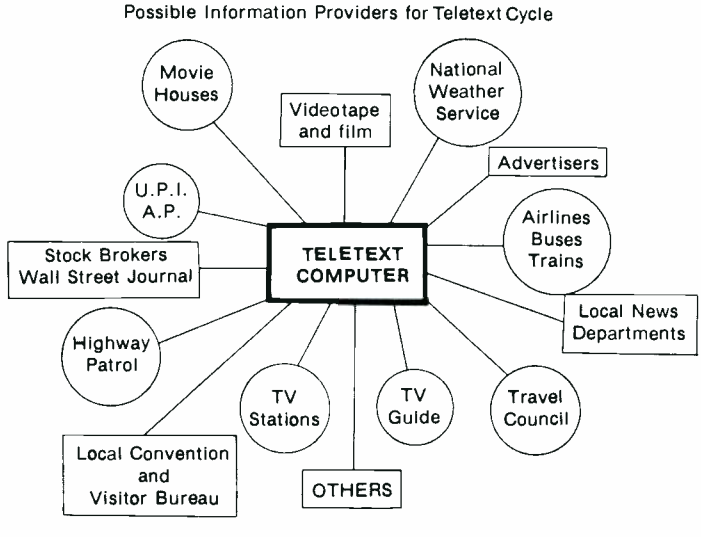

Figure 11. Typical information resources for teletext cycle.

Summary

After 1000 live, hands-on demonstrations of teletext, virtually everyone wants teletext and wants it now! Bonneville's concept of 2-way teletext, a variation of UK teletext, can satisfy the public information needs at a cost that will allow teletext to become a mass comunication media within a short period. A 32 character by 20 row display format is most desirable for the NTSC system. Compatibility with Viewdata or foreign standards is not necessary or desirable, because teletext is a local information service. □

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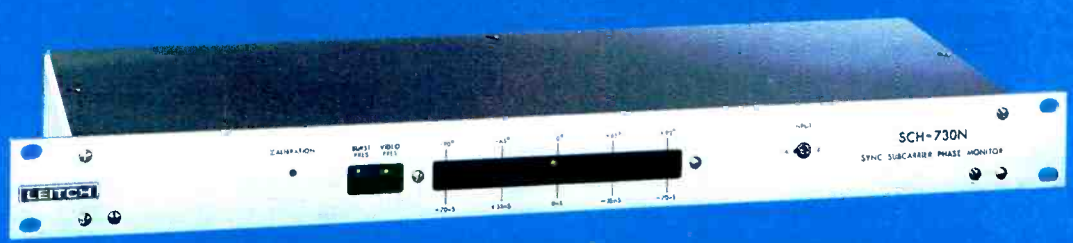

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CEEFAX - One small step?*

By Colin McIntyre, editor, CEEFAX

The British Broadcasting Corporation (BBC) in London introduced the world's first high definition television service on November 2nd, 1936. A couple of years later, I remember watching a flickering screen on which small black and white figures chased an invisible ball playing cricket.

British television went into abeyance during the war, as it was thought that the signals would lead German aircraft to London. When the war was over, it was others that set the pace, with a slightly competitive range of line-standards: 405 lines, 525 lines, 625 lines, 819 lines. This historical perspective is relevant in looking at the introduction by the BBC in 1974 of broadcast teletext—the BBC's news and information service know as CEEFAX—which is now in its sixth year with over 40,000 sets in use.

One might well ask why the BBC, a public service broadcaster funded by a compulsory Broadcast Receiving License Fee, should become involved at all in transmitting alphnumeric information in the form of data. To quote a famous British mountaineer on climbing Mount Everest: "Because it is there."

In the case of teletext, the BBC has been intimately involved from the very start. BBC engineers first announced their development of CEEFAX in the laboratory in 1972 and pioneered the first broadcast transmissions setting the pace throughout its experimental period.

On the editorial side, the BBC was first on the air anywhere in the world with pages of *live* news and information in late 1974. Then, after a 2-year pilot trial, the BBC was ready in November 1976 to go fully public with a regular 7-day service. Now, CEEFAX is updated by a team of journalists 18 hours a day, 365 days a year.

Almost all the technical needs and problems involved in broadcasting teletext have been identified and solved. An inexpensive, simple and rugged form of broadcasting has now been established in Britain and is currently being evaluated in a dozen other countries from the Netherlands to Australia, from Sweden to the US. Editorial patterns are still evolving, and will continue to evolve as other related and more complex methods of transmitting data information are developed and go public.

In Britain, the Post Office's viewdata system known as *Prestel*, went public at the end of 1979. Its essential differences from broadcast teletext are that it is on-line via telephone, has theoretically almost unlimited capacity in terms of *pages* of information, and is a charged service to access.

Broadcast teletext is supplied as part of the ordinary domestic television signal by the BBC and by the commercial television network (whose equivalent of CEEFAX is a service known as *Oracle*)—the BBC's service being financed from license revenue and the commercial service eventually to be paid for by advertising.

The cheapness and simplicity of broadcast teletext stem from the fact that the CEEFAX signal uses only a small part of the ordinary TV signal—it does not involve any extra bandwidths, any extra transmitters, or any extra antennas. Because the television picture does not use all (in the case of Europe) 625 lines in each transmitted field, there are some 25 lines in each field which are available. Several of these spare lines are used for sending engineering signals.

It was the imagination of the BBC's director of engineering, now Sir James Redmond, and his head of research department, Peter Rainger, to realize that this unused space could be used for other broadcasting purposes. BBC researchers were, in fact, searching for ways to subtitle for the deaf and hearing impaired (closed captions) which would only be seen by those with specially-equipped *decoders*. What they realized was that this spare capacity could be used not only for hidden subtitles, but as a new medium of broadcasting for the written word. CEEFAX has been described as *printed radio*, and to some extent that is still true today. Broadcast teletext handles the words of radio while appearing on the television screen.

It was a short step from realizing that this was something much, much bigger than subtitling, to transmitting dummy pages of information. It began with "The quick brown fox jumps over lazy dogs" which neatly fitted the CEEFAX format of 40 characters across by 24 rows deep. This format, providing for a total of 960 characters, is now the standard for both broadcast teletext and on-line viewdata Prestel systems. Hidden control characters additionally allow the use of seven colors (white, red, green, blue, magenta, yellow, cyan) plus black. Other hidden control characters allow use of graphics, separated graphics, double height letters, and on-off flashing of words or phrases or symbols.

The technical side—once standards agreed—was comparatively easy. In round terms it is fair to say that where you get a good television picture you get good broadcast teletext. Indeed, the teletext signal is generally good over a larger area than is considered correct for picture transmission.

Launching a new technology is never easy. Broadcast teletext began slowly in marketing terms, and its growth has been steady rather than miraculously impressive. It was necessarily a chicken-and-egg situation, with the TV set manufacturers reluctant to go into intensive production before there was evidence of public demand, and not much hope of inspiring a demand if the sets were not available.

It was the enthusiasm and early confidence of the *decoder* makers, in particular Texas Instruments, that got things moving, followed by Mullard, a subsidiary of Philips, and by General Instruments. With competition among the essential component-suppliers it was not long before there was competition in both manufacturing and marketing between the major British set-makers, followed by companies abroad. And in Britain, where some 65% of households still rent their first TV set, interest by the rental companies became an important factor.

The British on the whole have a delightfully pragmatic approach to

*The assistance of David Cockerham of the British Information Services in New York for his cooperation on this article is greatly appreciated.

A typical set equipped for CEEFAX.

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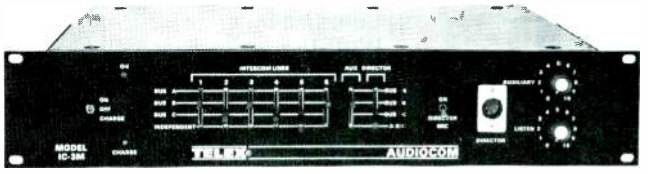
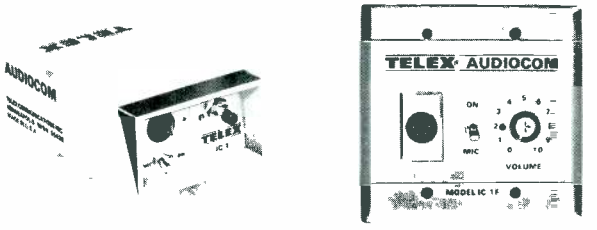


AUDIOCOM SWITCHBOARD, portable or rack mount, segregates six external intercom lines into three separate non-interfacing circuits; or stage, lighting and sound crews can communicate independently, jointly, or may be mixed. Contains 24 Vdc power supply with optional, rechargeable battery pack. Smaller power supplies also available



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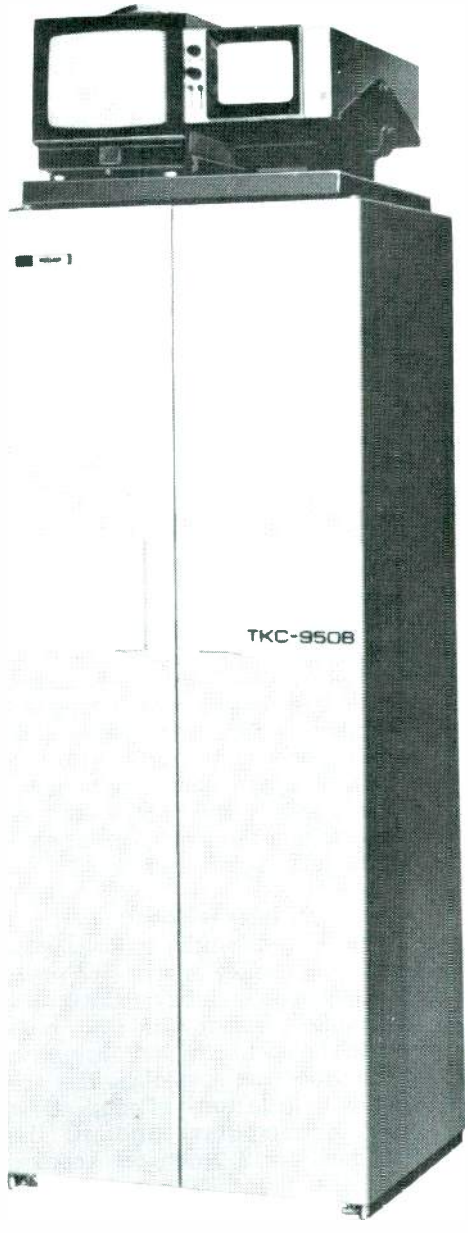
new technologies. There is still a good deal of the string-and-sealing wax approach of Rutherfurd and the Cavendish Laboratories, Cambridge. In CEEFAX, we have been cynically heard to remark that anything the British develop then still has to be re-invented by the French and the Russians, put into a legal and constitutional framework by the Germans, and into a sociological and welfare framework by the Scandinavians. (I will not trespass on your hospitality by defining the American role in this saga, but it has been suggested that a need for definitions and regulation by statutory bodies in Washington does not necessarily result in immediate applications visible to the public!)

Obviously, before initiating teletext or viewdata services, access to the air-waves or a telephone system is essential. The BBC view, and that of the regulatory bodies consulted, is that using part of the ordinary TV picture must be part of broadcasting; it is simply good housekeeping, making better use of an existing signal. This is further reinforced if a good deal of the teletext output is devoted to enhancing the value of television or radio to the license-paying viewer or listener. In covering the evening's TV or radio programs, teletext can provide full details of changes with a continually-updated running order.

With the government go-ahead in November, 1976 (almost exactly 40 years since the start of television), the BBC was able to announce its commitment to this new form of broadcasting, and this was duly acknowledged and noted in the Report of the Committee on the Future of Broadcasting led by Lord Annan published in March, 1977. Lord Annan's committee specifically recommended that the BBC and IBA (Independant Broadcasting Authority) should be authorized to provide teletext information services. It added that "Newspapers should not be given the right to participate with the broadcasting organizations in the development of these services."

No such recommendations were made with respect to the Post Office's on-line viewdata (Prestel) services by any government-sponsored agency. From the very beginning it was expected that newspapers and publishing groups would be an integral part of the resources for Prestel. Several newspaper groups are among the leading Information Providers (IPs) for Prestel. They include a specially-constituted subsidiary of London's **Financial Times** (the **Wall Street**

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.

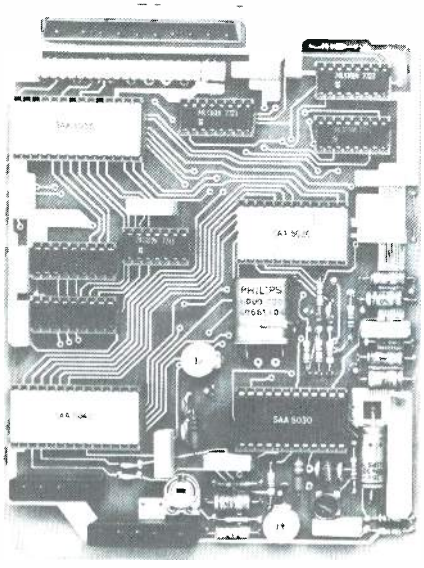
The TKC-950B is highly stable and any variations in the source material can be compensated for manually or with an optional new automatic color balance accessory which balances white, black and gamma automatically. And each function is available for local or remote control.

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.

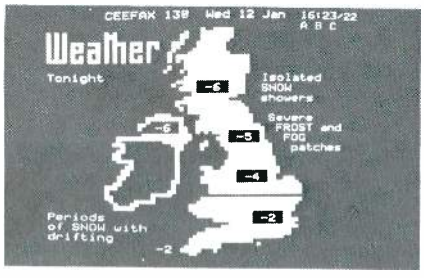
Ikegami

Circle (34) on Reply Card

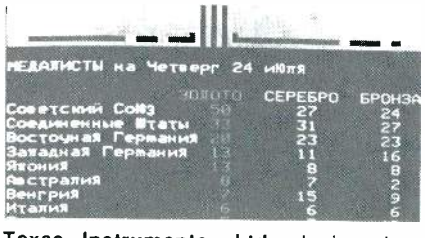
Journal equivalent) and the wire-service Exchange Telegraph known as **Fintel.** Other groups involved include the **Birmingham Post and Mail,** Eastern Counties Newspapers (Eastel) and the Westminster Press group.



The Mullard teletext/viewdata decoder module.



Weather—a popular subject in any media.



Texas Instruments, Ltd. designed a special ROM which could be used for the Moscow Olympics.

In the CEEFAX newsroom, Lord Trenchard (seated), Minister of State for Industry, gives a send-off (November, 1979) to British representatives going to Japan to promote sale of their firm's teletext decoders, test, and generating equipment to TV set manufacturers.

The Post Office does not act as editor or publisher of its Prestel service, but adopts a common carrier role. Editorial responsibilities lie with the Information Providers (some 150 sources responsible for some 100,000 pages.) For it is the collecting role that involves a major Post Office contribution, the gathering-in of payments via the ordinary telephone bill.

When a viewer makes use of his Prestel-equipped set, which is a much more expensive machine than a teletext-equipped one, this usage is registered in the same way that a telephone call is recorded. The viewer pays a connect charge, a usage charge, and for the individual page accessed. Some of these are free to access, with the cost borne by the advertiser or source, but others will range from one half of a penny to as much as 50 pence for a single page.

The charges will not deter commercial applications where the accessibility of such information can be cost-effective, but it has yet to be proved viable at a domestic level. However, Prestel is still in its early days. Some of its initial progress has been delayed by a shortage of sets, but this is being remedied, and other computer-centers outside London are being opened up to extend the service.

There is another distinction between broadcast teletext and the on-line viewdata systems. Whereas CEEFAX and Oracle went nationwide on the first day of broadcasting, Prestel can only extend region-by-region as computers are installed and telephone connections established. Another teletext advantage is that CEEFAX and Oracle are contained within the Prestel sets while the converse is not true.

Major lessons

What have been the major lessons learned *editorially* in over five years of broadcasting, and over three as a full public service? The main ones remain the simplicity and cheapness of the broadcast operation. The original installation of the first CEEFAX computer, and all the equipment for a 2-network service, was less than 200,000 pounds—about the cost of two color cameras or one major production. Even the replacement after five years of original equipment has involved only 250,000 pounds, a small sum in an annual budget of 250 million pounds.

Choice in selection using teletext is paramount. Ideas which might prove an embarrassment if tried on an audience of several millions can be advanced and tested on an audience of hundreds, who have chosen that particular offering. The viewer decides the order of selection, and edits out any page or section that is not of interest. As cassettes and video-discs also make their influence felt, viewer-power could have a completely new significance in the 1980s.

Another element in teletext is the very personal relationship between a single viewer and his chosen page. The words *my page* keep coming back to us in our feedback—you have changed *my page*, a viewer will say, or there is a spelling mistake on *my page*. There is a person-to-person, one-to-one nature in teletext reading, which was exactly what the teletext editors were finding in relation to their audience.

At present, CEEFAX employs a team of 20 journalists, and nobody else. Our technical requirements are looked after by the network engineers who are responsible for the rest of the television picture and its transmission; none of them are specifically CEEFAX engineers, though computer specialists will inevitably become more involved in the work.

The only specialists among the CEEFAX staff are the team of three who work on the finance section and the two sub-editors who specialize in sport. The remaining 15 are general news chief sub-editors and sub-editors, expected to turn their hands almost equally quickly to a newsflash or major political story as to rewriting gardening notes or putting in the details on a weather map. They also do the direct inputting, on the grounds that layout and style are an integral part of the page displayed. The use of color, larger or double-height characters, designs and logos are the teletext equivalent of newspaper type-sizes, and are as important.

The new system

To aid their efforts the BBC has just installed a completely new CEEFAX input and transmission system, the world's first second-generation teletext equipment.

At the heart of the new system are three Digital Equipment Corporation PDP11/34 computers, designed to provide advanced editorial facilities and very high reliability for the transmission. The aim was to provide an extremely flexible system

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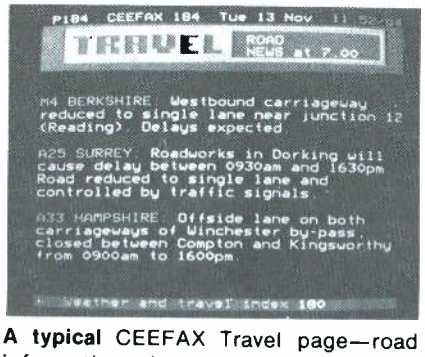
that can be adapted to both technical and editorial developments in the future.

The first of the three PDP11/34 units can handle the inputs from up to 16 VDUs (visual display units) continuously. At the moment there are five VDUs in the main CEEFAX newsroom in the Television Center, with a further two in the finance unit at Broadcasting House, five miles away. The VDUs and the computer communicate at 9600 bits per second; when an editor calls up or inserts a page, it takes less than a second.

CEEFAX sub-editor Audrey Adams inputting tennis results from Wimbledon 1979.

The main CEEFAX Index page-p. 100, shows the general range of broadcast teletext: news, finance, sport, food prices, travel, television.

The value of teletext for **lists**—in this case the card for the British Open Golf Championship.



A typical CEEFAX Travel page—road information about works and delays. This is one of several cycling pages.

A key feature of the input system is its large library. Two RK06 interchangeable disc stores operating in parallel each provide 14 million bytes of memory, equivalent to 10,000 CEEFAX pages. Five thousand pages are used to provide a library of any pages or graphics that are likely to be used again. Editors can assign several names to any new pages, and the system will automatically number the page, and place its titles in the correct position in an alphabetical list. Pages can be recalled either by number, after referring to the library list, or simply by entering one of the page names.

The keyboards are Aston TCG3. They provide many editing facilities independently of the main computer, and they allow CEEFAX journalists to make full use of the joint teletext specification, issued by the BBC, IBA and BREMA (British Radio Equipment Manufacturers' Association) in September, 1976.

One special VDU is linked to a black and white television camera, allowing ordinary pictures to be converted to CEEFAX-style graphics atr the flick of a switch. It also has a light-pen that allows the editors to amend the graphics simply by writing on the screen.

The remaining two PDP11/34s operate parallel output or transmission systems, each with its own RK01 store in an arrangement that gives excellent reliability. They provide a variety of options for assigning magazines to television data lines, and can handle more than the two data lines per television channel that are in use at the moment. Each output system has a separate, BBC designed, MSF clock receiver. To make the best use of the accuracy available, extra header rows are broadcast to ensure that the time shown on CEEFAX receivers is accurate to plus or minus one fiftieth of a second. The transmission is fully adaptive, which means that blank rows in any of the pages are not broadcast.

The output systems can also broadcast subtitles. The subtitle input can come from a floppy disc, which automatically runs in synchronism with a film or videotape; alternatively, they can be written into the CEEFAX system in advance, and called up and cued manually.

The new system offers many other facilities that speed editorial operation. For example, telex or wire service messages go straight into a part of the computer store, and can be called up, edited, and put on the air in a matter of seconds. The editors can command specific pages to be broadcast at specific times, so that pages can be prepared in advance, and broadcast later in the day using deferred time commands. There are temporary stores so that an editor, responding to an urgent newsflash, can dump the page he was working on and recall it easily once he has dealt with the flash.

This second generation CEEFAX computer system was designed by BBC engineers with assistance from a British software house called Logica. The BBC and Logica have signed an agreement that allows Logica to sell the design overseas, and the size of the transmission system can be as big as the BBC 3-computer system or a simple 100-page system employing one mini-computer and two terminals.

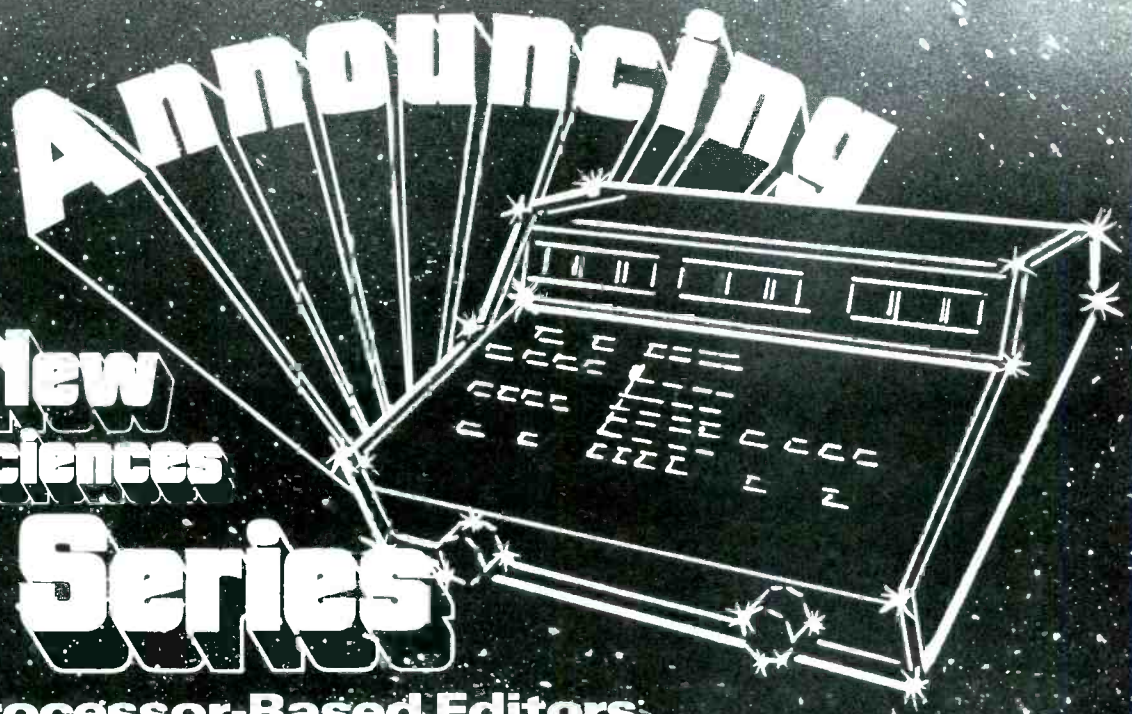
The future

What then of the future? It would be a daring man who would forecast where teletext might be at the end of the 1980s. It was developed in a decade in which moon landings and space shots became routine; in which computers became powerful and cheap; and which has seen hundreds of new ideas surface and be transistorized. In such an era, teletext can be considered the bicycle in a whole new dimension of communications.

My own prediction is that broadcast teletext will expand slightly in content, probably in a direction of regionalization and more local information. I am sure the entertainment content will be greatly emphasized —with more games, puzzles, quizzes and competitions. I can see a new emphasis on the transmission of telesoftware (that is, teletext pages containing software programs to activate home computers and domestic microprocessors. It will become much more of an information booth, expected to respond immediately to public needs for information.

I am also convinced—in the same way that the bicycle is still around in the age of Concorde, Apollo rockets, communication satellites, superhighways—that teletext will still be around in the 1990s and the 2000s. Because, like the bicycle, it is cheap, simple, rugged, and is working now. □

Announcing



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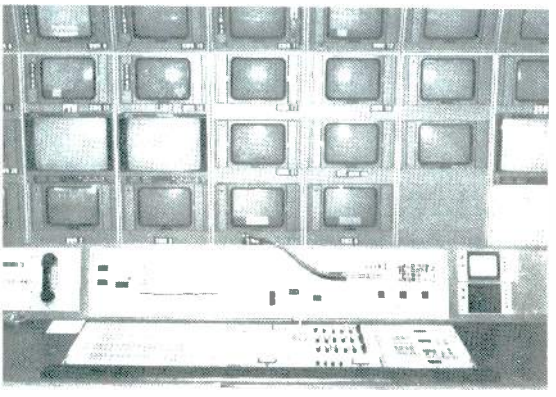
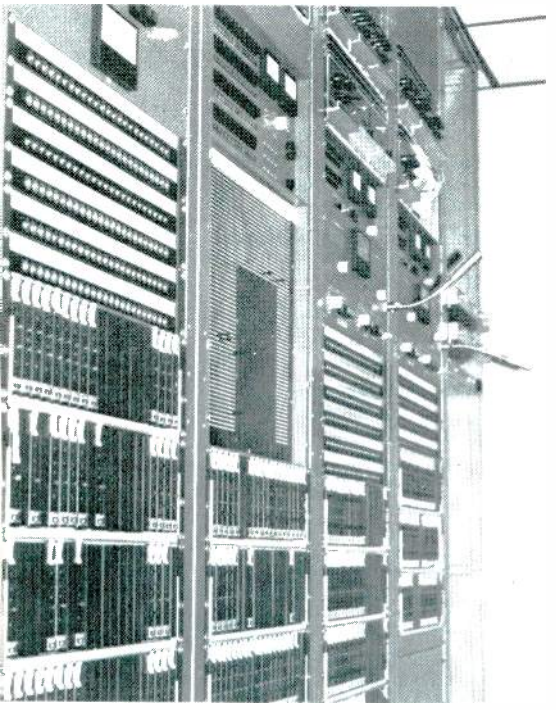
View of newsroom from flash camera position.

Audio mixer, one in each control room.



Video switcher position in control room.



Transmission room intercom racks.

A New Television Broadcast Facility: WABC-TV*

Elmer Smalling III, President, The Jenel Corp.

WABC-TV engineering began work on their new, 6-story, 7 Lincoln Plaza facility early in 1978. By August 1979, the first plant built exclusively for television broadcasting in New York City began operation in a building designed to be modern and functional and yet fit within the Lincoln Center area, which has been evolving into New York City's center for the performing arts.

The technical areas dealt with in this article are located on the first and second floors. The large studio, loading ramp, and scenery dock are located on the ground floor while the second floor houses most of the technical equipment.

Studio

The studio measures 55'x100' in floor space with a 22 foot maximum height lighting grid consisting of 21 electrically raised or lowered *hot* grid sections. These separately motorized sections allow for convenient access to the pigtails and luminaires, eliminating the need for cumbersome ladders and hooks. This grid scheme accommodates a wide variety of daily shows and scenery setups in the WABC-TV studio. Also, a crisscross of catwalks above the grid provides access to stationary support members for placement of special luminaires, microphones, speakers, flying scenery, etc.

Tiered wire trays skirt the perimeter of the studio with drops to the audio/video connection panels and the camera patch panel. There are 10 a/v panels in all—serving the studio, studio catwalk, roof, loading dock, sidewalks and the newsroom. In addition to microphone lines, trunks and studio announce feeds, the panels also provide console PA outputs, monitor feeds, intercom, interrupted feedback circuits and video trunks from each control room. Through patching, any source may be brought up on any one of the a/v panels. Sidewalk panels serve outdoor shooting as well as interconnection with remote television vehicles.

*This article was prepared with the cooperation of the following ABC personnel: James Baker, director of engineering, WABC-TV; Peter Adamiak and Richard Hess, ABC Television Network.

Triaxial camera cable and standby TV 81 cable is terminated at the studio camera patch panel where five studio cameras may be patched and routed around the entire plant. The thin triaxial cable allows for a small, wall-mounted patch panel with rugged, easy-to-make connections. Triax cable is quite simple to terminate and handle, requiring 1/10 the time of the older TV 81 cable.

The studio includes an automated studio lighting system that has been designed in accordance with ABC specifications and modifications. Computer assisted dimmer assignment incorporating floppy disc storage allows for maximum scene preset flexibility. Like many television stations, WABC-TV has a number of daily studio setups—news, public affairs, local programs, promos, etc.; so it is easy to see that this type of lighting system permits substantial reductions in setup time and manpower.

The main lighting control center is adjacent to the studio floor in a large and easily accessed room. Up to 395 dimmers may be instantly assigned to over 375 luminaires in any configuration with each pigtail set at any desired level. A large silkscreened annunciator panel in front of the operator shows each of the pigtail destinations and their number (address) while small lamps reflecting pigtail voltage provide a relative indication of luminous intensity on each pigtail. This analog of a lighting director's layout displays the scene in use at a glance. In addition to three levels of on-board computer backup, a readily accessible miniature control matrix pegboard is provided for emergency luminaire assignment to any one of 24 backup dimmers in the event of a computer system failure. Also, a remote terminal on a cart, used during setup, is equipped with a lighting computer control keyboard, and two CRTs.

In addition to this ample sized studio, there is a large indoor scenery dock and loading ramp allowing for off-street set and prop receiving and shipping—a must in a high traffic urban area.

Control rooms

Two identically-equipped control rooms may operate with the studio

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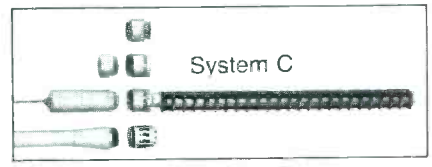

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or be used for post production or air unilaterally. Each of these control rooms includes a 24 input switcher with triple effects, effects memory (for pre-loading complicated transitions and breaks) and a digital effects unit. Each control room switcher is equipped with 16 routing switcher destination inputs permitting patch-free show preparation.

The audio area for each control room consists of a 32x8x4 audio console with full equalization on each input channel. These consoles are capable of mixing any 64 plant sources into two stereo output busses or four monaural lines. With the advent of the new videotape machines equipped with three audio tracks (code, audio 1, audio 2), two level audio processing is finding its way into many facilities. A great deal of care and engineering went into the audio portion of the WABC-TV plant so that recording studio quality audio is available up to and through the transmitter. The consoles (as well as all audio equipment at WABC) are equipped with peak reading meters. (ABC engineering's research into peak meters concludes that they will replace VU-type movements for broadcasting.)

Machine control is accomplished from the video switcher position and is routed throughout the plant on line 14 in the vertical interval. Instead of having to run and switch multiple conductor control cables from a number of operating panels to each VTR, film chain, etc., the analog control signals are converted to data on line 14 for plant-wide distribution. Detectors at each source location recognize their address and reconvert the vertical interval data into control signals. This new system provides a great deal of flexibility and allows for software changes to be made (when necessary) rather than re-routing cables and hardware. A source identification (video readouts keyed on respective control room monitors) system is presently being incorporated into this system.

The technical director's position at each video switcher includes a single button system to transfer cameras, tallies, intercom, machine control, etc. to either control room, with a master override switch located in the transmission area. This innovation obviates the need for switching and patching these elements separately, allowing multiple control rooms to share one studio, saving time and manpower.

Each control room is complete with a video character generator and an electronic frame storer. The character generators may be loaded and operated from the central composing room, either control room, or the newsroom. Computer and camera font-create facilities in the central composing room allow WABC-TV to devise their own electronic fonts and maintain a large graphic library on floppy discs. The video character generators now provide rapid access time and a small graphics storage area.

The electronic frame storage system replaces slide chain and camera art card photography on-air, again providing for rapid access and denser storage. Operating these two graphics innovations frees one or more studio art card cameras and a slide chain during broadcasts and requires less manpower hours.

Each of the two identical control rooms includes a position for a senior video operator. This individual is responsible for the technical quality (level, color, timing) of all of the video sources used during a show. The operator has a waveform

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2. *EFP*—studio quality portable, with remote control; timing and phase adjustable gen lock; instant convertibility to studio camera use by simple change of viewfinders.
3. *Studio*—compact, maneuverable; full broadcast quality; 5" viewfinder.

The LDK-14 combines innovative design and unique capabilities in a state-of-the-art 2/3 inch camera that is *much lighter* and *uses significantly less power* than the competitive ENG-only camera. Plus the LDK-14 gives you additional advantages in size, picture quality, stability, maintainability and cost.

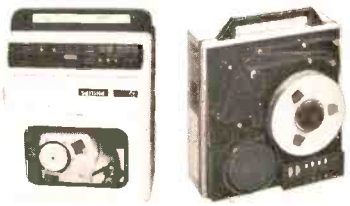
Among its many other unique features for portable and studio use are:

- Only 27 watts power consumption (almost 1/3 less than the ENG-only competitive portable) gives longer continuous operation with choice of battery belt or small battery pack affixed to camera. A standby switch further conserves battery power between takes.

- Viewfinder displays include: contour enhanced camera picture or external video signal; status monitors for video level, color balance, bars on, battery discharge, VTR functioning, intercom call and camera tally.
- Automatics include: color balance; white and black level; centering; noise reduction when operating with extra gain; auto iris with set and hold facility.
- Externally switchable black stretch and contrast expansion.
- Dynamic Beam Control (DBC), regulates beam current to suppress comet tailing and blooming.
- Circuitry designed to maximize advanced capabilities of the latest rear-loading Plumbicons.
- Optional remote control facilities.
- Easy access for set-up and maintenance. Rear casing flips up for access to five main plug-in circuit boards.
- The rugged magnesium housing and titanium quick-release lens mounting holds all optical and electrical components in absolute registration. (Lens mount is strong enough for the heaviest extended range zoom lenses.)
- Rain, splash and RFI proofed.
- Other features include electronic raster rotation for better registration; linear matrix for optimal and Philips compatible colorimetry; and 360-degree hue-selectable chroma key.
- Other competitive cameras may have some of these LDK-14 features—no one has them all.

Camera-Recorder Systems

With this unmatched combination of performance and portability, the LDK-14 is *also the ideal camera for field recording of ENG and EFP.*



And just as Philips has always offered the widest selection of portable and studio cameras to meet your specific needs, the same policy now applies to your choice of 1" VTR's and TBC's. Offering 'C' format and 'B' format VTR's in both portable and studio configuration, Philips can provide the greatest objectivity and cost-effectiveness in packaging systems to match your requirements.

Philips, the company that started it all, now introduces the latest portable breakthrough, the LDK-14 broadcast systems camera. It will be the industry standard for years to come. And for a camera-recorder package to match your requirements, your choice of 1" VTR formats. Only from Philips.

For all the facts on this innovative new camera or camera-recorder system (please specify) write: Philips Broadcast Equipment Corp., 91 McKee Drive, Mahwah, N.J. 07430 (Canada: Philips Broadcast Equipment, 601 Milner Ave., Scarborough, Ontario M1B 1M8)

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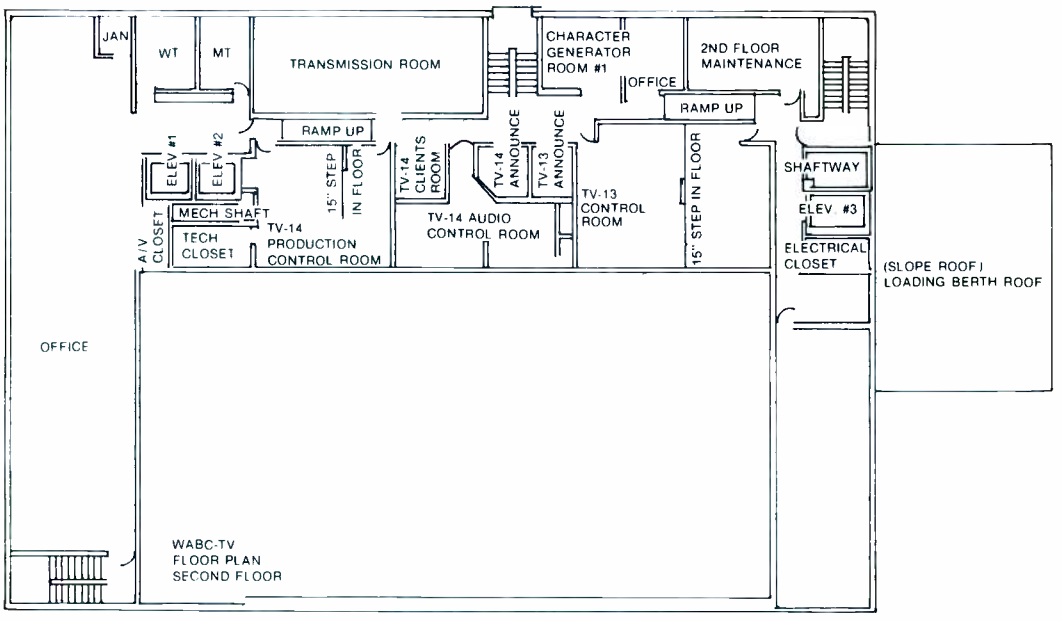
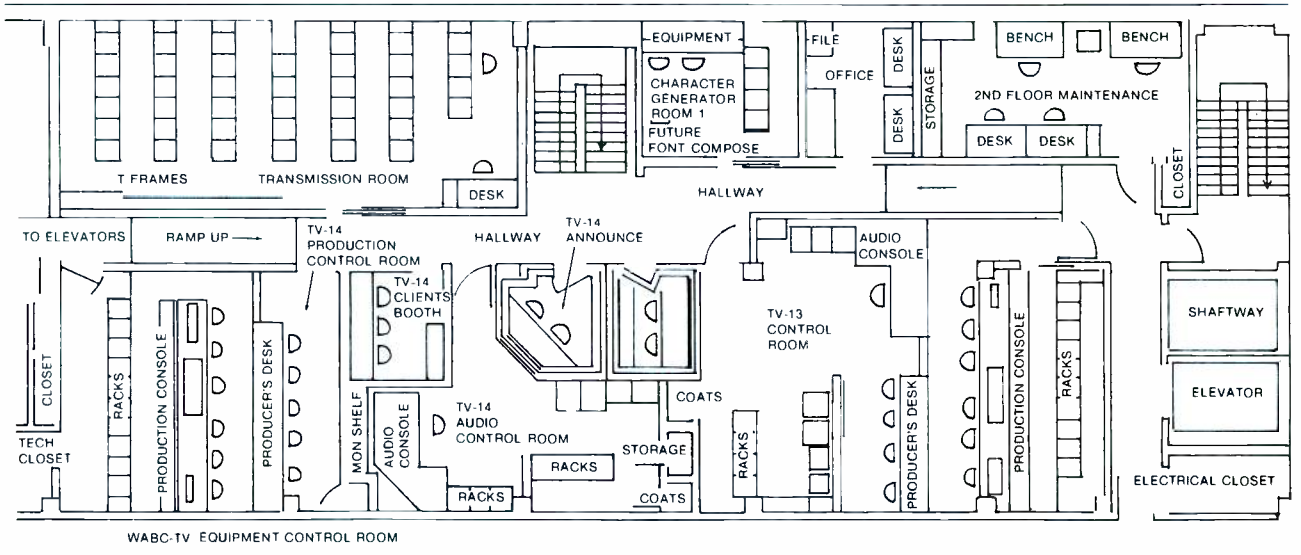




WABC-TV EQUIPMENT CONTROL ROOM

monitor, vectorscope, color monitor, two in-line color correctors, and remote iris and level controls for the studio cameras as well as a bus on the production switcher from which to select and match all elements. Although the studio cameras incorporate computer-controlled automatic setup (which saves the time-consuming manual geometric setup). the cameras must still be *fine trimmed* and matched to one another and other studio sources. One of the color correctors is timed to the effects bus of the switcher allowing synchronous video manipulation of a corrected source.

In addition to the two control rooms just discussed, WABC-TV has a computer automated *air* control room. A minicomputer-based system operates a multibus audio-follow-video switcher that can accomplish automatic cuts, fades, dissolves, keys, mattes, effects, audio overs-and-unders, and audio separates—just to name a few. The system itself stores a week of programming and can be updated by the traffic department or the control room. In addition to controlling the audio-follow-video switcher and all machine control functions, the system will handle *rolls in black, dead rolls,* and *joined in progress* programming situations. WABC-TV has used a similar computer operated system for a number of years and plans to interface this system with a traffic computer in the near future.

Many fast breaking news stories or those with timely import should not wait until the next scheduled newscast to be broadcast. WABC-TV has provided for this contingency with a newsroom *flash camera.* Mounted in an unobtrusive housing within the active newsroom, there exists a system that includes a color camera, tally light, monitor speaker, video monitor, and earphone feed for the air talent. This *flash camera* system can be switched on from the *air* control room allowing a live news insert to be broadcast within a minute. This camera may also be used quite effectively for logged news inserts or promos.

Technical area

Besides the air control room, the central composition area and the control room, the technical area includes an announce booth for each control room, a clients room, transmission room and technical maintenance area—all of which are equipped with computer-type flooring. The client's room provides for

FULL RANGE PRODUCTION WITH THE AMPEX VPR-2:

Instead of a Different Machine for Every Trick, a Single VTR that Does Everything.

Compact VPR-2 (tabletop version) on TBC-2. Height: 25.5"; Width: 19.2"; Depth: 16"; Weight: 135 lbs.; Power: 5.5 A @ 115 VAC. *TBC-2*: Height: 11"; Width: 19"; Depth: 18"; Weight: 80 lbs.; Power:2 A @ 115 VAC.

You can spend a lot of time and money recording on a videotape recorder, editing on an editor, and producing slow motion on an Instant Replay system. Or you can do it *all* on the Ampex VPR-2, far more easily and in far less time.

Straight Recording in Vibrant High Band Color.

There isn't a better recording combination in the world than the Ampex VPR-2 one-inch helical and Ampex professional recording tape. You get playback performance that stands up to a trained eye as well as the most exacting technical analysis. And you get unmatched ease of operation and serviceability because of the VPR-2's modularity. You'll also appreciate the way the VPR-2's compact packaging system provides a full line of configurations from rack mount to console with full monitor bridge to suit your particular needs.

Built-in Editing for Unlimited Creativity.

Built-in editing with automatic search-to-cue simplifies and speeds ambitious production work. Tape time accuracy is maintained for frame-accurate entrance and exit edit points, even without the optional time code system. You can visually select edit points "on the fly" because you always see the picture off-tape from stop through fast forward and rewind. The remote control capability of the VPR-2 provides easy interface to external editing controllers. The creative possibilities are unlimited.

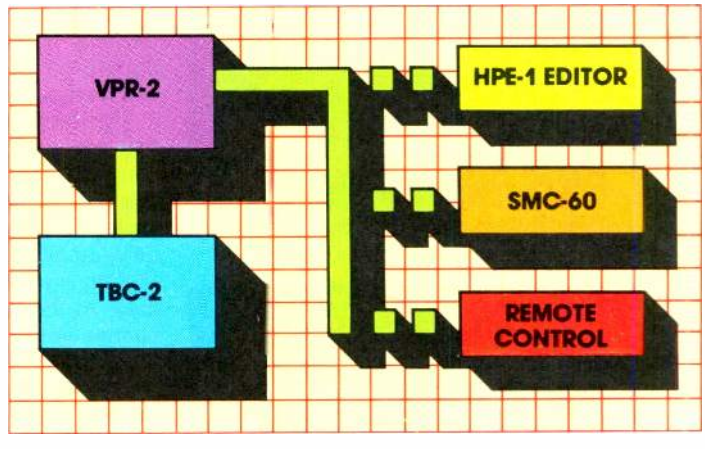
Sports Coverage From a Crawl to a Dash.

With the optional AST™ automatic tracking system, you're ready to produce all the effects of Instant Replay. There's even a slo-mo controller (SMC-60) accessory that gives you joystick command of the VPR-2 for a complete sports coverage system in one convenient package.

Automatic cueing keyed to the tape timer lets you set up for frame-accurate, "look again" in slow motion. And you can punch up slow motion at one-half or one-fifth real time for precise production matching. The Ampex TBC-2 digital time base corrector puts it all on the air, and even produces a picture in high speed shuttle for rapid cueing.

If the Specs Don't Convince You, A Demo Will.

The cost-effective VPR-2 is turning the impossible into the commonplace for users around the world. Because one machine does the work of three, the VPR-2 increases productivity and reduces operating costs. To find out why the VPR-2 is the world's most popular professional videotape recorder, contact your Ampex representative today.



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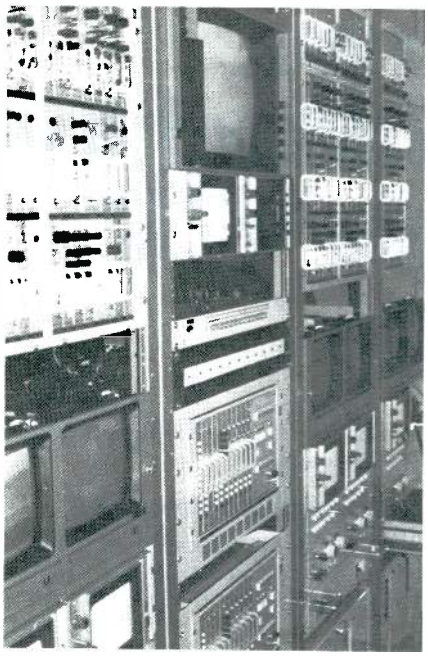
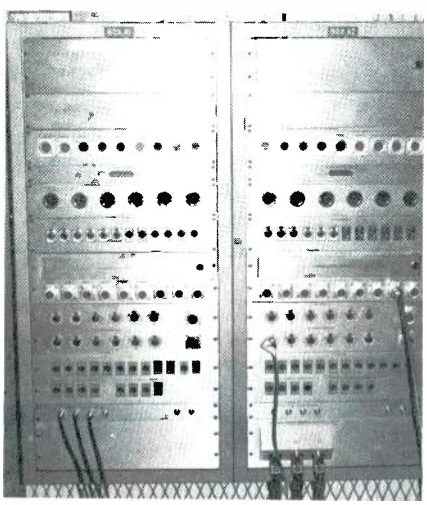


Transmission room camera controls.

Transmission room audio panel showing only VU meter in entire plant.



Typical studio wall a/v box.

Close-up of studio floor terminal.

an acoustically sound area with full audio and video monitoring facilities and a view of one of the control rooms. When not being used for clients or production personnel it may be equipped to house additional announce facilities, character generators, computer terminals, etc. for elections or special coverage.

A transmission room consisting of 40 racks of equipment houses the basic electronics for the WABC-TV plant. This equipment includes: (1) Electronics for switchers; (2) A 60 by 80 two audio level, one video level routing switcher with automatic subcarrier phase correction amplifiers; (3) Audio distribution; (4) Camera control units; (5) Vertical interval machine control and source identification equipment; (6) A 36 channel rf distribution system; (7) Pulse distribution; and (8) Video and audio test gear.

The WABC-TV intercom system is also noteworthy. Consisting of four, 50x50 matrixes, each with provisions for 12 interrupted feedback busses, this system is one of the largest used in broadcasting—providing maximum flexibility, breakaway isolation and room for expansion. The four separate systems permit a hedge on total system failure that might be encountered with one, large, monolithic unit.

The transmission room derives its name by providing the capability to receive and transmit signals to and from the ABC television network, microwave circuits, common carriers and the transmitter. The internal plant wiring includes 24 miles of video cable and six miles of multiple conductor audio line.

Pre- and post-equalization is used on all video lines, especially those feeding waveform monitors and vectorscopes. The plant derives its timing base from a Cesium frequency standard that allows for minimum frequency drift over very long periods of time. (The same Cesium standards provide tight time bases for navigational satellites).

The technical areas of the plant are protected with smoke and heat sensors controlling a combination zoned Halon/sprinkler system. Trade-offs must be made when designing television plant fire protection systems: sprinkler systems may cause damage to electrical components where Halon will not; however, it may take a week to refill the Halon tanks, leaving the facility vulnerable during the refill period.

Electronic journalism [EJ]

Eight van-type vehicles make up the WABC-TV EJ fleet. Each is equipped with a 2GHz return to studio microwave, a hand-held EJ camera, ¾-inch helical scan recording machine, portable lighting equipment and a time code generator.

New York City EJ units require a wide coverage range with main receiving antennas atop the Empire State Building as well as two perimeter receiving sites—one in New Jersey and one on Long Island. Each of these sites is equipped with a remotely steerable dish controlled from the studio. Transmit return to the studio from these sites is accomplished using 7 and 13GHz microwave systems that are fed to the house routing switcher for use at any location around the plant. Six EJ rooms, each with a time code editing system, audio mixer, two playback machines, and a record machine allow for rapid post-production and editing and are capable of being fed to air or any of the control rooms through time base correctors or frame synchronizers.

Transmitter

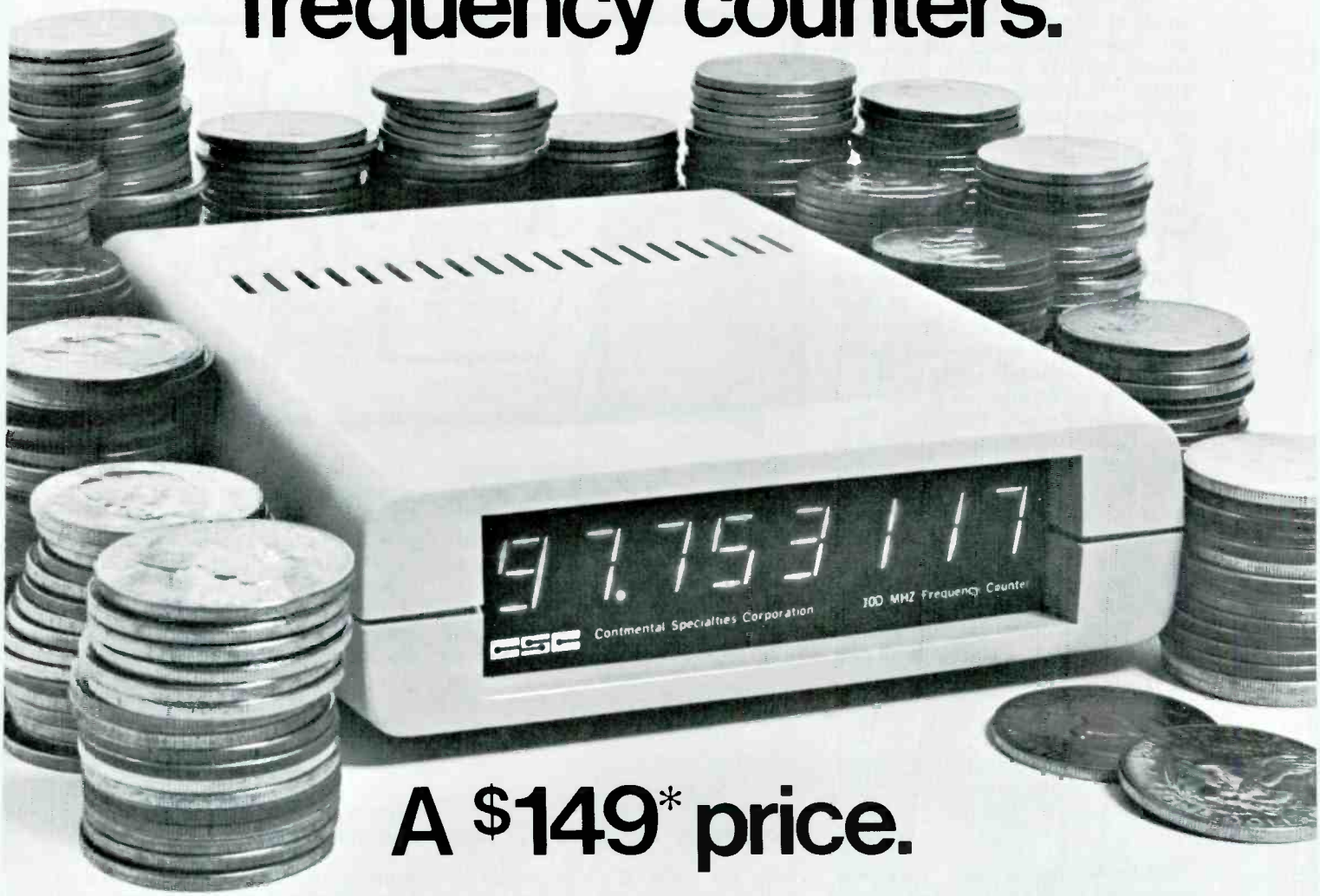
The existing WABC-TV transmitters are located atop the Empire State Building. This spring, the transmitter facility will move to new and even higher quarters atop the World Trade Center. The new plant includes four, 25kW transmitters—two each for main and alternate main feeding a CP antenna system (WABC-TV's sister station, WLS-TV in Chicago was one of the first stations to participate in FCC sanctioned in-service CP testing). The transmitters are configured so that the ones not feeding the main antenna are routed to the emergency antenna providing for very little *off* air time in the event of a failure in the main chain or during transmitter switch-over.

The line monitor in the air control room is an off-air monitor fed from a local tuner. This, coupled with an alarm leaves no doubt in the operator's mind when a transmitter outage occurs so that the problem receives immediate attention and program logs can be noted.

Final notes

Salient features and innovations incorporated in the new WABC-TV plant have been discussed to illustrate that planning a broadcast facility has become complicated with broadcast equipment changing as fast as it has over the last few years. Careful planning and solid design engineering techniques, which include provisions for future updating and expansion, are essential when enbarking on a project of this scope. □

Announcing a major breakthrough in $250 frequency counters.



A $149* price.

Keep the change! Our MAX-100 is remarkable, even compared to $250 digital frequency counters. With its turn-on-and-read operating simplicity. Direct 8-digit readings. Big, bright, display. And under-20 Hz to over-100 MHz range (past 500 MHz with optional prescaler).

It has all the features you'd take for granted, even at $250. Like high sensitivity, accuracy and stability. Lead-zero blanking. Plus visual indications of overflow and low battery. (The flashing low-voltage indication also prolongs the counter's useful battery life!)

MAX-100 is comfortable anywhere, monitoring nearby RF transmitters with its built-in mini-whip antenna. Or any other CW, AM, or FM signal via clip-lead cable or accessory low-loss tap-off cable. Powered by your choice of alkaline cells or rechargeable nicads with battery eliminator/chargers that operate from car cigarette lighter, 110 or 220 VAC mains.

CSC's incredible MAX-100 solves all your problems but one: what to do with the $101 change.

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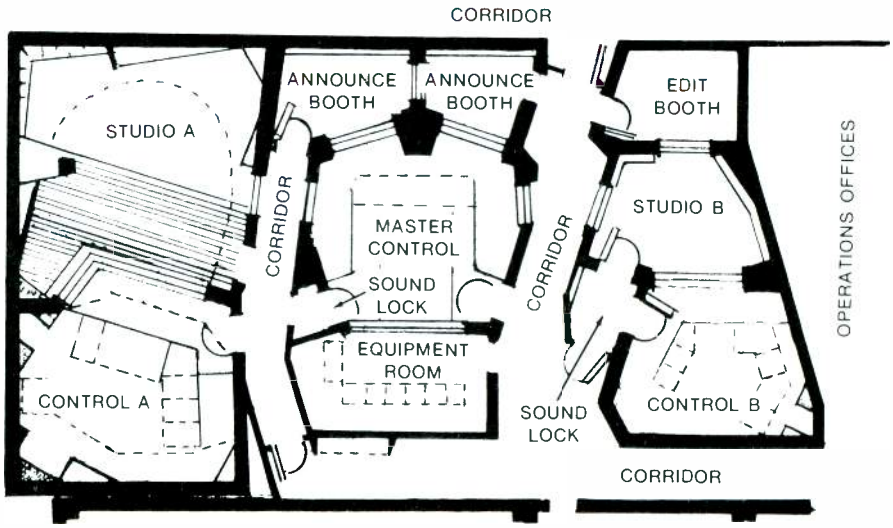
WGUC: Major new radio studio

John Storyk and Joe Schick, principals of Sugarloaf View, a 10-year-old New York-based design firm whose clients include over 100 major recording facilities worldwide, have announced finalization of plans for construction of one of the largest public broadcast studios in America: Studio A in the future home of WGUC (90.9 FM), Cincinnati's public radio station.

Architect John Storyk—whose credits include Electric Lady, the Howard Schwartz complex in New York City and the new Criteria West Studios in Los Angeles—was forced to design around several major structural difficulties on the second floor of the Crosley Telecommunications Center in Cincinnati, WGUC's new home. Overcoming the obstacles, Storyk was able to design a studio of 500+ square feet, which will make WGUC's primary studio one of the largest public broadcasting station studios in America when construction is completed during 1980. Total area of the new broadcast recording facility is 3800 square feet, which includes a smaller Studio B, two separate control booths, two announce booths and a separate central control facility with an adjacent equipment room. Sound locks protect the central control room and Studio B from extraneous noise. Since WGUC does substantial recording-for-disc of local artists, the studio was designed and will be wired for a 24 track recording console that WGUC plans to install at a future date.



WGUC recently announced its selection as one of only 15 uplink or transmission centers, feeding into the new National Public Radio network satellite transmission system.

WNCN radio studio designed for tops in sound

When WNCN in New York was purchased by GAF, the station was rebuilt from scratch, with nothing spared in the design and construction of the studio and control rooms. Richard Sequerra (known for his many designs, including the legendary Marantz model 10B tuner) was WNCN's consultant in its quest to produce "the best FM sound on the air."

Special care was taken in the design of the recording studio and two control rooms to ensure an undisturbed, clean sound. To prevent any vibration, all three rooms were floated on 4-inch concrete slabs that rest on rubber pucks. Not only are the rooms slightly irregular in shape to avoid build-up of acoustical waves, but each room is completely isolated, separated by airspace between the walls. Wall thickness, including airspace, is 1.5 feet. Even the offices above the studio and control rooms were rented by WNCN to ensure total quiet. To further insulate the studio from outside noise, the walls, ceilings and metal doors were fitted with compressed fiberglass acoustical panels. The window between the control room and the studio was triple paned, using extra-thick glass, and each placed at a slightly different angle to reduce sound transmission. Finally, the cables connecting the monitoring instruments between the rooms pass through flexible ducts packed with acoustical material.

WNCN's sophisticated equipment also goes a long way in ensuring a clean sound. Hardware used in the station includes Technics Sp-10 Mark II direct drive turntables set in modified McCurdy mounts for rumble-free disc playing; a Keith Monks Record Cleaning Machine; a specially modified Sequerra tuner (WNCN is one FM station that monitors its broadcasts directly off-the-air); Micro-seiki model MA-505 tone arms; AKG P8 cartridges; Mark Levinson phono preamplifiers; Bryson model 4B power amplifiers; Pyramid loudspeaker systems; and a Makamichi model 1000 cassette deck.

WNCN produces a signal which they consider to be ideal, exceeding the capacity of FCC type-approved measuring equipment.

A full-length article on this facility's design is currently being prepared for a forthcoming issue.

Facts from Fluke on low-cost DMM's

Direct readings in decibels: Keeping track of your gains and losses.

If you'd rather forget about the last time you got wrapped up in an audio jungle, you'll want to respond to this ad.

Meet our new 4½-digit Model 8050A Multimeter – the first low-cost DMM with self-calculating dB features that let you keep your mind on your mission instead of on conversions and formulas.

While most analog meters read dBm referenced only to 600 ohms, the Fluke 8050A delivers direct readouts in decibels over a 108 dB range referenced to any one of 16 impedances (8 to 1200 ohms) with 0.01 dB resolution

Push one button, and the microprocessor in the 8050A scrolls through its reference impedances. Simply stop at the one that matches your system and get back to work. No more math; just action. And with the 8050A's relative reference feature you can measure gains or losses in dB throughout your system faster than you thought possible.

When you're dealing with voltage, current or resistance, an offset function provides a means of comparing stored inputs with all subsequent inputs, automatically displaying the difference. A real timesaver.

And there's more. True RMS measurements to 50 kHz; 0.03% basic dc accuracy; conductance (measures leakage and high resistance); extensive overload protection and safety features; a full line of accessories; and a low price of $329 U.S.

For all the facts on how to maximize your gains with the 8050A, call toll free **800-426-0361**; use the coupon below;or contact your Fluke stocking distributor, sales office or representative.

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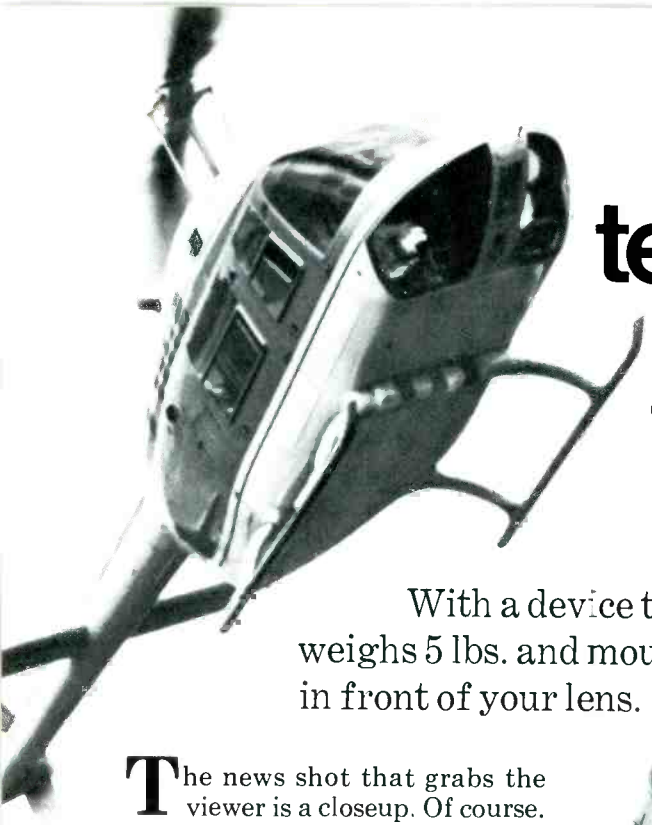
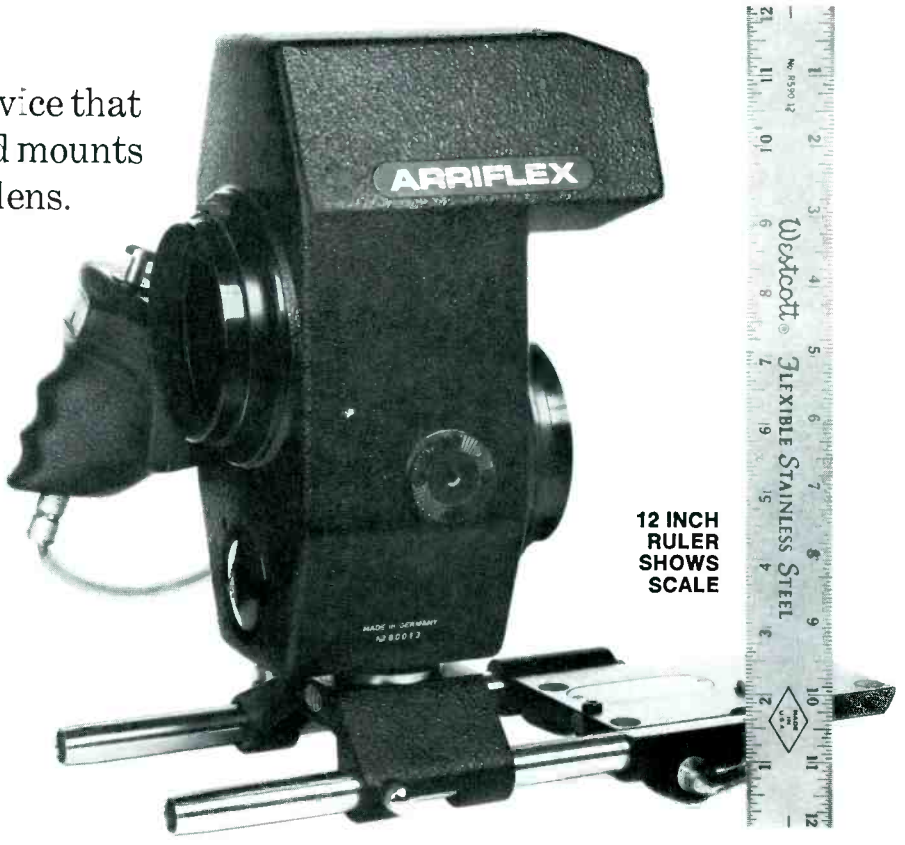


How to get steady telephoto shots of the news action from 300 feet up:

With a device that weighs 5 lbs. and mounts in front of your lens.



12 INCH RULER SHOWS SCALE

The news shot that grabs the viewer is a closeup. Of course. Like any other moving platform, though, the helicopter isn't steady enough for the camera to zoom in tight. Needless to say: at the long end of the lens, vibration is magnified.

You pay good money for that helicopter. You should get high-quality images.

The police, the F.A.A. and the pilot all quite rightly want you to keep a safe distance from the action on the ground. *But you need close shots.* You're paying for the helicopter to make your news operation look good. Shaky pictures don't help.

Get 3 times closer.

Without stabilization, you can't go longer than about the 50mm focal length on your ENG camera. With the Image Stabilizer, depending on air turbulence, you can get smooth shots at 150mm or longer.

No special training needed. It's just another (astounding) accessory.

The Image Stabilizer comes with its own Support Plate and bracket. You mount your camera on the Plate and position the Stabilizer in front of your lens. Switch on the Stabilizer. Switch on the camera. Shoot. Any competent cameraman can use it. It works with any camera and with any prime lens longer than about 35mm. (With zoom lenses, the widest focal length varies slightly.)

The new Arriflex Image Stabilizer

an important ENG/EFP accessory.

At focal lengths wider than 35mm, the Stabilizer vignettes. A small price to pay for getting *three times* closer. And if you need a panoramic shot, that's easy: Pull the helicopter back.

How it works:

The entering light rays are reflected off a front-surface mirror mounted on two gimbals powered by a battery-driven gyroscope. The mirror is effectively floating in space, as though on two trapezes – one oriented N-S, the other E-W. The image from this mirror is reflected onto another (fixed) mirror and thence into the camera's lens.

Aerospace technology.

A gyro's directional stability makes it resist off-axis movement – such as panning the camera. If you insist, it tumbles in that direction. British Aerospace, the designers, have turned this tendency to advantage. A precession brake causes the gyro to *lean with* the panning motion, steadily. This is military aerospace technology, ingeniously adapted.

The British Aerospace Steadyscope uses the same stabilization method. Above: surveillance from a NATO army helicopter.

British Aerospace is a company very much involved with high-precision technology. Military missile systems, orbital satellites...

One of their products is the Steadyscope. It uses the same gyro-stabilization as our Image Stabilizer, whose moving parts are also made by British Aerospace.

How well does it work?

In the November 16, 1978 issue of the British magazine NEW SCIENTIST, there's an article by Guy Parker on stabilized binoculars. Referring to the Steadyscope, Mr. Parker writes:

Anchored in space

"On pressing the uncage button there is an immediate transformation which is both psychological and optical. The impact is of course greater if one is being shaken in a helicopter, but even on land the image appears in an almost uncanny way to anchor itself in space, even if the instrument is deliberately jiggled about."

Detail resolution

"An optical phenomenon now becomes apparent," writes Mr. Parker. "After the initial pleasure at the disappearance of jitter, the eye seems to demand needle-sharp resolution, now that the visibility of detail is determined mainly by the quality of the optical design. *There is no future for a stabilizer which does not give the highest resolution under all conditions of use.*"

IMAGE STABILIZER SPECS:

Length (Image Stabilizer alone): 6 5/8 ins. Width: 4 11/16 ins. Height: 9 1/4 ins. Weight (Image Stabilizer alone): 5 lbs. Weight (on Support Plate with 9 1/2 inch rods and with cable-release handle): 7 lbs. 4 oz. Maximum panning speed: approx. 4 degrees/second. Maximum accelerative force: 6g. Equalizes vibration frequencies 1 Hz and higher. Camera lens focal lengths usable with ENG/EFP format: 35mm and longer.

Rear view of Image Stabilizer shows Support Plate with threaded camera mount. Custom brackets are available for various cameras. Stabilizer can be removed from camera in less than two minutes.

No light loss, no image degradation.

There are no lenses or prisms in the Stabilizer. Light rays pass through optical flats front and rear, and reflect off two front-surface mirrors. If you meter the light at the exit port, it measures the same as the light entering.

Doesn't perform miracles. *Does* work in a car, though, or any other moving base.

The Stabilizer is for making shaky shots smoother, *not* for simulating a rock-steady tripod. Its low mass is vital in the unwieldy g forces inside a helicopter. But that's useful in a car, too, or on horseback . . . You can get out of the car and continue shooting with a body-brace. And the Stabilizer is quiet enough to shoot sync sound out of doors.

Elegant proof of low mass space-hardware sophistication: a gyroscope powered by one flashlight battery.

To improve a gyroscope's effectiveness, you can increase either its mass or its RPM. For military purposes, British Aerospace had to make it small, light and efficient.

High speed with low mass requires exact dynamic balance, of course. Eccentricity and bearing friction would impair accuracy and soak up power. One measure of the phenomenal precision of this device: The gyroscope – with its double gimbal and mirror – will run about four hours on a 1.5 volt D cell!

Low mass saves money.

A low mass device is likely to be compact. With this one, you can rent a 5 place helicopter at $300 an hour, and get steady shots *from inside*. No need to hang out of the open door. And no need, either, for a 7 place helicopter at $400 an hour, or more. The Image Stabilizer, incidentally, rents for about $100 a day.

5 PLACE BELL JET RANGER

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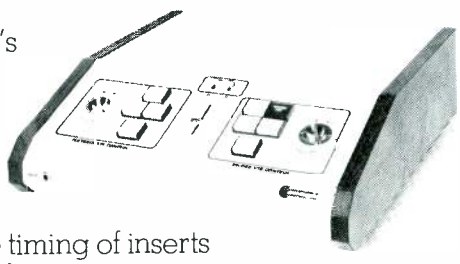
It takes years to make videotape editing this simple.

After inventing the world's first joystick editor, we didn't just rest on our laurels.

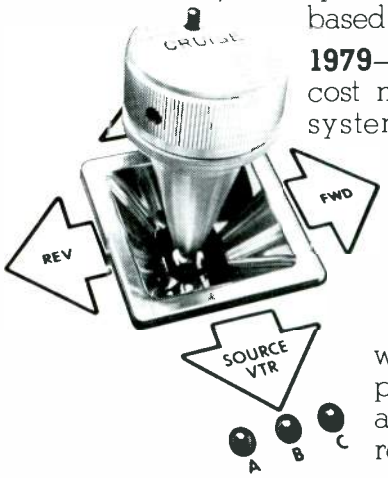


1975—ECS-1, world's first joystick editing system.

1976—TT-4, first resettable tape timers. PC-3, first computer for precise timing of inserts and high speed search.

1977—ECS-1B, advanced technology added to the original joystick editor to increase speed and accuracy. ECS-10, new low-cost editing system.

1978—ECS-100, first Superstick microprocessor-based editing systems.



1979—ECS-103, first low-cost multi-source editing systems. SE-100, first switcher designed for editing by an editor manufacturer.

1980—ECS-90, first editing system with plug-in compatibility to virtually all video cassette recorders.

Continuing advances in videotape editing come naturally to Convergence Corporation. Since 1975, we've sold more than 1,700 editing systems. And with each one, we've gained a better understanding of what you really want in an editor.

Our expertise in software development helps us respond to your needs fast. When you asked for a more economical editor with superstick power and full function keyboard, we went to work on the system you need for sophisticated ENG editing, magazine shows and high speed EFP post production.

Now, you're seeing the results—the new ECS-103A. Designed for cassette editing, this cuts-only system has a heritage of advanced thinking and easy upgradability to our most powerful multi-source system. Human-engineered for ease of operation, the ECS-103A includes split audio and video edits, store and recall of 99 scene locations, high-speed search, full edit status display, two interfaces for ¾" cassettes, plus the ability to work in both control track and industry standard SMPTE time code, all for **$12,500.***

Write or call for further information, or a demonstration.

Convergence Corporation, 1641 McGaw, Irvine, CA 92714; telephone (714) 549-3146

Editing means Convergence

CONVERGENCE CORPORATION

For Information Circle #51 on Reply Card
For Demonstration Circle #52 on Reply Card

*Mfr's suggested resale price. Prices higher outside U.S.

NRBA

National Radio Broadcasters' Association

1705 De Sales Street, NW
Washington, DC 20036

S-622 supported

The NRBA has formally commented on the revised draft of S-622, Senator Goldwater's proposed bill to amend the Communications Act of 1934. In a letter to Goldwater, the association expressed congratulations and support for the radio broadcast portion of S-622. Commenting on the "cost of regulation" fee included in the bill, NRBA indicated that while it remains a far more acceptable concept than the "spectrum fee" proposal embodied in HR-3333, the House Communications Subcommittee's "rewrite" bill, NRBA does "question the necessity of forcing broadcasters...to pay for the 'privilege' of being regulated" since radio broadcasters "provide service to the public in exchange for the privilege of using the airwaves."

Class IV power increase

NRBA filed comments with the FCC urging the commission to approve increased nighttime power to 1kW for Class IV AM stations. The present situation restricts Class IV's to 250W at night, which deprives many communities of adequate nighttime service and puts Class IV stations at a severe competitive disadvantage.

Additional directors named

Two additional directors-at-large have been elected to the NRBA board of directors. They are John Bayliss, president of the radio division, Combined Communications and Norman Wain, president of Metroplex Communications. Bayliss and Wain will serve one year terms.

NTIA minority ownership proposals

NRBA took the position that substantative rules and accepted principles should be applied regardless of race in comments filed with FCC on November 30 on the NTIA petition "For the Implementation of Further Policies Promoting Broadcast Ownership by Minorities." The association approved two of the three proposals advanced in the NTIA proposals, but the proposed minority-only waiver of the FCC's multiple ownership rules was said to be an example of the recent tendency by some goverment regulatory agencies and policymaking offices to become excessively involved in "social engineering."

Membership vice president

The board of directors of the NRBA announced the appointment of John K. Christian to vice president, membership development.

Loud commercials

The NRBA filed comments opposing any FCC regulations "Eliminating Objectionable Loudness of Commercial Announcements" calling them "unneccessary and inappropriate." NRBA comments noted that even if loudness could be defined objectively and measured accurately, to regulate audio levels the FCC would have to "determine what degree of loudness can be 'tolerated' by the 'public's sensitivities which is a matter of taste.

Matsui appointed to communications subcommittee

Representative Robert T. Matsui of California has been appointed to the House Communications Subcommittee. He is filling the spot left vacant by Marty Russo, who moved to the House Ways and Means Committee.

SONY INTRODUCES WIRELESS MICROPHONE SYSTEMS WITH AN INNOVATION NOBODY ELSE HAS: SIGNIFICANTLY BETTER SOUND.

Until now, using a wireless microphone system meant sacrificing the quality of the sound in a trade-off for portability.

No more.

Sony has engineered wireless microphone systems as portable and versatile as any on the market.

But with a very big difference. Excellent sound.

To begin with, Sony offers a wider dynamic range than any other wireless system, a range of 96 dB. This accommodates sound pressure levels up to 130 dB. (While most other wireless systems have limiters which hold their dynamic range to, at most, 75 dB, Sony engineering has produced a system that requires no limiters.)

So what goes into the microphone comes out again at the same sound level. And nothing takes away from the thrill of performance.

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

And the new Sony systems are virtually drift-free. Frequency stability is an amazing ± 0.005%.

Furthermore, Sony wireless systems are available with up to 14 channels in UHF, which means that interference from other sound sources is much less likely than at lower frequencies.

And while many wireless systems are put together with a mixture of components from several manufacturers, Sony uses only one: Sony.

So we've been able to create fully integrated systems that offer you a wide variety of options.

For EFP and ENG, Sony's system includes a tiny lavaliere mike, a transmitter about the size of a cigarette pack and a tuner smaller than a paperback book.

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

For studio and stage use, Sony has a modular rack-mounted system that can be engineered in any combination you want, from single-channel to multi-channel diversity reception.

It can be portable or fixed, and runs from 110 volts AC or 24 volts DC.

For more information, call Sony Professional Audio Products at (212) 371-5800, extension 143 or 145.

You'll find out that no other wireless systems sound as good as Sony's.

SONY

We've never put our name on anything that wasn't the best.

Circle (20) on Reply Card

people in the news

Manufacturers/Distributors

Gilbert R. Kesser has been elected chairman of the board of Micro Consultants. **George A. Grasso** has been elected to succeed him as president. Kesser founded Micro Consultants in 1975 and has served as president since then.

Industrial Sciences announced the appointment of **Dale Buzan** as director of product development. Buzan come froms Vital Industries where he was director of engineering.

Don Richter has been named sales manager of Modular Audio Products, a unit of Modular Devices. Prior to joining MAP, Richter was with Automated Processes, Huntington, NY, for 10 years.

Dean C. Leeson has been appointed Northeast regional sales manager for Microtime. Leeson is responsible for promoting the company's distributor network in the Northeast from Microtime's headquarters, Bloomfield, CT. Richard McLean has been appointed OEM product manager. McLean will be responsible for sales of Microtime's video processors to OEM's for resale or use in their systems, as well as investigating new product areas for the company.

McMartin has announced the appointment of **A. Hans Bott** as vice president and director of engineering. Bott has an outstanding record of achievement in the field of broadcast related products.

Radio/Television

George Watson, former director of engineering for Mariner Communications, licensee of WITS (AM) Boston and KBEQ (FM) Kansas City, and Paul Titchenal, former chief engineer for WGTO (AM) Cypress Gardens, FL, join Midwest Engineering Associates, Peoria, IL, as consulting engineers.

Larry Van Camp is the new manager of facilities maintenance for National Broadcasting Company's WKYC-TV-3, replacing the retiring **Matt Bracic**. Before coming to Channel 3, Van Camp was chief engineer at WEWS-TV-5.

Hartford N. Gunn, Jr., vice chairman of the board of the Public Broadcasting Service has been named senior vice president and general manager of KCET. Gunn was president of PBS from 1970 to 1976, prior to serving as vice chairman of the PBS board.

Buford Television has appointed **John Swanson**, vice president/director of broadcast engineering. Buford operated TV stations in Tyler and Lufkin, TX, in construction in Cincinnati, OH, and has a contract to purchase KDNL-TV in St. Louis, MO.

HUNT

CINE COLOR DEVELOPER REPLENISHER

THE MARATHON CHEMISTRY

...goes the distance you set in processing Ektachrome motion picture film.

The choice is yours! Two unique color developers to match the film production pace of your processing lab... **Cine Color 400**, for 25,000 feet—or more—of 16mm reversal film processing per week... and **Cine Color 800**, for shorter runs.

CINE COLOR 400, the long-distance runner, is the first two-part, all-liquid concentrate. It offers many advantages to the **high volume user**. Compared to conventional chemistries, it is easier to handle, reduces mixing time and requires less storage space. In addition, because of its greater strength, it only needs to be replenished at half the nominal rate (e.g., 400 milliliters of color developer for every 100 feet of 16mm film), which saves you money on chemical costs, and reduces effluents for better ecology.

CINE COLOR 800 is a three-part system with two liquid chemistries and one powder component. The developing agent is all liquid, unlike competitive systems which use a toxic powder. It is designed to give optimum economy and convenience to **medium volume processors**, without sacrificing film quality.

BOTH SYSTEMS are outstanding for: ■ **Cleanliness**—they help maintain process control while keeping equipment cleaner. ■ **Stable pH**—avoids major color balance shifts during processing. ■ **Tight Quality Control**—Hunt manufacturing provides chemically balanced products to assure more consistent film quality.

Now, regardless of how much footage you run through your tanks, it is possible to match your developer to your volume for consistent results and greater convenience and economy. Which is best for you—Cine Color 400 or Cine Color 800? Ask your Hunt Color Specialist to show you how to get the best run for your money!

HUNT

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Circle (49) on Reply Card

Introducing the Ramko a new cart machine, but

Finally you can get your hands on a cart system with reel-to-reel performance.

A cart system that eliminates phase shift error once and for all. That sets new standards for low wow-and-flutter. That provides signal-to-noise, distortion and frequency response that are better than anything else in the industry.

Finally, the PhaseMaster.

PhaseMaster: the cart machine, redefined.

The new Ramko PhaseMaster has all the features you want, and some that never existed before.

It's built to take the pounding you're going to give it, hit after hit, commercial after commercial, day after day.

The deck is a 5/8″ casting for stability, with a stainless steel cover plate for wear resistance. The crystal-controlled dc servo motor ensures greater speed accuracy and lower heat

PhaseMaster,™ not just a whole new concept.

generation (15 ips, 7½ ips, 3¾ ips motor speeds field-selectable). The machined head stack is rock-stable, and we've included internal illumination for your periodic head inspections and cleaning. There are no micro-switches to break or jam —and never any start-up wow—because the motor is started by an optical sensor as you begin to insert the cart. And the cart hold-down presses on the edges for greater stability and exacting alignment, pressing with roller contact for velvet smooth insertion and withdrawal.

lower track. On playback, the left channel signals from both tracks are compared, and any phase shift difference is corrected automatically by a continuously tracking electronic time delay.

Simple.

And it works—no more holes in your sound, and no more side-to-side spectrum shift.

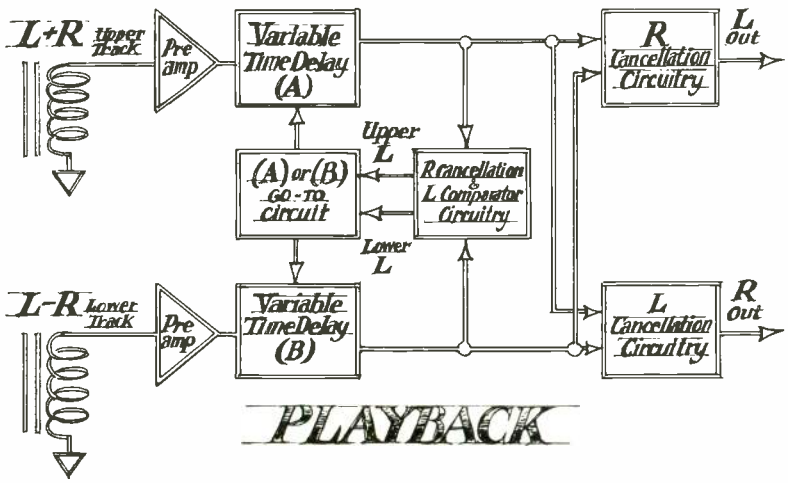
The ultimate cart system, mono and stereo

The Ramko PhaseMaster System, in mono and stereo, is available as a playback unit or a record/playback deck.

It also comes as a complete reproduction center which duplicates—as well as plays and records—your mono and stereo carts and cassettes. This consists of four modules: an electronic control center; two A and B cart decks; and a cassette deck.

To record, you switch-select any of three inputs to record on any or all of the decks. When you play back, the control center determines whether your tape is mono or stereo, coded or uncoded, and automatically reproduces the correct outputs.

To dupe, you simply load tape (cart or cassette) and one or two blanks, then hit Record/Play and the control center puts the signal where it's supposed to be.



And no more stereo phase shift error

Phase shift doesn't much matter in mono, so when you're recording stereo, the PhaseMaster encodes a mono L + R signal on the upper track, L − R on the

Call collect for the full-featured brochure

Get the brochure. It covers the PhaseMaster System's convenience and ease of operation; the left, right and phase meters; the 4-digit timer; the three cue tones; the integral testing facilities; and everything that you were hoping would be in it.

Write Ramko Research, 11355 Folsom Blvd., Rancho Cordova, CA 95670. Or if you can't wait for the mail, contact your nearest rep or call (916) 635-3600 collect and arrange for a 2 week free trial.

RAMKO
Brains, not brawn.

Circle (22) on Reply Card

Telediffision de France and Thomson-CSF announce success by French Television in Greece

Pursuant to the Franco-Hellenic cooperation agreement of September 1, 1979, Athanassios Tsaldaris, Secretary of State for the Cabinet, representing the Greek government, and Mr. Jean Autin, president of TeléDiffusion de France (TDF), on behalf of the French Republic, have signed a cooperation agreement in the field of audiovisual techniques.

This accord provides for the purchase in France of production equipment to be installed on the premises of the Greek radio and television organizations: ERT (Elliniki Radiophonia Tileorasis) and YENED (Yperesio Enimeroseos Enoplon Dynameon).

TéléDiffusion de France will order the necessary equipment, oversee its manufacture and check that it conforms with the contract specifications. Furthermore, TDF will ensure that the technical quality achieved is comparable to that offered to the general public by the French television service.

It will be the French concern THOMSON-CSF which, in its capacity of industrial project manager, will be responsible for all the supplies, i.e. for their implementation and their installation at the Greek radio and television facilities. The supply will include equipping and commissioning five color TV studios with their control room, a nodal center and eight broadcast vans, the whole representing 50 TTV1515/1516 cameras, 15 telecines and 15 video recorders. The entire supply incumbent upon THOMSON-CSF is worth a total of 86 million French francs.

In order to enable color television to be introduced under the best possible conditions, TéléDiffusion de France is organizing a major technical assistance and training scheme involving the dispatch of several dozen French engineers and specialists to Greece to help familiarize their Greek colleagues with color television techniques.

Compact Video appointed dealer

Dynasciences has appointed Compact Video Sales as exclusive dealer for their video products in the Southern California region.

1000th VPR-2 delivered

Ampex announced it has delivered the 1000th VPR-2 helical scan video recorder/reproducer to station WBBM-TV, Chicago. WBBM, owned and operated by the CBS Television Network, will use the system for broadcast teleproduction work.

Audio Designs changes name

Audio Designs and Manufacturing is now ADM Technology, Inc. The company designs and manufactures audio consoles and components for television, AM/FM stations and recording studios. The name change was made to better reflect the expanded scope of the company's plans for meeting the technological challenges of the 1980's.

A.D. Ring relocates

A.D. Ring & Associates announced the relocation of their offices to 1140 19th St., NW, Suite 500, Washington, DC, 20036, telephone (202) 223-6700.

new products

Film handling systems

RCA's FR-35DP 35mm projector is designed for large screen direct projection in film re-recording suites, sound replacement rooms and other film post-production applications. The unit, which is equipped with a xenon lamp house console, can function as a stand-alone master system in multiple machine sound re-recording set-ups, or can be locked as a slave to other film or videotape machines.

Circle (150) on Reply Card

Roll around console

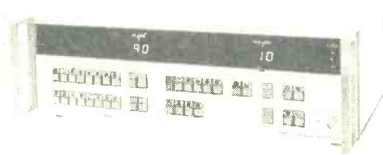
The model 3100 VTR console from **Winsted** is designed for efficiency and operator convenience. The

turntable rotates 360° allowing better servicing, viewing and more flexible operation.

Circle (151) on Reply Card

Stereo signal generator

The RE501 stereo signal generator introduced by **Radiometer Electronics,** is a completely programmable source of high-quality stereo signals. The RE501 is also designed for automatic operation with its own,

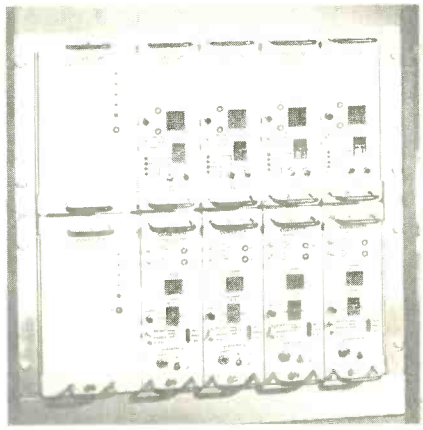


RE developed, internal control system providing 64 full function setups programmed, as desired, on its own keyboard. Complete manual and override capabilities are retained via front panel controls.

Circle (152) on Reply Card

SCPC terminal

Coastcom has introduced a single channel per carrier terminal, model 412, that can be used to receive or transmit high quality audio program material, voice or data at any carrier frequency in the range of

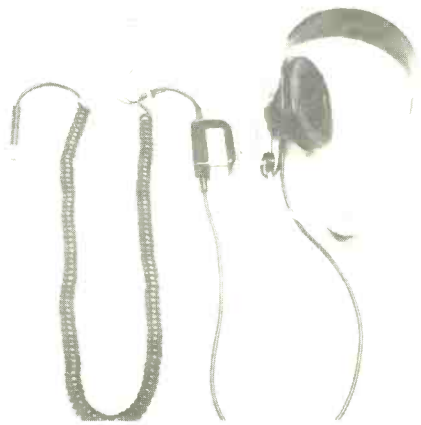


52MHz to 88MHz. The 412 provides the satellite terminal operator with 16 manual or remote selectable channels spaced at least 300kHz apart in the 52-88MHz spectrum.

Circle (153) on Reply Card

Intercom headsets

Television Equipment Associates is marketing a range of carbon intercom headsets that have soft ear-enveloping foam cushions and a

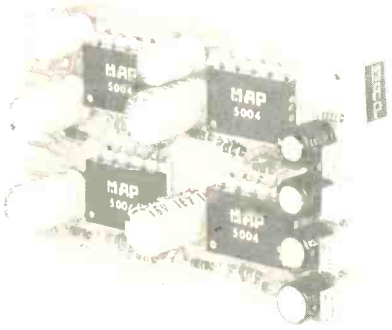


padded headband. The headsets are manufactured by Audiosears and are supplied with an expandable 15-foot coil cord, 3-position mic switch and plug.

Circle (154) on Reply Card

4-channel amplifier

Modular Audio Products has introduced the Model 4020, 4-channel amplifier as an addition to its IMPAC series of modular plug-in card amplifiers. The unit, which is capable of delivering up to +20dBm

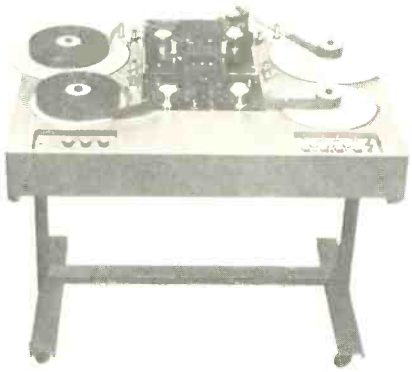


into 75 Ω loads on four independent channels, can be used as a line amplifier. The frequency response is flat to within ±0.25dB from 20Hz to 20kHz and has a maximum distortion of 0.1%.

Circle (155) on Reply Card

Telecine transfer machine

A telecine transfer machine that enables the transfer of film to videotape has been introduced by **Magnasync/Moviola**. According to the manufacturer, the series V-1000

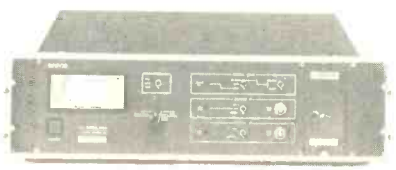


Videola will transfer film to tape with the film speed independent of the television synchronization and irrespective of any vertical scanning rate.

Circle (156) on Reply Card

Television modulator

The **Barco** VSBM 1/S is a high

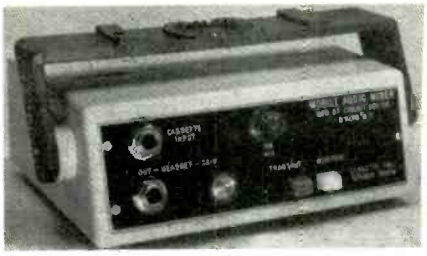


precision TV modulator applying SAW devices for VSB band filtering with extremely steep transitions from pass-to stopband and exact group delay performance. The VSBM 1/S is available for systems M and BG as an IF modulator and can be equipped with a frontal plug in RF converter for any TV channel between 40 and 890MHz.

Circle (157) on Reply Card

Mobile audio mixer

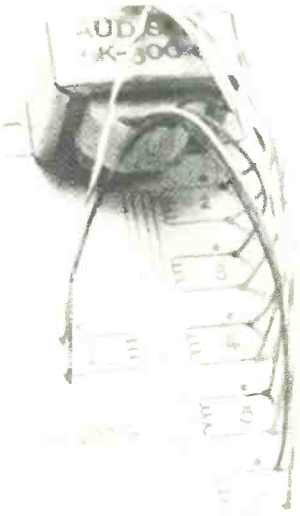
Circuit Development has introduced a mobile audio mixer that is compression amp-equipped with fully adjustable input and output levels. It is designed for three inputs (two mic or handset and one cassette audio tape recorder.) The mixer interfaces with all Motorola mobile radios and can be easily adapted to most current land mobile radio models.



Circle (158) on Reply Card

Repeat coil assembly

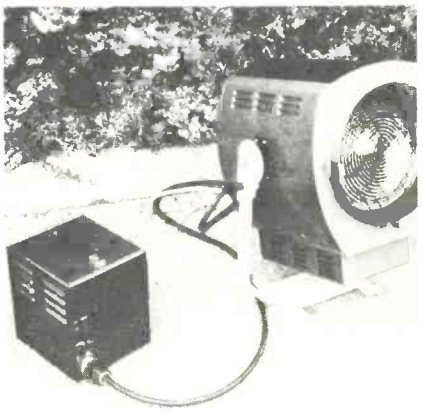
A repeat coil assembly from **Audisar** is designed for use with 600 Ω balanced lines, repeat coil model 9K-600-6 allows for one balanced input and five balanced outputs. Frequency response is 20Hz to 50kHz±0.5dB, with +30dB of headroom; insertion loss is 0.75dB.



Circle (159) on Reply Card

Electronic daylight power supply

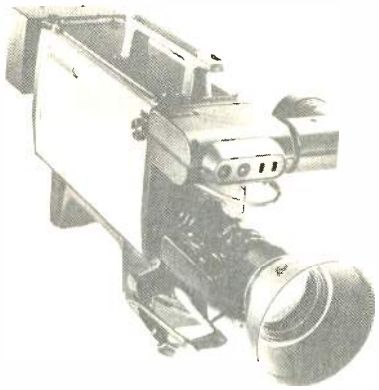
A solid-state electronic ballast for HMI and other daylight high efficiency gas discharge lamps for motion picture and television production has been announced by **Pep.** The new ballast, called the Moduleur was developed by Cremer in association with France's high technology group CSEE.



Circle (160) on Reply Card

Portable camera

Hitachi has designed the FP-40 self-contained prism portable camera. The FP-40 features modular design, +6 and +12dB gain, color

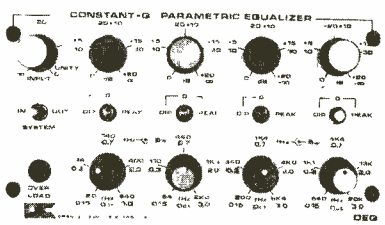


bars, built-in test pulse, automatic camera cap, IQ encoder and stand-by mode. A snap-on battery provides over two hours operation.

Circle (161) on Reply Card

Parametric equalizer

Orange County Electronics has introduced the DEQ full parametric equalizer module. The DEQ module is a four-band parametric with center frequencies variable from 20Hz to 20kHz in overlapping five

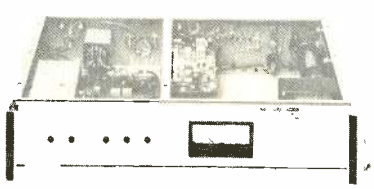


octave (32:1) ranges. Each section tunes over an 80dB control range (60dB cut and 20dB boost). Bandwidth is variable from .15-3 octaves as well.

Circle (162) on Reply Card

Audio consoles

The Series 2000 audio consoles, from **Cetec**, are all solid-state, and available in 5-mixer (14 inputs) and



8-mixer (20 inputs) models. Mixers are of printed-circuit board modular construction, with dual audio bases.

Circle (163) on Reply Card

add interlocked multi-track sound

to your programming with a BTX 4500 SMPTE Synchronizer. BTX lets you sweeten, re-record, overdub, edit, recombine and simulcast sound tracks that dramatically enhance audience appeal. The BTX Corporation, 438 Boston Post Road, Weston, Massachusetts 02193 (617) 891-1239; 6255 Sunset Boulevard, Hollywood, California 90028 (213) 462-1506.

The BTX Corporation

NOW!

COMPLETE REPRODUCE HEAD CALIBRATION

The new Magnetic Tape Reproduce Calibrator (Flux Loop Test System) accurately establishes and isolates the magnetic characteristics of the reproduce head. It allows one to use a Reproduce Alignment Tape to isolate and establish losses produced by gap characteristics and spacing effects. Gap losses and reproduce equalization are tabulated in the recently introduced Standard Tape Manual.

In addition to the new Reproduce Calibrator and the Standard Tape Manual, STL offers the most complete selection of magnetic test tapes available - Frequency Alignment - Pink Noise - Sweep - Speed & Flutter. All are available in reel-to-reel, cassette and cartridge.

Write or phone for fast delivery. Write for free catalog and detailed information on the new calibrator.

STL STANDARD TAPE LABORATORY, Inc.
26120 Eden Landing Road #5 / Hayward, CA 94545
(415) 786-3546

Circle (68) on Reply Card

A New Generation Of Audio Distribution Amplifiers

Here is a series of new Audio DAs with best of both worlds: the clean linear gain of transformerless differential amplifiers with a dynamic output of 23 dBm without clipping. Choice of

Choice of three different configurations:

ADA 105 - Five balanced outputs
ADA 110 - Ten balanced outputs
ADA 210 - A pair of ten balanced outputs

All with self contained power supply and full range front panel gain control.

Max. out - 23 dBm into 600 Ohm load
Distortion - < 0.1%
Noise - 82 dB below rated output
Freq. Resp. - 15-30 kHz ± 1/2 dB

SIGMA ELECTRONICS INC.
1830 STATE STREET, EAST PETERSBURG, PA 17520
(717) 569-2681

Circle (69) on Reply Card

new literature

Guide book

Narda Microwave—A detailed, 16-page guide book is being offered. This publication provides technical information, product specifications, applications data and outlines drawings for the company's complete line of amplifiers.

Circle (170) on Reply Card

Maintenance manual

Convergence—An Operation and Maintenance Manual is now available for the ECS-100 Superstick Series Editing System. The manual is divided into three sections including system operation, preliminary setup adjustments and theory of operations.

Circle (171) on Reply Card

Eidophor

Conrac—A 6-page brochure describing the Eidophor is available. The Eidophor is the largest TV projection system in existence today.

Circle (172) on Reply Card

B&K catalog

B&K-Precision—All of the test instruments shown in BK-80 catalog, including eight new products, are now featured in a condensed, compact catalog, suitable for insertion in a 6¾ size envelope. Copies are available in quantity without charge to B&K-Precision distributors.

Circle (173) on Reply Card

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TRAINING

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NEW LENCO TERMINAL EQUIPMENT—Fast shipment, 30 brands of new equipment—special prices. We will buy your used TV equipment. To buy or sell, call Toll Free (800) 241-7878, Bill Kitchen or Charles McHan, Quality Media Corporation. In GA call (404) 324-1271.

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PRE-1960 BROADCAST audio & recording equipment, catalogs, 16" transcriptions. Robert Van Dyke, Squires Ave., East Quoque, NY 11942. 11-79-4t

WANTED (CONT.)

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HELP WANTED

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MAINTENANCE ENGINEER: Experienced maintenance engineer for Ampex 1" facility, also Sony ¾". Will train partially. Good maintenance background preferred. Salary negotiable. Mobile Video Productions, 1933 NW 27th Ave., Portland, Oregon 97210. 2-80-tfn

HELP WANTED (CONT.)

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TELEVISION CHIEF ENGINEER—FOR HERNREICH BROADCASTING STATIONS. Experienced hands-on Chief Engineer wanted for rapidly-expanding group-owned UHF station in Fort Smith, AR. Applicant must have excessive maintenance and supervisory experience. Send resume to Don Vest, Director of Engineering, Hernreich Broadcasting Stations, P.O. Box 4150, Fort Smith, AR 72914, an Equal Opportunity Employer. 2-80-1t.

VIDEO ENGINEER WANTED by Video Tape Associates. Applicants should have an excellent sense of color and be a perfectionist for quality. Also you must have the capability of performing total setup of color cameras and medium level maintenance experience. Studio and remote work will be required. Earn an excellent salary while working with a close and dynamic group of professionals. Call or send resume to: Michael Orsburn, Director of Engineering, Video Tape Associates, 2351 SW 34th Street, Ft. Lauderdale, Florida 33312, (305) 587-9477. 2-80-1t

POSITION OPEN—MIAMI UNIVERSITY, OXFORD, OHIO. HELP WANTED—TV TECHNICAL maintenance Engineer, capable of trouble shooting and repair of broadcast and industrial audio and video equipment. Must have technical school or equivalent theory training and strong maintenance background. Minimum of three years experience desired. Knowledge of quad vtrs and color cameras necessary. Position is open now. Salary based on experience. Good benefits package. Send resume, letter of application and three technical references to Joseph Wasser, Director of Engineering, Telecommunications Service, Miami University, Oxford, Ohio 45056. Applicant screening will begin February 1, 1980, and continue until position is filled. Equal Opportunity Employer. 2-80-1t

RCA/EECO SMRTE Tape Editing Controllers. Used with RCA TR-61 recorders. Units have been recently overhauled. McDonald's System—Television Department, 2010 E. Higgins Road, Elk Grove, IL 60007, (312) 593-3230. 2-80-2t

ELECTRONIC/VIDEO TECH'N: Fully experienced in color studio maintenance. Full time position in a relaxed atmosphere of a college campus. Full tuition, medical & dental coverage, also pension plan. Experience & qualifications. Write to Broadcast Engineering, Dept. 490, P.O. Box 12901, Overland Park, KS 66212. Affirmative Action, Equal Opportunity Employer, M/F. 2-80-1t

CHIEF ENGINEER: Immediate opening for thoroughly experienced broadcast engineer with comprehensive knowledge of all phases of Television Station Systems. Send resume and salary requirements to Dept. 487, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 2-80-1t

TELEVISION MAINTENANCE TECHNICIAN/REMOTE SUPERVISOR: Midwest Production Company seeks full-time broadcast maintenance technician/remote supervisor. Applicant should have three or more years maintenance experience with emphasis on digital technology. Position involves travel and work on large scale remote productions. Excellent salary and benefits package. Reply to: Bob Uhlis, Laclede Communication Services, Inc., 1345 Hanley Industrial Court, St. Louis, Missouri 63144, (314) 961-1414. 2-80-1t

WSM AM/FM is seeking an experienced, energetic Radio Engineer to supervise, improve and maintain our Radio Studio facilities. This position requires previous years of experience in these areas, as well as knowledge of state-of-the-art equipment and techniques. Supervisor ability a must. Send resume, references and salary requirements to the Personnel Director, WSM, Incorporated, Box 100, Nashville, TN 37202. An Equal Opportunity Employer. 2-80-2t

TELEVISION CHIEF ENGINEER for growing station in 195th market. Management experience necessary. All fringe benefits, station located in beautiful southern Idaho. An Equal Opportunity Employer. Reply to Dept. 484, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 12-79-tfn

TELEVISION STUDIO/MAINTENANCE ENGINEER for midwest Independent station. Immediate opening. Minimum 3 years broadcast experience, 1 year broadcast equipment maintenance duties with First Class. Contact Paul Bohrer, WTTV, 3490 Bluff Road, Indianapolis, Indiana 46217, (317) 787-2211. 1-80-2t

CHIEF ENGINEER: 100kw public FM station. Must maintain high quality studio, STL, transmitter, and remote recording equipment. Construction experience, music recording ability, digital knowledge helpful. Salary competitive. Contact: Employment Division, 111 Pettigrew Hall, UNC, Chapel Hill, NC 27514. Equal Opportunity/Affirmative Action Employer. 2-80-1t

STAFF ENGINEER: Top 35 market in Southeast needs engineer capable of doing on-air as well as tape recording switching, mixing, and editing of program material. Should be able to handle master control, audio, videotape, ENG, and camera control shifts when required. Must have FCC First Class. EEO-MF. Send resume to Dept. 489, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 2-80-1t

We are a long-established Washington, D.C. radio, film, and television production house with major, daily, live television responsibilities. We are seeking qualified candidates for existing permanent expansion Engineering positions in Television Maintenance and Repair.

Candidates for consideration must have a minimum of five years current, direct, professional broadcast experience. This is an excellent career opportunity in a very challenging and rewarding professional environment. Please submit a detailed resume to:

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Candidates appearing to meet our professional requirements shall be contacted by mail or telephone to arrange for a personal interview in their locale. Equal Opportunity Employer.

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MAINTENANCE ENGINEER: SAUDI ARABIA: USA based firm needs experienced engineer to maintain PAL TV studio and multi-media presentation areas. Applicant must be a self-starter and work without supervision. Contract will be a minimum of one year, renewal is expected. Outstanding salary with all living expenses paid. One month vacation with travel paid to USA and/or Europe or Orient. No provisions for family living abroad. Starting April. Call R. Henderson, (201) 288-6130 or send resume to Stylist Systems, Inc., 39 Industrial Avenue, Teterboro, N.J. 07608. 2-80-2t

ENG MAINTENANCE ENGINEER

KLAS-TV, Las Vegas, Nevada, has opening for qualified ENG Maintenance Engineer with two to three years experience in 3/4" video tape maintenance and three tube cameras; FCC first class license desirable; chosen applicant will be responsible for overall technical condition of ENG equipment; must be willing to relocate to Las Vegas; salary DOE; send resume to:

Linda Imboden
KLAS-TV
P.O. Box 15047
Las Vegas, NV 89114

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10

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PRINCIPAL TV TECH—$22,872-27,576. Experienced in the maintenance of all equipment necessary for the operation of videotape and master control rooms, Helical VTR's, editors, microwave and I.T.F.S. systems, and all associated equipment. Must have 2 years full time experience in helical videotape maintenance, with 3 years experience in maintenance and/or operation of the full range of T.V. studio, control room, videotape and transmitter equipment. Send resume or inquiries to University of California, Personnel Office, Rm U-12, S.F., CA 94143. Afrm. Act./EOE m/f/h. 2-80-1t

ELECTRONICS TECHNICIAN (TV MAINTENANCE)—The Veterans Administration Center for Endoscopic Programs (VACEP), VA Medical Center, Lake City, Florida, announces an opening for an Electronics Technician in the television engineering department. This career Civil Service position is at the GS-9 level with an annual salary starting at $17,035. VACEP is a fully equipped two-studio, television production center which utilizes latest state-of-the-art equipment including computer editing, 2-inch high band, full-frame videodisc, computerized routing switcher, and studio and low-light level cameras. Responsibilities of this position include scheduled and preventive maintenance, digital equipment repair, line operation of all equipment, and operational testing and set-up of equipment. Minimum education requirements: 1st Class F.C.C. radio-telephone license, 2-year technical school degree, or B.S. degree in either broadcast or electronic engineering. Candidate must have at least one year of experience in the maintenance of 2-inch quad/helical VTR's, general broadcast experience, and general maintenance experience in digital and analog video equipment. Send Personal Qualifications Statement (SF-171) or resume to Personnel Officer, Veterans Administration Medical Center, Lake City, FL 32055. An equal opportunity employer. 2-80-1t

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You'll become involved in the final quality audit of Ampex cameras. Other work includes some traveling into the field and customer interface.

Ampex's television camera operations are located in Cupertino, California on the lower, beautiful San Francisco Peninsula.

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Immediate permanent full time openings for Supervisory and Non-Supervisory positions.

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RCA Service Company is seeking highly skilled technicians to operate, install, modify, and maintain baseband audio-video television studio equipment.

These positions are located in Bethesda, Maryland, and offer competitive starting salaries, relocation assistance, and a comprehensive fringe benefits program.

Please send confidential resume to:

Ms. K. Marone
RCA Service Company
Bldg. 201-1, Dept. N-2
Route 38
Cherry Hill, NJ 08358

Or, call collect at:
(609) 338-6820
Weekdays 9 am to 4 pm

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RCA

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MAINTENANCE ENGINEER: Position available for studio maintenance engineer. Experience in the following desired: AMPEX tape, RCA cameras; and/or digital technology. Salary commensurate with experience. Call or send resume to Jim Doyas, Chief Engineer, KTVK-TV, Box 5068, Phoenix, AZ 85010, (602) 266-5691. 2-80-2t

TV CHIEF ENGINEER for network VHF station. Maintenance experience with RCA and Ampex equipment required. New studio facilities and hold C.P. for new transmitter and antenna. Send resume to WSLS-TV, P.O. Box 2161, Roanoke, VA 24009, or call Bob Teter collect at (703) 344-9226. 2-80-1t

TELEVISION SYSTEMS ENGINEER: If you are a television systems engineer with a track record in designing color television studios, master controls, RF and baseband distribution systems, surveillance systems, and specification writing, or, if you have equivalent design experience in broadcast television or a top CCTV business, industrial, or educational operation; if you want to advance your professional future by working with the leading television and audiovisual consulting and design firm in the field with offices in New York, Los Angeles, and London; if you want to work in New York City, where the action is, with top professionals, on projects which are setting the trend—Send your resume and salary history, in confidence, to: Robert J. Nissen, Vice President, Hubert Wilke, Inc., 280 Park Avenue, New York, New York 10017. Full company benefits. Salary commensurate with experience. 2-80-2t

BROADCAST TECHNICIAN: Maintain and operate new color TV production studio. All new equipment including three Hitachi SK-90 cameras and RCA TH 200 1-inch recorder. First class RT operators license required. 12 months contract, salary $1,443 per month plus benefits. Applications accepted through Feb. 29, 1980. Palomar College, 1140 W. Mission Rd., San Marcos, CA 92069, (714) 744-1150 or (714) 727-7529, ext. 410 for additional details. EOE. 2-80-1t

JOB OPENING: KC101 AND 13/WAVZ NEW HAVEN looking for assistant Chief Engineer with thorough knowledge of AM and FM transmitters, solid state, digital, directional antenna systems, STL & RPU. Contact Tom Osenkowsky, Chief Engineer, (203) 776-4012. 2-80-1t

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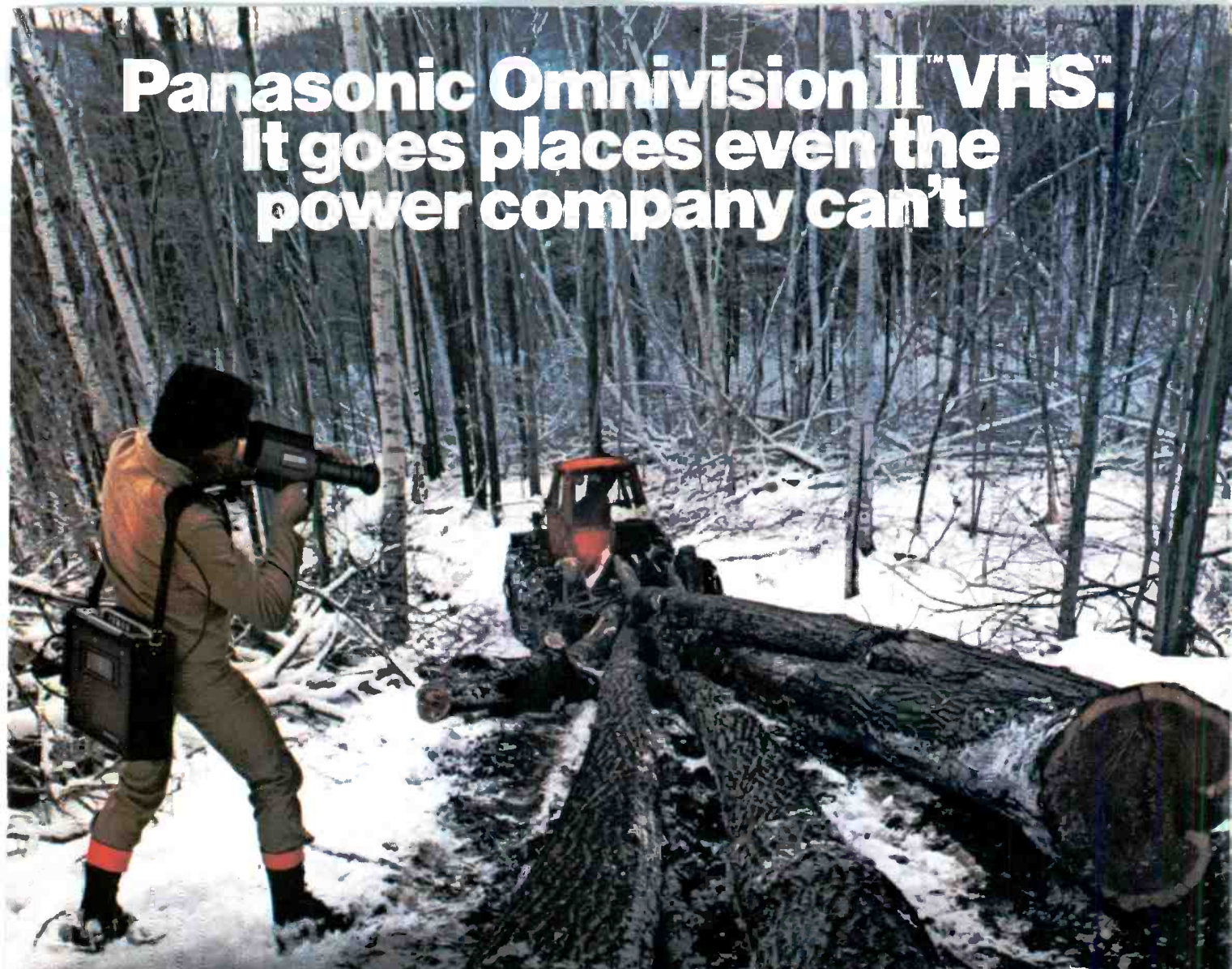

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And you don't have to look further than Panasonic to find a lightweight, portable color camera to team with the NV-8400. Our new WV-3320 weighs only 5.7 lbs. So it's easy to take anywhere. Its price tag is even easier to take.

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For more information, write Panasonic Company, Video Systems Division, One Panasonic Way, Secaucus, N.J. 07094. In Canada, contact Panasonic Video Systems Department, Mississauga, Ontario.

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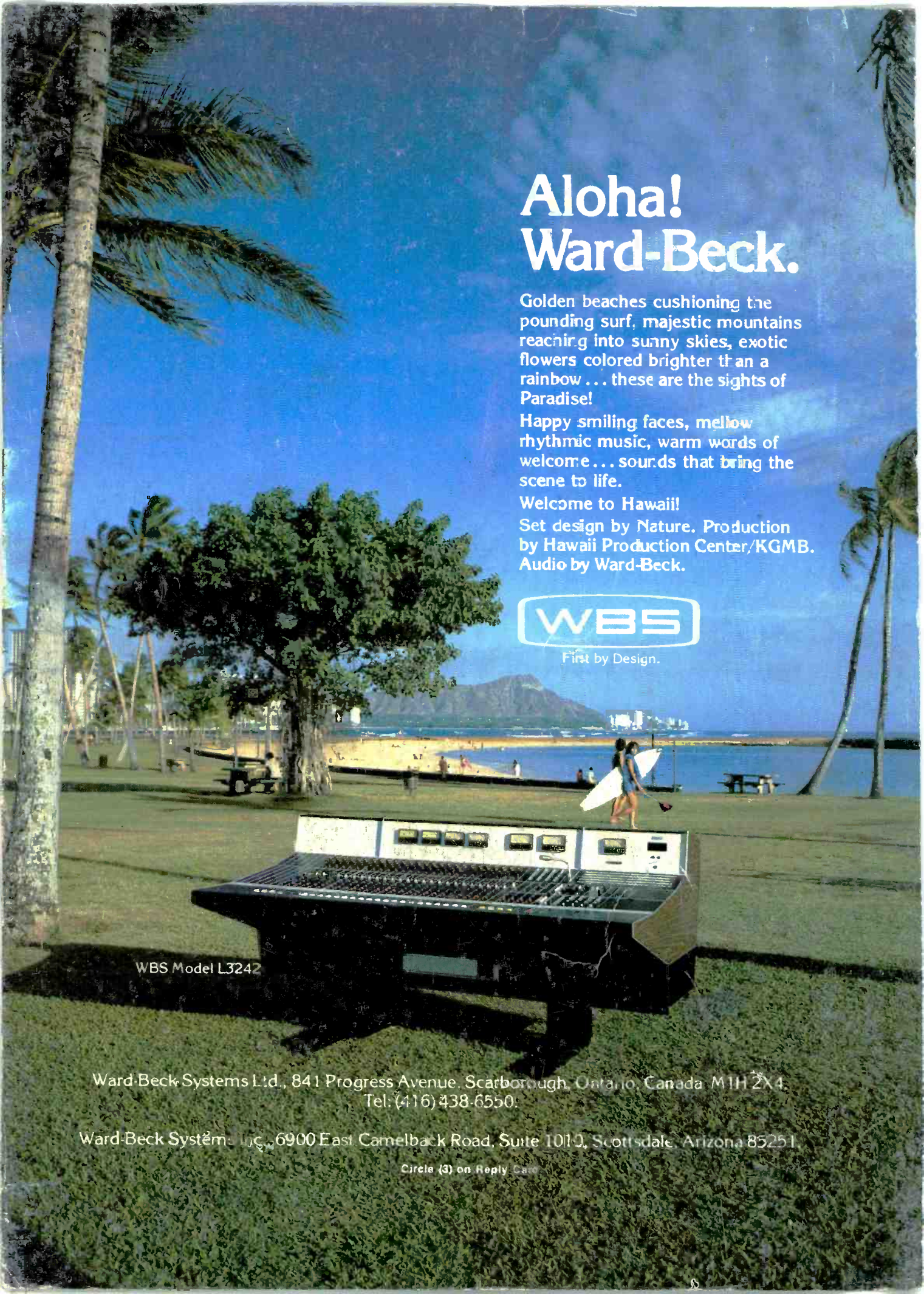
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