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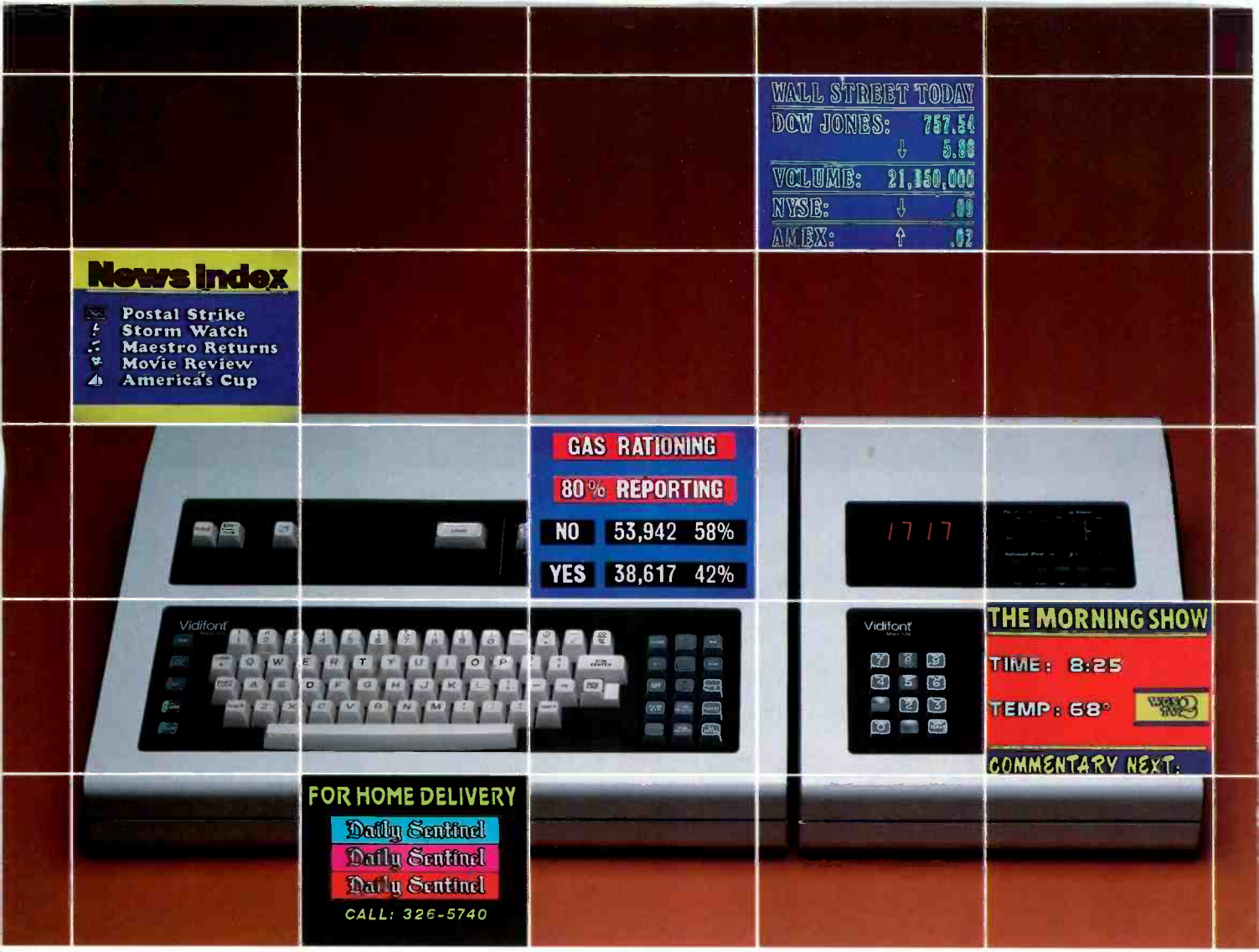

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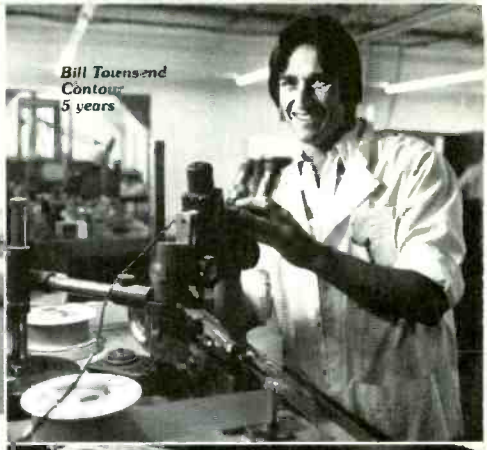

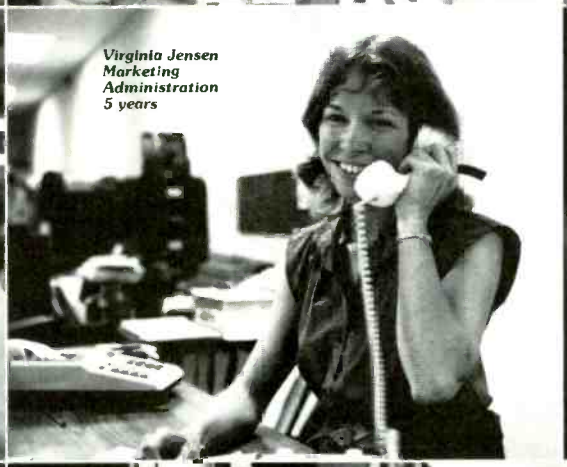

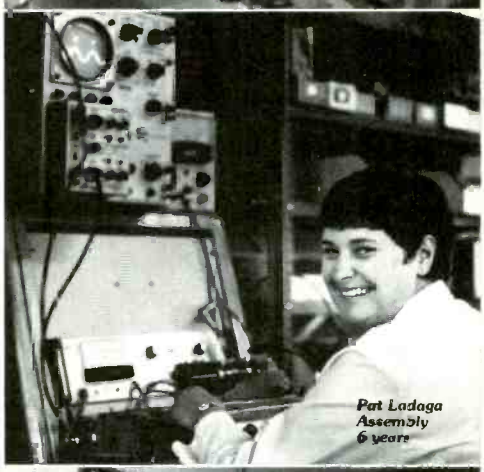

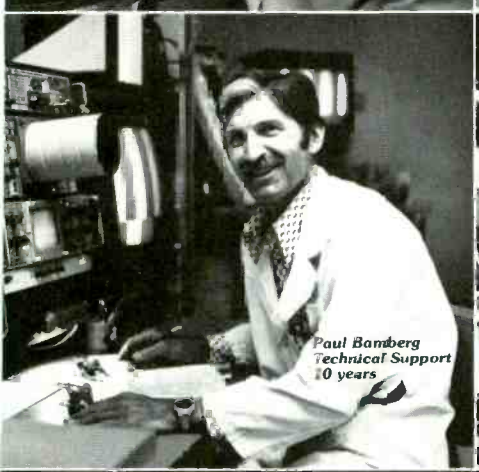

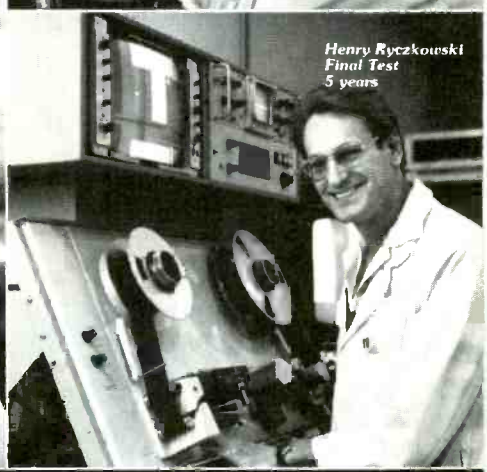

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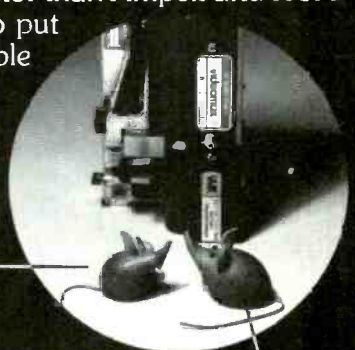

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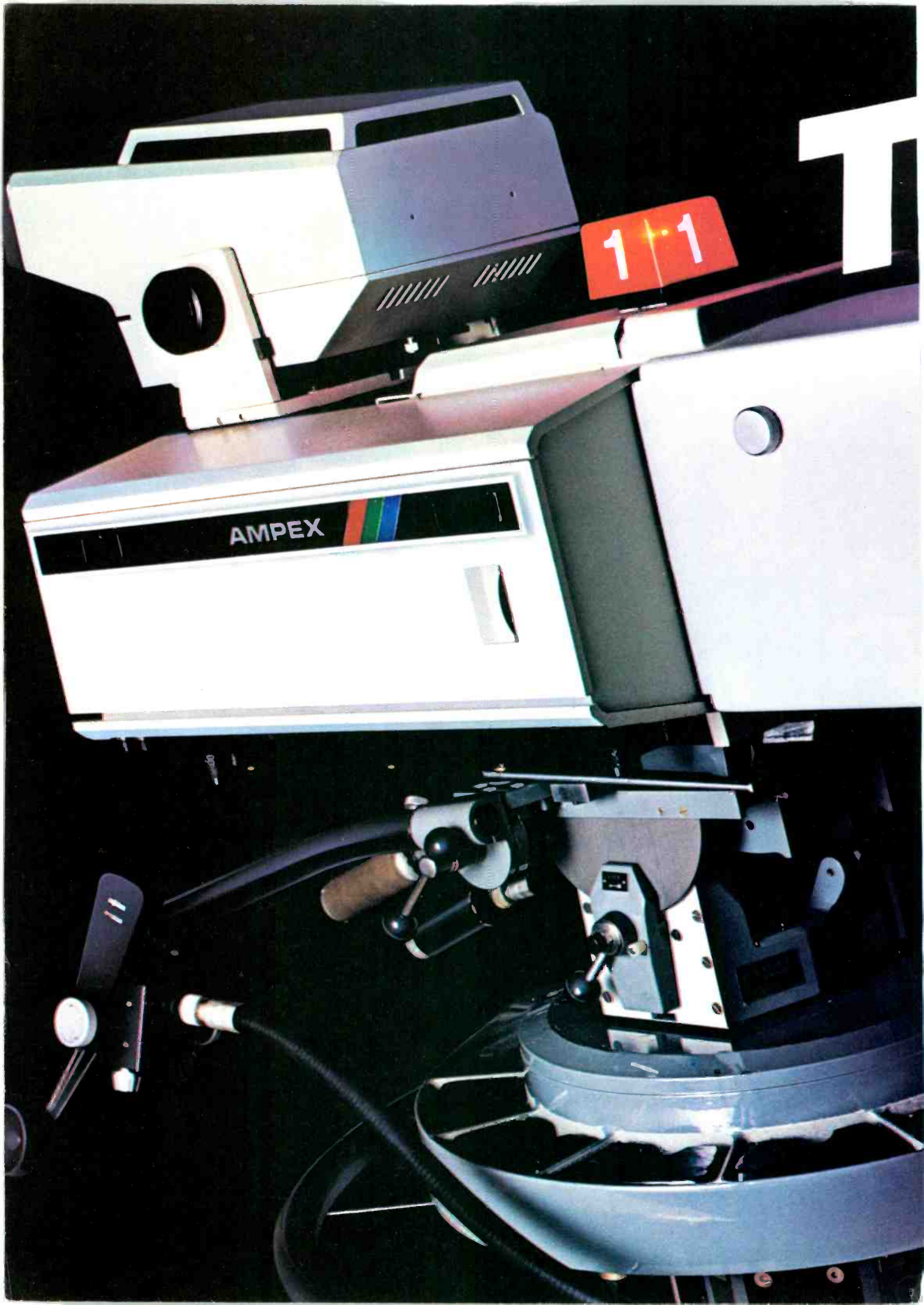
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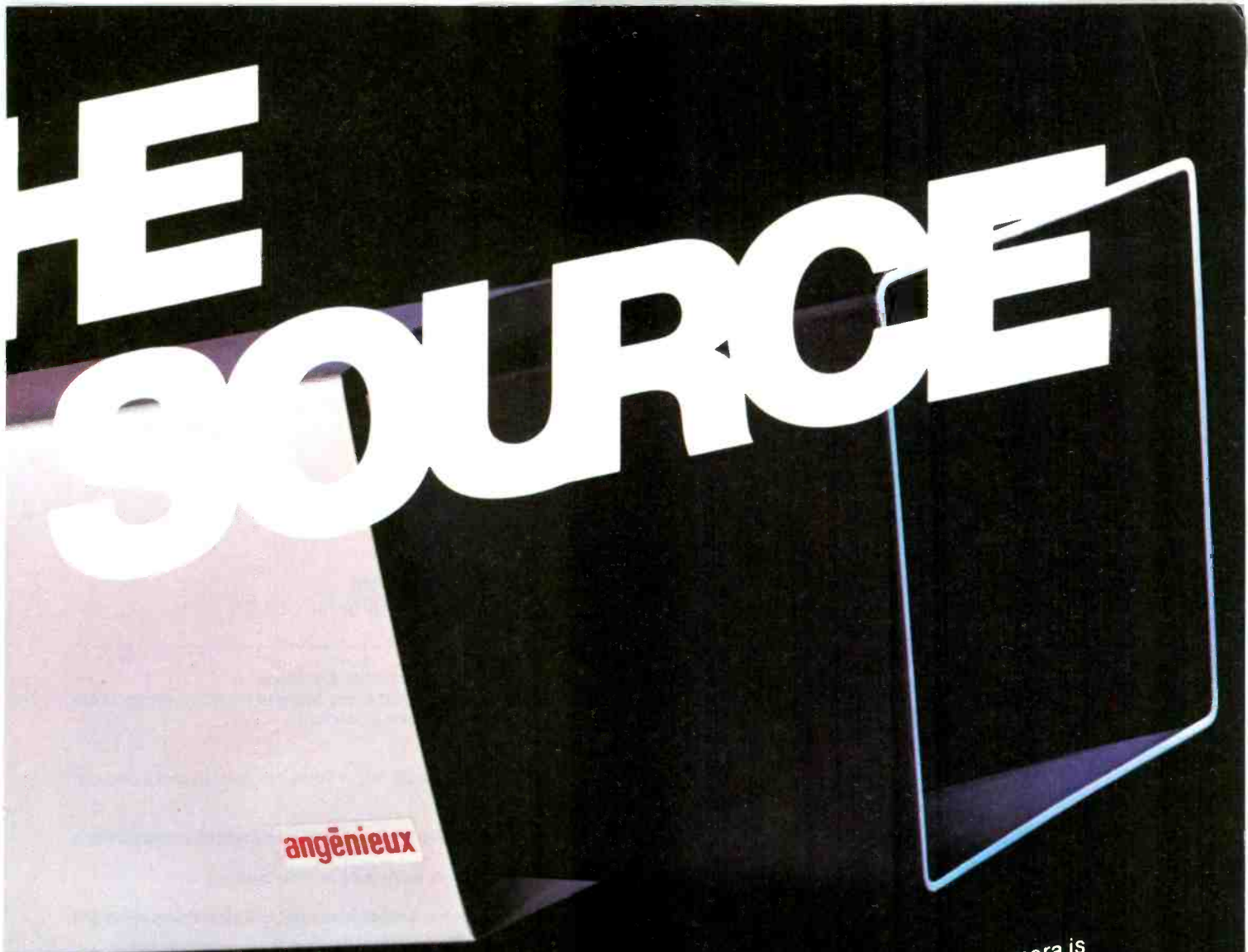

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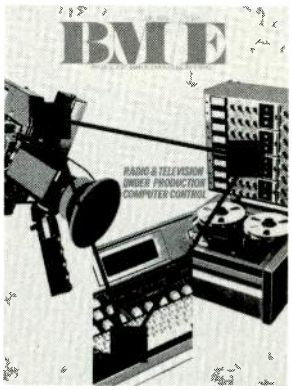

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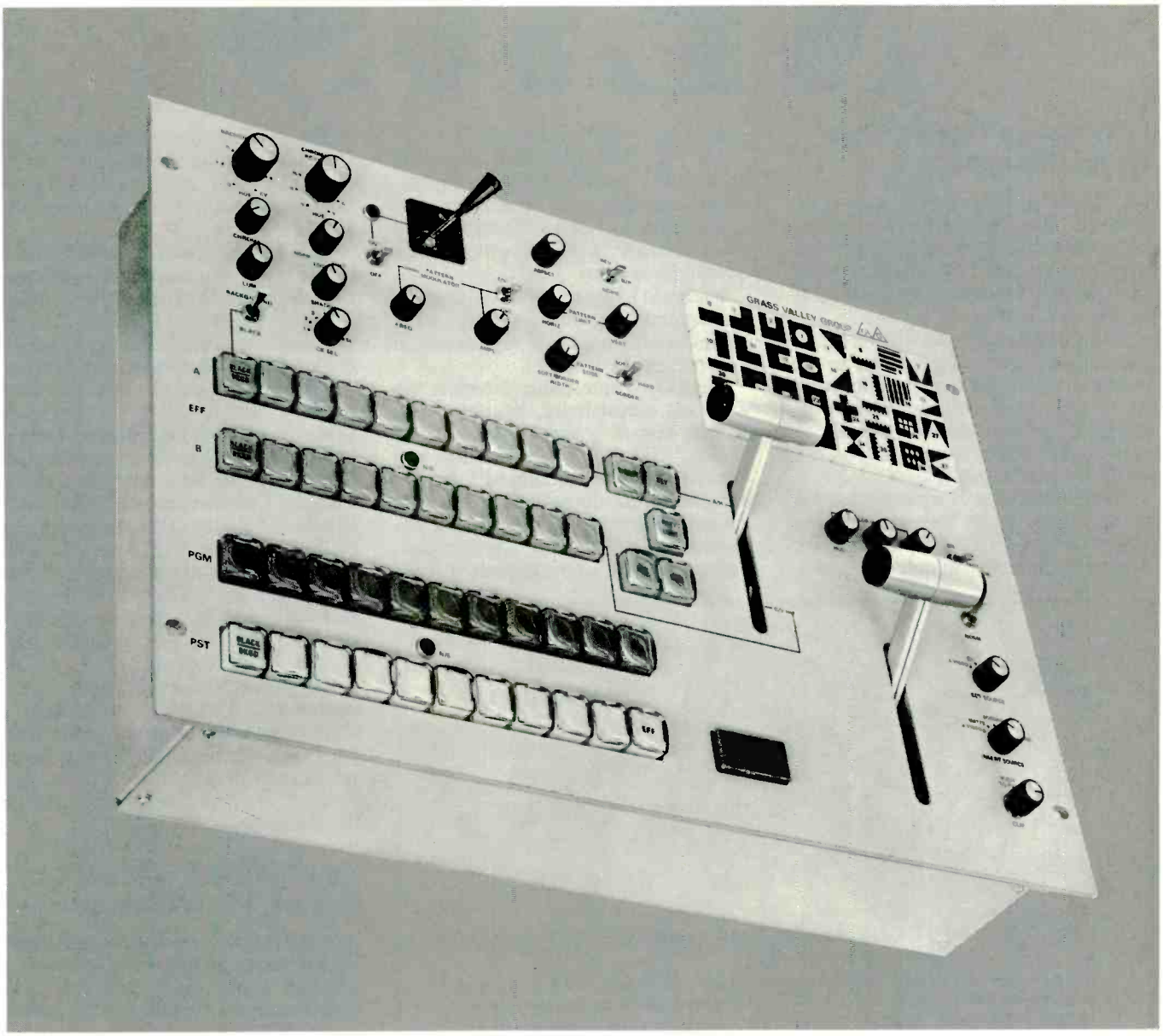

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BROADCAST INDUSTRY NEWS

FCC Moves Toward Total Radio Deregulation

Staff investigations showing that radio stations are voluntarily "over-complying" with existing regulations may prompt the FCC to deregulate radio without an experimental period of partial deregulation.

The Commission said that its initial data showed that radio stations in the markets surveyed are broadcasting news and other informational programming in amounts well above current guidelines (six percent for FM and eight percent for AM).

In addition, the "vast majority" of the surveyed stations "were not coming close" to the FCC's upper limit for commercial time (18 minutes per hour), according to the Commission.

The FCC also proposed scrapping community ascertainment requirements, stating that "the increasing specialization of radio formats toward sub-audiences" made this procedure of questionable value.

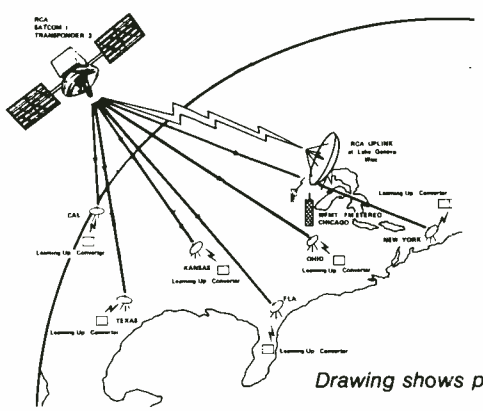
It seemed likely as of this writing that the Commission would soon propose complete elimination of regulations in the areas studied.

Reaction from radio broadcasters was, not surprisingly, positive. Abe Voron, executive vice president of the NRBA, said that his association was "heartened and encouraged" by the possibility of deregulation without lengthy experiments. "The most encouraging development," Voron continued, "is that it now appears that the FCC is seriously considering deregulating radio beyond the original experimental plan and may extend deregulation to all radio markets, large and small."

The NRBA also announced that it would submit the results of its recently completed Small Market Programming Survey to the FCC to aid it in reaching a decision about the inclusion of small-market stations in deregulatory actions.

Meanwhile, some consumer and public-interest groups reportedly geared up to battle the proposed deregulation attempt. The National Citizens Committee for Broadcasting and the Citizens Communication Center both announced tactics to discourage easing of the rules. The NCCB's plans were for lobbying efforts before the formal rulemaking. CCC director of litigation Edward Kuhlmann, quoted in *Variety*, claimed, "All of our clients will participate in the rulemaking" in an attempt to swamp the FCC with formal comments. Kuhlmann stated that a chief target of its clients' barbs will be the FCC staff-compiled figures themselves, claiming that the FCC's own statistics show numerous violations of the guidelines.

WFMT Becomes First Radio Superstation



Drawing shows planned network link for WFMT

Chicago fine arts station WFMT has become the first radio station in the country to have all of its programming distributed nationally by satellite. United Video, Inc., of Tulsa, Okla., is experimentally carrying WFMT's signal in stereo via RCA's Satcom I. Once FCC approval is obtained, the signal will be made available to any cable system in the nation that has an earth station to receive it.

WMFT is already carried by at least 29 cable systems in its six-state coverage area. Those systems either pick up the signal with a sensitive FM receiver or, if they are outside the station's receiving range, pay a common carrier to deliver the signal by terrestrial microwave. Satellite distribution, however, will enable cable systems across the country to transmit WFMT's FM signal.

Feasibility tests were conducted before United Video's final decision to distribute WFMT. The company's engineering manager, Tom Keenze, worked with Leaming Industries of Costa Mesa, Calif., to test its FMT-201 FM Stereo Multiplex Transmission System, which receives the off-the-air signal and converts it to a form suitable for transmission by satellite. The system consists of a down converter and deviation enhancement unit at the microwave originating site and an up converter at each cable system served by the network. The stereo signals are normally multiplexed onto a microwave channel carrying a video signal. United Video will lease the special receiving equipment to cable systems for a small charge.

Subscribers who opt to receive WFMT in their homes will have the cable split and hooked up to their FM receivers as well as their television sets.

Cable systems will pay United Video for the service, of course, but WFMT will receive no direct financial benefit from its superstation status. What, then, is the advantage? Dr. John Major, WFMT's director of research and marketing, explained: "The more listeners the better! This will bring classical music and fine arts radio to communities that have never had it available before."

Small-Market Stations Exceed FCC Minimums

A study recently released by the NAB shows that radio stations in small markets are broadcasting non-entertainment matter in amounts greatly exceeding the FCC's prescribed minimums for such programming. The average for non-entertainment programming was 25.4 percent for the surveyed stations. FCC minimums are eight percent for AM stations and six percent for FMers. News accounted for 13.3 percent; public affairs was 2.8 percent and "other" non-entertainment material was 9.3 percent of the stations' schedules, on the average. The figures were based on information submitted to the FCC by stations applying for their most recent license renewals.

The NAB called on the FCC to deregulate small-market radio stations immediately based on its findings, which coincided with similar FCC staff investigations (see separate story).

Revenues Up, Profits Down For Radio And TV Nets

According to figures just released by the FCC, net broadcast revenues for the

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eight nationwide radio networks and the three nationwide television networks were up for the calendar year 1978, although both radio and TV nets showed a decrease in profits.

Total net revenues for the radio networks (CBS, NBC, the two MBS nets and ABC's three AM and one FM net) and their 18 O&O stations were $236.3 million, up from the 1977 figure of $212.7 million. Profits (before federal income tax) were down six percent, however, totalling $3.7 million. The 1977 level was $46.5 million.

The TV nets showed a 7.7 percent increase in net revenues in 1978. Their pretax profits also dropped, though — $373.5 million, down 7.9 percent from 1977.

Both radio and TV network O&O stations reported increased profits, despite their parent companies' downturn. Profits of the radio nets' O&Os rose a big 33.8 percent to $28.4 million; the TV O&Os showed profits of $186.3 million, almost 25 percent above 1977 figures.

Verveer Named Head of FCC Broadcast Bureau

Philip L. Verveer has been chosen to replace retiring Wallace Johnson as chief of the FCC's Broadcast Bureau, in a move that caused some controversy within the Commission. Three Commissioners — Quello, Lee, and Washburn — strongly opposed the appointment, which was favored by Commission head Charles Ferris. Such major appointments are usually, but not always, agreed to unanimously by Commission members. Verveer served as Cable Bureau head until the new appointment.

The dissenters had pressed for the appointment of deputy broadcast chief Martin Levy to the top post. Calling Verveer "the wrong man for the wrong job at the wrong time," Commissioner Quello said of Levy, "He's strong, independent, and the best qualified."

Neither the NAB nor the NRBA has commented officially on Verveer's appointment, although some sources have hinted that he is regarded as a strong regulator. One source at NRBA told *BM/E*, however, "We've heard good things about him . . . we feel that it's going to be a very productive relationship."

Replacing Verveer as acting Cable Bureau chief is Willard R. Nichols.

IEEE Sponsors Teletext/ Viewdata Conference

As part of the twentieth annual Chicago Spring Conference on Consumer Electronics, the IEEE presented a special conference on teletext and viewdata systems on June 4 and 5. The sessions were organized and chaired by Walter S. Ciciora of Zenith Radio Corp.

The papers, and exhibits in some half-dozen applications suites, demonstrated that although Europeans (notably the English and French) are well underway with digital transmission of pages of graphics and text information (broadcast in the case of teletext systems, carried over interactive telephone lines in the case of viewdata), much discussion needs to take place before acceptance in the U.S.

One major question still to be resolved is page format, although most at the conference seemed to agree that 26 rows of 40 characters each should become the working standard. Another major issue centers around the configuration of the control code. In some systems, the image is completely formatted in the composition, while the user is presented with the option of employing a high or a low-resolution decoder. The question of costs, and who would bear them, was raised frequently. Still another issue prompting lively discussion was the page refresh

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time offered by the various systems. There seemed to be a consensus that assigning priorities to pages was a desirable feature; pages carrying important information such as news flashes can be changed as often as every six seconds, while less important information runs only once every five minutes or less.

Two major U.S. experiments are currently underway with teletext systems. CBS's Robert O'Connor reported on the side-by-side trials of the British Cefax/Oracle and the French Antiope systems at KMOX in St. Louis. William Loveless of Bonneville International reported on the progress being made at KSL, Salt Lake City, Utah, with an interactive teletext system using touch-tone telephones.

Manufacturers demonstrating systems included North American Philips, which is working with the British Post Office on Prestel (a viewdata system), and with the BBC and Independent Broadcasting Authority on Ceefax/Oracle (a teletext system); Sofratev, which is responsible for the French Antiope teletext/viewdata system; Micro TV, whose Info-Text teletext system is undergoing trials in the Philadelphia area; the Canadian Government, which showed Telidon, the latest offering in the viewdata field; and General Instrument Microelectric, which showed single-sided PC boards for teletext and viewdata decoders.

Philips "Compact Disc" Enters Digital Audio Race

The Philips "Compact Disc" player, described briefly at audio meetings and in earlier news releases, got its first demonstration for the general press at a series of meetings in New York on May 31. As noted in the February, 1979, *BM/E*, it uses a laser recording and playback system for PCM audio on a small disc, about four inches (115 mm) in diameter. One side only is recorded, and it has a maximum playing time of one hour. Rotational speed varies from 500 to 215 rpm during play to maintain a constant linear speed.

The coding is 14 bit linear for a dynamic range of 85 dB and distortion less than 0.05 percent. Sampling rate is 44.3 kHz. The lighten beam in the player is produced by a semiconductor laser. Servo systems, as in the optical video disc player, keep the light beam spot, about 1.6 microns across, the micron-wide track and keep it in focus on the playback surface. Like the video disc, the Compact Disc has a transparent layer over the playing surface that makes the record largely impervious to ill effects from dust, grease, and scratches.

In the demonstration the low distortion and tremendous dynamic range were obvious. Thus the Philips disc becomes a rival of PCM audio disc systems shown in the last two years by Teac-Mitsubishi, Sony, Matsushita, and JVC. All the others are using 12-inch discs, similar to the discs used in the video optical players. A Philips spokesman said they had considered this kind of compatibility, but decided it would overly penalize the buyer who wanted only an audio system. They said the player would be ready, with a heavy backup of software, in the "early 80s," at a price comparable to that of a good hi-fi turntable.

Supreme Court Rules Producer's "State Of Mind" Must Be Disclosed

Broadcast news directors and print journalists across the country reacted with anger and dismay to the Supreme Court's ruling that newspeople involved in libel suits can be forced to disclose the opinions they held while

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working on a story. The ruling was handed down in April in the *Herbert* v. *Lando* case, in which a former Army officer, Lieut. Col. Anthony Herbert, claimed he was libeled during a CBS *60 Minutes* news show. Barry Lando, producer of the show, had refused to answer questions dealing with his decisions on what material to include or exclude and whether interviewees were being truthful, and his "intentions" in selecting material for the broadcast.

In his majority opinion, Justice Byron R. White said that to exempt journalists from such disclosures in libel cases "would constitute a substantial interference with the ability of a defamation plaintiff to establish the ingredients of malice" as they have been defined. Joining in the majority opinion were Chief Justice Burger and Justices Blackmun, Rehnquist, Stevens, and Powell. Dissenting were Justices Stewart, Marshall, and Brennan.

RTNDA president Paul Davis, writing in the association's publication, the *Communicator*, said that in his opinion a court hearing a case on grounds of "actual malice," a legal term applicable only to public figures and at issue in the *Lando* case, should "have the right to question reporters or producers on their evaluation of information they published . . . what is troublesome in the most recent ruling is the sequence." The Court's decision, said Davis, allows a plaintiff to inquire into the "state of mind" of the defendant before the plaintiff has proven that the information was actually false. Davis continued, ". . . we hope judges will perceive, as we do, that there is a higher level of balancing needed in libel discovery proceedings when First Amendment issues are present."

PBS Considering 'Core" Program Service

The Public Broadcasting Service is reportedly considering a plan to provide PBS stations with a satellite-distributed "core" program service. The core programs, as conceived, would run for two prime time hours per night four nights a week. They would be nationally promoted.

A PBS report indicates that carriage of the system's national prime time schedule dropped significantly this year over last year. The core schedule idea is seen as seeking to solve this problem and its attendant decrease in audience size.

Another satellite feed might consist of regional and/or instructional programming for use at local discretion, in addition to the nationally oriented core programming.

Final decision on the proposals was not expected before the annual PBS membership meeting, held in Los Angeles June 24 to 27 (after *BM/E's* press deadline).

News Briefs

Spring 1979 RADAR 19 data shows that, nationwide, **FM radio has surpassed AM** in audience share for the first time. Overall FM share was 50.5 percent (48.7 percent last year); strongest showing was in the 7:00 p.m. to midnight time slot, 58 percent of total audience . . . . **Classical music radio audiences increased** 4.7 percent from 1977 to 1978, according to figures compiled from recent Arbitron books by the Hall Radio Report . . . . *The Directory of Concert Music Stations* 1979-1980 **lists almost 900 classical music stations** across the country; 45 percent are commercial stations. The directory is available from WFMT, 500 N. Michigan Ave., Chicago, Ill. 60611.

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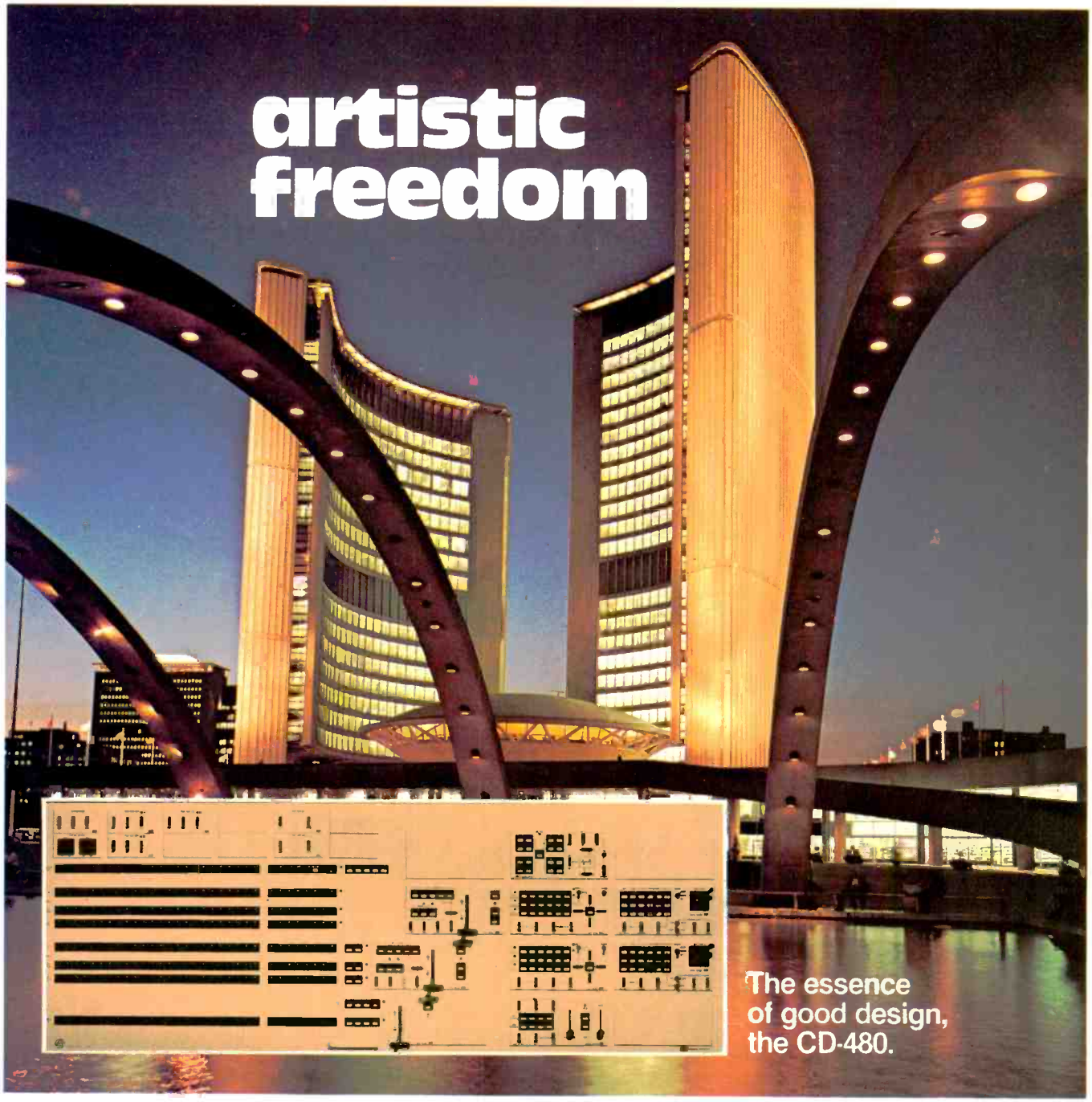

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News Briefs

Fearing increased TV reception interference, NAB has asked the FCC to **deny Texas Instruments' request** to relax emission standards for home computers (see *BM/E,* June, 1979) . . . . The federal government may need to **regulate the design and manufacture of radio and TV receivers** in order to reduce interference, NAB said in a filing with the FCC. The association says many stations have been injured by loss of effective coverage due to interference . . . . **Deregulation is the single most important step** the FCC can take to reduce the backlog of radio broadcast station applications, NAB senior vice president and general counsel told FCC Chairman Charles Ferris in a letter outlining several measures for lessening the problem. Other suggestions included mutual cooperation among the Commission and its regulatees, clearer instructions on forms, and changes in processing policies and rules . . . . The NRBA is **publishing a weekly Editorial Service** focusing on "the inhibiting burden of over-regulation." Editorials in the series will be distributed to NRBA member stations.

The FCC has **modified the financial qualifications** for broadcast television applicants to allow applications by parties who can demonstrate sufficient capital to construct the station and operate for 90 days without advertising revenue. The former standard, requiring enough capital to operate for one year, was judged to be in conflict with FCC policy of encouraging minority ownership and diversity . . . . The fifteenth annual Management Compensation Survey, conducted by Sibson & Co., **will include top and middle management pay levels for the broadcast industry.** Stations must participate to receive the report next fall. For information contact Vern Meyers, Sibson & Co., Research Park, 1101 State Road, Princeton, N.J. 08540, (609) 924-7510 . . . . The National Academy of Television Arts and Sciences has **elected 16 new members** to its Board of Governors. The new board will select its executive committee at its July 10 meeting . . . . KATU-TV, Portland, Ore. ABC affiliate, has embarked on a **major expansion program.** Existing facilities will be renovated and a specially designed 20,000-square-foot structure will be built.

NCTA chairman Robert W. Hughes told the Senate Agriculture Subcommittee that the **cable industry supports the passage of S 836,** a bill to authorize the Rural Electrification Administration to broaden its communications funding and technical assistance programs to include support of cable TV and other broadband telecommunications systems . . . . Wometco Enterprises, Inc., and National Subscription TV of New York, Inc., will **offer subscribers the same pay-TV decoder box** in the New York/New Jersey market. The decoder used is manufactured by Blonder-Tongue . . . . Visions, Anchorage-based cable system, has become the **first MDS system to fund production** of a docudrama for public television. The program was based on the play *Terra Nova.*

Five cable executives will **advise the Associated Press on its future role in CATV.** Th AP-CATV Advisory Board met first at the NCTA Convention in Las Vegas . . . . **Four cable systems have signed up** for AP NewsCable, AP's 24-hour information channel. Oregon has joined 10 other states in participating in AP NewsCable's **state news experiment,** providing regional news, sports, and weather data via a special formatted circuit from early morning to late at night.

Mutual Broadcasting System's annual **affiliates meeting** will be held October 5 to 7 at the Washington Hilton, Washington, D.C. . . . . Mutual Black Network will hold **regional affiliates meetings** in Atlanta, September 19 and 20; Jackson, Miss., October 10 and 11; and Arlington, Va. (Washington, D.C.), November 7 and 8. The first such regional meeting was held June 20 and 21 in Kansas City, Mo . . . . The twenty-fifth annual **Broadcaster's Clinic,** coordinated by University of Wisconsin-Extension (UWEX), will be held October 24 and 25 in Madison, Wisc. The Silver Anniversary program will feature discussions, technical papers, and an equipment display. For registration information contact Don Borchert, director of engineering for radio/TV, UWEX Telecommunications Center, 821 University Ave., Madison, Wisc. 53706, (608) 263-2157.

FOC '79, the second International **Fiber Optics and Communications Exposition,** will be held September 5 through 7 at Chicago's Hyatt Regency O'Hare. Contact Information Gatekeepers, Inc., 167 Corey Rd., Brookline, Mass. 02146 . . . . The Communications Institute of Boulder will hold **intensive seminar programs** in Tele/Information Systems and Tele/Systems Design, August 14 to 17 at the Broker Inn in Boulder, Colo. For information contact the institute at 1216 Pearl, Suite 1, Boulder, Colo. 80302, (303) 444-7740 . . . . August 1 is the **deadline for applications** for the CINE Fall 1979 Competition. For application forms and further information contact the Council on International Nontheatrical Events (CINE), 1201 16 St. NW, Washington, D.C. 20036, (202) 785-1136.

Business Briefs

Nubar Donoyan, president of **Vital Industries, Inc.,** died on Saturday, May 19. His brother, Christopher Donoyan, succeeds him as Vital's president . . . . **Westinghouse Broadcasting Co.** has signed an agreement in principle to buy WRET, Charlotte, N.C., from Turner Communications for a reported $20 million . . . . **Scientific-Atlanta** has agreed in principle to acquire Adar Associates of Burlington, Mass. Adar manufactures automatic test equipment for solid state memory devices and memory boards . . . . **COMSAT General Corp.** has acquired Environmental Research & Technology, Inc. for $19.6 million.

Oak Industries will acquire Tesdata Systems Corp. for an exchange of common stock. Tesdata, headquartered in McLean, Va., manufactures computer diagnostic equipment and develops computer performance evaluation systems . . . . **Promax Photo Industries** has purchased complete rights to Lucht Engineering's line of cine film processors. Both firms are based in Minneapolis.

Sofratev, the French Company promoting teletext in the U.S., has created a U.S. subsidiary, AVS, Inc. (Antiope Videotex Systems) . . . . **Agfa-Gevaert** of Teterboro, N.J., part of West Germany's Bayer Chemical Group, announced plans to continue its capital investment program in the United States . . . . **Philips Test and Measuring Instruments** has begun manufacturing oscilloscopes in the U.S. The first units will be ready for delivery by late 1979 . . . . The installation of two 12-foot diameter microwave antennas has expanded **RCA Americom's** Satcom uplink capacity in New York City . . . . **Cerwin-Vega** is constructing a new 100,000 square foot building adjacent to its recently acquired plant in Arleta, Calif.

Logitek Electronic Systems moved into its new facility, located at 3320 Bering Dr., Houston, Texas 77057, on May 1. New phone number is (713) 782-4592 . . . . **Verbatim Corp.** has expanded its Sunnyvale, Calif., plant by nearly 25 percent. The maker of flexible discs, data cassettes, and cartridges is also constructing a $5 million facility in Limerick, Ireland . . . . **Wiltron Co.** has acquired a Morgan Hill, Calif. site for construction of an electronics-oriented business park. The company will use a portion of the park for its own expansion . . . . **Uni-Sync, Inc.,** of Westlake Village, Calif., is consolidating its manufacturing and sales facilities into DBX, Inc., of Newton, Mass. Address for the companies, both subsidiaries of BSR, is 71 Chapel St., 02195.

Burns Audiotronics of Hicksville, N.Y., has been appointed exclusive distributor of Beyer Dynamic Co.'s line of consumer and professional headphones and mics. Beyer is based in Heilbronn, W. Germany . . . . **Peirce-Phelps, Inc.,** of Philadelphia and **Lake Systems Corp.,** Newton, Mass., have been named to represent ADDA Corp. in their respective regions . . . . **Video Components, Inc.,** of Spring Valley, N.Y., has been appointed manufacturer's representative for the Maxell line of video products . . . . Sonny Sonnenfeld will represent **Strand Century** in the New York metro area. His firm, Sonnenfeld and Co., is located at 24 E. 38 St., New York 10016; phone is (212) 679-2766.

Ampex will supply the U.S.S.R. with over $7 million worth of VTRs and related equipment for the 1980 Olympics . . . . **ADDA** Corp. recently marked the delivery of its one hundredth VW-1 Digital Frame Synchronizer (to NBC in New York), as well as $3 million in total product shipments . . . . Five Group W O&O TV stations purchased 30 **Sony** BVP-300 cameras and 50 BVU-50 U-Matic VTRs in a deal totalling over $1 million. **BM/E**

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RADIO

PROGRAMMING & PRODUCTION FOR PROFIT

Serious Talk, Informative Talk, Culture That Entertains

THE QUALITY AND QUANTITY of syndicated talk shows, both serious and "popular," are going up. Also up is the availability of syndicated programs that fit in that very elastic bag, "culture." Common to these varieties of talk show is an attempt to plug in something called "entertainment value." Two cases in point follow here, the first Gamut Productions, Inc., of Barrington, Ill., and the second the etc. Network of Los Angeles. The latter is an enlargement of a peliminary story in last month's column.

From WFMT, into Gamut

In 1952, Rita Jacobs and her husband, the late Bernard Jacobs, took over a floundering and foundering FM station in Chicago and created WFMT, which became one of the earliest great commercial successes on FM, with programming made up largely of classical music and other "culture" ingeniously presented. WFMT won a basketful of awards for programming excellence, and also won a profit position that helped spark the rise of FM and encouraged similar ventures in other cities.

New owners bought WFMT in 1968, but continued and enlarged WFMT's programming stance. The present management is in the forefront of the classical music purveyors and of those determined to do the best technical job possible with today's equipment. WFMT continues to be the bearer of excellence and a solid commercial success.

Meanwhile, one of the founders, now Rita Jacobs Willens, has begun to exercise in another way the talent she demonstrated strikingly in building WFMT, building programming that combines many elements to be both serious and attractive. She and her present husband, David Willens, have recently (1974) set up Gamut Productions to create and distribute a wide variety of programs for radio stations. Mrs. Willens is president/producer.

She has shown already that she is still award-prone, with several Ohio State Awards, two Armstrong Awards and the Gabriel Awards of the Catholic Radio/TV Center of Cleveland. Her programs have run as "specials" on WFMT and a number of other stations. Some examples: "Gamut: The Great Idea of Man" is (in the words of the Armstrong Award citation, 1974) "a trip through the inner space of human thought and feeling as expressed in words and music, using an artful stream of consciousness technique . . . a program that challenges, amuses, and illuminates . . ."

A more recent one, "Rozhinkes Mit Mandlin" ("Raisins With Almonds"), a two-hour documentary first heard on WFMT and slated to be an annual presentation there, won a 1979 Ohio State Award and was cited there as being ". . .all at once contemplative, contemporary, serious, and lighthearted . . . it illuminates essences of the spirit of Judaism, achieving its aim with style and superb technical competence."

Gamut, Mrs. Willens has told *BM/E*, is now preparing to move into production of several regular series of programs, making the quality shown in the specials available much more frequently. In preparation is *ETC*, a series of five-minute programs that use music, narration, and docu-drama to illuminate "the one hundred great ideas." Another series in the works is *Chautauqua*, each of which she describes as a "one-hour bandwagon of the best in jazz, folk, blues, showtunes, country, and classical music, with humor, poetry, and history added"! Obviously, that is an incredible mouthful, and one would be highly skeptical of its successful assimilation without Mrs. Willen's more than two decades of proof that she does this kind of thing extremely well.

The new series are slated for distribution starting in September; samples will be ready earlier. Gamut is also moving into production of original music for radio, TV, and audio/visual producers (intros, IDs, stings, bridges, musical punctuation, etc.). Mr. Willens, vice president and music director, is the creator in this area: he is a composer and performer of classical and electronic music. Gamut has full production studios with recording equipment and electronic music synthesizers, including the Moog.

Radio programmers who want to know more should write to Gamut at Route Two, Box 61A, Barrington Ill. 60010.

More on the etc. Network

In May there was a short notice here on the talk programs put out by the etc. Network of Hollywood, featuring such personalities as Gore Vidal, Cleveland Amory, and others. Too late for inclusion, additional information was brought to *BM/E* by Stacie Hunt, one of the principals, on a visit to New York.

The program format has had a successful three-year run on Station KIIS in Los Angeles. Among the creators are Jay Allen, a representative for Gore Vidal, and Lynn Bowers, political speech writer for several governmental figures. Additional talk figures are being recruited to give the programs expanded "name" interest.

The form of the programs is aimed to make them sound as though the station itself is doing them. In each 22-minute program, each of the famous persons talks for two minutes. Then there is space for the local announcer to come in with news, weather, comment, and reference to the speakers the listener has heard and will hear. This gives each program plenty of room for a local identity and spontaneity, created by the ability of the station's own staff.

The management of etc. is looking for a partial sponsor who will aid in a considerable enlargement of the scope with a greater number and variety of speakers. The topics are serious, covering politics, health, and finances, and are aimed at the common problems of people. The organizers say that the strong response to their programs on KIIS convinced them some time ago that many other stations would be glad to get serious talk by authorities in a similar form.

For the latest on the growth of this interesting idea, write the etc. Network, 6363 Sunset Blvd., Suite 520, Hollywood, Calif. 90028, tel. (213) 466-5128. **BM/E**

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....is the only system compatible with the new breed of AM receivers using synchronous detection for less distortion, less noise.

As the only manufacturer of radio transmitting equipment to propose an AM stereo system, Harris has drawn on over half-a-century of experience to put AM stereo broadcasters on a competitive basis with FM...in a cost effective manner.

For more information, and your free demo tape, write on your station letterhead to: Harris Corporation, P. O. Box 4290, Quincy, IL 62301. We think you'll agree that Harris' V-CPM is the future of AM broadcasting.

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COMMUNICATION AND INFORMATION PROCESSING

Circle 114 on Reader Service Card

New Material From The Syndicators

SYNDICATION FOR RADIO is a kettle at full boil, with the competitiveness of radio keeping the heat high. Established syndicators bring out new material from time to time in order to keep in the forefront and find new customers. Here are a few examples.

AOR from Cavox

Cavox Stereo Productions of Inglewood, Calif. (*BM/E*, December, 1977) has one of the most varied and flexible repertories of programming on the market. In addition to regular format service, Cavox has a "Library Programming Service," consisting of 10½-inch reels each holding from 20 to 30 tunes in a single format category. The user can air them in any order he pleases, inserting them into other programming or mixing them with tunes of a different class from a second or third Cavox tape. The Library Programming tapes are updated monthly; a station can contract to get up to 12 hours of new music a month.

Lee Tate, president of Cavox, recently announced two new categories. PR100 will be Album-Oriented Rock tunes up to four minutes long; PR200 will be AOR tunes over four minutes long. The tapes are available in form for automated, semi-automated, or live operation. A PR100 reel will hold from 32 to 34 tunes; PR200 tapes will average 20 tunes each. Updating, as with other library tapes, will be monthly. Lee Tate says the music will consist primarily of "mellow" album rock. Previews can be had by calling Cavox at (213) 776-6933.

The firm of which Cavox is a division, Tape-Athon Corporation (same address), also recently announced new services. Tape-Athon supplies background music to a large number of organizations. The entire Tape-Athon buy-or-lease library is now available on NAB Type C cartridges, so it can run on such machines as Telex, Viking, Sparta, Audio Environments, and Yesco. It is also available in the "Track 4" system.

Lee Tate draws attention to the two general kinds of background music Tape-Athon supplies. One is in the traditional character of "non-forefront" music, appropriate for thousands of locations. Tape-Athon also has a "bright" music, still not forefront but more "contemporary" than the standard kind, popular for shops and other places used by the teenage and early adult crowd. For more info use Cavox number (above).

Country from Automated

Automated Music Unlimited, Port Arthur, Texas (*BM/E*, February, 1979), announces a total country music service. It consists of 30 reels of "gold," hit songs over two years old; 15 reels of recurrents, hit songs less than two years old; plus two reels each week of up-to-minute hits. A station signing up for the service at $295 per month gets all the gold and recurrent reels at once. Alternatively, the station can buy any of the gold or recurrent reels at $50 each (up to nine reels) or $45 each for 10 or more.

James Joynt, president of Automated, gave *BM/E* advance notice of another format to be ready in July: gospel music, which is apparently the first one of its kind from a syndicator not an arm of a religious organization. The basic library, delivered to all subscribers, is 30 reels with about 28 tunes each, to be followed by four new reels a month. Fee will be around $200 per month. Info: (713) 727-0775.

"American Rock" is fourth for Radio Arts

A new format, "American Rock," is the fourth put on the market by Radio Arts of Burbank, Calif. (*BM/E*, February, 1978). Larry Vanderveen, president of Radio Arts, told *BM/E* that the aspect of the music called "Maximized Energy Curve Programming," based on long research with listener reactions, is a careful positioning of tempos and character for sustained "push" to extend listening time. The "mainstream" music is aimed primarily for 12-34 audiences and can be had for AM and FM, automated or live. A few of the stars: Rod Stewart, Donna Summer, Rolling Stones, Doobie Brothers, Billy Joel, Alice Cooper, Little River Band, and many more. Info: (213) 841-0225.

Toby Arnold sums the decade

A new 12-hour radio special from Toby Arnold (*BM/E*, May, 1979) is called "Opus 79/The Dynamite Decade." It continues Arnold's series of year-end wrap-ups, with the difference that "Opus 79" will cover the top music of the whole decade of the seventies. To the top 100 songs of 1979 will be added hit music all the way back to 1970, with the usual mixture of music and artist interviews, tracing "the rock-solid history of today's music and its decade-long origins." Supplied with the program will be graphics, sales aids, and other collateral materials. Info: (214) 661-8201. **BM/E**

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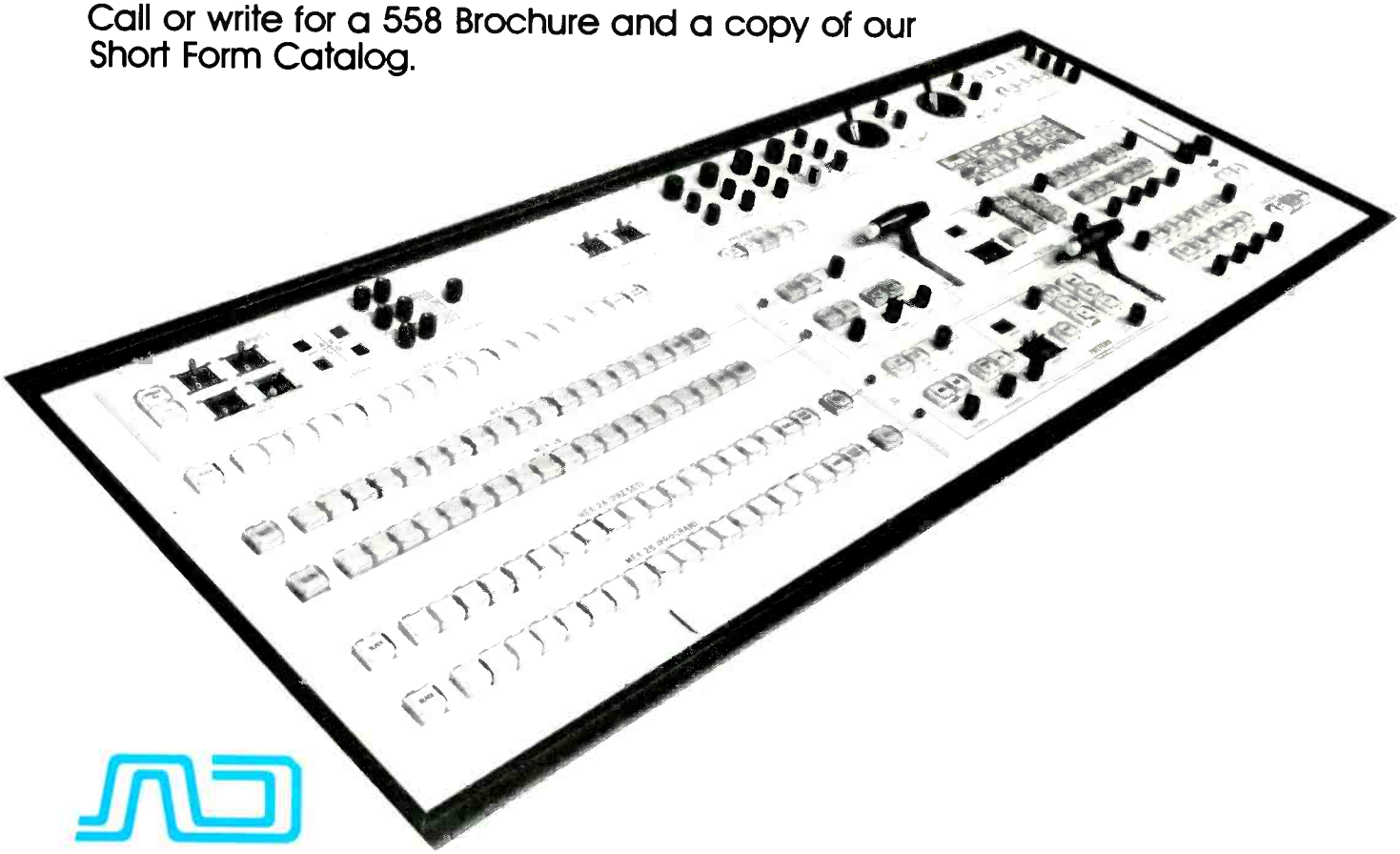

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KRON, Cairo Link Up For International Farewell To King Tut

ON THURSDAY, May 31, viewers across the U.S., and in Egypt, too, were treated to a rare television event. KRON-TV, San Francisco, arranged 90 minutes of programming that included not only a documentary shot in Egypt that revealed the adventure of the discovery of King Tut's tomb, but also simultaneous live feeds from the Pyramids and the de Young Art Museum. The occasion was the opening in San Francisco of the final American stop on the much-heralded tour of the Treasures of Tutankhamun.

KRON networked its live show to 17 stations across the U.S., with 30 more due to receive it on videotape for syndicated airing. For KRON it meant a 26.4 rating/41 share — the highest rating that the station has ever received for a non-entertainment show, exceeded only by some major sports events. With a potential nationwide audience of some 70 million, "In Celebration of Tutankhamun" may also have developed the largest audience ever for any local show.

Much of the credit for the show's success goes to producer Ziggy Stone, Emmy award winner for his production of Group W's *Evening Magazine* program.

Stone and a crew of five spent almost a month in Egypt taping the documentary portion of the show. Using two Ikegami HL-77 cameras and Sony BVU recorders they worked in Cairo, the Valley of the Kings, and various other Egyptian locations to piece together the events surrounding the discovery of the tomb in 1922. The documentary features a number of scenes captured for the first time on videotape, including closeups of the solid gold coffin of the boy king, kept under limited access at the Egyptian Museum in Cairo. The KRON crew was also the first to be allowed to visit a newly discovered temple in the Valley of the Kings.

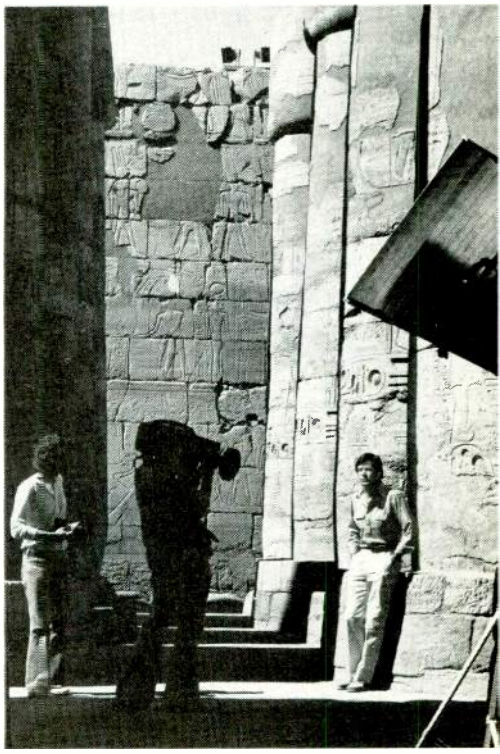
Stone brought the massive amount of videocassette material back with him and edited on KRON's Datatron Tempo/BVU-200 editors. SMPTE time code was used throughout. The material was very tightly worked and Stone often spent an entire weekend editing to generate four or five minutes of program material. Stone was even able to create matched dissolves in a couple of scenes.

Four satellite bounces

Larry Pozzi, KRON's chief engineer, explains that he was a little nervous going into the project, never having arranged a satellite feed of this complexity before. He reports, however, that everything went extremely smoothly.

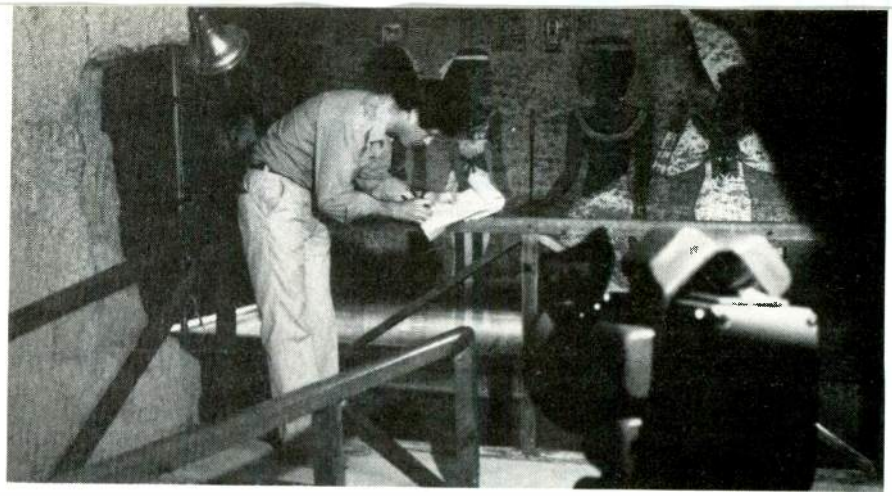
The feed from Egypt originated from the site of the Pyramids, about

Cameraman Scott Gibbs, Producer Ziggy Stone, Audio Technician Tony St. John and an Egyptian helper video taping in the desert of Western Egypt. At right, KRON-TV EFP crew preparing to shoot the hieroglyphic columns at the great Temple of Karnak, near Luxor



eight miles from Cairo. An Egyptian crew, using Thomson-CSF cameras leased from the government operated network, microwaved the material to an Egyptian uplink which put it on the Comsat I satellite. At this point the signal was in the 625-line PAL format.

Comsat I beamed the signal down to the Federal Republic of Germany for standards conversion to 525-line NTSC. The signal was then uplinked



Reporter Thayer Walker and KRON-TV crew inside the antechamber of the tomb of King Tutankhamun

to Comsat IV, bounced across the Atlantic, and downlinked to the earth station at Andover, Maine. From there, the signal was carried by microwave to Western Union's switching center in New York City. It was then routed and uplinked to Westar I for the trip to KRON in California where it was downlinked at an earth station near San Francisco. The signal was carried to KRON through a local loop. Finally, integrated with KRON's other material, it was uplinked to Westar I again for distribution to the other stations in the network. Arrangements for the domestic network were made through the Robert Wold.

A return video line from KRON to Cairo sent the program back to Egypt where it was presumably put on videotape delay for later rebroadcast (8:30 p.m. in San Francisco was 5:30 a.m. in Egypt).

The audio setup was equally complex. A program coordination line was opened between KRON and Cairo so that program audio was available at the Egyptian location for announcer Thayer Walker. Then, just prior to the beginning of the show, an intercom line was established via the satellite using the SCA portion of the video feed. The program coordination channel also linked KRON with its EFP team and announcer John Hambrick at the de Young Museum.

"Our only moment of doubt," recalls Pozzi, "was just as the show was about to begin. This was the live-by-satellite portion, and we had no way of predicting what the quality of the image would be. But then, at 8:20, 10 minutes before air time, the bird came on perfectly. Our only problem was that the audio level was a bit high, but we corrected that quickly. The satellite feeds went flawlessly.

"Setting up the satellite network proved to be the easiest part of the production," Pozzi continues. "The

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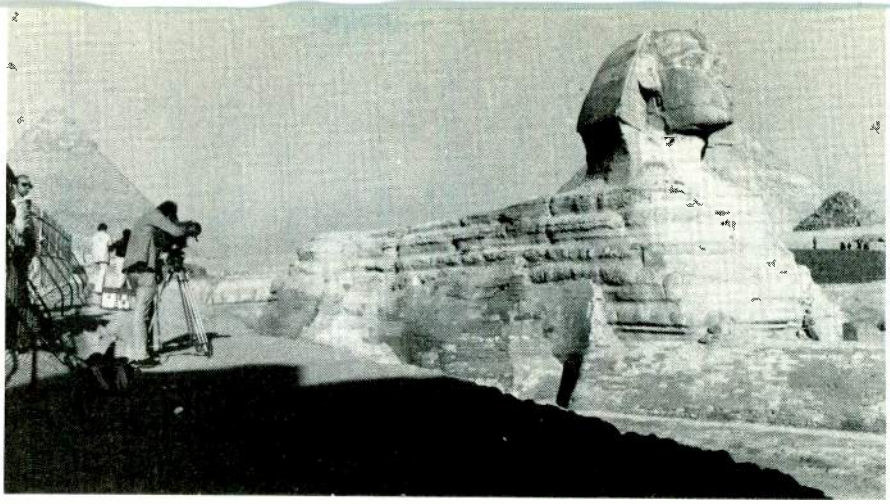
people at Western Union were excellent at explaining everything and making the necessary arrangements. Our people weren't quite sure how everything was going to work. But it did. There's a sense of euphoria at the station."

Live images from the pyramids, Museum simultaneously

The show opened with a portable camera's slow reveal of the monitor racks in the remote truck with the feed from Egypt on one of the monitors. The image then dissolved into a split-screen that showed the museum on one side and the scene from the pyramids on the other. Thus, viewers were treated to a live image that combined pictures from sources many thousands of miles apart.



The KRON-TV EFP crew at the Great Sphinx flanked on either side by the Pyramid of Giza

The remote van at the museum bounced its signal back to KRON with microwave, with a telephone line available as a backup.

Also included in the program were live images from KRON's helicopter, which hovered overhead. Helicopter footage was also included in a prepared tape of the gala festivities that had surrounded the exhibit opening the night before.

Stone carefully preformatted every moment of the 90-minute presentation. This was especially important for establishing commercial breaks since KRON had to delete its own local advertising for the nationwide network distribution. Local stations in the network sold their own ads. Breaks were established by cutting or dissolving to a prearranged "buffer image" 10 seconds before a break so local stations would be alerted to cue their local material. KRON then fed black during the break. About 10 seconds before the break was over, KRON fed the buffer image again, giving local stations the opportunity to cut or dissolve back to the live feed at their discretion.

Was the estimated $250,000 investment in the project worthwhile in the end? KRON's ratings, and its success in distributing a local program nationwide, attest to the continued value of presenting unusual programming to the public. What can never be valued, however, is the experience KRON engineers and production people have gained in the adventuresome use of new broadcast technologies. **BM/E**

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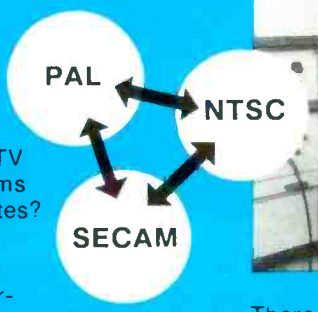

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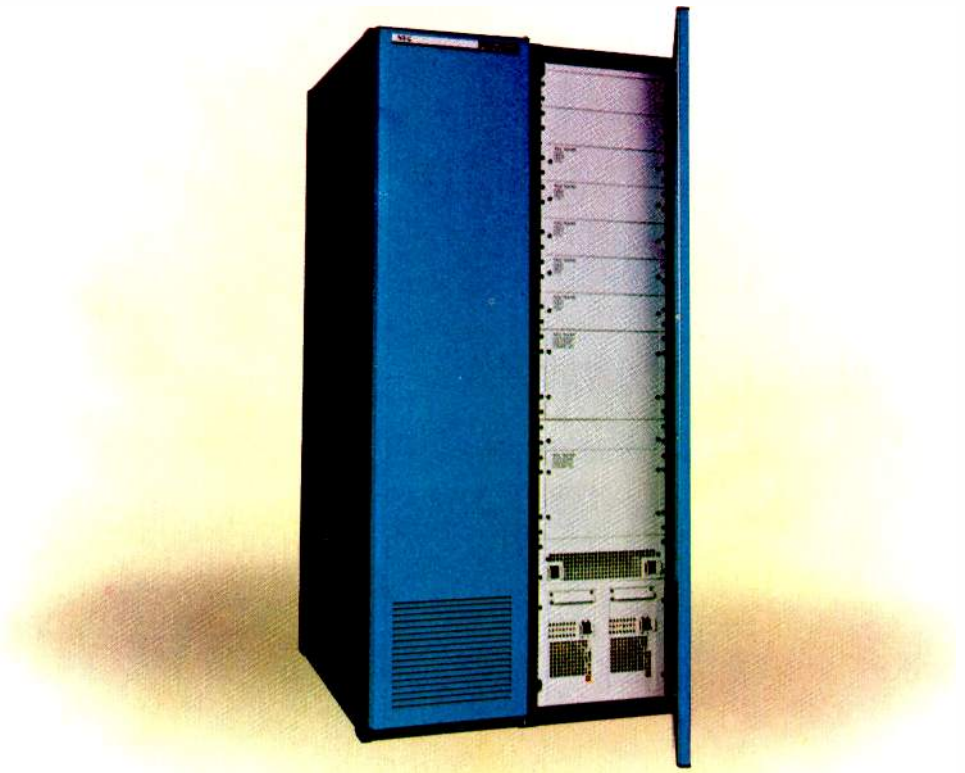

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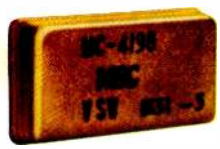

Each 2-wire controller is a microprocessor that confirms switching at all levels in the switcher via word exchanges to the four kinds of circuit boards. The TKA-105 was NBC's choice for the 1980 Olympics, NBC Burbank, NBC Chicago and the expansion of switching at NBC New York. If your routing requirements are for a matrix of 60 x 60 or larger, we invite you to explore the most advanced technology available.

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DISTRIBUTED PROCESSING: THE MAXIMIZED MICRO FOR BROADCAST

Industry committees, individual stations, networks, and manufacturers are working hard to bring the full potential of microprocessor control to fruition. No other ongoing process today is as important to the future of broadcasters as is this search for a practicable "network" of intelligent technology.

IN THE COMING MONTHS recommendations will be made, plans laid, and field tests conducted that could alter the face of radio and television production and broadcasting for all the years to come. In the past few years the microprocessor has been applied to virtually every piece of equipment in the production process, affording greater flexibility, reliability, and efficiency. Yet, from an operational point of view, the production process remains largely unchanged — still time-consuming, inefficient in terms of under-utilized production capacity, and creatively restrictive.

According to Robert McCall of Vital Industries, chairman of the SMPTE Working Group on Standards for Digital Control of Television Equipment, the object is to give the broadcaster the ultimate in terms of software flexibility for his plant, "so he can get away from totally dedicated systems and not have excess capacity on-line just to meet peak demands." In a phrase, the goal is efficient "resource management." Currently the radio or television plant may include any number of resident intelligent systems, but few of these systems talk to one another. Therefore, while their individual functions are to some degree automated, the process by which the individual systems relate to one another in the production of a television or radio program is still a clumsy step-by-step progression in fits and starts. The hoped-for ideal would place the full resources of a broadcast facility at the fingertips of any operator placing a demand on the production system, whether for editing, on-air switching, transmitter control, dubbing, or studio production. Whatever the job, a properly structured distributed processing system should allocate the resources of the facility according to the types, times, and nature of the demand placed on it.

The key to such a system is a common data bus and common protocols so that each machine is speaking the same language and understands its role in any configuration of the system. In some cases, for some need, different nodes in the system should be able to take control; i.e., in some instances one would prefer to have the production switcher in control of cameras, lights, character generators, VTRs, etc., while in other cases one would prefer to have control passed onto the editing system. Moreover, it would be desirable to have the total resources of the station configured in such a way that numerous functions could be carried on at the same time — this would involve the careful assignment of the appropriate equipment to the appropriate tasks. Such a system should also be flexible enough to keep users informed of operating status so that when machines are down for maintenance, alternative configurations can be quickly established.

If this sounds at all "blue-sky," one need only to read the articles that follow. Already, radio and television stations are pressing toward limited distributed processing systems for their plants. Nowhere is the trend more advanced than in post-production facilities where the need to allocate numerous VTRs, digital effects systems, still stores, character generators, and other equipment to various editing positions is an absolute imperative.

If networking a distributed processing system is already possible, why all the fuss about establishing a standard? Because it is economically essential if this level of control and efficiency is ever to be generally available. Bob Dolson, president of Retina, a New York-based systems software consulting firm, points out that the current state of affairs has led to a situation where each system needs to be individually programmed, often at each node in the system. Currently, manufacturers offer a variety of interfaces such as the IEEE 488 (GPIB) or, more commonly, RS-232. While these two standards are the most common, there are dozens of others that are used. As a rule of thumb, according to Dolson, the programming cost for microprocessor-based systems often runs about 10:1 in a cost-of-software to cost-of-hardware ratio. While a broadcaster may feel he is getting a bargain when he can pick up a powerful microprocessor for $1500, he may find that the cost of programming it could run to $15,000.

A "snapshot" of standardization in progress

Robert McCall is quick to stress that the work of the

Distributed Processing

SMPTE committee is "still in progress." Absolutely no hard and fast decisions have been reached, though the Working Group is leaning towards EIA RS-422 as its choice for the broadcast interface standard on control data. McCall said that the work of the committee is at a critical point and he urges all interested parties to come forward to help the working group in its efforts.

The reasons for leaning to the RS-422 standard are that it is faster (it will operate at a speed in excess of 50 kilobaud, perhaps as high as 70 kilobaud, compared to RS-232 which has an upper limit of 19.2 kilobaud); it is serial, which means that bits are transmitted one after the other as contrasted to parallel, in which an individual wire is used for each bit in a word; it has common mode rejection; it is less subject to interference (crosstalk) than is RS-232; and it should be effective in cable runs as long as 4000 feet.

The work of the SMPTE Working Group is now at the stage where preparations are being made for a field test of the RS-422 standard. At KSL-TV in Salt Lake City, Utah, eight manufacturers to date have agreed to produce systems using the RS-422 interface. The companies include, thus far, Ampex, Dynair, CMX, The Grass Valley Group, RCA, Sony, TeleMation, and Vital Industries. Assuming for the moment that these tests are successul, work will proceed along two vitally important lines. One will be the establishment of the data format by which RS-422 will be used in a broadcast environment and the other will be the development of a protocol, or established vocabulary, which all manufacturers' equipment using RS-422 will use. It is in these areas that the broadcast industry must respond. McCall and the Working Group must have as much information as possible on what a "typical broadcast environment" looks like and what functions must go on within that environment. Further, the development of the protocols will require a thorough study of what words, instructions, and commands will be required to control each and every piece of equipment in the system. Whatever vocabulary is established will have to be broad enough to accomodate the activities of a transmitter or audio console, as well as a video production switcher or graphics systems. McCall urges interested broadcasters to provide his Working Group with detailed descriptions of what equipment they have on-line in their plants. Further, this description should include a list of functions to be accomodated by the protocol.

This is an important moment in the development of broadcast technology, for what comes of it may control the future topology of radio and television plants in the years ahead. Radio broadcasters should participate as well since their interest is also at stake in this process.

Another point the Working Group wishes to stress is its goal. "The main objective is to arrive at a consensus standard for the television industry control communications to allow reliable and economic interchange of data

Broadcast equipments with RS 232 type interfaces are becoming more prevalent. In addition to those mentioned above, Central Dynamics uses such equipment in its 480 switcher. Thomson-CSF ties its Vidifont graphics generator into systems via RS 232. Automation equipment such as the Harris 9000 and 9100 fits the bill. So do the products of Adda, Datatron and 3M to mention some others that have come to our attention. Readers may wish to consult the ads of CDL on page 16, Thomson-CSF, inside front cover, and Vital on page 11 for more information.

between systems produced by different manufacturers. It was further agreed that the standardization would be at the level of current technology and current systems requirements. It is not the function of the standards activity to lead technology by drafting standards for functions or systems yet to be developed or to set standards in areas that are essentially intra-system (communications among different television installations as opposed to communications within the plant)."

What the Working Group is addressing is the standardization of local communications over dedicated circuits between individual devices without becoming involved in multi-level multiplexing, "in time, space, frequency, or the like." As McCall put it, "We don't particularly need more technical help (though it would be welcomed) at this point. What we need is people to come forward with various configurations of broadcast television equipment that they feel are typical of their applications." The committee would welcome any input addressed to Robert McCall, Chairman of SMPTE Working Group T14-10, SMPTE, 862 Scarsdale Ave., Scarsdale, N.Y. 10583.

Establishing an interface standard is only the first important step towards a truly distributed processing system. The next step is to begin tying all the various equipment together — networking. Attempts at this are already being made, particularly in the television post-production environment (see "Taking Control of Your Television Plant," p. 41). The ultimate system in a post-production house might work like this: The director and editor would sit down at a console which might look something like the current CMX-type keyboard or a CRT and keyboard arrangement. First, the editor would log in, giving his name, a keyword that authorizes him to operate the systems, and job number and title. At this point, either the system would inform him as to where his material is (tape 1 is on VTR 2, tape 2 is on VTR 3, your master tape is on VTR 6, you have requested a digital effects unit, a graphics systems, two audio recorders, a proc amp, etc.) All items requested are on-line and ready. Proceed.) or it might present a menu of the resources available and allow the operator to choose. Tapes and other materials would be loaded after the operator had made his choices. The specific choices made would be implemented on the basis of the time estimates for the particular job, the maintenance schedule, the production schedule or any other parameters programmed into the resource allocation program. All other users would be locked out from the equipment being used. If, for instance, a particular piece of equipment was not available, the system could provide a list of alternatives. Also, if a piece of equipment was requested and subsequently not used for some selected time period, the system might inquire of the operator at some point if he still wanted that equipment. If not, the equipment would be made available elsewhere in the system. At the completion of the job, the operator would log out, an invoice would be printed and presented on the CRT for approval by the client, and then, if the system were tied to a business automation system, the proper invoice would be mailed immediately to the client.

While the above hypothetical scenario may seem a bit far out, Bob Dolson assures us that such a level of sophistication is entirely possible. The key to such a sophisticated network is distributed processing building blocks at the microprocessor level. Currently, there are none. Such distributed building blocks are available at the minicom-

puter level and many industrial processes are now using such systems. Perhaps the best example is the computer-controlled oil refinery. In a sense, the oil refining process is analogous to the television production process in that all final products are created from a single raw element, crude oil in the case of refineries and electronic signals in the case of television. Whatever the finished product is, it is the result of various sequences using different configurations of essentially similar equipment acting upon the raw material. It is the control of the devices in the production process that determines the ultimate constitution of the product.

Dolson is quick to point out that the analogy sticks only in that both systems can be viewed as industrial processes — the television system, after all, must be creative, that is, responsive to the desires of creative people. There may be many instances where some configurations are unique: where some selection of equipment and some routing pattern will never be used a second time.

It is this requirement for flexibility that makes the SMPTE Working Group's efforts so important. As much as can be known about how broadcasters want to use their systems must be known and this information can only come from the industry at large.

As things stand now, the demand for flexible distributed processing can only be answered for the wealthiest and/or neediest of television and radio installations. What is involved in the absence of a standard interface for control is a complicated process that could take an individual installation as much as two years to develop.

First, the chief engineer and other members of a production facility would have to go through a painstakingly thorough process of identifying each and every element in its production process and defining precisely how they would like to have the various elements relate to one another. What information would they want passed back and forth and for what purposes? Then the hardware would have to be chosen and a systems analyst called in. Here, a careful cost/performance evaluation of the proposed system would have to be made, and according to Dolson, this is where the difficult choices occur. A careful system topology would have to be drawn up. The structure or order in which you choose to interconnect the system will play an important role in determining how flexible and/or powerful your system will ultimately be. (See "Systems of Black Boxes," *BM/E*, June, 1977.)

According to Dolson, most broadcast plants have the necessary hardware knowledge to put an effective system together. Some even have the necessary software expertise to do the job, but often additional programmers have to be brought in. A systems designer is essential and often consultants are the best source since after the system is up and running successfully you don't really need to retain the designer.

There is another problem, however — with software there is no "provability." All that can be said of a software system is that it seems to work and it seems to work better or worse than another software system. There is no single, provable, "best way." This unfortunate fact of "software" is another reason to push for a standard interface. If, at least, the various nodes of the system spoke a common tongue, there would be an opening to the evaluation of system performance in terms of the degree to which the potential of the system is exploited. **BM/E**

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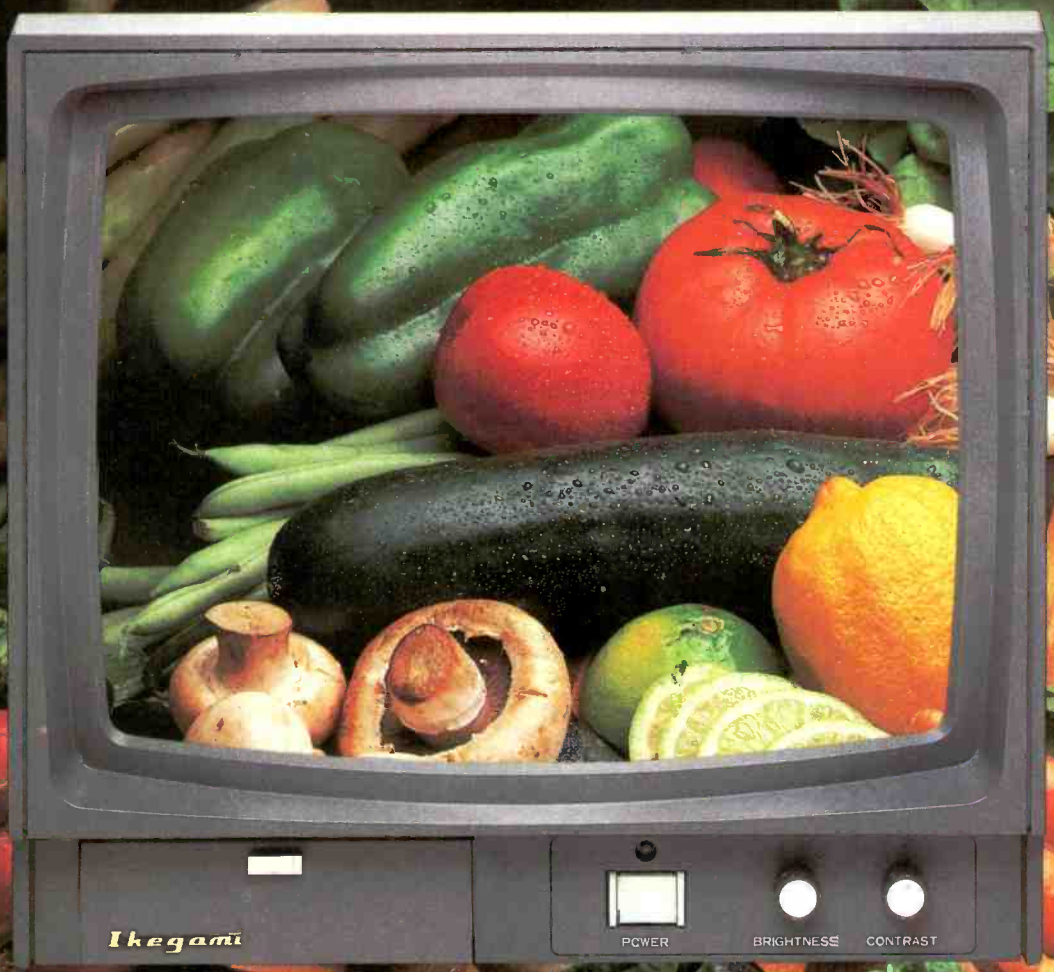

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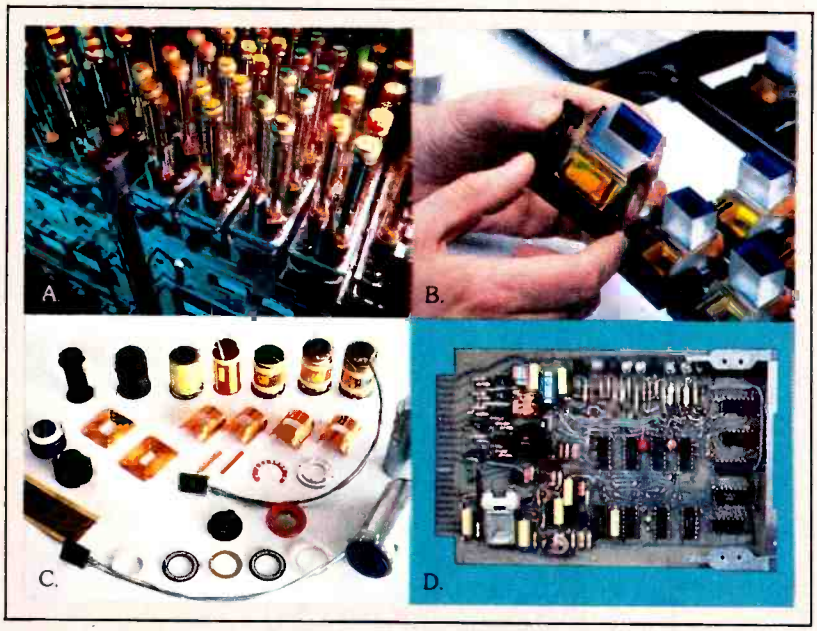

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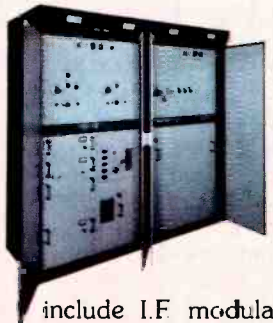

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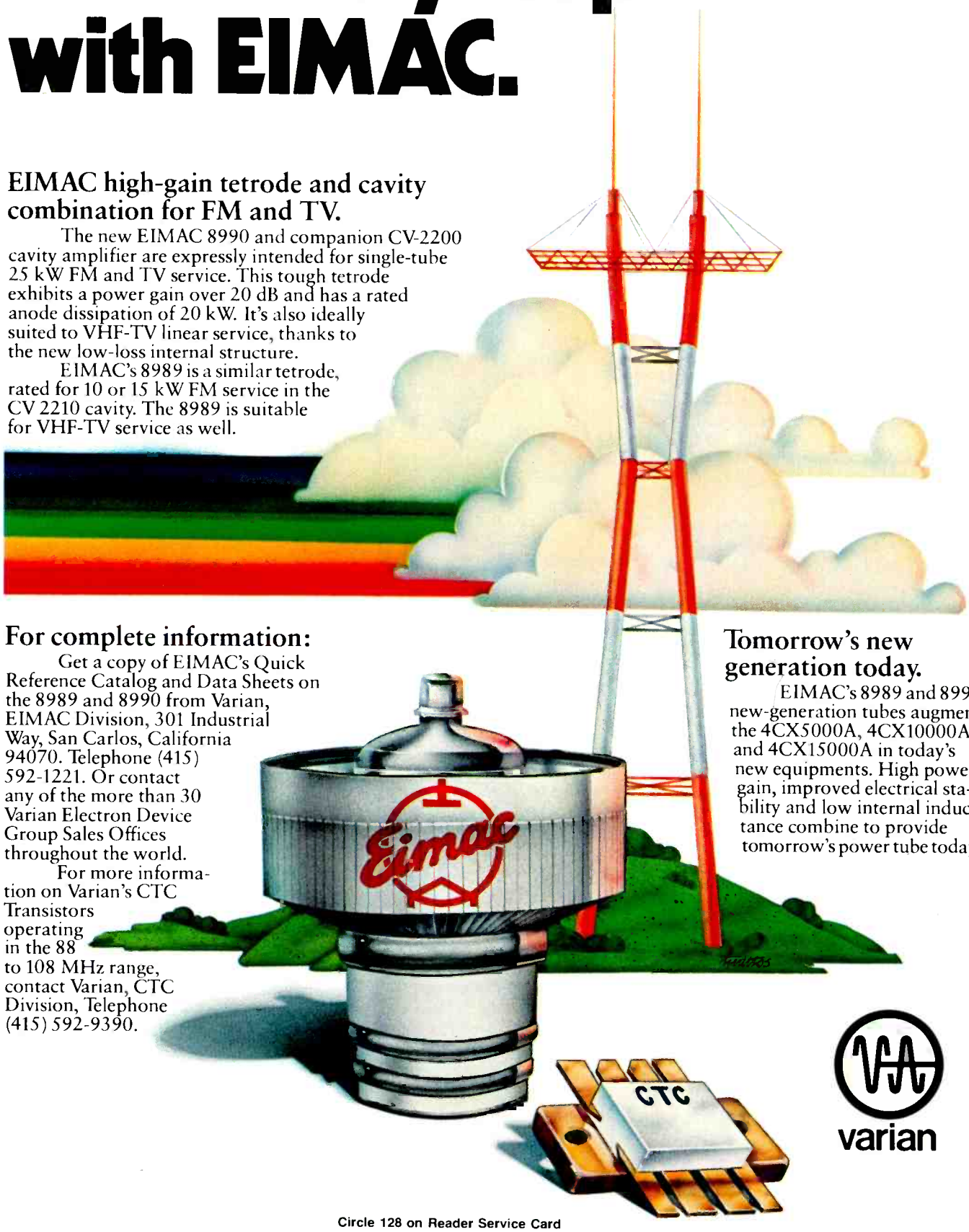

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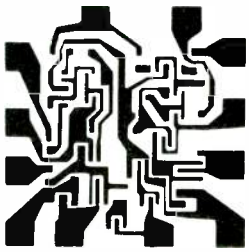


Microprocessors are playing an ever-increasing role in the latest generation of broadcast equipment. Along with them have come a range of new microprocessor-based control devices which communicate directly with other microprocessors.

Director Tom Fraser supervises editing session at Nexus Productions. CMX 340X with E/D keyboard is meta-controller, interfaced with Vital 114-2A switcher, Vidifont IV graphics system MCI four-track recorders, and Sony BVH-1000s

MICROPROCESSOR CONTROL is moving towards the era of systems-approach "meta-controllers." Given that a station may have microprocessors in its production switcher, editing system, digital effects generator, character generator, color camera, frame synchronizer, and so on, it is now possible to tie them all together into a meta-control system that offers more flexibility and even greater control than if the units were simply used separately.

Most now concede that today's full-blown production switchers with their multiple effects banks, multiple reentry, downstream keying, large range of transitions, etc., coupled with digital effects generators, have become too much for one TD to handle. The manufcaturers have responded by introducing microprocessor control systems for their switchers — specifically, Grass Valley's E-MEM (Effects Memory), Vital's PSAS (Production Switcher Automation System), and Central Dynamics' CAP (Computer-Assisted Production acessory). By interfacing with the switchers, these systems offer the possibility of preprogramming very complicated effects, utilizing any or all of the switcher's functions, and then carrying out the effect with the touch of a single button (or, in the case of CAP, a single lever movement).

With each passing week, however, we are seeing innovative broadcast and teleproduction facilities extending the range of their systems until now, according to Wyatt McDaniel, chief engineer of the Outlet Company's WJAR-TV in Providence, R.I., "we could just about run our entire evening news show with one person mixing audio and another to push the 'start' button of an automatic sequencer."

As reported in *BM/E* last month, WJAR has recently completed a brand new facility in which microprocessors are everywhere apparent. The heart of its on-air capability is a brand new Vital automation system — the Vimax 200, which used to drive Ampex ACR-25 cart machines. The Vimax computer, which can store up to 30 days' worth of events, is in turn hooked up to a Jefferson Data-programmed Sycor 440 computer which handles day-to-day operations, including the preparation of program logs. The lists are dumped into the Vimax computer daily or, on weekends, for several days.

In turn, the Sycor computer is hooked up to the Outlet Company's main IBM 371/38 computer which acts as the central processing unit for all of Outlet's divisions, includings its television and radio stations and retail stores. The total corporate picture is instantly accessible to Outlet's executives while the day-to-day operations are handled by the station staff. In time, even the billing will be handled by the station computers, with Jefferson Data supplying a program that will see the Vital system feeding back discrepancies and errors to the Sycor computer, which will bill anything not flagged. At the same time, a record will be kept of what went wrong and why so that faulty equipment can be pinpointed.

Of equal interest at WJAR are the two new studios with associated control rooms, one for news and the other for commercial and program production. Each is fitted with a Vital VIX-1600 production switcher with PSAS. Vital has created a distribution system for the single SqueeZoom unit at the station. Each of the two control rooms has a SqueeZoom control box, while a pushbutton above the control panel delegates control to either studio; an indicator light shows which has control. At present there is no lockout system, so either studio can simply take the SqueeZoom away from the other with intercom communication about who needs it most. McDaniel points out that they may eventually need to establish an automatic priority system.

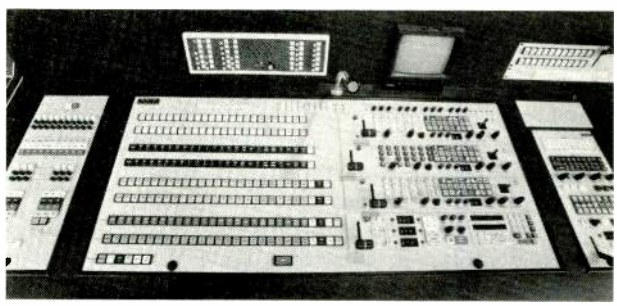
The production switcher in the news studio is fully integrated with the automation system. To the left of the switcher is a panel with machine control buttons connected to the ACR-25s. When the time for the newscast comes, the Vimax computer will automatically assign

control of the ACRs to the machine control panel so that the decks can be rolled from the newsroom; when finished, the Vimax computer will automatically return control of the system to the switcher.

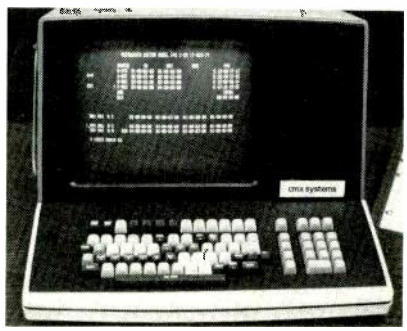
During the newscasts, then, full access to all the station's computers is through the newsroom control room. According to Jerry Plemmons, VP of engineering for Outlet Broadcasting, the PSAS microprocessor will, after some experimentation, be able to handle much of the lighting for the news show, too. The same PSAS key which is used to activate the tracking chroma key setup with the switcher and SqueeZoom, for instance, can also activate the Strand Century lighting control board to go to its preset lighting setup for the chroma key. If the TD is wiping back to the anchor position following the chroma key through PSAS, the wipe and the lighting change are both made with a single PSAS entry.

Character generators, too, are more and more often being placed under the control of production switcher computer control systems. For instance, Bill Kelly, chief of engineering for WNEW-TV in New York City, has CDL's new CAP system on order for his CDL switchers. When the system arrives, he will be seriously looking into the possibility of interfacing his switchers with his two dual-system TeleMation Compositor I character generators. Activation of a CAP preset could also automatically call up the correct graphics page or sequences of pages for a roll or crawl. Many we talked with, especially those in post-production facilities, find the precise repeatability of graphics pages within a complicated editing sequence a real bonus.

Kelly, like others we spoke with, is contemplating interfacing his character generators with his program automation system. By assigning every event in his CDL 260 computer memory a house number, he can have the appropriate graphics displayed whenever the event is aired. This would be particularly useful for commercials in which the local advertiser beds the name of his store at the end of the national spot. Again, the precise repeatability is of major concern to Kelly. The interface is simply achieved, requiring only conversion of the BCD output from the CDL system into the ASCII input of the Compositor.



Control room console at Outlet Broadcasting's WJAR-TV. Vital 1600 switcher is the meta-controller



Part of rewritten program for CMX 340 system at Vidtronics

The computer-assisted editing system as meta-controller

With the addition of a computer-assisted editor to a system including a computer-assisted production switcher, digital effects, a character generator, VTRs with logic circuits, and assorted peripheral equipment, a facility can have a fully microprocessor-controlled system. Finally realizing the full promise of microprocessors in broadcasting, these systems become synergistic in the sense that total system flexibility is often greater than the flexibility of its individual components added together.

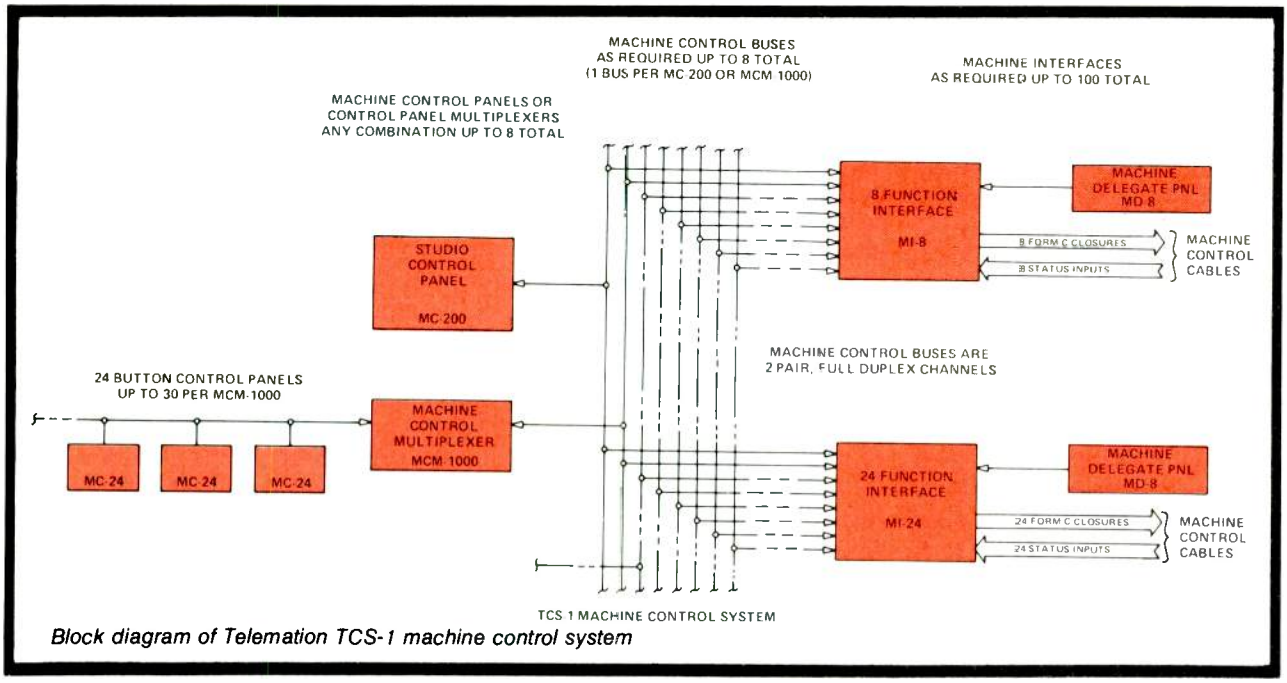
One of the first facilities to realize the benefit of interfacing its equipment into a meta-system was Vidtronics, a Hollywood-based post-production facility. According to Jack Calaway, Vidtronics' VP of engineering, the first step was to rewrite some of the software in the "executive" program of its CMX 340 editing system to simplify some of the editing dialog and provide for single-keystroke functions whenever possible. At the same time, a slight modification in the 340 keyboard enabled some of the keys to be "permanently" shifted (rather than having to hit the shift button each time), enabling the keys to be used for two separate functions. (Vidtronics is currently in the process of adding new keyboards to its 340 system. These are not CMX's new E/D keyboards, but rather, custom-designed boards which add 12 additional keys.)

The next step was Vidtronics' construction of an interface for its Grass Valley 1600 7K switcher. The basic interface, a mimic of CMX's own interface, controls one of the switcher's effects buses plus the downstream keyer. Since the interface was custom-designed, however, Vidtronics was also able to add control of many additional features of the switcher. These controls take the form of 10 sets of ASCII-encoded thumbwheels, each set consisting of an eight-digit time code address and a three-digit command signal. The thumbwheels address not only the full range of the switcher's capabilities but also a Quantel DPE-5000 digital effects generator.

The CMX/thumbwheel interface operates in three modes. The first is simple control of one M/E bus plus the downstream keyer through the interface alone. In the second mode, full or partial control of the switcher is taken away from the CMX and operated through the thumbwheels which can address either the crosspoints or the dissolves, or both. In the third, "learn" mode, the thumbwheels operate as an independent, parallel system to the CMX interface.

As an example of the system's flexibility, Calaway offers the example of a delayed dissolve. The CMX is used to control the record machine and playback machines to perform a delayed dissolve. Simultaneously, the thumbwheels can be used to instruct the DPE-5000 to create a freeze frame just as the dissolve begins.

At the latest count, the Vidtronics facility contained 11 DEK computers, plus about 25 microprocessors of one sort or another. A fair share of the hardware forms part of the facility's computer-controlled distributed processing audio sweetening system. Designed by Vidtronics, the system incorporates two four-track audio recorders interfaced with an IVC one-inch VTR. Each deck is fitted with a microprocessor-based smart interface with an INTEL 8080 master control system. Any deck will serve as master or slave. All the normal deck functions — play, re-



Block diagram of Telemation TCS-1 machine control system

wind, fast forward, stop, in and out edit points, etc. — can be controlled through the central system. In addition, an override model allows the operator to put the machines into sync and then offset one machine relative to the others to achieve true audio sync. GPIB relay closures are provided for starting up special effects and other devices. Further, the system can be interlocked to the time code output from any VTR in the plant with the aduio decks set to chase the VTR's time code.

Another innovative leader in establishing a completely microprocessor-controlled system is Image Transform in North Hollywood. Using a Mach One editing system as its meta-controller, Image Transform has developed interfaces for both its TeleMation character generator and its E-MEM system for its GVG 1600 production switcher.

Ken Holland, VP of engineering, explains that the interface with the switcher is still undergoing development. At this point, the Mach One addresses the switcher and part of E-MEM while E-MEM addresses the switcher simultaneously. In the ultimate system, however, the Mach One will be able to access the entire memory of the E-MEM which will, in turn, call up settings on the switcher. In this way, all of the GVG switcher's vast capabilities can be used at once; the TD simply sets up the transition or effect and logs it in E-MEM. The Mach One, instead of addressing individual effects, addresses the E-MEM, which moves the edit to its next location along with auto transitions, etc.

The same interface is used to give control of the Compositor. A simple RS-232 twisted pair interface connects the E-MEM to the TeleMation system. If titles are to appear over a dissolve, the appropriate graphics page is simply remembered in E-MEM along with the instructions for the dissolve. Again, the complete E-MEM setting is controlled through the Mach One interface.

A similar approach to interfacing was taken by Alfred Muller and Girish Bhargava when they recently expanded their New York City-based post-production facility, Nexus Productions. Here, a new CMX 340X expanded/dedicated keyboard is the meta-controller, interfaced with a Vital 114-2A switcher with PSAS, a Thomson-CSF Vidifont Mark IV graphics system, and up to four Sony BVH-1000 Type C one-inch VTRs.

Muller explains that he has ordered BVH-1100s from Sony (he is interested in the Dynamic Tracking feature for slow motion and freeze frame). Rather than being delivered directly to him, these units will first be shipped to CMX so that the interface can be developed.

Like other broadcasters we spoke with, Muller is anxiously awaiting the day when he will be able to fully access the PSAS functions of his switcher. As it is, the GPIB interface allows the CMX to control one bus of the Vital switcher for dissolves and wipes. The passive relay closure system is also used to control the dual system Vidifont, enabling precise insertion of graphics materials. "The switcher can do so much more," explains Muller. "If I could control PSAS through the GPIB interface, I'd even be able to do wiped keys."

Nexus is not simply standing around and waiting for developments to come, however. It will shortly be installing an audio mixing system completely tied into the CMX control. A four-track half-inch MCI recorder will be placed on line with the stereo-capable Sony one-inch VTRs; one track on each machine will be used for time code. Four tracks are thus available for mixdown through the Sound Shop CU-1600 console, three on the MCI and one on the Sony; the second channel on the Sony would be reserved for the final, four-into-one mixdown. A variety of audio cart decks and other equipment can also be controlled with the GPIB interface for special effects.

Muller, anticipating the eventual move towards TV stereo, has installed enough system flexibility and capability (distribution amps, etc.) so that he could mix stereo today by simply reassigning machines from one room to another. This is due partly to the two-channel control capability offered by the CMX's intelligent interface system. One channel ties the equipment into the CMX computer in each of Nexus's three editing rooms. The second channel can be designated to either of the other two rooms. In this way, for instance, an editor in a one-inch editing room could gain control of a 3/4-inch U-matic deck in another if the need arose.

The machine control system as meta-controller

The possibility at Nexus of distributing machine control about its (relatively small) plant is a simple example of a

Taking Control

vast new development in computer control: the microprocessor-based machine control system.

In the past, machine control systems have been relatively simple affairs — adjuncts to technical automation systems, or, in the case of very large facilities, adjuncts to routing switcher systems. Today's situation at medium to large-scale facilities, with dozens of dedicated VTRs of many different formats, audio decks, and film chains, plus incoming feeds from microwave and satellites, has almost demanded the development of machine control systems capable of communicating accurately and swiftly with large numbers of units. The microprocessor has once again come to the aid of broadcasters. With it has also come the advantage of inexpensive, often long-distance, cabling through the familiar single twisted-wire pair.

The situation at ABC-TV in New York City is fairly typical of what is going on around the country. Bill Miller, assistant manager of TOC engineering maintenance, explains that ABC installed its Moore Associates machine control system some 17 years ago. The system (no longer manufactured) uses two twisted pairs to establish a control loop between VTRs (each of which has a delegate panel above it) and various studios in the ABC complex. Other studios are connected to machine controls through a 70 by 16 crosspoint matrix which was added to the main 100 by 100 matrix Grass Valley routing switcher somewhat later.

As Miller points out, and others we spoke with are quick to amplify, adding more and more crosspoints to a routing switcher to handle larger facilities with more and more equipment is no longer economically practical. ABC has therefore made a major commitment to completely revamping its machine control system. Slated for 1980 installation is an exciting new vertical interval switching system developed in England by DTC. Each machine in the system will be fitted with a Z-80-based box connected to the video in and outputs. Switchers will have one Z-80 plus a decoder per output. Machine addresses, control bits, and tally bits will be encoded on various lines of the vertical interval, with machines set to selectively read specified lines of the vertical interval for control information. A set of built-in checks will insure that the correct machine is being addressed — i.e., addressing a quad machine in a room containing only U-matic VCRs would be impossible. Telecines will be fitted with dummied-up video inputs to handle the vertical interval coded information. Tallies will indicate the full status of the system, telling any operator which studio actually has control of which machines.

The ABC system is obviously ideal for a large-scale operation. Those with smaller facilities have also found new uses for microprocessors in machine control. At WNEW, for instance, Bill Kelly was faced with the problem that though his studio is located in New York City and controlled there by a CDL automation system, some of his programs originate some 25 miles away in New Jersey. (New York City stations pay an entertainment tax on films that originate there; New Jersey, just across the Hudson River, has no such tax.)

Kelly studied CDL's plan to tie the New Jersey VTRs and telelcines together with the automation system through the introduction of additional crosspoints. He decided ultimately, however, on a system that combines

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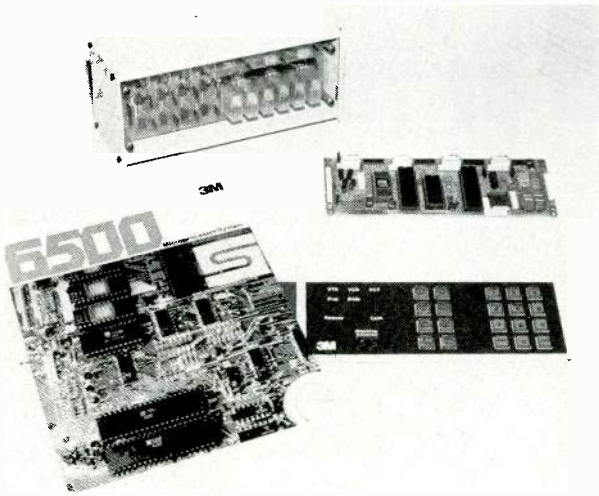

Some of the hardware for 3M's new 6500 microprocessor-based machine control system

the automation with some operator control. A microprocessor circuit using a pair of terminals at either end of a telephone line was set up so that the CDL system could transmit its event stack to the New Jersey facility. There, the operator loads the tape or film onto whichever machine he thinks is appropriate. The CDL machine control signals simply activate whichever VTR or film chain has been cued. In this way the CDL system treats the entire New Jersey facility as a single source.

Other microprocessor-based machine control systems are beginning to make their impact, too. KPIX-TV in San Francisco co-designed TeleMation's TCS-1 machine control system, which it will be installing in its new broadcast facility slated to open later this year.

Chief engineer Walt Nichol explains that KPIX will be using four out of the eight possible machine control buses designed into the system: one each in his three production control rooms and one in the VTR/telecine area. Each of the source machines (the system can handle up to 100 VTRs and telecines) has its own delegate panel plugged into an eight-function (for VTRs) or 24-function (for film islands) interface.

The studio control panels contain seven groups of pushbutton controls — four for VTRs, three for film islands. Each group of buttons contains a thumbwheel selector enabling the control to be assigned to any one of 100 possible VTRs or film islands. At KPIX, the control loops are established manually, with an operator at the VTR or telecine delegating the machine to one of the control buses while an operator at the control panel simultaneously selects the machine to be controlled. Once the loop is established correctly, the pushbuttons light up on the control panel. This automatically locks out control by any other bus. The system is also designed to accept computer or microprocessor delegation through a serial data port, and can be set up to "permanently" assign certain machines to particular control buses.

In KPIX's VTR/telecine area, machines are fitted with single-machine control panels. These panels include a thumbwheel to select the machine to be controlled and two remote start enable switches. This allows the machines in this area, both telecines and VTRs, to be easily interfaced

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Thus, by using a centralized microprocessor for housekeeping among the control buses, and local microprocessors in the control panels for the actual control functions, an extremely complex, flexible system can be created using only dual twisted-pair wiring throughout.

Perhaps equally exciting at KPIX is the interface between the machine control system and TeleMation's TVS-TAS-1000 distribution switcher. This will first see use with the two sets of two frame synchronizers/four VCRs used for news and *PM Magazine*. The Dynamic Machine Selector option allows, for instance, playing back-to-back videocassettes. Four cassettes are loaded into the four VCRs. Using machine delegation panels, the operator assigns the synchronizers as if they were VTRs to the studio control bus. He then switches VCR 1 into synchronizer A and VCR 3 into synchronizer B. The TD now needs to hit only one button — the machine control for the synchronizer — to roll VCR 1 and, when it ends, dissolve or cut to synchronizer B which rolls VCR 3. The operator then simply switches VCR 2 to synchronizer A, and so on.

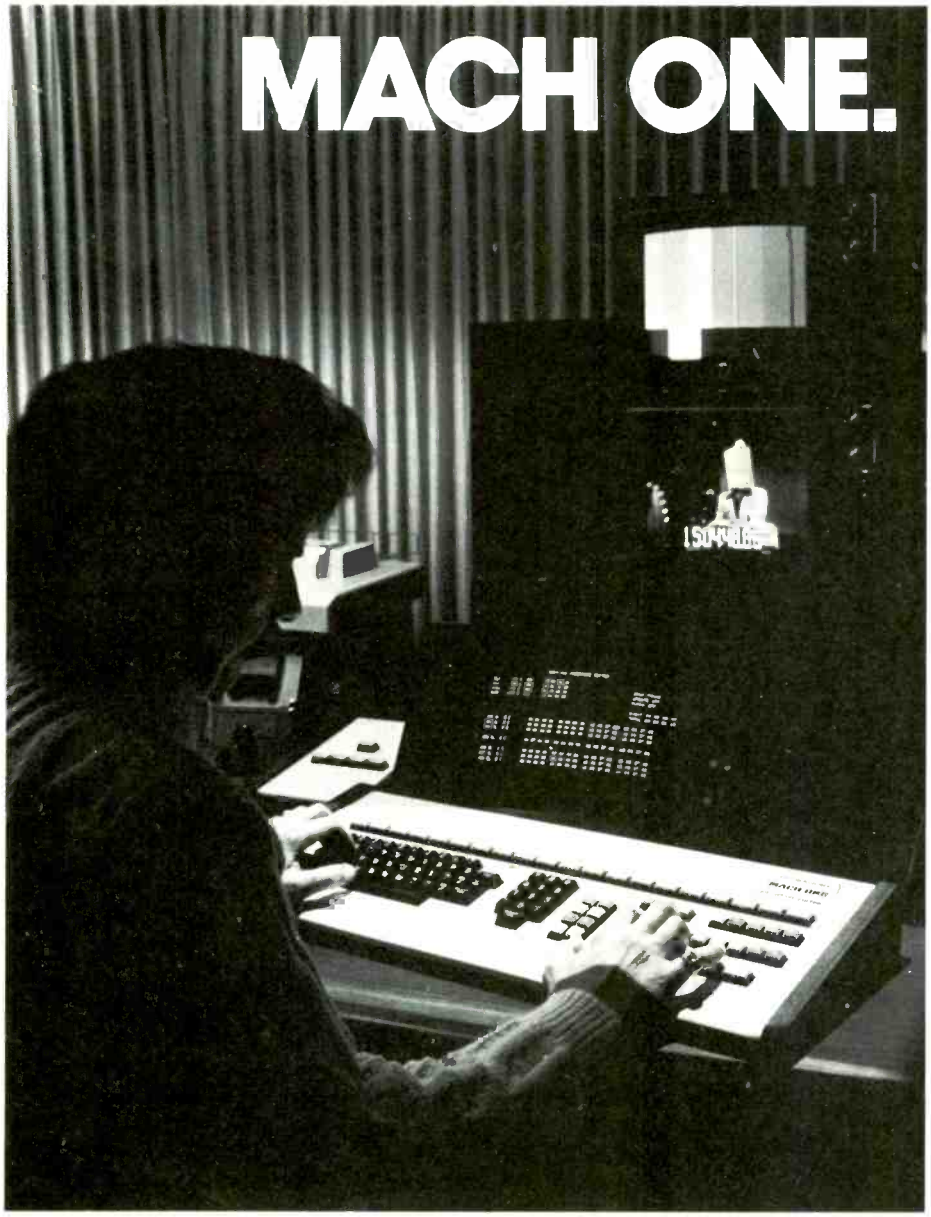
Extremely new in this field is 3M Video Products/Mincom Division's 6500 microprocessor-based system. Though it can function with a routing switcher (the source selected on the routing switcher is automatically connected with the machine control panel), it is also designed as a standalone system. Using serial data along a single coax or twisted pair, the system offers return tally in addition to machine control.

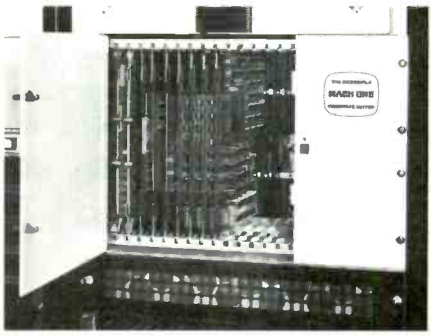
The 3M system offers a rather interesting approach to the design of its control panels — one which takes full advantage of its 6502 microprocessor (4K bytes of RAM and 16K bytes of PROM/ROM, expandable through the use of floppy discs). The panel contains a touchpad for selecting machines and a group of 12 LED tally indicators/eight pushbuttons for selecting functions. The operator first selects a machine (VTRs or film chains designated by machine type and number). This establishes the control loop. The operator now has control of eight out of a possible 16 machine functions, and indicator lights alongside the pushbuttons show what the options are. In controlling a quad VTR, for instance, the "reverse" function is not operative; the "record" function does not operate with a telecine; and so on.

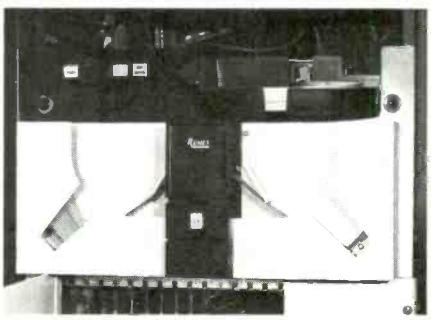
Also incorporated within the system are automatic lockout circuits that prevent more than one operator from taking control of any given machine.

In this article we have surveyed some of the myriad forms which have already been taken by microprocessor interfacing. The number of other forms — computer/character generator hookups for election reporting programs, microprocessor-controlled test and measuring instruments which communicate directly with the microprocessors they are testing, microprocessor-based routing switcher systems which communicate with serial data, and so on — are probably as numerous as the ones we have mentioned.

What is clear is that, though the promise of an all-digital plant with fully distributed processing may lie somewhere in the future, innovative broadcasters are already beginning to make it a reality today. **BM/E**







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Shortly after the merger, Chris Young, one of our seven Regional Sales Managers, challenged us with this goal: "We need the SPIRIT of a small company, with the RESOURCES of a large one!" Obviously, we have the resources. Control Data is a world-leading supplier of computer services. And we are proud to have retained the small-company spirit with the enthusiasm and excitement that a compact team can generate.

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It means, among other things, results. For example, our Systems Development group has released some remarkable new capabilities for certain BAT systems within the last few weeks:

- For Radio — a new music library system that prepares fully-timed playlists, hit lists, music analyses, license reports, etc.
- For Television — an election tabulation system that lets a large number of computer terminals enter raw vote data, while the BAT computer processes the information, assembles it in the right order, line-justifies it, and automatically feeds the results directly to the station's character generator. With no need to keep a camera on a computer screen, picture quality is enhanced and composition is more flexible than with less sophisticated systems.
- For Television — a complete film inventory system that handles the accounting capabilities suggested in the BFM seminars on the subject, and also provides full library information for the programming department.

A Team Effort

Every week we hold special meetings to discuss development work. And the array of talent and experience represented is substantial:

- Client Service people are on hand who, in addition to their extensive experience in broadcasting, continuously visit and talk with the hundreds of stations we serve;
- Marketing and Sales personnel, all of whom are ex-broadcasters, attend in order to provide input from prospects, customers and trade organizations;
- Systems Development staff, with the substantial experience of creating the most widely-used computer systems in the industry;
- Station Business Systems management, to ramrod projects and decisions where necessary, and to stay informed on the status of all activities and industry trends.

Frankly, we doubt anyone in the industry uses such a powerful, frequent and disciplined technique for product development. We're proud of it!

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If you're considering an improvement in your present Traffic and Accounting procedures, our free Station Systems Analysis should be part of your fact-gathering.

We will arrange to come to your station and make a thorough study of your requirements. With your permission we will interview your key people in Sales, Traffic, Billing, Accounting — all the areas computerization will affect. We will make an in-depth analysis of your activity in each area. Then, our Systems Expert will discuss our findings, and perhaps (though not always) recommend one of our numerous BAT systems to suit your needs. A complete, computerized cost analysis will be provided for your consideration.

There is no charge for this service.

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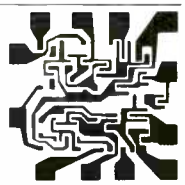
STATION BUSINESS SYSTEMS

a division of CONTROL DATA CORPORATION

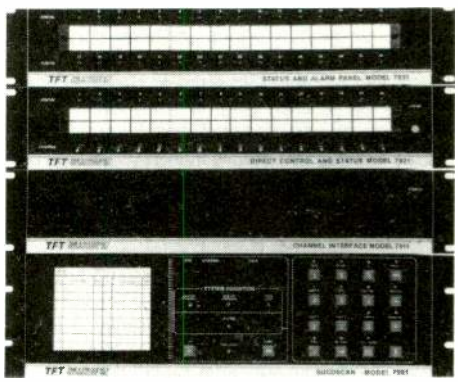
THE MICROCOMPUTERS ARE TALKING WITH EACH OTHER, AND BROADCAST EFFICIENCY GETS A BOOST

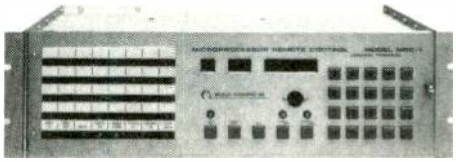
Computing power is being put at separated points in more and more broadcast systems, with inter-computer "conversation" taking over a lot of the operation load and providing startling new modes of action. Some up-to-the-minute remote control systems and a super-intercom show what these conversations can mean to the broadcast operator.



THIS IS A STORY with two characters. "Remote" is a microcomputer-controlled "smart" terminal at a transmitter, part of a remote-control system. "Studio" is the microcomputer-controlled unit at headquarters, the interface with the human operator. All on its own, following one section of the programming built into it, Remote shows one of the many reasons it deserves "smart." It queries Studio every few seconds, almost literally saying, "What's going on there? Is there an EBS alert? Is audio really coming out of the console at a normal level? How about these functions (long list)? Have you any problems at all? Be specific!"

For each of the answers to some 20 or 30 questions, Remote knows exactly what it must do, including a number of complex series of operations involving the transmitter or the antenna or both, each one laid out in detail in Remote's memory. Remote undertakes its responsibility instantly in each case, reporting the action and its results back to Studio. The latter may say, "That's fine, Remote — now go on to this." Studio also informs the human operator as to what has happened, using a digital or CRT or LED readout, or other machine-human interface.





Time and Frequency remote control unit (above) and Moseley Associates' MRC-1, below. These two units are examples of the new generation of "smart" systems that take advantage of microprocessors in order to enhance the effectiveness of the human operator

Are we a bit too whimsical in presenting this as a conversation between microcomputers? Not at all — an important fact of computer applications in radio today is that microcomputers are, indeed, talking to each other. The contents of their conversations are, of course, limited to the contents of their respective memories, but that allows them a rich repertoire which is getting richer all the time. The outstanding values of these conversations to the human operators of the radio station are immensely high speed, accuracy of question and response, and capacity for fast detail work, all beyond the powers of any human operator.

This growing volume of precisely-tuned babble springs from the growing use of multiple microprocessors in radio systems of several different kinds. The example given was suggested by Eric Small, drawn from his "Telesis" remote control system for radio and TV. Remote control systems of Moseley and Time and Frequency Technology and an intercom system from Automated Processes are a few of the other current systems that similarly have "smart" terminals providing "distributed computing power," terminals equipped with considerable ability to converse with the studio unit, and to "listen," too.

To suggest how rich the conversations might be, and how much of the detailed operating load a "smart" remote can take over, here is a *partial* list of the regular functions of the remote (again from Telesis):

Set date; set time; print date (on log); print time; clear staff list (for proper authorization); enter staff list; delete a single staff entry; print sunset/sunrise times by month; enter a message to be sent to the studio; enter analog calibration data; enter date of ac power consumption reset; set data OK flag; enable automatic functions; disable automatic functions; print system diagnostic; print total hours on components related to main transmitter; print

system diagnostic at selected intervals; enable direct power calculation; enable indirect power calculation; enter nominal, upper, and low values of analog parameters; print antenna information.

A special value of intelligence in a terminal, pointed out by all the remote control makers, is that it can function "by exception"; that is, it knows enough to distinguish between a routine situation and one that the studio ought to know about immediately. Remote can look over the information it has at any moment and decide itself what items to transmit to the studio; the studio system is not required to monitor repetitively every bit of information at the remote and pick out what's interesting.

Further, in a great many cases the remote can *act* on the "exception" all by itself, having the proper course to take laid out in its memory. As Mark Fehlig of Moseley points out, this cuts way down on the load of communications traffic on the line between remote and studio, an important aid to efficiency and cost effectiveness. It also contributes to the speed of operation.

A partial lineup of typical "by exception" messages might be: 50 kW transmitter on air; generator running; standby power on line; dummy load water on; transmitter building occupied; replace air filter; transmission line gas low; sample line gas low; 50 kW transmitter on dummy load; 10 kW transmitter on dummy load; 50 kW transmitter efficiency low; overmodulation; operator's FCC license expires soon (date).

The last item needs some explanation. All the microprocessor-controlled remote control systems can provide a "limited access" mode, which requires each operator coming on duty to enter his personal code in the control system before he has access to it. The operator codes can obviously be tied to the licensing status of each operator, and this can be used to "flag" renewal dates and to restrict the operator to certain duties if his license requires that.

The items on efficiency and overmodulation in the above list are parts of a more general category, tolerance limits, which are among the most valuable aspects of remote control. All the remote control systems discussed here have automatic tolerance alarming in one form or another.

Frank Stolten of TFT, discussing the tolerance limit system of that firm's new Sucoscan remote control, in development at the time this article was written, points out that the studio microcomputer can "dump" a set of tolerances into the remote microcomputer's memory after they are chosen and entered at the studio. From then on the remote is on its own in following the relations of the various parameters to the tolerances. The remote can alarm the studio, at various levels of urgency, about out-of-tolerance operation; or the remote can independently take the action it has been programmed to take to meet specific situations. Here is a case (one of many) in which the conversation is started by the studio microcomputer; there may or may not be an immediate reply

Business Computer Talks With Program Computers At WWDL/WICK In Scranton

Doug Lane, president of WWDL/WICK, has pursued the further integration of his business and technical automation systems

The oldest inter-computer talk in radio broadcasting takes place, of course, at that comparatively small number of stations with "total automation," using a business data processing system interfaced with a program automation system. Over the past five years or so something like a dozen stations have adopted this all-out computerization (see earlier stories in this magazine for some of them).

What may well be the most all-out system of this kind, certainly rare in a medium-sized market, has recently gone on-line at WWDL-FM/WICK-AM in Scranton, Penn. There is a Cetec/Schafer Model 7000 automation system for each transmitter. There is a BAT 1500 Station Business Systems computer for doing all data processing, traffic, and accounting work in the two stations. The BAT has a disc memory especially to hold all the programming for seven days in advance for both stations, which have entirely different formats. WWDL has Adult Contemporary,; WICK has Easy Listening.

The programming is developed in consultation with syndicator Peters Productions, but the program staff retains final control of the actual choice and sequence of numbers on both stations, attuning the programming closely to local market trends in popular music. Current hits are all on carts, in accord with the standard requirements of the program automation systems.

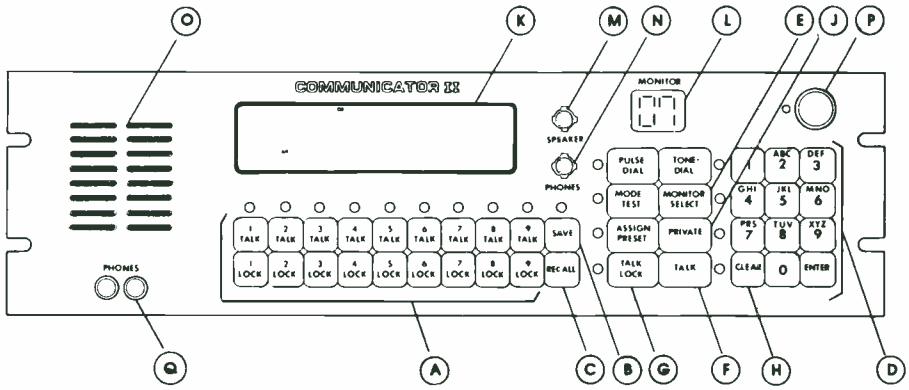
Programming, commercial sequences, etc. are all done "into" the BAT computer. Then daily the BAT dumps the day's program into each program automation system. Part of the program production is a voice track for each sequence of musical numbers. Voice tracks are made by the station's own on-air personalities and the voices integrated skillfully with the music by the automation systems, so that the finished material has a "live" quality.

Doug Lane, president, told *BM/E* the staff, initially concerned about the effect of total automation on their jobs, now would refuse to go back to manual operation. The computers take over all routine jobs and allow the staff to give a lot of time to creating their material, far more satisfying than hours a day of cueing up discs or cart machines.

The computers talk to each other in many different passages. For example, the on-air computers keep total track of material aired and report the daily airing back to the BAT 1500 for a nearly immediate discrepancy list. Program personnel can alter the programming at any time by setting up a subroutine, a short sequence assembled in the on-air computer and shot back to the BAT 1500 for the total record keeping while being integrated into the ongoing program.

Working in the other direction, the BAT 1500 sets up the commercial sequences, which it gets directly from the billing department, and passes them on to the program computer. Any last-minute additions or changes are entered in the BAT by the billing department, immediately shot over to the programming computer (along with an alert to the operator if a new cart has to be inserted in a given position).

Lane described an interesting extension of the facility. With a small portable keyboard-terminal and a set of modems, the whole automation system can be run by remote control over dial-up telco lines. This has opened up attention-getting and profitable remotes of various kinds. In a sense, the computers are using the telephone for their conversations.



Automated Processes' intercom system

A. PRESET PUSHBUTTONS determine destination of call
B. SAVE holds place in network during another call
C. RECALL re-connects previous conversation
D. KEYBOARD NUMERAL KEYS (two-digit addresses)
E. MONITOR KEY enables CSU to establish crosspoints
F. TALK button depressed to talk, released to listen
G. LOCK enables "hands free" operation
H. CLEAR cancels a keyboard entry or terminal
J. PRVT locks out incoming calls
K. ANNUNCIATOR PANEL with LEDs to show station called
L. MONITOR PANEL shows two-digit monitor input address
M. VOLUME controls speaker level
N. PHONES controls earphone level
O. SPEAKER
P. MICROPHONE mounted on "gooseneck"
Q. HEADSET JACKS/CONNECTOR PANEL

from the remote, but the actions at the remote will reflect immediate understanding of the message.

Stolten points out another value of the remote microcomputer (one available to all the other systems discussed, too): an automatic log there can record just the items pertinent to that transmitter, independent of the general log format.

Mark Fehlig and John Leonard of Moseley, discussing that firm's new MRC-1 remote control system (introduced at the recent NAB in Dallas), point out some other advantages of the microcomputer-here/microcomputer-there arrangement. Telemetry calibration becomes a push button operation at the remote; calibration potentiometers are not needed (similar facility calibration is also part of the other systems discussed here). The system has a "window" of 1 to 10 volts, and this can be assigned to sensor values by keyboard action.

The tolerance alarms can be programmed for on-off or latching. And a further big advance: the transmitter microcomputer can take over the job of multiplying two numbers together to get a third, for example, providing readout of indirect power from voltage and current measurements. Also readily provided is log-linear conversion; dc amplifiers, similarly, are not needed.

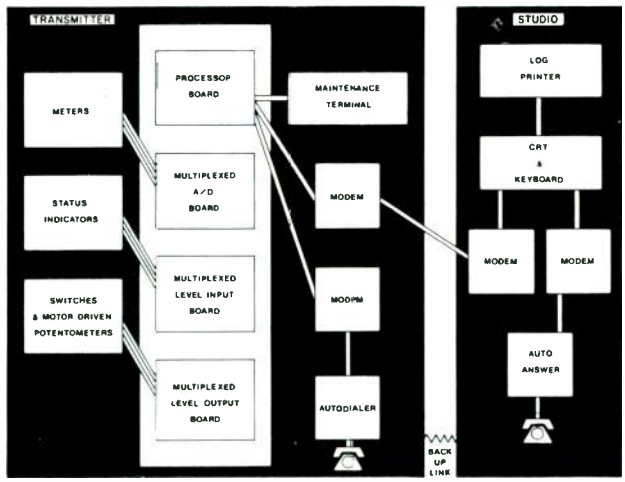
A spectacular variety of "talk" from the remote comes up if there is any fault or breakage in communication with the studio. With a dedicated backup line such as a telco connection, the remote can call the studio saying, "I'm cut off on radio — see what's wrong." If the management does not want a dedicated telco backup, the remote can even be given the ability to dial-up a regular telco line to call the studio (Telesis).

A final general advantage of having remotes with the capacity for intelligent conversation (and action): systems are easily expanded to include very large numbers of remotes. Since each remote can do so much of the job by itself, the studio system does not need complete duplication of control capacity for each remote. Choice of the *size* of a remote control system will depend on need and marketing factors, not technical limits. Fehlig, for example, says that the nine-remote configuration of the MRC-1 is aimed for a certain medium-range cost bracket; larger systems will later be available.

Another kind of system winning great operational advantages from remote terminals that can talk intelligently is the intercom-plus system of Automated Processes. An updated version of this system was introduced at the NAB show in Dallas (see May "Show-in-Print" issue). It is a hub-and-spoke system, with each terminal connected to the central processing unit by its own four-conductor telephone-type cable. All connections between terminals are made by microcomputer-controlled solid state switching in the central processing unit, with one pair of conductors in each cable carrying digital switching information.

The system is much more than an intercom because it carries top-grade audio with very low noise and distortion, fully up to the needs of signal distribution in a broadcast studio complex, for example. And as in the remote control systems, the number of terminals that can be added is very large, up to about 80 in standard models. A new terminal means only a new cable from central processor to terminal and a new plug-in card in the central unit.

Automated introduced "smart" terminals this year with a microcomputer in each one. One example of the functions this allows: the user of a certain terminal has, say, six particular people he wants to speak with at certain



Block diagram of Telesis transmitter monitoring system. Sixty-four control channels operate external functions

Expanded Conversation In The Harris Multi-Function Remote Control

Microcomputers can "discuss" with each other a great variety of topics in remote control and super-intercom systems. The Harris 9100 Facilities Control provides another outstanding example of the operating benefits to be gained from having "articulate" (computerized) terminals spread throughout systems of this kind. It is important to note here, too, that inter-computer talk can have high value in many kinds of systems useful to broadcasters. Console tape recorder interfaces and program automation hardware interfaces in general are two that come to mind. It seems certain that as the microcomputers get smaller, cheaper, and more versatile they will be used increasingly throughout the broadcast plant. Further down the road for radio, but definitely on the way, is the tying together of many microprocessor-controlled units into one system with a large computer in control, the "distributed processing" noted in other articles in this issue.

The Harris 9100, shown in preliminary form at earlier NABs and put on the market in final form at Dallas last May, like the others has a microcomputer-controlled terminal at the studio and "smart" microprocessor terminals at each transmitter site. The system can be put together along "building block" lines to achieve a number of different purposes: straight transmitter remote control, ATS, or broad facilities control including such items as heating and ventilating systems, air conditioning, plant security alarms and controls, and many others.

As presently available, the 9100 can handle three transmitter sites with up to 64 telemetry channels, 128 command channels (32 raise-lower), and 128 status channels at each site. However, as with many microprocessor-controlled systems of this general class, the number of sites and channels served is readily open to amendment to meet special needs.

The remote terminal is programmed to scan data coming from the transmitter and antenna and to take action on its own if the data indicate action is needed. This is based on tolerance limits that can be sent to the memory of the remote terminal from the studio terminal at any time, an important form of studio-to-remote talk. There can be two sets of limits for each parameter. If the quantity monitored is higher or lower than the first set, the remote terminal initiates action to correct the condition. If the out-of-tolerance condition does not disappear within some specified time the remote will alert the studio, a vital element of the remote-studio talk.

A second set of limits can be set up for serious discrepancies which may require fast shutdown or transfer from main to auxiliary transmitter. This can be programmed for action by the remote or by the studio. In any case, the two microcomputers instantly tell each other and the human operator what is happening.

A most important advantage of using microcomputers for this kind of work is that a *sequence* of operations can be set up for each situation, in effect a series of button-pushings carried out much faster and more accurately than any human operator could. Since these sequences are in software, they can be altered, added to, or removed at any time by simple keyboard action, to the extent that the system has RAM memory. With ROM, changes are only a little harder, requiring new EPROMs that are usually readily available from the system manufacturer.

The flexibility of the Harris system can be seen, for example, in one being installed as this is written: it will monitor, among many other things, 15 bays of tower lights on a 1500-foot tower. The system is also available in closed-loop form so that it functions as an ATS. The levels of audio modulation and of output power are continuously monitored. If either is outside the FCC limits, the remote terminal orders an adjustment of control circuits to bring the quantity back into line.

Logging can be at the studio, at the remote, or both. With logging at the remote, maintenance of the transmitter is more efficient because the maintenance crew has all data on the transmitter operation right at hand and can take action on the spot.

A list of all the things the system can do would run to a page of type (as it does for other similar systems discussed here). It really depends on what the operator wants. This open-ended quality springs from the flexibility of changes in software and the "intelligence" with which microcomputers can divide jobs among them, according to the most accurate and efficient planning.

intervals. He has a keyboard on which he can successively enter the calling code for each of the six and thus assemble them for a "conference." Meanwhile, the system can be handling any number of other conversations among other terminals, an advantage of the hub-and-spoke layout.

But our caller can also, once his six people are assembled, enter their numbers as a "snapshot" in the memory of his terminal with a certain code as the "address." Thereafter, a single button sends that "snapshot" to the central switching unit, which makes the indicated connections. The terminal has taken over the job of "remembering" that setup, and simply has to tell the central switcher the pattern is wanted. There is enough memory in the terminal for a considerable repertory of special assignments of this kind, and the central switcher is tuned to "listen" to the terminal for them. Obviously, the same kind of "pattern memory" can be applied to the handling of audio programming in a broadcast plant, for monitoring, studio-to-air, or whatever.

Michael Golden of Automated points out a few of the other ways in which inter-computer talk provides remarkable capacities in this system. Any terminal can ask for, and get, from central the "right" to perform many other functions in a broadcast plant, such as rolling audio or videotape recorders, keying the transmitter remotely. The terminal can check its own pathway to central and to other terminals, asking each of them, "Am I coming through OK?" and passing the answers back to the human user. The terminal can establish a number of different modes of headset operation with a couple of buttons: stereo, separate channel in each headphone, mono. A final example: a telephone interface can give access to any terminal from outside the plant, and thus access to any combination or all terminals.

The examples in the foregoing of inter-computer talk in broadcasting are relatively few, but they tell a full story. Microcomputers can speak their quite restricted language with each other at a high rate of speed, much faster than a human operator could. By putting computing power at a number of separated points in various kinds of systems, broadcast operators are gaining tremendous new flexibility and efficiency. **BM/E**

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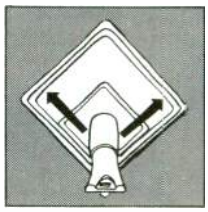

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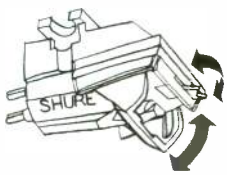

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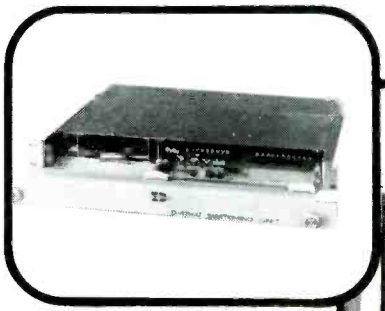

D-4300 Series
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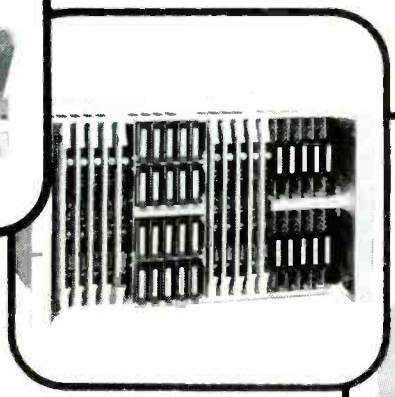
medium



D-400 Series
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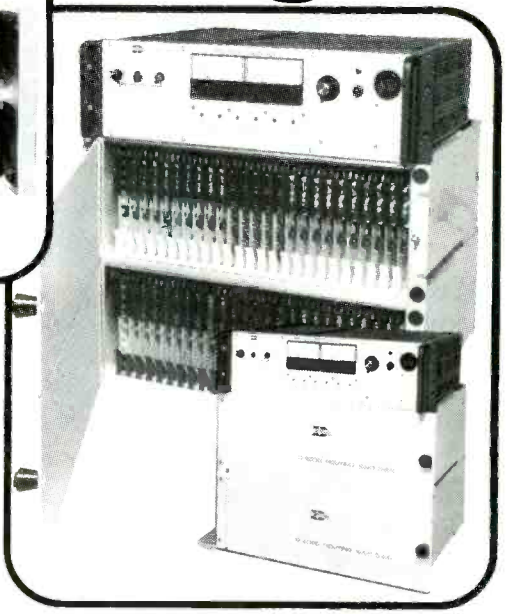
Available in 20x10, 20x15, 20x20, 30x10 and 30x15 video and audio basic matrix sizes which may be used as building blocks for larger systems for up to 100 inputs. Control system is BCD. Each output bus has an independent control system.

Large



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Business Automation, NAB '79

Today, business automation has settled into the foggy area of software design differences. Since effectiveness of software is very much in the eyes of the beholder, the logical manifestation would be an explosion of the number of people "with a better way." And that is exactly what happened in Dallas.

Certainly the lion's share of new business automation firms has moved into the radio field. A number of these companies are also members of another group — broadcasters who have developed business systems for their own stations and are now offering them to others.

Among this group are Bloomington Broadcasting Corp., which offers a variety of in-house business systems for radio, and Bonneville Data Systems, which offers in-house business systems to both radio and television. While both of these firms made their first appearances at last year's NRBA, along with Groton Computer, Inc., companies making their first NAB appearance included Custom Business Systems, Chase Media, Inc., and Computer Management Systems, Inc.

These firms have joined the ranks of the more familiar firms that demonstrated mostly new programs for radio and television management. In Dallas were Automated Business Concepts, Autotron Systems, Inc., Data Communications Corp. (BIAS), Jefferson Data Systems, Kaman Sciences Corp./BCS, and Station Business Systems, Inc., (the recently merged Paperwork Systems (PSI) and CompuNet).

More companies offer service to radio & TV

Computer Management Systems, Inc., new to NAB but serving broadcasters since 1970, calls its system BMIS (Broadcast Management Information System). The hardware for the system is based upon a distributed processing system for television using the IBM System 370 at its Indianapolis headquarters and terminal equipment at the station. The radio system is an in-house minicomputer-based system. BMIS provides the full range of traffic and accounting functions for radio and television stations along with a wide range of sales and management reports. The basic system for a single station would cost about $2300 monthly for radio and $3200 monthly for television.

Kaman Sciences, with its BCS system, is one of the better known computer service companies. Its major advances this year included a new radio business package and "BCS DEMOS," an in-house program that gives station sales staffs immediate access to all rating book information and computerized printouts of standard 4A availability submissions. More than 1000 different "book search" combinations are available to the sales staff. The new radio business package brings both the 1100 and 800 systems in-house for radio broadcasters.

Station Business Systems unveiled its new BAT-2700 system for television. Two years in development, the 2700 is designed for medium to large-market stations and will provide up to 26 weeks of avails reports. Also, the traffic and accounting functions are written in standard COBOL, which helps keep the cost of the system down. The new system is available on a lease-option plan for the first year. This new system rounds out the wide range of in-house computer systems offered by SBS to radio and television stations.

Data Communications Corp. (BIAS) announced the availability of their Micro-BIAS system with a full radio business package aimed at smaller market stations, though a company spokesperson said that interest in the Micro-BIAS system has been good from large and medium markets.

Based on the microcomputer system developed by BIAS, it offers full code breaks, avails by break codes, an FCC log, marketing and sales reports, average rate per spot reports, and a comparison of budget to spot price report. Base rate and performance objective analysis are also offered. New to the larger BIAS system is a film inventory program that will handle carts, tapes, slides, and other media, and an amortization program.

Jefferson Data, a division of the Jefferson Pilot Broadcasting Company, explained a new approach for its full traffic, sales, and accounting systems. By the fall of 1979, Jefferson will offer its complete software package for television to users of IBM System 34 hardware. By 1980, the same plan will be extended to cover the Jefferson Data radio systems. This plan will be in addition to Jefferson's current distributed processing system and is designed for broadcasters who want their business system in-house and want an IBM system for reasons of technical support.

Radio systems get more software

Automated Business Concepts is typical of the companies that have reached maturity in this field. On the market for just over two years, the ABC system is now offering routine software updates to its customers every three months. Its most recent update, for instance, involved some 14 major improvements and enhancements to its software packages. ABC now has some 20 radio clients.

Autotron, likewise, has developed several new options for its system. New to the Autotron system are a Sales Person Scheduling System, demographic analysis, a music report system, and a radio index. Two of the more intriguing functions are the Word-Processing System for preparation of correspondence and the Music Research and Reporting System, MRRS. MRRS allows scientifically designed music styles and titles as reported by samples of potential audience members to help in the preparation of the playlist.

Groton Computer has some broadcasters shaking their heads in disbelief with its remarkably inexpensive approach to business automation. Groton, which first appeared at last year's NRBA, is still offering a fairly complete package to radio broadcasters for a basic monthly charge of $385. There are additional charges depending on the number of invoices used, certain freight charges, and telephone charges for connection to Groton's on-line computer system but still, the overall fee seems very low.

As mentioned before, one of the new companies at NAB was Chase Media, Inc. This company has some 17 radio station clients at this time and has been in the field since 1973. Its system is based around the CADO System 20/IV minicomputer which offers a full range of terminals, both CRTs and printers. Memory on floppy disc storage will provide up to 40 days' advance availabilities while the dual configuration will go to 90 days. The entire system with the complete accounting, traffic, and sales software package sells for about $30,000. Chase also offers a Music Format Control System that allows you to control quarter hours, 24 hours a day. The music library can be sorted in any number of ways with instant playlists generated by chart position updates or any other parameters. ASCAP/BMI logs are also generated automatically.

Bloomington Broadcasting offers a hardware and software package to radio stations which uses the Nova 3 central processor and 10 million byte disc drive and Diskette floppy drive memories. This is in addition to the 128 kilobyte main memory. The system price for a single station is $46,900 or for a combo, $49,900. A lease-purchase option is available. The software package offers full traffic, accounting, and sales programs along with a wide range of management reports. A Bloomington spokesman reports that an interface to program automation systems will be available in the very near future.

Another new company at NAB was Custom Business Systems, which currently serves some four Oregon radio stations. Now ready for expansion, the CBS system is based on an in-house mini — the Wang WCS-15. Software and hardware are provided by CBS, though technical support is from Wang. A single AM radio station installation will cost about $23,500, while an AM/FM installation will run about $26,000. The software package was developed by the broadcasters who recently formed Custom Business Systems for their own radio operation. **BM/E**

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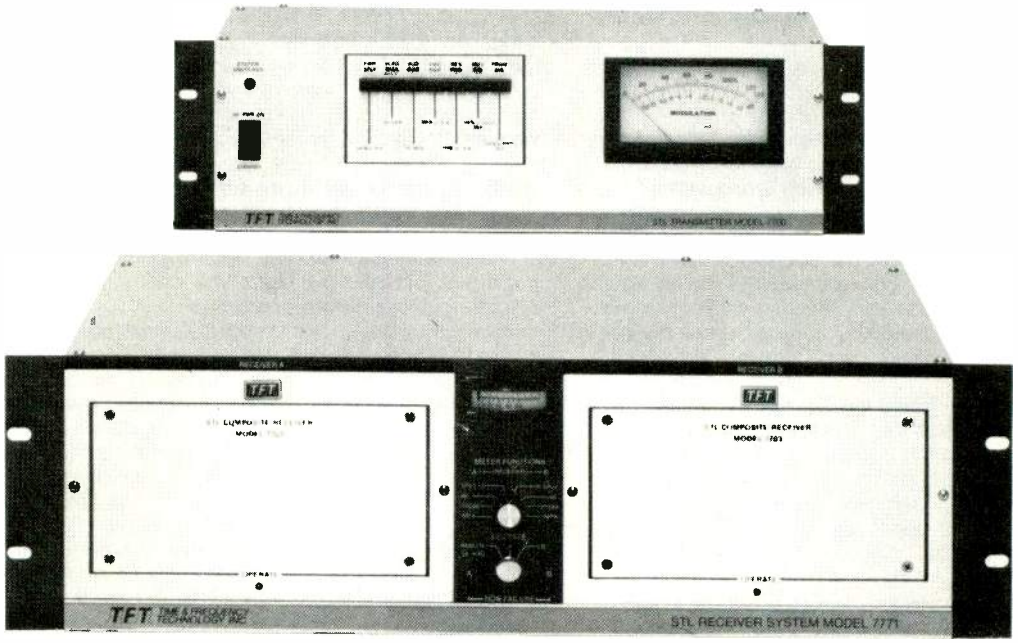

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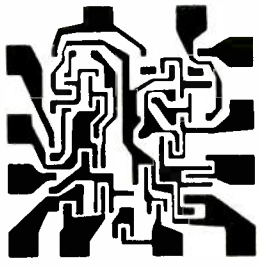
ON-LINE MONITORING: READING THE "MINDS" OF INTELLIGENT EQUIPMENT

By Gene Leonard



As both television and radio facilities move toward the use of more complicated software-based systems, more and more of the operations recede deeper into the inner workings of machine intelligence and farther from the view of maintenance personnel. New approaches to monitoring equipment and, eventually, to the entire plant are called for.

THE DAYS OF "observe glitch — kick proper panel — corrective maintenance performed" are long gone. During their heyday, the technician could keep a series of 'if this, then that" rules in mind which were developed from experience. The key maintenance element was the human being — the maintenance technician — who had developed diagnostic capabilities quite sufficient for the problems encountered.

Now, automation, digital control, digital manipulation, computer-driven cameras and switchers, plus digital image formation and storage, are all here with a vengeance, and mostly that vengeance is being wreaked on the maintenance man.

Physical assemblies or subassemblies perform a number of functions on a time-shared basis. The equipment keeps a series of "if this, then that" rules in memory (not in "mind") which were developed by software programmers. Along with time-shared functions come incredible speeds of equipment decision-making as the software routines are implemented. The maintenance technician is still the key element because only the human mind is capable of diagnosing. But the technician faces completely new problems, which can be linked to four areas: (1) the increased reliability of equipment; (2) the increased circuit speed and complexity residing more and more inside of integrated circuit chips; (3) the increasing percentage of software involved in the control and processing of signals and operations; and (4) the occurrence of transient malfunctions when no maintenance personnel are within hailing distance.

Item 1: The relatively greater reliability of present-day equipment limits the opportunities for maintenance personnel to become namiliar with or remember the detailed operation of the equipment. Lack of familiarity plus complexity of symptoms call for some new methodology of supplying maintenance documentation.

Item 2: Since large numbers of possible test points are hidden within large scale integrated circuits or complex linear integrated circuits, new techniques to assist the serviceman must be developed. Once a fault has been localized to a particular piece of equipment or subsection, these techniques come into play. Techniques for this type of service assistance, such a "signature analysis," "mapping," and built-in diagnostics, are becoming available.

Item 3: The third problem area, the increasing intermix of software and hardware (particularly in microprocessor organized equipment), requires maintenance personnel with greater understanding of the interrelationship between the two forms of logic and the ways in which that logic is documented. Some mechanism is required to help maintenance personnel thread their way through the interrelated documentation of software and hardware that now describes the television broadcast station's plant.

Item 4: The final problem is the need for the maintenance capability to diagnose events which are transient and which occur when no maintenance observations are available. The operator's need to get back "on-air" will wipe out evidence of faults.

Norn Rosenheim (left), supervisor special projects VTR maintenance CBS Network, and the author with the new DOM V installed on an ACR-25 at CBS's New York facility

Gene Leonard is president of Da Vinci Systems Group, Inc.

TABLE 1 — Probable Tape Problems

Max. Rate	Servo Loss	Limited section of tape	Probable Cause	Suggested Action
No	No	No	Tape aging	Less critical use or retire
No	No	Yes	Light scoring or wrinkling	Less critical use
No	Yes	No	Bad tape pack or edge damage	Retire
No	Yes	Yes	Stop-starts in record or edge damage	OK if stop-starts Retire if damage
Yes	No	No	Tape scored or creased	Less critical use or retire
Yes	No	Yes	Dirt or wrinkling	Less critical use or retire
Yes	Yes	No	Tape aging	Less critical use or retire
Yes	Yes	Yes	Bad tape section	Cut-out and splice or retire

Significant increase in dropout, max rate or servo loss count limited to a particular tape. No correlation to record or playback units

TABLE 2 — Probable VTR or VCR Problems

Max. Rate	Servo Loss	Limited section of tape	Probable cause report to Maintenance
No	No	No	Head problems, marginal record or playback, tracking errors
No	No	Yes	Possible loss of tension at various levels of tape buildup on feed or takeup reels
No	Yes	No	Control track head or circuits, drum speed or servo circuits
No	Yes	Yes	Tape tension or guidance variations
Yes	No	No	Head problems, marginal record or playback tracking errors, head switching errors
Yes	No	Yes	Tape tension or guidance variations
Yes	Yes	No	Dirt buildup on heads, servo problems, head switching, power supply regulation
Yes	Yes	Yes	Tape tension or guidance variations

Significant increase in dropout, max rate or servo loss count similar for tapes which have been recorded on a particular tape recorder, or similar for tapes being played back on machine associated with the DOM

In some cases, where videotape is the output medium, clues regarding faults are buried in the recorded video, audio, control, and time code tracks. Diagnostic monitoring equipment located at a suitable playback point can extract these clues and present them for maintenance analysis. When the medium is an electronic link, whether microwave, satellite or cable, in-plan diagnostic monitoring equipment can be configured to capture and record anomalies for subsequent maintenance analysis. A prime requisite to improve maintenance effectiveness is to have permanent, full-time records of the nature of malfunctions — even the transient ones. This means that there must be a new class of equipment which is "on-line" and which monitors activities, reports anomalies, and preserves the report for subsequent maintenance analysis.

This sort of equipment divides naturally into two types. One class of equipment monitors critical nodes of the overall plant and reports back to a central point the precise time and occurrence of any untoward event. The purpose of such a plant-wide system is to point toward the piece of equipment in which the fault originated.

The second type of such equipment is dedicated to monitoring a particular machine. Such monitoring equipment must be cheap enough to accomplish its basic function at a reasonable cost.

On-line monitoring of individual equipment

These were the considerations which led to the introduction of the DOM line of equipment (Diagnostic On-line Monitors). The first point of attack was magnetic tape systems, which present the greatest probability of problems or involve the greatest intermix of technologies. The decision was made to provide equipment which could range from use with the ½-inch consumer type equipment up to the complex two-inch video cart machines. In all cases, it was necessary to provide a means for interfacing the DOM to its appropriate VTR or VCR in such a way as to provide simplicity of installation and a guarantee that the DOM would not impact the operation of the machine it was monitoring. During the last year, this complete line has been developed and installed in a number of locations. The machines involved have ranged from ½-inch to quad cart machines.

The installation may range from an interconnection of seven wires in the simplest case to an interconnection involving perhaps 70 wires in the case of a cart machine.

In the simplest case, the points sensed are the servo-drive signals, the vertical signal frame pulse, the dropout compensator switch pulse, and the play control. Where SMPTE time code is available, it, rather than the frame pulse, may be used to report events. Errors in time code are also reported.

The outputs consist of a readout of the number of dropouts, a signal indicating a rapid burst of dropouts (which may mean head clogging or pickup of dirt), and a signal indicating losses of servo lock. The DOM II and DOM III units operate in this fashion and rely on a routine manual recording of results to flag any potential tape or system problem. (The DOM III differs from the DOM II in that the former handles SMPTE time code.) Either of these two units may have a printer connected which provides a running record of anomalies and the time of their occurrence, as well as a summary at the end of play.

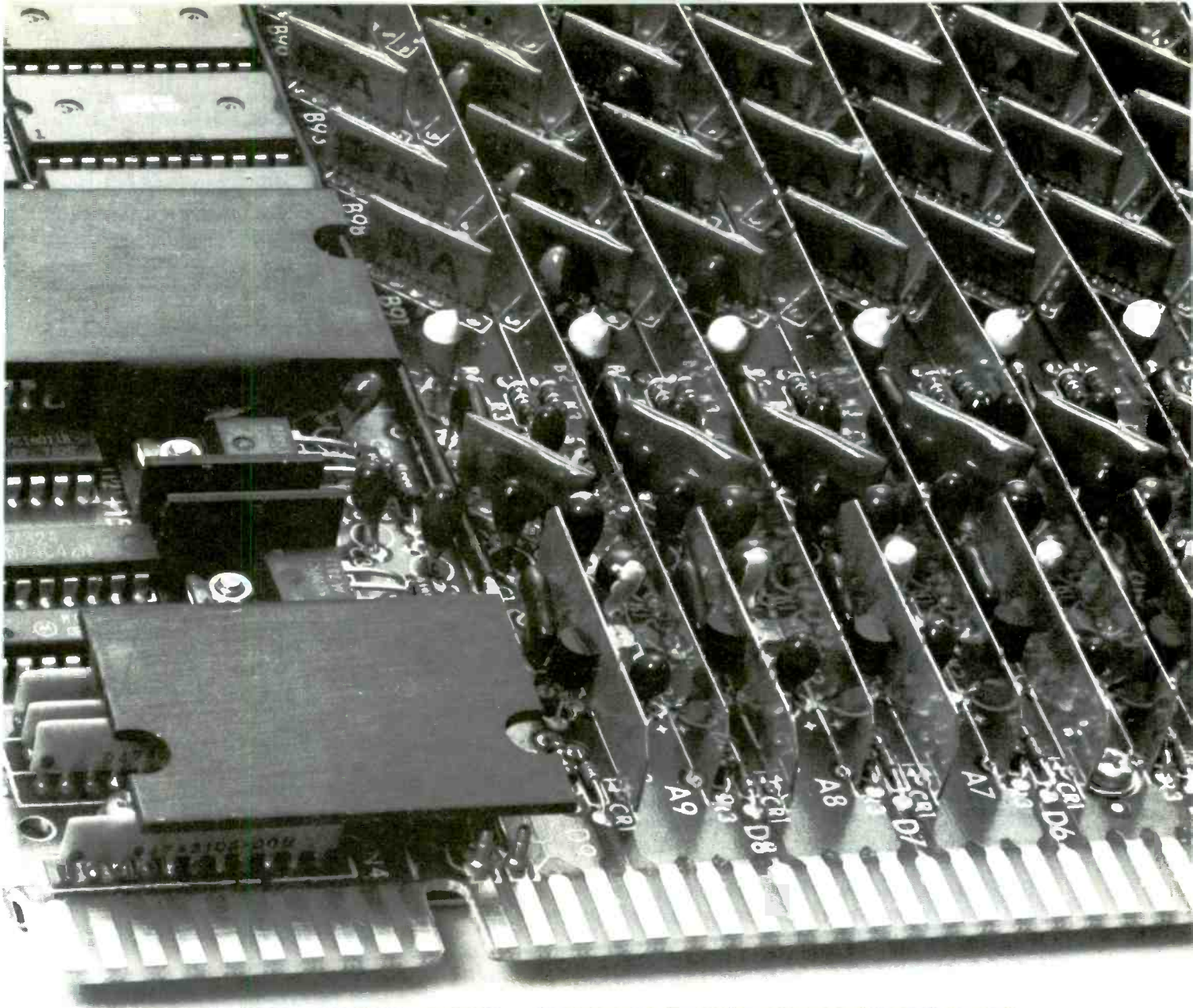
The printout results or the manually-recorded results are a condensation of the history of operations as recorded on the magnetic tape. These DOMs are diagnostic tools and are not capable of intervening in operation at any time. The intention is solely to provide information to the maintenance people.

Given reasonable input evidence, the maintenance technican can deduce causes and infer remedial action. Tables 1 and 2 show some of the possible interpretations of the very simple diagnostic data which can be derived from a DOM II or a DOM III without its printer. The printer, of course, offers additional recorded information which could not be captured by the DOM II or DOM III by themselves.

At the other end of the scale is the DOM V and its application to the cart machines. The combination of electromechanical complexity, cost of equipment, and the dollar cost of a failure warrants a far more sophisticated approach.

The diagnostic device must remain on-line as before. In this case, however, it contains a microprocessor with a memory that includes a representation of all the event sequences required to move cassettes, load them, thread them, play them, unthread them, unload them, and replace them in the carousel or magazine. Not only is the design sequence stored, but also the maximum permissible time for any event, particularly the electromechanical events. In addition, when the tape is played the requisite combination of observations regarding the quality of the tape signal, the tape itself, and the tape playing and servoing system are also observed by the microprocessor.

Since the device is on-line full-time, there must be



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some flexibility in the desired printout format. One format which prints out the detail, sequence and timing of every event in every operation is excellent for preventative maintenance. This is readily seen if the week-by-week readouts are compared and any degradation in performance noted. An example of such a "long form" printout from an ACR-25 is shown in Table 3, together with a list of explanations of the abbreviations used in the printer. Events occurring out of sequence are flagged, as are events which require too much time to complete. In practice, this device has allowed preventative maintenance to be applied long before any anomalies are observed in the on-air performance.

The DOM V, which costs less than one-fiftieth as much as the equipment it is monitoring, represents the next logical step up from the more basic monitoring of the DOM IIs and DOM IIIs and the associated printer.

Monitoring the overall plant on-line

Thus far, the discussion has involved monitoring at the individual equipment level. The whole TV plant, however, is a large, complex interacting system. To locate the source of faults within the entire plant a second level of monitoring will be called for in the future.

The logical approach to monitoring overall quality would be to incorporate quality control information in the same signal stream that carries the video signal itself. The VITS and VIRS signals represent the first step in this direction. There is sufficient bandwidth available in the video channel to carry a host of additional information in-plant, even if it is to be stripped off before final transmission.

The candidates for space in the video channel include audio, time code, machine control, source identification, and logging data, as well as quality control. These are all in-plant. What will replace them as the signal leaves the plant is the subject for an entirely separate discussion involving teletext, home newspapers, and content identification, among others.

What can be done regarding plant-wide quality control information signaling within the video signal itself depends upon a number of industry-wide priorities, but an approach available to individual stations is to supply detectors at each of the nodes in the television plant. At these nodes digital check data which has been inserted into the vertical interval for the purpose of quality control is monitored. The digital check data is derived from the operation of a "check-sum generator" at each video source or control point to be monitored. Then at each of the nodes similar checking computations are performed and compared with what has been inserted at the source or the control point. Any difference is immediately flagged and signaled to a central data-collecting computer which will serve to pinpoint the origin, time, and nature of the anomaly being reported.

Steve Smith, director of television engineering at KCMO, uses the on-line monitoring device to check quality of incoming commercials as well as to keep tabs on VTR conditions

After some experience with a prototype DOM V (cart machine monitor), two user-suggested features were added. The first feature provides a group of four "user option" monitoring points. These allow activity of equipment associated with the cart machine to be monitored as well as the activity of the cart machine itself. In effect, a "mini-plant" monitoring system is created.

The second feature provides an output data port on the DOM V so that its information can be sent to a central monitoring computer. Using this approach, quality control signaling (except the check-sum data) may be carried outside of the video channel. Thus, the DOM records for the suspect equipment would be available either as local printouts or as data stored at central monitoring computers.

The skilled maintenance person

It is worth pointing out that irrespective of the sophisticated nature of new diagnostic tools with their signatures, maps, and built-in diagnostic procedures, the skilled, highly motivated, diagnostically oriented maintenance person will not be superceded. This combination of equipment will allow maintenance personnel to operate at levels of efficiency corresponding to their skills and salaries. It may even reduce overtime. It will certainly reduce the frequency of on-air failures and the duration of downtime.

Our highly skilled, highly motivated, diagnostically oriented maintenance person, however, has one more hurdle to surmount. It will be impossible to maintain full familiarity with the wide range of devices to be handled. The documentation supplied such people should fit their skills and tasks. The burden for this is on the manufacturer of equipment or the designer and installer of the overall plant.

It is important to start paying attention to the format of the documentation. There is no worse fate than to be lying on the floor at the bottom of a rack of equipment with scope, probes, inadequate lighting and a pile of miscellaneous documentation. That situation is the particular purgatory of the maintenance person.

Thus, after all of the elegant electronic ingenuity has been applied, the final challenge rests with the human being. He needs maintenance data about his equipment, as well as diagnostic monitoring data. Maintenance information in a more accessible and helpful format is an essential. Vendors must begin to use modern imaging techniques, information-retrieving techniques, and teaching machine techniques to replace the maintenance manual as it now exists.

When this happens, the maximizing of maintenance effectiveness that requires diagnostic monitoring of equipment, full plant monitoring, and proper documentation techniques will become a realistic goal. **BM/E**

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"I think there is a film look and there is a live look. If you are on tape, the psychological appearance is that it is a live show. On the other hand, when you are doing an adventure show, you want a film look. This tells the audience: 'This is a fantasy.' A large percentage of our prime-time programming *is* on 35 mm film.

"Film and tape both have certain inherent qualities, and we should recognize them and use them to their best advantage. Tape gets us on the air fast with a live look. Film is very flexible, reliable and convenient. I think we should always have a network film capability.

"The dream of a broadcaster is to do something that is good for the people *and* gets a high rating. I think the Olympic Games fit this best. It is an overwhelming assignment.

"When we returned from the '72 Olympics, we were honored at a big dinner for us on the 40th floor of ABC. Everyone was involved, from the guy on the bottom, right up to the top. I was asked to speak, and I said that it was an honor to prepare a great easel for great artists. That's what I did—what my people did, prepared the easel. We gave our artists the paint, brushes, the easel, and they did the job.

"To someone starting out in the engineering end of the business I would say get a good technical background, good training. Learn computers and computer programming. Learn systems. The best candidate for my area (broadcast operations) would be a person who takes an undergraduate engineering degree and then goes to business school and gets an MBA.

"You have to make sure you have good people around you who are going to be able to speak their piece and do their job. Give them their heads and let them make decisions. Tell them what the guidelines are and your policies, and let them go out and do it. I want people who will make decisions, right or wrong. People have the right to make the wrong decision. If you operate out of fear, then you are not making the right decisions; you are simply making the decision the boss will agree with. That is not my way of operating.

"I think this is a great business, an exciting one, with a great future. I just don't think we should ever take our future for granted. We have a big job to do, and I don't want to see any limits or restraints on the things we can do to get on with it."

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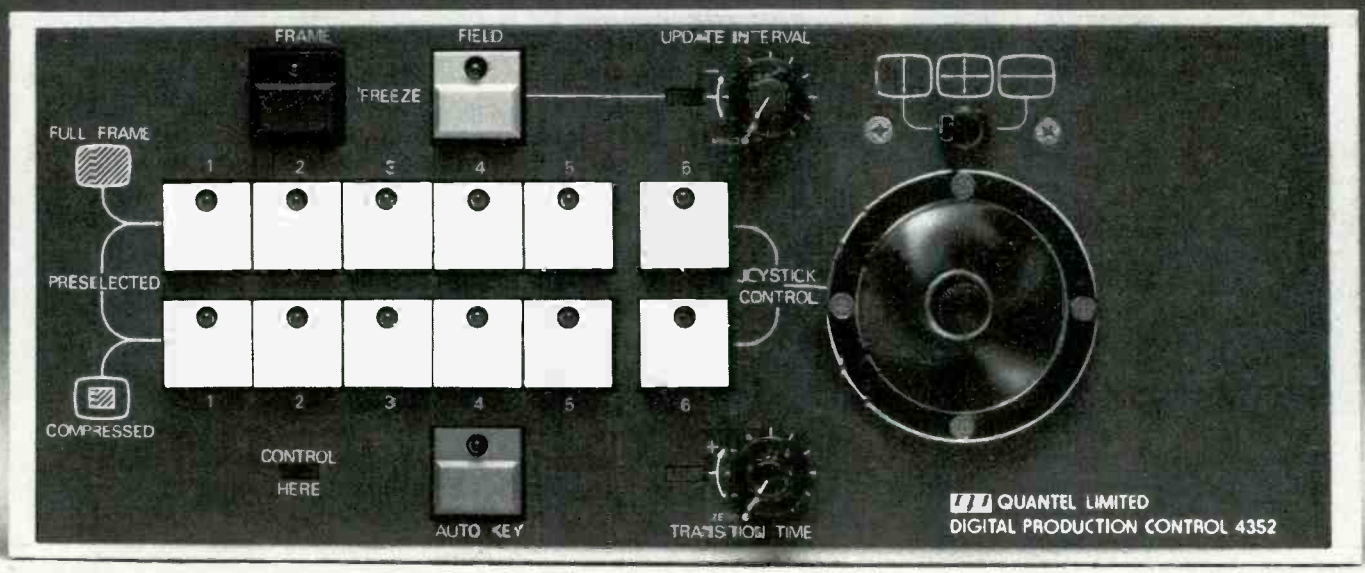

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HIGH-LEVEL LANGUAGES- EXPLOITING THE POWER OF MICROCOMPUTERS

By Juan Rivera

High-level languages provide almost anyone with a powerful tool for programming a small computer. Part 1 of this series (February, 1979) introduced the reader to programming. Part 2 (March, 1979) discussed microprocessor hardware and its relationship to software, as well as machine language and assembly language.

IN PAST ARTICLES, I have dealt with machine and assembly language programming. Programs thus created tend to be very compact and memory-efficient, but they are also very time-consuming and tedious to create. Also, those techniques require an intimate knowledge of the particular microprocessor used. Since each has its own unique instruction set, a program written for one μp won't work on any other. As a result, *low-level* programming is usually reserved for situations requiring extremely compact code. This may be essential when working with a small single-board computer with its very limited memory capacity, but it is hardly practical when dealing with a larger general purpose machine. Can you imagine spending months trying to teach your computer to multiply two numbers together? Hardly!

So far we have dealt with the machine on its own terms. But to fully utilize the power of computers, what is needed is a human-oriented approach, and *high-level* languages are the answer. A high-level language is really nothing more than a sophisticated program which translates your instructions into machine readable form. But now the instructions tell the machine *what* to do instead of *how* to do it! (The translator takes care of that.) When using a high-level language, we no longer care what type of μp the machine uses. As a matter of fact, source code written in a high-level language is *machine independent*. Aside from small variations in syntax between various translators, a program written in BASIC, for example, will run on any machine which supports that language from an IBM to a Pet.

High level languages — two types

All high-level languages can be classified as either *compilers* or *interpreters*, depending on when the conversion to machine code is done. Compilers do the conversion before the program is to be run. Once a program is written using a compiler, it can be translated into machine code and stored for later execution in that state. Many compilers require a "run-time" package which contains a library of often-used functions such as mathematical routines for example. The object code created by the compiler then interlocks itself to this run-time package and calls the various sections as needed.

Interpreters, by far the most common type in small systems, do the conversion at run-time. Code created using an interpreter is stored in the high-level form and only translated to machine instructions as it is run. At run-time an interpreter's memory requirements are greater than a compiler's, due to the interpreter's need to be resident in electronic memory while the application program is run. Since an interpreter may require anywhere from four to 20,000 bytes of memory, this is no small consideration. (The interpreter's memory requirement is a fixed overhead, regardless of the size of the application software.)

It would appear then that compilers would be the most popular, but this is not the case since they're more complicated to create and more difficult to work with. As you will see, the interpreter's few shortcomings are more than offset by its simplicity and straightforward operation.

BASIC — Easy to learn, easy to use

When BASIC was first created it was envisioned as an easy way to acquaint students with computer programming. Over the years it has been enhanced and expanded and its popularity has continued to increase to a position of total dominance in the microcomputer segment of the industry. Since your first exposure to computers will likely be with BASIC, why not prepare now?

The best way to learn BASIC is to begin using it. All BASIC interpreters have two modes of operation, a *direct* mode in which commands are executed immediately and a *program* mode in which instructions previously entered in the form of a program are later executed. A ommand is a special instruction which can only be executed in direct mode and has value only during program development. For example, LIST is a command which causes BASIC to list the program currently in RAM. Since there is seldom an application in which a program would list itself, LIST is implemented as a command only.

A statement is a BASIC instruction which may be used as part of a program. It begins with a keyword nd may be followed by rguments and other keywords. For example, the statement PRINT "THIS IS A TEST" begins with the keyword PRINT and is followed by the argument THIS IS A TEST. As you can see, the argu-

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ment is the information or modifier on which the statement operates.

Any BASIC program consists of a series of lines, each containing one or more statements. Examine the simple "FOR-NEXT" loop in Figure 1.

Notice that each line begins with a unique line number. The instructions are interpreted sequentially by line number from left to right. Here's what this program does:

10 The "REM" at the beginning of the line denotes this line as a *remark*, and the interpreter will ignore it. (Strictly for our use.)

20 For all values of N from zero to sixteen . . .

30 PRINT the value of two raised to the N power, followed by two spaces . . . (The second comma tells BASIC to inhibit the normal carriage return/line feed which it would otherwise do at the end of each PRINT statement.)

40 Repeat the procedure with the next sequential value of N.

The program will loop until N reaches a value of 16, at which time it would then "drop through" to the next step, if there were one. If ran this way the printout will be the powers of two.

Learn BASIC's syntax first

Each computer language has its acceptable rules of grammar or *syntax* which must be strictly adhered to. One of BASIC's strong points is its impressive list of error messages. In Figure 3's example, our attention has been called to the spelling error just entered. It's then a simple matter to edit that statement and proceed. Of course a statement may be syntactically correct and still be in error. I might have misspelled a word within the argument, for example. In that case the command to print a character string is understood. Whether the characters make sense to humans is of no concern to the computer.

H-Pad . . . writing an actual program

Rather than continue to use isolated examples, I would much rather lead you through the various stages of the design of an actual program. The program, "H-Pad", calculates the resistance values of H-pads. The current version is the result of many updates over a long period of time. In its present form it finds the nearest actual five percent resistor values, then does a network analysis on the pad it has designed. If the analysis reveals a design which does not yield an attenuation within five percent of that requested, the program will then assume a modified set of input values calculated to overcome errors introduced during the five percent resistor selection process. The process is then repeated until the results are satisfactory.

As always, the first step is to start at the beginning and plan ahead. Since BASIC is so easy, the temptation to plunge right in and begin writing is almost overwhelming. As a matter of fact my plan was so simple that at first no flow chart was needed. It consisted of only three sections: (1) input required parameters, (2) do the math, and (3) display the results.

Once the machine is turned on and BASIC is loaded, it will issue the prompt "READY" and you may then proceed. Notice the line numbers in Figure 4. When entering lines there are three possibilities: (1) if the line number has not been used before, the line will become part of the program; (2) if the number has been used before, the new line will replace the old one; and (3) if a line number is typed followed directly by a carriage return, that line will be deleted.

Let's proceed: Line 10 is a remark and is strictly for our enlightenment. As you can see, once I listed the steps I had entered so far, I noticed that I had forgotten

Table 1

```
LIST...
LIST <line number>  list only the line specified.
LIST <line number>, list all lines from the specified line to the end of the program.
LIST <line number>,<line number>  list all lines from the first specified to the second.

DEL... (delete)
DEL <line number>,<line number>  delete all lines between the first and second lines specified.

SCR... (SCRatch)
SCR erases the current program.

REN... (RENumber)
REN <line number>,<increment>  renumber all lines in the program starting with line number, (10 if not specified), in
increments specified, (10 if not specified.)

CAT... (CATalog)
CAT <drive number>  catalog the contents of the disc drive specified.

SAVE...
SAVE <file name>  save the program in memory on diskette.

LOAD...
LOAD <file name>  load the program named from diskette into RAM.

RUN...
RUN <line number>  execute the program in memory starting at line  specified, or beginning if not specified).

CONTROL-C...
Holding the control key down while hitting C causes a running program to be interupted.  Basic then  returns  to  the  DIRECT
mode.
```

a statement. Since I left unused numbers between lines, I simply inserted it at the end. (BASIC will order the lines sequentially before running the program, so they may be entered in any order.)

With the exception of line 10, all the statements entered so far are *data input statements*. This is the method used to request data from the operator. (It should be noted that this program is written in North Star BASIC, version six. There will be a variation in syntax as well as sophistication and implementation among various software vendors.)

All input statements in this BASIC take the following form:

INPUT <optional device number>, "<prompt>", <variable>

It's possible, in this particular version of BASIC, to specify any one of seven different devices for input or output. Two of the most common are a video terminal and a hard-copy printer. Since I've chosen not to specify a device, BASIC will default to my printer for all input/output (I/O). Following the optional device number is the prompt. BASIC will prompt the operator with the character string enclosed within the quotes. Should none exist, a question mark will be used. Following the prompt, and separated by a comma, is the variable. This may be either an alphanumeric *string variable* or a *numeric variable*. In this case all are numeric and consist of a capital letter followed by an optional digit. Let's LIST the program and take a second look (see Figure 5).

H-Pad . . . a running version

With the input section complete, remaining sections may now be added (Figure 6). The math occupies lines 60 through 120. The three formulas used to derive the resistor values have portions in common (see Table 2), which I have chosen to break out separately as variables *A*, *B*, and *C* in lines 70 through 90. *A* and *B* in turn reference the *K* factor derived in line 60. Since BASIC executes statements sequentially in ascending order, I must first derive *K* before attacking the other variables. *E1* and *E2* have been bound to values by the input statements of lines 20 and 30, so line 60 will work, and with *K* set, *A* and *B* are solved with the equations of lines 70 and 80. (A table of symbol definitions will be published in Part 4.) In line 90, *C* is equal to two times the square root of the quantity *Z1* times *Z2*. (These variables were bound to values in lines 35 and 40.) The only item of concern here is the order of execution. If the math statements appeared before the input statements, the results would have been all zeroes since BASIC sets all variables to zero until they are expressly defined within the program.

Now that all resistances have been calculated, they may be printed by the statements of lines 140 through 160. The PRINT statement can either be used as a direct command, or as I have done here, as a statement followed by one or more arguments. The argument enclosed in quotes, "R1=," will be printed as a character string. The second, separated by a comma, is interpreted as a variable, and its current value printed. But before running the program I want to modify it slightly (Figure 7).

First of all, for aesthetic reasons, I've chosen to renumber the lines starting at line 100, in increments of 10 with the direct command "REN 100,10". Also a program title has been added at line 100. (Multiple statements may occupy the same line by separating them with a back slash as I have done here.) Since I wanted to skip a line after the title, I simply use "PRINT" again, but with no argument. Next, in lines 110, 170, and 260, I've skipped a line in the program to help set the sections apart visually. Since BASIC ignores REM statements, it doesn't care whether there's anything following the REM or not. (Basic also ignores spaces, which may be inserted to make the program listing more readable for humans.)

Table 2

$$K = E1/E2$$

$$R_1 = Z_1 \times \frac{\left(\frac{K^2+1}{K^2-1}\right) - \left(\frac{K}{K^2-1}\right) \times 2\sqrt{Z_1 \times Z_2}}{2}$$

$$R_2 = Z_2 \times \frac{\left(\frac{K^2+1}{K^2-1}\right) - \left(\frac{K}{K^2-1}\right) \times 2\sqrt{Z_1 \times Z_2}}{2}$$

$$R_3 = \left(\frac{K}{K^2-1}\right) \times 2\sqrt{Z_1 \times Z_2}$$

Figure 1

```
LIST

10 REM (PRINT POWERS OF TWO)
20 FOR N=0 TO 16
30 PRINT 2^N,"  ",
40 NEXT
READY
```

Figure 3

```
10 PRINT "THIS IS A TEST"
RUN

SYNTAX ERROR IN LINE 10
READY
```

Figure 4

```
READY
LIST

10 REM (INPUT H-PAD PARAMETERS)
20 INPUT "INPUT VOLTAGE..... ",E1
30 INPUT "OUTPUT VOLTAGE..... ",E2
40 INPUT "OUTPUT IMPEDANCE... ",Z2
READY
35 INPUT "INPUT IMPEDANCE.... ",Z1
```

Figure 5

```
LIST

10 REM (INPUT H-PAD PARAMETERS)
20 INPUT "INPUT VOLTAGE..... ",E1
30 INPUT "OUTPUT VOLTAGE..... ",E2
35 INPUT "INPUT IMPEDANCE.... ",Z1
40 INPUT "OUTPUT IMPEDANCE... ",Z2
READY
```

Line 280 is a great example of the importance of correct syntax. In my particular BASIC this argument sets the numeric output to a right-justified nine-digit field with two digits to the right of the decimal point. The "#" makes this the default format, and it will remain in effect until modified or the program RUN is completed. Every symbol must be in the correct position or an error will result when BASIC tries to interpret this argument. Since it's typical of the BASIC functions which vary from vendor to vendor, I'll leave it at that. Incidentally, this line is another example of a multiple statement line in which a comment has been added for clarity. (Don't forget — it may make great sense now, but what about next year when you decide to modify the program?)

Now, run the program with the direct command RUN, which does exactly what it says. To enter the pad's values, the numbers are typed in and will be simultaneously printed. Should an error be made, the backspace key can be used to make corrections. Once the data looks correct, it is entered by pressing the RETURN key. (This same procedure holds true for any entry to BASIC — it does nothing until the return key is pressed.)

As you see in Figure 8, the program outputs the list of resistor values after the information has been entered.

Figure 6

```
READY
LIST

10 REM (INPUT H-PAD PARAMETERS)
20 INPUT "INPUT VOLTAGE..... ",E1
30 INPUT "OUTPUT VOLTAGE..... ",E2
35 INPUT "INPUT IMPEDANCE.... ",Z1
40 INPUT "OUTPUT IMPEDANCE... ",Z2
50 REM          (DO THE MATH)
60 K=E1/E2
70 A=(K^2+1)/(K^2-1)
80 B=K/(K^2-1)
90 C=2*SQRT(Z1*Z2)
100 R1=((Z1*A)-B*C)/2
110 R2=((Z2*A)-B*C)/2
120 R3=B*C
130 REM (OUTPUT THE RESULTS)
140 PRINT "R1=",R1
150 PRINT "R2=",R2
160 PRINT "R3=",R3
READY
```

Figure 7

```
READY
LIST

100 PRINT "-<=*>  H - P A D  <*>=-"\PRINT
110 REM
120 REM (INPUT H-PAD PARAMETERS)
130 INPUT "INPUT VOLTAGE..... ",E1
140 INPUT "OUTPUT VOLTAGE..... ",E2
150 INPUT "INPUT IMPEDANCE.... ",Z1
160 INPUT "OUTPUT IMPEDANCE... ",Z2
170 REM
180 REM          (DO THE MATH)
190 K=E1/E2
200 A=(K^2+1)/(K^2-1)
210 B=K/(K^2-1)
220 C=2*SQRT(Z1*Z2)
230 R1=((Z1*A)-B*C)/2
240 R2=((Z2*A)-B*C)/2
250 R3=B*C
260 REM
270 REM (OUTPUT THE RESULTS)
280 PRINT%##9F2\REM (SET OUTPUT FORMAT)
290 PRINT "R1=",R1
300 PRINT "R2=",R2
310 PRINT "R3=",R3
READY
```

Figure 8

```
READY
RUN

-<=*>  H - P A D  <*>=-

INPUT VOLTAGE..... 5.0
OUTPUT VOLTAGE..... .005
INPUT IMPEDANCE.... 5000
OUTPUT IMPEDANCE... 250

R1=  2498.89
R2=   123.88
R3=     2.24
READY
```

Figure 9

```
READY
LIST
100 !"-<=*>  H - P A D  <*>=-"\!
110 REM
120 REM (INPUT H-PAD PARAMETERS)
130 INPUT "INPUT VOLTAGE..... ",E1
140 INPUT "OUTPUT VOLTAGE..... ",E2
150 INPUT "INPUT IMPEDANCE.... ",Z1
160 INPUT "OUTPUT IMPEDANCE... ",Z2
170 REM
180 REM          (DO THE MATH)
190 K=E1/E2
200 A=(K^2+1)/(K^2-1)
210 B=K/(K^2-1)
220 C=2*SQRT(Z1*Z2)
230 R1=((Z1*A)-B*C)/2
240 R2=((Z2*A)-B*C)/2
250 R3=B*C
260 REM
270 REM (OUTPUT THE RESULTS)
280 !%##6F0\REM (SET OUTPUT FORMAT)
290 !".........",R1,".........",R2,"........."
300 !TAB(16),"!"
310 !TAB(12),R3
320 !TAB(16),"!"
330 !".........",R1,".........",R2,"........."
READY
```

Figure 10

```
READY
RUN

-<=*>  H - P A D  <*>=-

INPUT VOLTAGE..... 10.0
OUTPUT VOLTAGE..... 2.5
INPUT IMPEDANCE.... 600
OUTPUT IMPEDANCE... 250

........  237.........   38.........
                 !
              207.
                 !
........  237.........   38.........
READY
```

Figure 11

```
10 FOR N=1 TO 10

    [BODY]

80 NEXT
90 REM (more program here)
```

Figure 12

```
10 IF A=B THEN C=10 ELSE C=20
20 IF D>R THEN PRINT "DONE"
30 IF A<=14.5 OR B>6.2 THEN !"DONE" ELSE !"CONTINUE"
```

Figure 13

```
10 IF N$="JUAN" THEN !"HELLO MASTER!" ELSE !"I DON'T KNOW YOU."
```

(Notice how the output has been formatted.) I was reasonably satisfied with it until I forgot which resistors went where. Wouldn't a diagram be nice?

In several versions of BASIC, an exclamation point can be substituted for PRINT as I have done in Figure 9. This is a great time-saver since the argument is so common. Also, I've eliminated the useless decimal fractions from the resistor values by modifying line 280. Lines 290 through 330 have been added to produce a diagram of the pad. Notice the use of the function TAB. Use of this function will cause the cursor or print head to move to the character position mentioned in the argument unless it has passed that position already, in which case it will not move further.

The program as seen in Figure 10 is now fairly useful. It prints a diagram with the resistors shown in their appropriate places, and all that is required of us is to decide which resistor values most closely match those of the computer's "ideal" pad. But this too could be done by the computer if it had access to a standard resistor table.

In essence, what would be required once an ideal value had been calculated would be a sequential comparison of all the various values in a standard resistor table. Once the value in the table exceeded the ideal value, we may assume that the ideal value had just been "bracketed"; that is, the last comparison was the value just below the ideal, and the present comparison was just above the ideal. Then, all that would be required would be a selection of the closest match from among those two.

This type of repetitive operation may be easily accomplished with a "FOR-NEXT LOOP". In Figure 11, the block of repetitive statements, here referred to as [BODY]", is sandwiched between a FOR statement and a NEXT statement.

Here the sequence of statements represented by [BODY] would be executed 10 times unless action was taken within the body to exit the loop prior to its completion. During each iteration of the loop, the value of the control variable, in this case N, is incremented, and a comparison is made to see if the upper limit has been reached. When the upper limit is reached, program execution "drops through" to the next statement.

Decisions, decisions . . . the IF-THEN-ELSE block

Decisions are made in BASIC with an IF-THEN-ELSE block. Here's how it works: if the logical expression is TRUE, the statement following the THEN will be executed. If the logical expression is FALSE, the statement following ELSE will be executed, if it exists. (The ELSE portion is optional.) A few examples are given in Figure 12.

Up to now, we've been dealing strictly with numeric variables, but BASIC also has a powerful assortment of keywords which deal with *string variables*. They allow comparisons to be made between alphanumeric strings, or selected portions of strings. (A string variable is differentiated from a numeric variable by the dollar sign appended to it.)

So far program flow has been exceedingly simple, but now it is going to become a bit more complicated. Next time we'll combine the present program with a DATA table containing five percent resistor values, and design a routine to select the closest actual resistor from the table.

BM/E

WGBH engineers talk about the Ikegami HK-312

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

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

Pops without noise
Tom Keller, Director of Engineering:

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

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

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

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

Washouts and dropouts
Bill Fairweather,
Video Control Engineer:

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

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

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

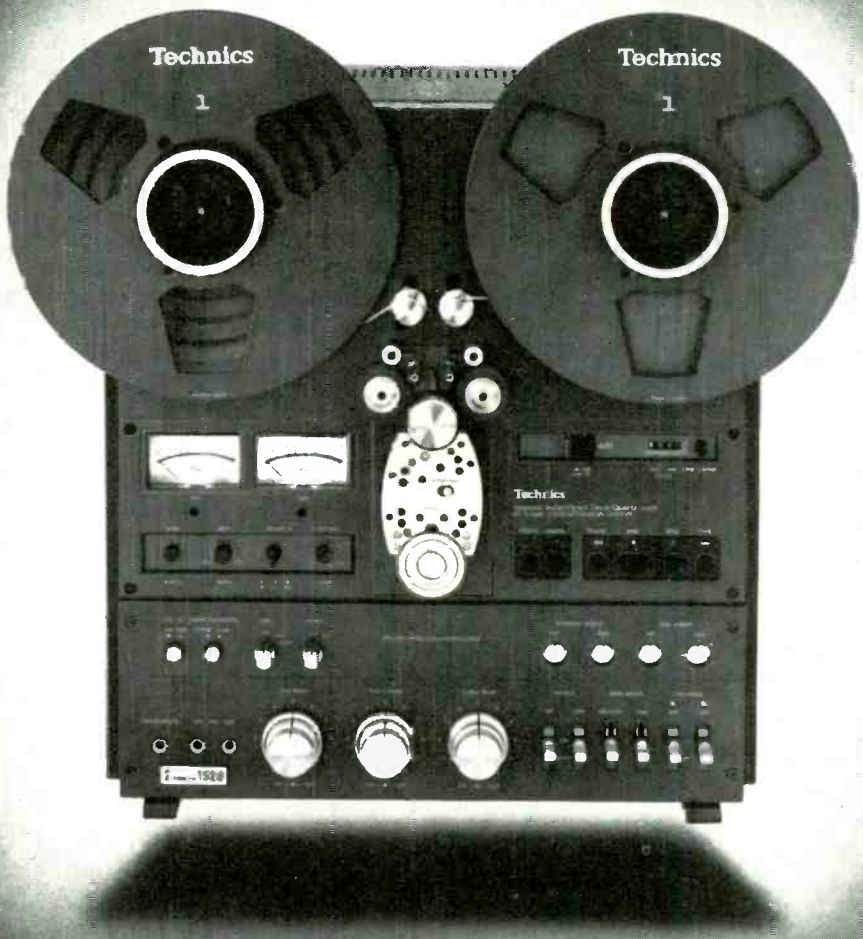
Adapters for triax cable, using digital techniques, make their cameras remote-usable at nearly a mile from base stations, yet easily revertible to multicore cable whenever needed.

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

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

Ikegami HK-312

If Technics RS-1500 meets the high standards of A&M Records, why did we improve it?



After the music is recorded, and before it becomes a record, how do the top executives of A&M Records listen to Peter Frampton, Chuck Mangione, and their other stars? On the Technics RS-1500. Why? Because of its outstanding frequency response, constant tape speed and low wow and flutter. In fact they were so impressed, A&M Records bought seven more.

Now, with Technics RS-1520, you can have the same performance A&M Records has with the RS-1500, plus these extra features studios want. Like adjustable front panel bias and equalization controls. A 1kHz/10kHz test-tone oscillator for accurate equipment checks. The precision of ASA standard VU meters with a −10dB sensitivity selector. A Cue/Edit switch for quick, safe edits. And balanced low-impedance, XLR-type output connectors to match other widely used broadcast and studio equipment.

Like all our open reel decks, the RS-1520 has Technics "Isolated Loop" tape transport system. By isolating the tape from external influences, our "Isolated Loop" minimizes tape tension to a constant 80 grams. This not only provides extremely stable tape transport and low head wear, it also reduces modulation noise to the point where it's detectable only on sophisticated testing equipment.

Electronically, the RS-1520 is equally sophisticated. And the reasons are as simple as IC full-logic controls. A highly accurate microphone amplifier. FET mixing amplifier. And separate 3-position bias/EQ selectors.

The RS-1520. It meets the high standards of A&M Records for the same reasons the RS-1500 does: FREQ. RESP.: 30-30,000Hz, ±3dB (−10dB rec. level) at 15ips. WOW & FLUTTER: 0.018% WRMS at 15ips. S/N RATIO: 60dB (NAB weighted) at 15ips. SEPARATION: 50dB. START-UP TIME: 0.7 secs. SPEED DEVIATION: ±0.1% with 1.0 or 1.5 mil tape at 15ips. SPEED FLUCTUATION: 0.05% with 1.0 or 1.5 mil tape at 15ips. PITCH CONTROL: ±6%. TRACK SYSTEM: 2-track, 2-channel recording, playback and erase. 4-track, 2-channel playback.

RS-1520. A rare combination of audio technology. A rare standard of audio excellence.

Technics
Professional Series

Circle 142 on Reader Service Card

AES Meeting Spills New Technology Into Broadcast Audio

New signal compression techniques, a fresh look at TV sound improvement, a resurgence of advances in microphone techniques, plus a flood of new digital hardware and technology were some of the items that made the Audio Engineering Society's Los Angeles convention a prime resource for broadcasters.

BECAUSE THE AUDIO upgrade spirit is firmer all the time in both radio and television, broadcasters will find crucial interests touched by a number of developments shown or reported at the Audio Engineering Society's sixty-third convention, May 15 through 18 in Los Angeles. Like all recent conventions of the AES, the meeting showed audio technology and the audio industry bursting forward; there were more than 6000 people on hand and 170 exhibitors (a record). More than 70 papers were read in eight technical sessions.

No less than four papers described new compression/expansion devices or techniques reflecting the continuing high interest in this. Daniel Talbot of dbx described the compandor developed in cooperation with National Public Radio specifically for the NPR satellite distribution system which was described in *BM/E* in October, 1978. This includes a compressor with frequency response flat within ±.05 dB, and compression ratio of 3 to 1 (near the maximum usable without audible side effects). This has allowed NPR to provide subscribing stations with about 120 dB of subjective signal-to-noise in network programs, on a transmission channel with a "window" of 40 dB.

Talbot also described what he called a "respectable single-band expander" using a proportional-plus-derivative attack circuit. Leslie Tyler of dbx described an above-threshold compressor with one control, using an "over easy" change from no compression to heavy compression.

Takashi Wakuri of the Japan Broadcasting Corporation (NHK) proposed a novel new compression system that divides the signal into segments containing a fixed number of zero crossing points (or a fixed time span, with division always at a zero crossing point). Each segment would be compressed in relation to the energy content of that segment. Wakuri claimed this provides much higher compression ratios with low distortion. To further reduce distortion in the process, the signal is converted into digital form before being subjected to control. Experimental versions of the system provided very high "compression efficiency" without audible distortion.

AM stereo, Harris point of view

The five systems for AM stereo now before the FCC got an informative going-over in a paper comparing them with each other, read by Joe DeAngelo of Harris Coprporation. Basic design differences were clearly laid out. DeAngelo ascribed certain faults to each of the four non-Harris systems, which he claimed to be non-existent in the Harris variable-angle quadrature system. Important, according to Mr. DeAngelo, was the existence of troublesome extra side-band energy in the other systems, absent from Harris, and high detector distortion in band limited receivers, much lower in Harris. He said that the Harris systems works with synchronous detectors (likely to be used more in the future), whereas the others do not.

How to get better TV audio at the receiver

With substantial improvement in most parts of the complex chain carrying TV audio from studio to viewer, noted in earlier issues of this magazine, it becomes highly useful and pertinent to look carefully at a link so far little discussed, the transmitter-receiver interface. Talbot of dbx gave a paper on this topic in which he analyzed thoroughly the main causes of audio distortion in the TV receiver. As one might suspect, the "cure" is much more than simply putting in better audio amplifiers and loudspeakers (although that is a vital part of it). To get the high audio quality which is a potential of the system Talbot found essential, in addition to better amplifiers and speakers, the following: less compression of the audio baseband signal; better trapping of visual frequencies in the vicinity of the aural carrier; separate handling of the aural carrier in the TV receiver; higher aural carrier levels; synchronous detectors, with their lower distortion; and less AM to PM conversion in the limiters in the receiver.

The digital hardware keeps rolling up

The digital revolution continued to accelerate in new hardware brought to the show. Sony put on a massive digital demonstration with a range of devices. There was a new processor for putting PCM audio onto videotape recorders, the PCM-100, with a 14-bit code and bit rate of 2.643 Mbits/sec, providing performance intermediate to the PCM-1 (13-bit) and the PCM-1600 (16-bit). Another introduction was the first unit in a series of fixed-head digital recorders, the PCM-3224, a 24-channel system using one-inch tape running at 22.5 ips, a 16-bit system with tracks for SMPTE code and analog audio to aid in editing. Sony says the system allows punch-in and tape-cut editing as well as electronic editing. Another unit from Sony was an editing controller, the DEC-1000, for easy electronic editing of digital audio material recorded on VTRs by the Sony PCM-1600 processor. And a fourth machine was a sampling-rate converter, the DSX-87, which converts digital systems in real time from a 44.056 kHz sampling rate to a 50.25 kHz rate.

Are all-rate digital systems coming?

The problem of lack of standardization in digital systems also got attention in a paper read by Toshi Tada Doi of Sony. He and several associates proposed a new form of stationary-head digital recorder that works with any of a range of sampling rates as a way of getting some compatibility among various brands of digital machine. This may be opening a door on a more hopeful view of the future of digital standardization that we have had so far.

Bjorn Bluthgen of Polygram Record Operations, Hanover, Germany, also brought a glimpse into a possible future of "multicompatible" digital machines with a proposal for a code-word controlled system that would adapt itself automatically to different standards. Bluthgen points out that only in this way can digital technology become really useful on a broad scale, while keeping the line open for advances that entail standards amendments.

Technics of Matsushita showed their stationary-head, four-channel digital recorder, which uses ¼-inch tape running at 15 ips, 16-bit linear coding, and a 50.4 kHz sampling rate. The objec-

tive, says Technics, was to develop a machine using about as much tape as top-grade analog machines and handling it in much the same way. Important in the machine's performance are thin-film magnetic heads produced by photo-exposure techniques like integrated circuits. Both tape-cut and electronic editing are possible, according to Matsushita. Distortion is less than 0.05 percent, dynamic range more than 90 dB.

Both Pioneer and JVC showed processors for putting PCM audio onto VTRs, JVC's adapted to both the Beta and the VHS videocassette formats. Soundstream, Inc., put their pioneer digital system to work in an excellent demonstration that included playing of a number of the commercial recordings mastered on the system. 3M also demonstrated their system (introduced at earlier shows), playing recordings made in commercial studios using the system. 3M promised its electronic editing system for later in the year and four more, at least, of the complete recording system by the end of the year, with their Camarillo plant being tooled for quantity production.

Ampex brought an audio digital delay system, the ADD-1, which it said was for top-quality "disc previewing." Its purpose, on investigation, turns out to be the provision of a pitch-control signal in the cutting of discs from tape masters. It works as follows: the signal from the tape is fed to the cutting machine pitch control system, where a rectified voltage sets the pitch in the usual way. The signal is also fed to the digital delay unit where it is digitized and stored, to be fed out again, after a controllable lapse of time, to the cutting head. The digitization preserves the signal at an extremely high quality level. The system is, in other words, a substitute for the "advance head" method used in disc mastering for many years.

Back to "square one," microphone placement

As a moment or two of thought would lead us to expect, a side-effect of the burgeoning of digital technology with its far lower distortion of all kinds is a refocusing of engineering attention on microphone techniques. With distortion so low in the recording-playback process, the aural character of recordings will become much more dependent on the microphones, their design, and their use.

We can see the beginnings of this in some of the papers at the Los Angeles show. J. Robert Ashley of the University of Colorado, reviewing the main faults in recordings going back to 1951 (which he hoped would not be carried forward into the digital era), included poor microphone technique as one of the most neglected sources of poor quality. Wieslaw Woszczyk of McGill University, Montreal, presented an intensively detailed study of the use of multi-miking for single instruments, a very new approach to mic technology which is certainly only the first of such new-level explorations of this subject. M. Matsumoto and some associates at Matsushita described a new push-pull electret condenser microphone claiming extremely low distortion. There will be much more on microphones in coming years, and we will become more conscious than before of the relations of mic placement to the aural characters of recordings.

The technical program was very rich in several other areas, too: measurement and instrumentation, sound reinforcement, consumer audio, etc. Broadcasters who did not attend and who want a closer view of the ferment going on in audio should ask the Audio Engineering Society for their list of preprints of the papers: no less than 57 of the 70 papers are available in this form at very modest prices. Write AES at 60 East 42 Street, New York, N.Y. 10017. **BM/E**

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SPEAK OUT

Bob Paulsen Asks, "Why Should There Be A Digital VTR?"

IN THE LAST FEW MONTHS I have heard many otherwise lucid and technically bright broadcast engineers muttering some variation of the following thought:

"I think I'll keep my quads running a few more years until the digital VTR comes along." This is a ridiculous policy for *anybody* in television to have about present and future investments in VTRs, but most especially a broadcaster.

The idea is at least in part nurtured by continuing trade press speculation that the second coming of quad is just around the corner. The conclusion evolves from recent impressive one-shot digital video recording demonstrations by three of the major analog VTR manufacturers — Ampex, Bosch/IBA, and Sony. Carefully and strongly worded statements by their top executives and engineers indicating the true purposes of these demonstrations are acknowledged but not treated seriously in this enthusiastic reporting and opinion giving. What the executives said about the demos is that they don't know know now and won't predict when or if there will *ever* be *economic* or *creative* justification for a "digital VTR," — i.e., a standalone black box that is plug-compatible with existing quad and helical analog VTRs.

They are not even sure there will be *technical* justification for it at that time several years into the future when it could be shipped, based on a flying development program starting right now. They know how good the one-inch helical formats are now, compared to the 10-year-old quad high-band recording standard. They are working diligently to improve on this performance by taking advantage of constant new developments in video heads, videotape, electronics, modulation/demodulation schemes, and pre- and post-processing of the video signal. Recorders have always been the bandwidth-limiting, noise-adding constriction in every transmission system starting with Edison's original phonograph. Just because the video signal is going to be digitized in this system doesn't ream away the constriction.

The first problem is the inordinate bandwidth currently required to digitize even a 4 MHz video signal (which European broadcasters won't accept). Then there's the need to integrate two wide band audio channels and a time code channel into the bit stream.

Finally, there's the sophistication and complexity of the production and post-production systems into which the digital VTR must be integrated. Analog video and audio interfaces would be required for plug compatibility with the analog VTRs being replaced. But what about digital interfaces for the many digital video and audio products proliferating in the marketplace? Should they be bit serial or parallel? Or both? What clock rates? What coding schemes? What about "bandwidth compression" (redundancy elimination)? What interleaving scheme should be used for video/audio/audio/code?

Unless miracles happen on 57 and 66 Streets and at 30 Rock, electronic production and post-production systems of the mid-1980s will still have many analog video and audio components. For any advantages of digital domain recording, editing, and dubbing to be exploited, digital domain video production switchers and audio mixers will have to be invented simultaneously with the digital VTR. Otherwise, every new digital tape generation will contain the noise and distortion products of all the previous analog domain processing experiences of the picture and sound signals.

Thus the economic and technical justification issues of themselves are enormous problems for the design engineers to attack. But they shouldn't be attacked at all until *creative* justification for a standalone black box called a digital VTR has been thoroughly explored and documented.

At the present time between 75 and 85 percent of *all* prime time programming on the networks is shot and edited on film, much of it in 35 mm. The number of productions shot on *tape* for *film* distribution to motion picture theatres can be counted on fewer than the fingers of one hand.

Unless the evolution to digital somehow raises some part of this huge chunk of iceberg up out of the film processing chemical lagoons, economic justification for a digital videotape recorder will never be established. That's because the creative capabilities of the system must be better than film, faster to use than film, cheaper than film, and at least as good picture quality as a large-screen presentation of conventional and wide-screen film. The designers must first come up with a total production and post-production scheme which must be creatively, economically, and technically competitive with film production for *both* television and theatrical release.

Moreover, looking ahead to the year 2000, and maybe the early 1990s, let's assume that the four-wall theatrical distribution format could feature wide- or even surround-screen stereopticon (3-D) pictures as well as total surround sound. Television transmitted into the home could also feature wide-screen stereopticon pictures of high vertical and horizontal resolution and four-channel sound. Should the designer consider technical specifications of these orders of advanced performance? Even a "technically less ambitious" (more realistic) design target, staying with two to four-channel stereo sound, doesn't relax the requirements very much.

Bob Paulson, head of AVP Communication, Westborough, Mass., is a product planning and marketing consultant to international television and film equipment manufacturers. The editors of BM/E join with him in inviting other opinions on this controversial topic.

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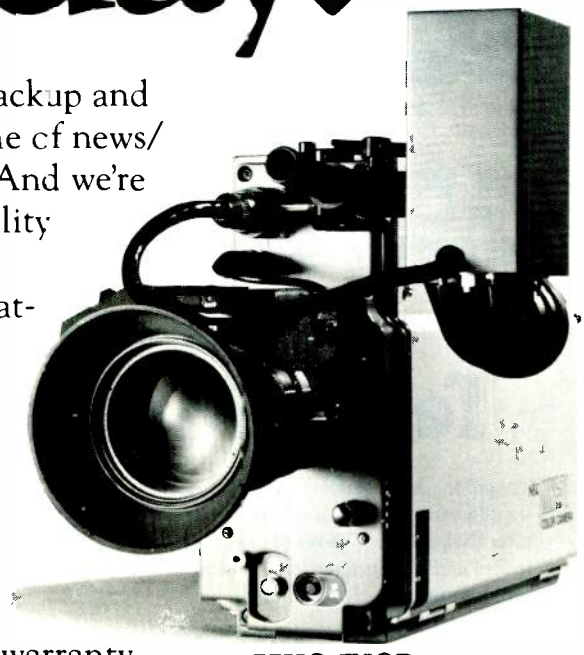

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Another crucial fact: profits for TV production today don't come from the prime-time, first-run release, but from the syndication market, the overseas television market, and the Third World theatrical release market. If you shoot and edit a production in 525-line NTSC, how do you tap the other markets? You have to shoot in 16 mm or 35 mm film and let the distributor bear the cost of format transfer.

Thus, the ultimate digital production/post-production system must yield film *or* videotape prints of as good picture and sound quality as 35 mm film, be faster to utilize *without* departing substantially from production and post-production procedures familiar to creative film people, and be cheaper overall than the film medium.

Can this be accomplished? Consider that "television style" starts with multiple-camera (three or more) coverage of an event, with editing done live in a control room or remote truck. Recordings are made on a "single-system" video plus multiple audio channels recorder. "Film style" starts with a single camera plus a separate synchronous audio recorder.

Electronic and film post-production obviously therefore now require vastly different hardware and techniques. If that previously identified 75 to 85 percent of prime-time programming now done on film is to switch over to digital videotape and digital EPP, it's going to happen on the currently busy and prosperous film lots, with unionized film creative specialists doing the work. There isn't a videotape editing system on the market today that is anything but a NASA Apollo spacecraft console nightmare to those unionized film creative specialists.

To react and say that the digital video recorder (DVR?) will *never* emerge is as illogical, however, as predicting that it will appear in the next two or three years. But when it does appear, will the recording medium be tape or a direct read-after-write digital video disc?

The 1980s evolution of television production and post-production systems toward the exploitation of digital recording is a monumental creative and technical task. It can be undertaken only by a company with vast financial resources, brilliant digital systems, circuit and component engineers, and a manufacturing capacity that must be kept loaded up.

It is *not* a field for individualist, underfinanced creative/technical entrepreneurs. The engaging, modestly successful, truly innovative, but constantly in turmoil entrepreneurs that brought us the plethora of digital black boxes in the 1970s please note. **BM/E**

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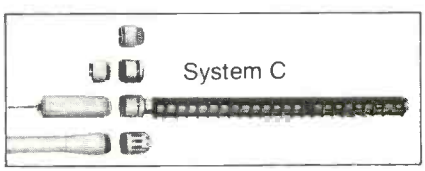

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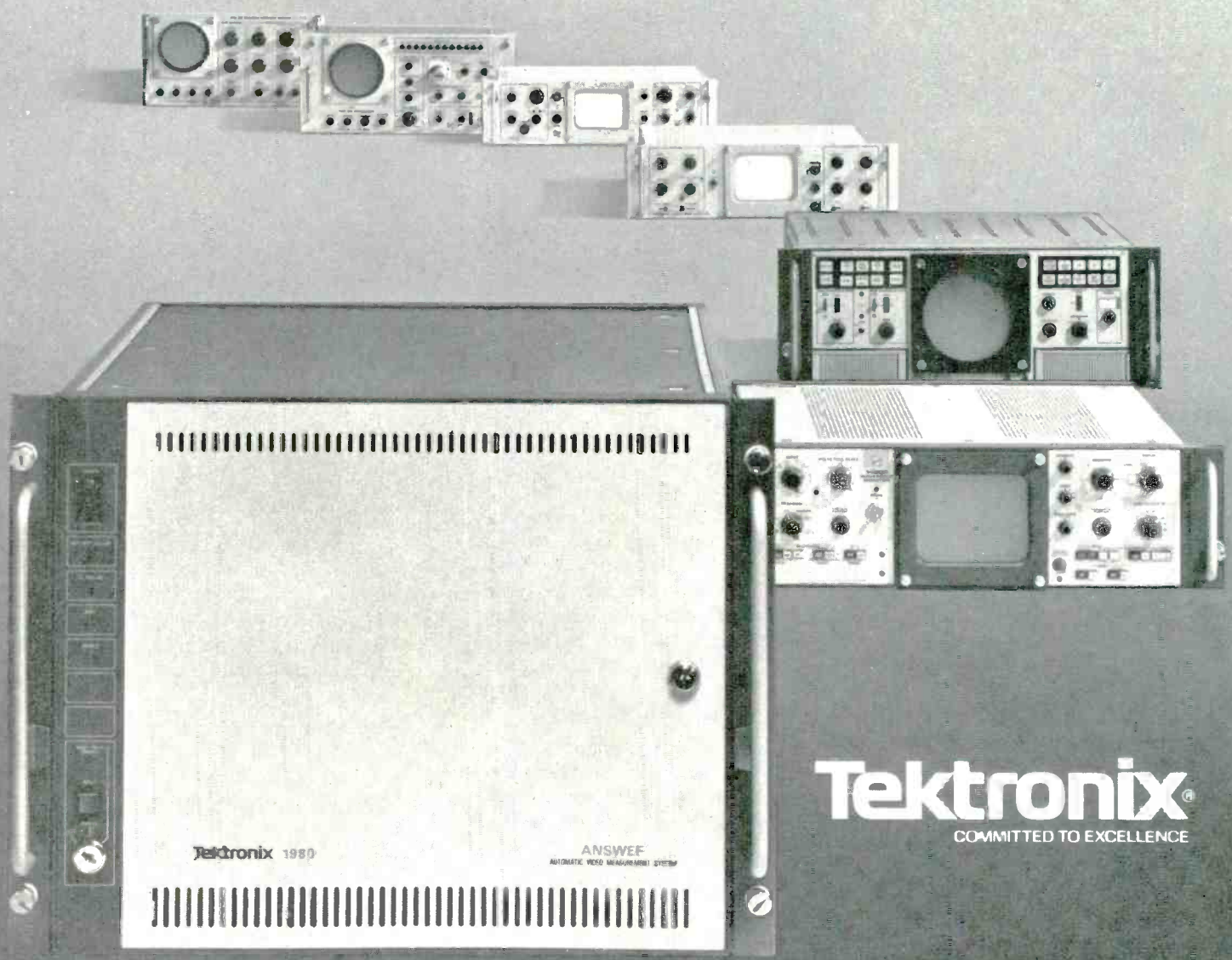

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INTERPRETING THE FCC RULES & REGULATIONS

By Frederick W. Ford and Lee G. Lovett; Lovett Ford and Hennessey, P.C., Washington, D.C.

First Amendment: Is The Media Still Protected?

AS A RESULT of the reluctance of Chief Justice Burger to appear before the media at a recent American Bar Association convention, more attention has been focused upon the Court. Recent Supreme Court decisions have reexamined the protections and privileges extended to the media through the First Amendment. These decisions have had a drastic impact upon the courts' view of First Amendment contentions by the media concerning searches and seizures, libel suits, and access to government information. This article will examine the changes in these areas and comment upon the possible ramifications of these Supreme Court decisions.

It was the general sentiment that searches and seizures of media property pursuant to a warrant should only be used in extreme situations when the media was the subject of the warrant. However, the recent decision by the Supreme Court in *Zurcher* v. *Stanford Daily*[1] has placed this proposition in doubt. The facts of the case are simple.

Late in the day on Friday, April 9, 1971, officers of the Palo Alto Police Department and the Santa Clara County Sheriff's Department responded to a call from the director of the Stanford University Hospital requesting the removal of a large group of demonstrators who had seized the hospital's administrative offices and occupied them the previous afternoon. The demonstrators had barricaded the doors at both ends of the hall adjacent to the administrative offices. After several futile efforts to persuade the demonstrators to leave peacefully, the police chose to enter forcibly at the west end of the corridor. As they did so, a group of demonstrators emerged through the doors at the east end, and armed with sticks and clubs, attacked the group of nine police officers stationed there. One officer was knocked to the floor and struck repeatedly on the head; another suffered a broken shoulder. All nine officers were injured. Police photographers were not located at the east door, and most bystanders and reporters were on the west side. The officers themselves were able to identify two of their assailants, but one of them saw at least one person photographing the assault at the east doors.

On Sunday, April 11, a special edition of the *Stanford Daily*, a student newspaper published at Stanford University, carried articles and photographs devoted to the hospital protest and the violent clash between demonstrators and police. The photographs carried the byline of a *Daily* staff member and indicated that he had been at the east end of the hospital hallway, where he could have photographed the assault on the nine officers. The next day the Santa Clara County District Attorney's Office secured a warrant from the municipal court for an immediate search of the *Daily* office for the negatives, film, and pictures showing the events and occurrences at the hospital on the preceding Friday. The warrant affidavit did not contain any allegations or indications that members of the *Daily* staff were involved in the unlawful acts at the hospital.

Subsequently, the *Daily's* photographic laboratories, filing cabinets, desks, and waste paper baskets were searched. The search revealed only the photographs that had already been published on April 11; therefore, none of the *Daily's* materials were removed.

A month later, the *Daily* filed suit in U.S. District Court seeking a decision against the police, the chief of police, the district attorney, and the judge who issued the warrant. The complaint alleged actions in violations of the First, Fourth, and Fourteenth Amendments. The District Court found that (1) pursuant to the Fourth and Fourteenth Amendments, a warrant was an inappropriate vehicle for gaining information from an innocent third party and (2) where the innocent third is a newspaper, First Amendment interests, namely freedom of speech and press, require the issuance of a warrant only in extreme situations. In the court's opinion, this was not an extreme situation; therefore, the search was illegal. The Court of Appeals affirmed this decision.

However, *the Supreme Court reversed the lower court's decision*. Initially, the Court found that the lower court's interpretation of the rights of innocent third parties under the Fourth and Fourteenth Amendments was incorrect. Having disposed of this point, the Court turned its attention to the First Amendment rights of the newspaper. On this issue, the Court stated that it did not believe that the issuance of a warrant in such cases would infringe upon First Amendment rights. Further, the Court noted that involvement of the media in a search dictated simply "that the Court apply the warrant requirements with particular exactitude when First Amendment interests would be endangered by the search." Therefore, although decisions to issue a warrant in situations involving the media must be carefully scrutinized, the Supreme Court maintained that this fell far short of the strict standards proposed by the lower court.

This decision by the Supreme Court will have a substantial impact upon media operations. A court can constitutionally issue a search warrant if it is shown that the media entity has pertinent evidence within its control. Although at present few warrants are issued in situations involving the media, this decision increases the likelihood that warrants will be used in the future.

Since the celebrated *New York Times* v. *Sullivan* case[2] (holding that a media outlet must publish a falsehood with malice), the media has enjoyed some degree of insulation from libel suits — particularly as they would inquire into the editorial process. However, in the recent *Herbert* v. *Lando*[3] decision, the Supreme Court permitted inquiry into the editorial process for purposes of ascertaining

[1]56 L. Ed. 2d 525 (1979). [2]76 U.S. 254 (1964). [3]99 S. Ct. 1635 (1979).

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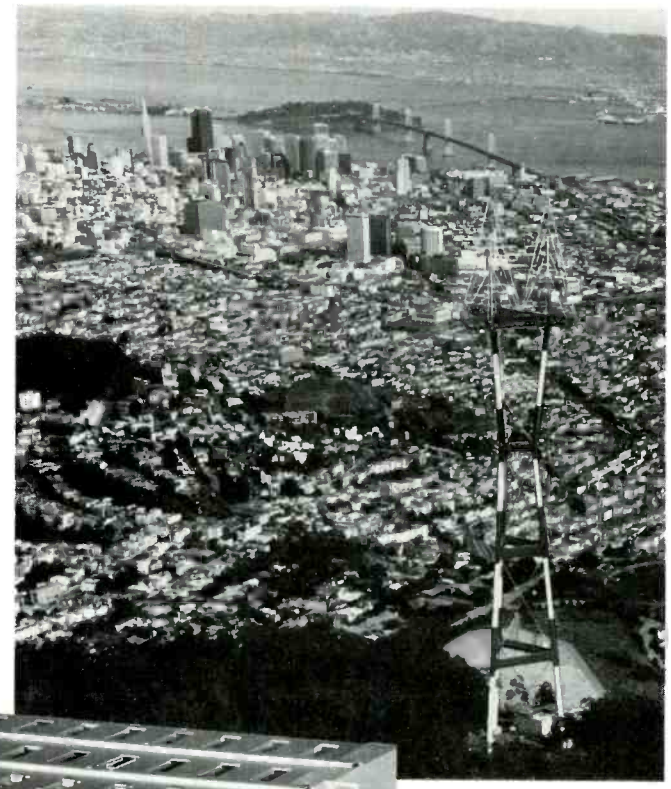

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proof of malice in a libel suit. The facts of the case illustrate the shift in the Supreme Court's thinking in this delicate First Amendment area.

Anthony Herbert was a retired Army officer who had served in Vietnam. He had received widespread media attention in 1969 and 1970 when he accused his superior officers of covering up reports of atrocities and other war crimes. Three years later, CBS broadcast a report on Mr. Herbert including these accusations. The program was produced and edited by Barry Lando and was narrated by Mike Wallace. Mr. Lando later published a related article in *Atlantic Monthly* magazine. As a result of the program and the article, Mr. Herbert sued Mr. Lando, Mr. Wallace, CBS, and *Atlantic Monthly* for defamation of character. In his complaint, Mr. Herbert alleged that the program and article falsely and maliciously portrayed him as a liar and a person who had made war crimes charges to explain his being relieved of command. He requested substantial damages for injury to his reputation and to the literary value of a book that he had just published recounting his experiences.

Mr. Herbert conceded that, since he was a public figure, the First and Fourteenth Amendments precluded recovery of any damages absent proof that the accused had published the damaging falsehoods with actual malice. In preparing to prove his case, Mr. Herbert's attorneys deposed Mr. Lando at length. Mr. Herbert sought an order to compel answers to a variety of questions that Mr. Lando refused to answer on the ground that the First Amendment protected against inquiries into the state of mind of those who edit, produce, or publish, as well as protecting against inquiries into the editorial process. The District Court ruled in favor of Mr. Herbert. In the District Court's opinion, the information sought was of central importance to the issue of malice and, therefore, Mr. Herbert was entitled to the information.

The Court of Appeals reversed this decision. This Court concluded that the First Amendment protected Mr. Lando from inquiries about his thoughts, opinions, and conclusions with respect to materials gathered by him, as well as inquiries about his conversations with his editorial colleagues. The Court of Appeals held that the privilege (of not answering) was absolute.

The Supreme Court, on the other hand, did not share the view of the Court of Appeals. It ruled that *Mr. Herbert was entitled to make inquiries into all of these areas*. The Supreme Court agreed with the District Court that this information was central to the issue of malice and that without such information it would be extremely difficult for Mr. Herbert to prove his case. In the Court's opinion, the First Amendment did not insure this type of protection.

The ramifications of this decision could be monumental. Prior to this decision, the media was reasonably assured that inquiries into editorial policy and state of mind would not be allowed. However, the *Lando* decision makes it clear that such inquiries will be allowed, where appropriate. Therefore, broadcasters should exercise great care and responsibility during the editorial process.

Media access to government information

It has been argued that the public and the media have a right to access to information within the government's

FCC Rules & Regulations

control. However, in the recent decision in *Houchins* v. *KQED, Inc.*,[4] the Supreme Court reiterated its opinion to the contrary.

On March 31, 1975, KQED reported the suicide of a prisoner in the Greystone portion of the Santa Rita Jail. The report included a statement by a psychiatrist that the conditions at the Greystone facility were responsible for the illness of his patient-prisoners. The report also included a statement from Mr. Houchins, as sheriff of Alameda County, Calif., denying that the prison conditions were responsible for the prisoners' illnesses.

KQED requested permission to inspect and take pictures within the Greystone facility. After permission was refused, KQED and the Alameda and Oakland branches of the NAACP filed suit for access. They alleged that Sheriff Houchins had violated the First Amendment by refusing to permit media access and failing to provide any effective means by which the public could be informed of the prevailing conditions at the Greystone facility. They asserted that public access to such information was essential in order for the NAACP members to participate in public debate on jail conditions in Alameda County. Further, they alleged that television coverage of the conditions in the cells was the most effective way of informing the public of prison conditions.

Both the District Court and the Court of Appeals agreed that the public and the media were entitled to such access. However, the Supreme Court took a contrary view. In the Supreme Court's opinion, although the public should be informed about conditions in such facilities, neither the First Amendment nor the Fourteenth Amendment provided a right of access to government information or sources of information within the government's control. In other words, *the news media did not have a constitutional right of access to the county jail, over and above that of other persons*. Further, the Court pointed out that it is a legislative and not a judicial function to determine the public's right of access to jail facilities. In the Court's view, this was strictly a policy decision and not an issue of constitutional right of access.

As is the case with all the decisions discussed herein, the *KQED, Inc.* case may well have broad ramifications on media coverage of particular events. It is interesting to note that while the Court sympathized with the argument that the public should be informed, it clearly stated that this created no legal right to access. Therefore, unless a legal right to access is specifically stated within the law, it would appear that the media has no constitutional right to this information.

Conclusion

The apparent trend of the Supreme Court is to take a conservative stance with respect to the privileges and protections extended to the media under the First Amendment. Therefore, it is advisable that media entities exercise great care in making determinations as to the applicability of the First Amendment. Certainly, in situations where there is some question, counsel should be sought from a qualified expert. **BM/E**

[4]57 L. Ed 2d 553 (1979).

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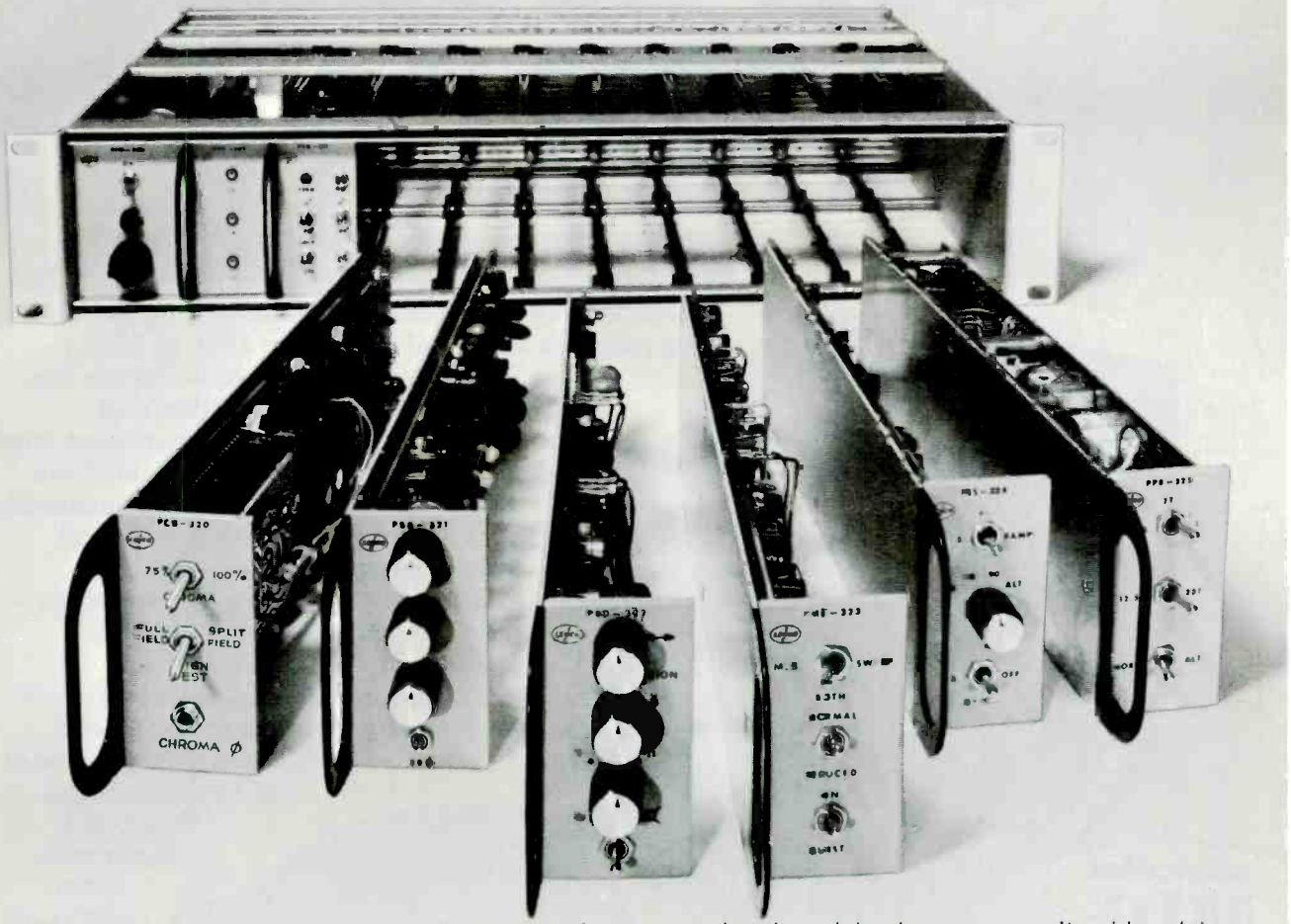

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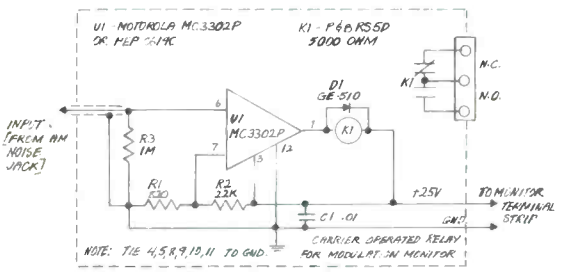
15. Warning Light For Transmitter Problems

David J. Butler, Engineering Staff, WJEJ-FM, Hagerstown, Md.

Problem: To derive a carrier-operated relay output from a modulation monitor to drive a warning lamp or other device, alerting operators that the transmitter has gone off the air.

Solution: This circuit was developed for the Belair FMM-1 monitor, but can be used with any monitor which has a positive voltage available with carrier on. No modifications to the monitor are required and the unit derives its operating voltage from the +25 volt supply available at the monitor terminal strip. Total current drain with the relay picked up is about 7 mA. The entire unit was constructed in a small mini-box and attached to the rear of the monitor.



Circuit for Butler's relay output

The circuit uses an MC3302P four-section differential comparator. Only one section is utilized in this application, with the inputs to the other sections tied to ground. The input is connected via a BNC connector to the AM noise jack of the monitor. With no signal applied to the monitor, the inverting input to the comparator (PIN 6) is held at ground potential by R3. The relay is dropped out since the output (PIN 1) is at positive potential. When signal is applied to the monitor at rated level, approximately 1.3 volts appears at the AM noise jack. This exceeds the .9 volt reference voltage derived from the voltage divider R1 and R2 at the non-inverting input (PIN 7) of the comparator, which causes the output to go to ground, picking up relay K1.The value of R1 can be changed to obtain any desired triggering voltage.

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Great Ideas

16. Video Clock

David K. Peters, Maintenance Engineer, WITF-TV, Hershey, Penn.

Problem: To generate a video clock to use as a pseudo-time code for cassette dubs and as a real time clock on control room monitors.

Solution: The schematic in Figure 1, developed from the manufacturer's spec sheets, meets the needs of removing horizontal and vertical sync from incoming video and inserting a video clock.

Transistor Q1 operates as a video stripper, isolating sync to be sent to horizontal driver Q2 and vertical driver Q3 which delivery sync to IC1. IC1 is the character generator and control chip. IC2 is a clock chip designed for use with IC1. The resistor/capacitor networks on pins 16 and 17 and on 20 and 21 are timing networks for horizontal and vertical positioning respectively. IC3 is wired as an oscillator of about 4 MHz which determines the height of the characters. Video output is on pin 15 of IC1 and its level is adjusted by the 10K pot. Time set switches are on IC2 as well as the ac input limiters used as the time reference.

The circuit was built on a three-by-four-inch plug in circuit board as shown in Figure 2. Figure 3 shows the component placement. The board is mounted in a chassis with the power supply, video connectors, time set switches, hold switch, and display off switch.

The unit is operated similar to an LED clock. Time is set by putting the clock in hold and advancing the display with the fast and slow set switches until the display is slightly ahead of the actual time. When the actual time and the displayed time are the same, the hold switch is opened and the clock will begin to run. When used as a pseudo-time code the clock is first preset to 00:00:00 and then

Figure 2. Foil view (left)

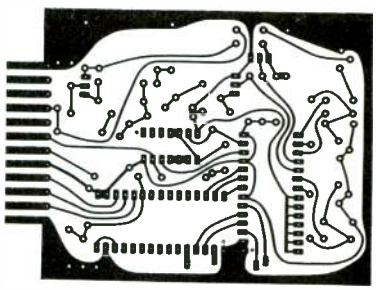
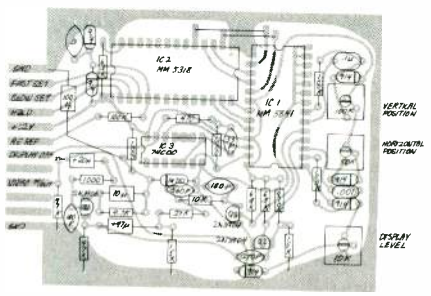


Figure 3. Component view (right)



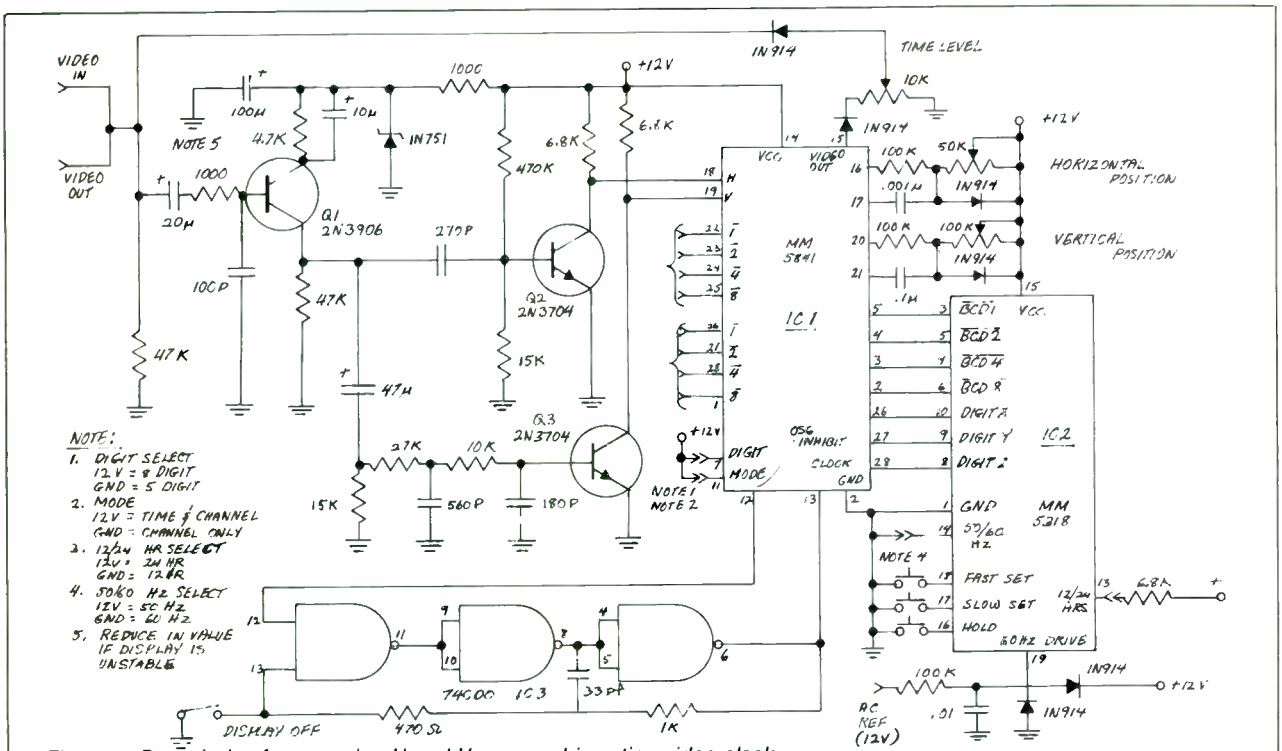


Figure 1. Peters' plan for removing H and V sync and inserting video clock

started at first video. The dub then contains the original video with a clock reference. The display off switch removes the video display without disrupting the count.

The display is stable with any video input and causes no degradation of the incoming video. Four have been built and all work satisfactorily. One has even been modified to work with our rubidium frequency standard as its time base.

All parts are common and available from most mail order parts houses for about $30.

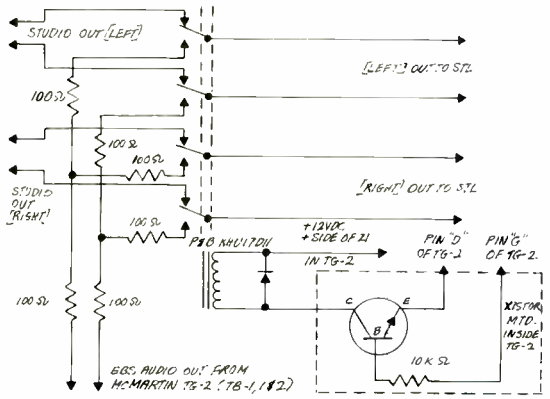
Great Ideas

17. Automatic EBS/Program Switcher

James C. King, Manager, WVXU, Cincinnati, Ohio, and Jay Crawford, Chief Engineer, WEBN, Cincinnati, Ohio

Problem: To build an automatic EBS/program switcher using a McMartin TG-2 EBS generator.

Solution: Most of us are confronted with the problem of getting the EBS tone on the air with a minimum of operator error and technical difficulty. The problem is compounded with stereo FM stations which prefer to put the EBS tone on both channels when only one mono output is provided by the generator (such as the McMartin TG-2). One solution is to simply go through a pot on the board, but that is often impractical and demands that the operator remember to turn the pot up.



King and Crawford's EBS/program switcher

A foolproof circuit is shown here. The addition of a simple relay (P&B KHU17D11), a common transistor (2N3053 or equivalent), six 100 ohm resistors, and a 10 K resistor will handle the job beautifully. Basically, the TG-2 has an LED which is triggered whenever the EBS tone is generated. This circuit takes the pulse voltage from the base of the transistor switch in the TG-2 and uses it to trigger the 2N3053 in the diagram. Thus, whenever the EBS tone is generated, the switching transistor is turned on. The relay is wired in series with the 2N3053 so that it pulls in whenever the tone is on. When the timed tone cycle ends, the relay releases and restores studio programming to the STL. The use of a splitter pad from the EBS audio output to the relay contacts permits the tone to be applied to left and right channels.

This system does not have to rely on the announcer or operator. Once the EBS start switch is engaged, programming is disconnected from the STL and EBS tone is applied. When the cycle finishes, programming is automatically restored to the transmitter.

It is recommended that the 2N3053 switching transistor be wired inside the TG-2 unit. If you are not using the 45 ohm speaker output terminals on TB-1 you might want to run the 12 V dc+ from the + terminal of Z-1 in the generator to terminal 3 of TB-1 (formerly one of the 45 ohm speaker terminals). Then the collector of the 2N3053 can be wired to the other terminal (4). The relay can then be outboarded wherever you wish. **BM/E**

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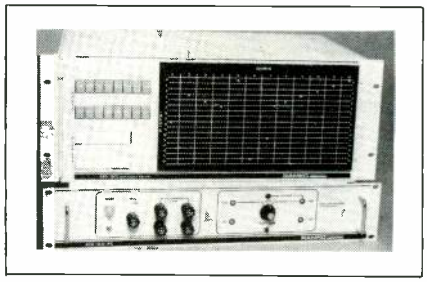
Audio Router/Amplifier 250

Model ARA-1612 "electronic patch panel" is capable of feeding from 16 mono sources or eight stereo sources to up to 12 outputs with no interaction between locations. The system may be expanded to 45 in and as many out as needed. Other features include local and remote lighted output status displays, individual gain-adjustable input amplifiers, programmable output cards for stereo and/or mono feeds, dual instantaneous switchover power supply, and balanced in and out. Response is ±0.5 dB, 20 Hz to 20 kHz; distortion is 0.3 percent maximum; gain is variable (each input) +15 dB; S/N is −75 dB below +8 dBm out. From $1099. RAMKO RESEARCH.



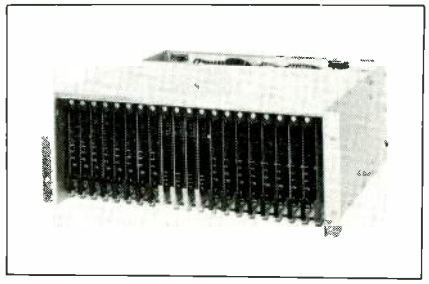
For more information circle bold face numbers on reader service card.

Production Switcher 251

Model 6112 is a completely self-contained broadcast-quality video production switcher with two fully independent mix-effects systems, downstream keyer, and optional chroma keyer and color bar generator. Featured are nine inputs including internal colorizer, bus toggle, pattern modulator, soft wipe, border, spot-lite, automatic mix or wipe, preset of mix and wipe (enabling user to wipe to a preset mix or mix to a preset wipe), mix or wipe to a key, switchable internal or external key, and downstream keyer. Each mix-effects system has 12 patterns with double re-entry capability, allowing user to create a scene with one pattern next to or inside of another pattern. The unit requires only sync and subcarrier; it will accept any combination of synchronous, non-synchronous, composite, non-composite, color, or monochrome signals. $5790. CROSSPOINT LATCH CORP.

Switching System 252

The 300 Series production switching system offers fully integrated digital video effects, with four input buses provided to each mix-effects system and two separate input buses for video and title key sources. Each M/E can be re-entered into every other in any order. Other features include a bordered quad split from each M/E, new wipe patterns including matrix wipes, rate control positioner, and expanded rotary and pattern modulation control. Each M/E contains a built-in Effects Memory (E-MEM) system as standard equipment; an optional expanded E-MEM is available. GRASS VALLEY GROUP.



Digital Framestore Synchronizer 253

The 630 Series digital framestore synchronizers are built around a "universal" memory architecture that is compatible with NTSC, PAL, PAL-M, and SECAM standards. This design is made possible by processing the video signal in component, rather than composite, form; a high degree of signal processing versatility without loss of output quality is the claimed result. A TBC is built into all units; front panel selectable field or frame picture freeze is standard. In addition, a DMA (direct memory access) I/O interface opens up such applications as digital still store and image processing. Digital noise reduction is available as a plug-in option. $24,990. CONSOLIDATED VIDEO SYSTEMS.

Cart Machines 254

The Sonifex series of cart machines, manufactured in the U.K., feature solenoid-operated pinch roller or air-damped solenoid, depending on model. All use a 1 kHz burst for primary cue. Flywheel is belt-driven from synchronous or dc motors and servopac digital servo drive. Some models employ some TTL and CMOS logic. Specs for the QFX-250 model include frequency response, 40 Hz to 15 kHz ±2 dB; noise, −62 dB; THD, 2 percent maximum, referenced to +8 dBm; wow and flutter, 0.15 percent rms or better; crosstalk, −50 dBm; and start and stop time, less than 0.1 second. TRACK AUDIO, INC.

Routing Switcher 255

The CAV-7 series of compact audio and video routing switchers employ the same circuit cards and perform to the same broadcast specifications as the maker's larger AVS-1 series. They are packaged in a seven-inch rack-mount chassis and are available in seven basic configurations for video-only, audio-only, audio/video, and tally voltage switching. Maximum matrix sizes are 20 x 10 audio/video, 50 x 10 video or audio-only. Matrices are available with either local or remote control and feature a refresh memory with 24-hour memory-save. Optional FSK tone control permits remote operation over STL links or land lines. From $4000. UTAH SCIENTIFIC, INC.

Cart Player/Recorder 256

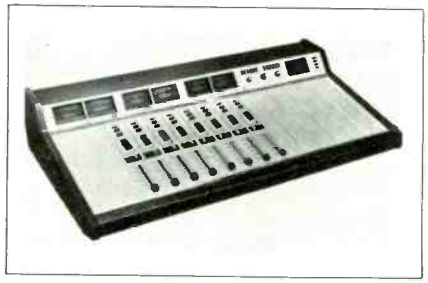
The Series 99 cart reproducers and recording amplifiers feature microprocessor control of all transport logic and motion sensing. The microprocessor also generates and detects all cue and test tones and controls the ELSA functions (cartridge erasure, azimuth adjustment, and splice location). Tape transport is a brushless dc crystal-referenced servo motor and a positive, mechanically latching solenoid, which hold tape speed stablility to within 0.1 percent. Head design is an open-face conformation; modular construction with plug-in sub-assemblies is used throughout. Headroom before clipping is +26 dBm. The ELSA cartridge preparation system is fully automatic, and a cartridge positioning system assures precise, rigid tape-to-head alignment. Specs include: frequency response, ±1 dB from 31.5 Hz to 16 kHz; wow and flutter, 0.12 percent or less DIN-weighted; S/N, 54 dB or better mono,

Broadcast Equipment

52 dB or better stereo; crosstalk, 50 dB or better between channels at 1 kHz; distortion, 1.5 percent overall. INTERNATIONAL TAPETRONICS CORP

Audio Consoles 257

Beaucart audio consoles are eight to 16-channel stereo units with top channel modules that plug into the mother board with gold-on-gold connectors. Each channel module has three selectable inputs allowing a maximum of 48 hard-wired inputs; module cards include a high-low switch for impedance matching and a ±10 dB trim switch. Three fully metered matching stereo



buses out (program, audition, and utility) plus a fully metered mono feed bus are standard. Each module has a Waters conductive plastic fader with 100 mm travel. In addition to the cue detent at the bottom of each attenuator, a momentary cue bus access select button on each channel allows the user to audition upcoming program material without disturbing preset volume levels. On/off buttons in each channel provide noiseless dc switching and remote start/stop for external equipment such as cart machines. External power supply and built-in cue amplifier are featured. Options include: crystal-controlled real time count up/count down LED digital clock; outdoor LED digital temperature, humidity, or barometric pressure displays; and PPMs or VU meters with PPM-flashing LEDs. UMC ELECTRONICS CO.

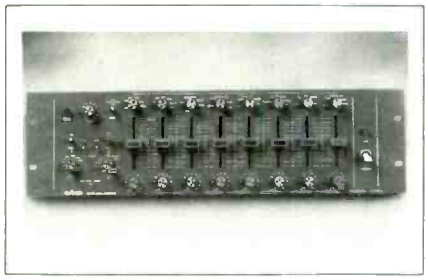
Options For Effects System 258

DPE 5000/Plus is a package of multiple-input options for the DPE 5000 digital video effects system. The new options permit digital manipulations to be performed on three, four, or five channels simultaneously. The basic option includes two effects units connected to the master system, yielding a total of three channels. It is housed in a 48-inch high enclosure. One or two additional effects units, which will mount in the same rack, may be added

at any time. Each effects unit is a complete framestore system dedicated to a single input. The multi-channel systems operate from a single control panel, but each input may be keyed into any other input so that processed video in one channel may be passed through or across processed video from any other channel. Existing systems may be updated to include the new options. Basic option, $75,000; each additional unit, $25,000. MCI/QUANTEL.

Parametric Equalizer 259

Model 672A is an eight-band, single-channel parametric equalizer featuring graphic-style EQ controls. EQ sections are reciprocal and have a range of ±16 dB. Independent high and low-pass filters can be used to bandlimit in the



usual way; with the auxiliary low-pass output, a two-way 12 dB/octave continuously tunable crossover may be obtained. A "peak-stretching" overload amp warns of clipping anywhere in the unit. Broadcast uses include enhancement of announce mics and equalization of phone or remote lines. Frequency response is ±0.25 dB, 20 to 20,000 Hz; THD is rated at less than 0.05 percent, 20 to 20,000 Hz (+18 dBm). $499. ORBAN ASSOCIATES, INC.

New Version Of Steadicam

The Universal Model II has been modified from previous models for greater maneuverability and safety. The new breakaway-style camera operator's vest features an emergency release cord located on the right shoulder which allows the operator to remove the entire system in less than two seconds in any emergency situation. The new raised video monitor is now positioned midway between the camera-mounting platform and the lower portion, allowing the monitor to be tilted up or down and rotated about its axis. The camera itself can now rotate a full 360 degrees during the shot. A special adapter is required for low-angle and tabletop shooting with the camera on the bottom instead of the top. $19,500 and up. CINEMA PRODUCTS CORP., 2037 Granville Ave., Los Angeles, Calif. 90025.

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