MAY 1973

BM/E

BROADCAST MANAGEMENT ENGINEERING

CM/E

INCLUDING: CABLE MANAGEMENT ENGINEERING

NAB SHOW-IN-PRINT ISSUE

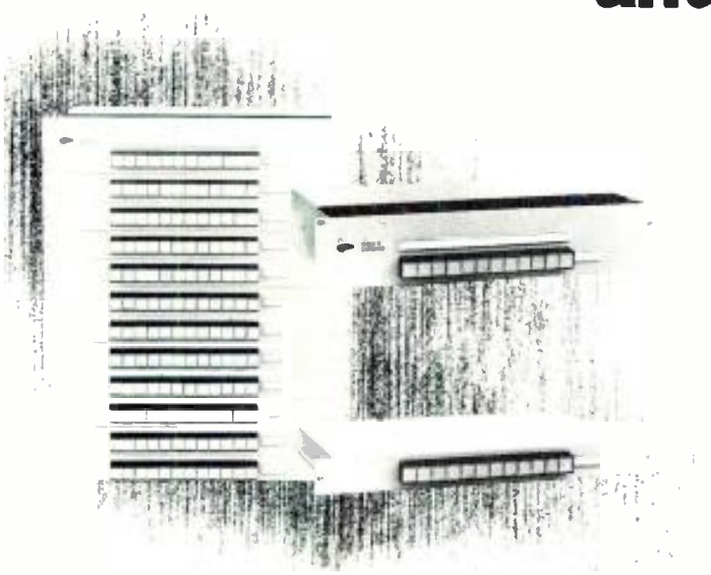
Turning Point in Technology and Regulation

Helical VTRs challenge quad for first time *Automated audio delivery systems go pocket-sized*

Era of digital transmission coming

On the regulatory front, it's all roses

DYNAIR's price catalog describes these new products and over 150 others.



NEW "PATCH CABLE ELIMINATOR"

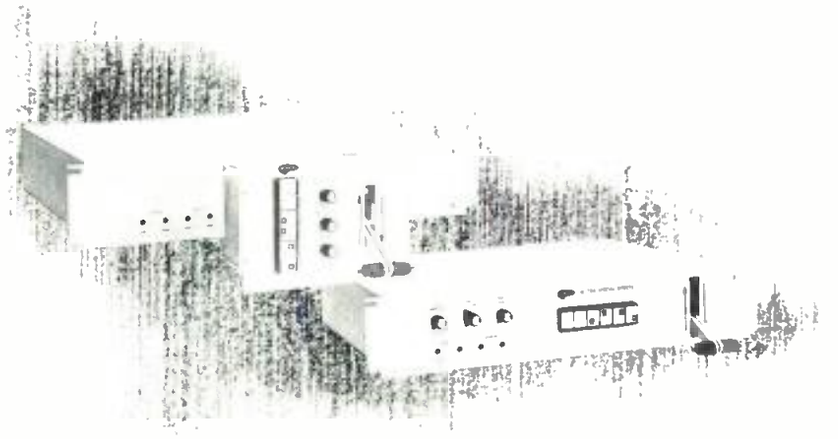
DYNAIR's new Series-X Video-Audio Switchers eliminate the custom fabrication usually required for routing switchers. These units are totally modular, allowing off-the-shelf assembly of almost any input-output configuration, either video-only, or audio-follow-video. And, expansion is easy too . . . you simply add input or output expansion modules as required.

The basic unit is video only, with options including audio, sync-mixing and tally provisions. Illuminating pushbuttons are standard, with provisions for easily labeling the individual inputs and outputs. The new Series-X provides exceptional performance at prices which are, in many cases, much less than our earlier version of the Series-X.

NEW SPECIAL EFFECTS GENERATORS

DYNAIR's new SE-70A and SE-70A-R Special Effects Generators allow basic effects to be easily and inexpensively added to any television system. These broadcast quality units operate equally well on color or monochrome signals, with either broadcast or industrial sync. A quality locking-type gear-driven effects mechanism is used, allowing effects to be easily implemented.

The units provide horizontal and vertical wipes, inserts from any corner with diagonal expansion, and internal and external keying and matting. The SE-70A is self-contained for console mounting and the SE-70A-R is an electrically identical remote-controlled unit, the control panel of which may be easily mounted in custom panels.



NEW DYNAIR "PRICE CATALOG"

DYNAIR's new price catalog has been designed to provide you with a quick look at the large variety of equipment we manufacture and our current price on each item. We think that you will appreciate the convenience of this new catalog/price list combination . . . it's a very handy reference guide to DYNAIR's world of television.

Request your copy today . . . we think you'll like what you see.

DYNAIR ELECTRONICS, INC.
6360 FEDERAL BOULEVARD
SAN DIEGO, CALIF. 92114 U.S.A
TELEPHONE: 714-582-9211

DYNAIR

BM/E
BROADCAST MANAGEMENT/ENGINEERING

MAY 1973/VOLUME 9/NUMBER 5

NAB SHOW-IN-PRINT

Literally hundreds of products at this year's NAB Convention are described and illustrated in BM/E's NAB Show-In-Print issue, starting on page 26.

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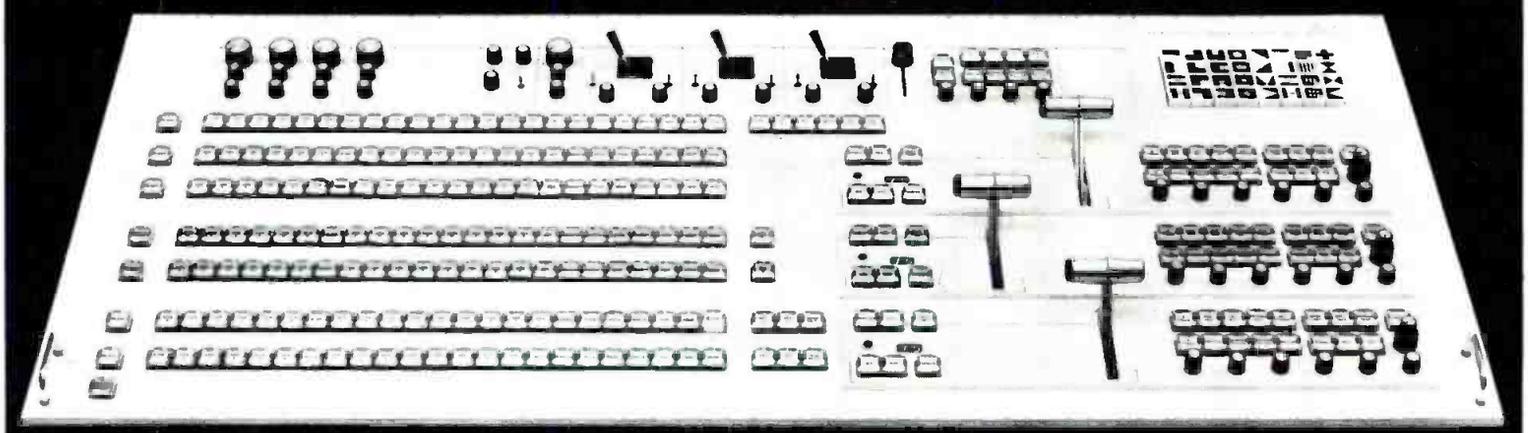
THE 1600 SERIES

LINEAR CHROMA KEY, SOFT WIPE, and ELECTRONIC VIGNETTE are some of the modern concepts in GVG's new 1600 Series television production switching systems. LINEAR CHROMA KEYING is a basic improvement in chroma key technique. Its effect is to virtually eliminate noise and tearing, even in the most difficult chroma key situations, such as keying through glass or smoke.

1600 Series systems are a second generation design which is based upon experience gained in the manufacture of almost three hundred 1400 and 3600 Series switchers. This new design is in direct response to customer requests for fundamental improvements in special effects capability, together with a high standard of electrical performance.

Some of the design concepts employed in the 1600 Series systems constitute an advance in the state of the art and, as such, are offered for the first time. These new concepts include both mechanical and electrical aspects of design and have led to the development of systems which are both compact and cost effective.

1600 Series switchers range in size from Model 1600-2A, with 16 input buses - 4 output buses and one mix/effects system, to Model 1600-7G (illustrated below), with 24 input buses - 7 output buses and three mix/effects systems -- each with separate pattern generator, color matte generator, and modulated positioner.



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BROADCAST INDUSTRY NEWS

NAB CONVENTION: SHOW IN PRINT (See page 31)

FM Station Cuts Raw Sex After FCC Hits "Obscenity"

The Federal Communications Commission has apparently won without a court fight what was widely regarded as an almost-sure obscenity test case, in an action against WGLD-FM, Oak Park, Illinois. Sonderling Broadcasting, the licensee, announced that material cited by the FCC would be dropped, and there were indications that Sonderling would pay the $2000 fine, assessed by the FCC, without contest.

The material cited was in a so-called "topless radio" format with the announcer taking calls from the audience. Responding to "How Do You Keep Your Sex Life Alive," some callers very explicitly described oral sex and were coaxed by the announcer for details and their feelings about them. Most observers believe the material would have been adjudged obscene in court.

The FCC's authority to move against obscenity was questioned by Commissioner Johnson, who thought the matter should be left to the courts.

Meanwhile, the FCC has opened an inquiry into obscenity on cable, in response to complaints from the viewing public (Docket 19716). And Chairman Burch of the FCC blasted titillating sex talks as "electronic voyeurism" at the recent NAB Convention, while the NAB has strongly urged members to drop such material. Storer Broadcasting, in apparent response, dropped its syndicated program, "Feminine Forum." Storer said its material was in good taste, blamed imitators for the vulgarity that riled the public.

Canon k-35 Macrozoom lens wins Academy of Motion Picture Arts and Sciences Award Citation because of its ability to permit extreme close-up photography in addition to normal and extended zoom functions. Perspective control of foreground and background is possible. Posing at the award reception are Dr. Takeshi Mitaria, chairman of the board and president of Canon Inc. (center right), Keiichiro Ryu, exporter of the lens (center left), Wilton Holm, Motion Picture and Television Research Center (far right), and Ed DiGiulio, Cinema Products, U.S. distributor (far left).

Round X: CPB and PBS Are Still In The Ring

The battle between the Corporation for Public Broadcasting and the Public Broadcasting Service over control of programming in public television went through several more turns, with more still likely by the time this sees print. Developments up to press time included a restructuring of PBS to make it the national negotiating body for the 250-odd local public television licensees around the country, able to give the ideas of the locals proper weight in national programming and use of network facilities. At the end of March, CPB and the new PBS sat down together and reached an apparent compromise on outstanding issues. But then the board of CPB, reportedly under pressure from the White House's Office of Telecommunications Policy, rejected the agreements and appointed a new negotiating team to get "tougher" with PBS, Thomas B. Curtis, president of CPB and principal architect of the agreements, resigned. Which puts us right back where we were. Watch out for Round X!

TPT, Scientific-Atlanta, To Show Satellite Link

The TelePrompTer Corporation and Scientific-Atlanta, Inc., will join forces at the National Cable Television Association meet in Anaheim, California, June 17-20 to demonstrate, if the FCC approves, satellite distribution of program material to cable systems, according to announcements from both companies. The receive-only earth station to be used has been designed and built by Scientific-Atlanta; it is mounted on a trailer-truck and, following the Anaheim meet, will travel around the country for other similar tests and demonstrations. The Anaheim demo, according to the plan, will use the Canadian domestic satellite, ANIK-1, to relay signals from east-coast U. S. to the mobile earth sta-

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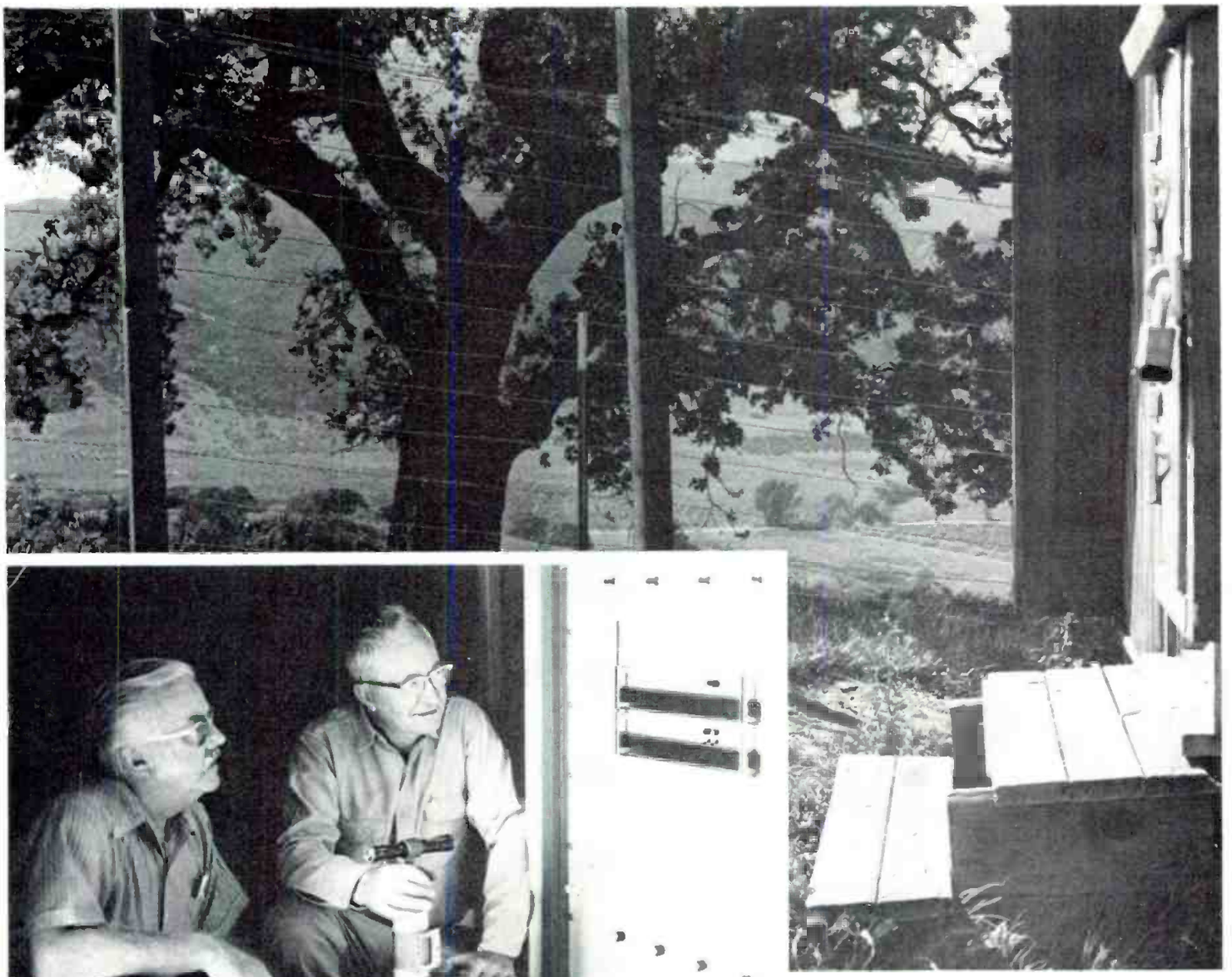

BUSY BEAUTY SPOT FOR SPARTA

The sunny, oak-clad Vaca Hills surround this transmitter site, but there's nothing else sleepy about this bustling area between San Francisco and Sacramento. Within view of the Sparta 602A FM Transmitter lies Travis AFB, where our returning Vietnam POWs first touched their native soil. The Sierra Nevada brings heavy San Francisco Bay Area traffic to I-80, below, both summer and winter. This area is growing, and builder Don Reeves (left) is planning for the future.

Don has been associated with construction of ten stations in his nearly 30 years in radio, and was given the huge Broadcast Coordinator's job for the 1960 Winter Olympics. Consulting Engineer Cecil Lynch has worked with Don on many of those projects, including the mammoth Squaw Valley one.

Yes, these men know radio, and its future in busy Northern California. After five years experience with Sparta equipment at KPOP-KPIP in Roseville, Don and Cecil picked Sparta again for this new venture . . . complete Showcase studio outfitting and the 602A Transmitter with the all new 680 Exciter and 682 Stereo Generator.

To their listeners they're KUIC. To us they're Don and Cecil.

SPARTA, the 'just right' company. Small enough to be first name friends . . . big enough to offer EVERYTHING. Call us. Collect.

NEWS

tion. The station includes the elecronics for processing and feeding the material into a cable system, as well as a 25-foot maneuverable dish antenna.

TPT Chairman R. P. Shafer said: "Early use of the domestic satellite system is essential to the cable industry's ability to realize . . . its great potential . . . satellite communications offer economic advantages over means presently available."

NCTA, NAB, TIO Ask For Strong Newsmen's Shield Law

In representations to Congress and in public addresses, industry leaders are supporting enactment of a "shield law" giving newsmen in all media an uncontestable right to keep news sources confidential. David Foster, president of NCTA, urging enactment of such a law for cable newsmen as well as those in other media, said: "The real issue is ensuring that the existing constitutional protections encouraging free flow of information to the American public are upheld." The National Association of Broadcasters, in a filing with the House subcommittee considering the law, said it "strongly urges passage of unqualified newsmen's privilege legislation." NAB said it knows of no cases in which newsmen impeded justice by withholding information. Rather the opposite has been true; newsmen, able to protect sources, help ferret out crime. Roy Danish, director of the Television Information Office, in a speech marking the 20th anniversary of KOLN-TV in Lincoln, Nebraska, predicted that, unless a shield law is passed, "we will see much less of investigative reporting . . . the news will, more and more . . . be a warmed-over hash of the government releases on the other."

TV Advertising Hit A $4 Billion Record in 1972

Advertisers paid the television industry $4,110,000,000 in 1972, an all-time record, according to Television Advertising Bureau, summarizing figures released by McCann-Erickson. That was 14% over 1971's $3,590,000,000, and the first year the total topped $4 billion. Every segment of television was up: network by 12%, spot TV by 14%, and local TV by 20%. Most other major advertising media were also

continued on page 10

You may not know us . . .

but you do know them!

Bartell Broadcasting • Metromedia

McLendon Broadcasting • Sparks Broadcasting

WXON-TV Detroit • WWJ-FM Detroit

These well known broadcasters have reputations to maintain . . . reputations built on solid service. They can't afford second best when it comes to engineering. That's why they've turned to ASI for the kind of engineering excellence they demand . . . an excellence born of our commitment to the broadcast industry in seeking new, imaginative and effective approaches to its problems. ASI is unique in that it was founded by a group of people like you . . . people who are broadcasters themselves . . . people who are conversant with the problems you face every day. That's why ASI takes the total approach when it comes to the design of its products and services. Whether it's one of our standard units, or a custom designed system, all ASI products have been created with both the engineer and the programmer in mind.

No product is added to our line unless and until we are convinced of its operational ease as well as its technical excellence. Our engineers speak the programmer's language too. So you won't get a lot of double talk . . . what you will get is straight answers. This philosophy has led us to some rather unique solutions to some pretty perplexing problems . . . So is it really important that you may not know who we are? You know our clients and now you know our philosophy which, if you stop to think about it, probably parallels your own ideas about what a company like ours should be. When you get right down to it, you've known us all along. Now we'd like the privilege of knowing you. Call us in Detroit at (313) 353-7555 and get a company of broadcasters to solve your problem.

- **Equipment Design**
- **Custom Systems**
- **Installation and Maintenance**

26935 W. ELEVEN MILE • SOUTHFIELD, MICHIGAN 48076
(313) 353-7555

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NEWS

higher in 1972, with newspapers up 11%; business papers, 7%; radio, 6%; magazines, 6%—but none topped television's 14% increase.

Armstrong Awards Go To Eight FM Stations

The annual Armstrong Awards for excellence and originality in FM broadcasting, presented March 24 at the National Association of FM Broadcasters Convention in Washington, divided $4000 in prize money among eight FM stations. In the commercial division the winners were: WFMT, Chicago, for "The Studs Terkel Program;" KHQ-FM, Spokane, for "An American Youth Culture;" KSAN, San Francisco, for "Fillmore Weekend;" and WBCN, Boston, for "The Election: Nixon 49, America 1."

Non-commercial winners were: WMUK, Western Michigan University for "Abortion Special;" CBL-FM, Toronto, for "The Oceans;" WITF-FM, Hershey, Pa., for "RVW—A Musical Biography;" and WBUR, Boston University, for "Kids Talk," a series.

ABC Buys Four RCA Video Cart Machines

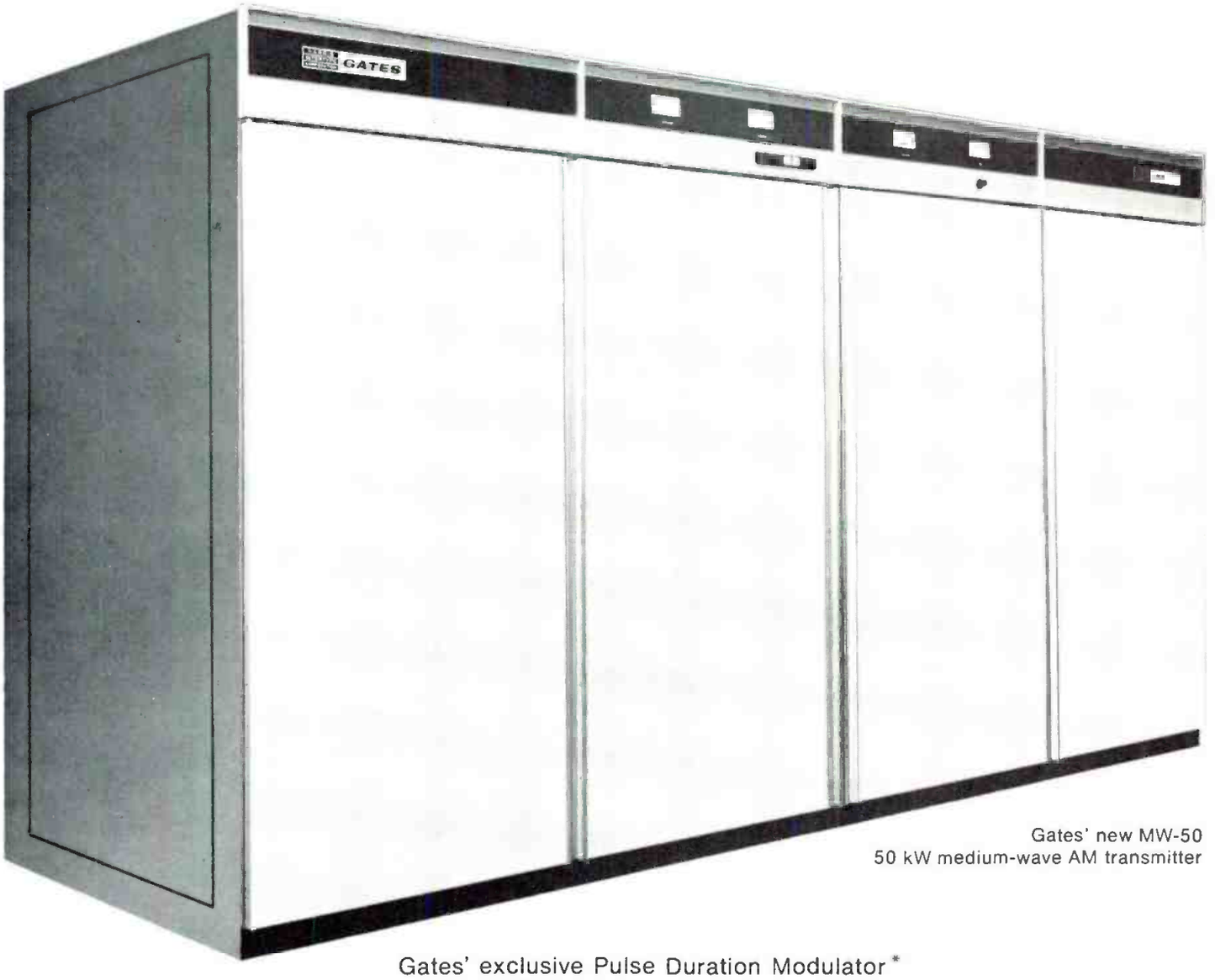
RCA announced that the American Broadcasting Company has signed up for four of the RCA TCR-100 automatic video cartridge systems, an order totaling approximately $900,000. Two of the machines are for WABC-TV, New York, and one each for WLS-TV, Chicago, and WXYZ-TV, Detroit. RCA also said that shipments of the TCR-100 reached 100 units early in the spring.

CBS Prexy Taylor Hails Radio's "Genius For Change"

Radio has " . . . a really irrepressible capacity to adjust to new circumstances, new interests, new conditions," said Arthur R. Taylor, president of the Columbia Broadcasting System, in an address at a New York meeting at which station KCBS, veteran San Francisco broadcaster, got the Mike Award of the Broadcast Pioneers group. "Today radio is still the most ubiquitous and the most immediate of media. . . more news and discussion programs . . . more community service . . . and a healthy pluralism . . . It has

continued on page 13

We threw away the 50 kW modulation transformer and reactor... With PDM*, who needs them!



Gates' new MW-50
50 kW medium-wave AM transmitter

Gates' exclusive Pulse Duration Modulator* System is 90% efficient. That's why Gates' new MW-50, 50 kW medium-wave transmitter operates at greater than 60% overall efficiency. With greater reliability, greater frequency response, and lower power consumption than any other AM broadcast transmitter in the same power range.

There are other reasons why the MW-50 is superior. Like the use of only 5 tubes (in just 3 tube types) in the entire transmitter. And 130% positive modulation capability.

If you'd like to hear the whole story of the MW-50, write Gates Division, Harris-Intertype Corporation, Quincy, Illinois 62301.

HARRIS
GATES DIVISION
Quincy, Illinois 62301, U.S.A.

Circle 108 on Reader Service Card

With our mono recorder you get the low end of our line. Not the short end of the stick.

If you've heard our 24-track recorder, you've heard our mono, two and four track units—they're like peas in a pod.

Because while our new low end Series 79 mono, two and four track Professional Audio Recorders are priced like the competition, they're built like our high end eight, sixteen and twenty-four track machines.

You get the same Isoloop® differential drive transport, with its extremely low flutter and wow, automatic tape tensioning and easier editing.

The same electronics, with built-in overdub, three selectable speeds and state-of-the-art signal-to-noise ratios and frequency response.

The same dc servo capstan with external input to enable the use of synchronization and resolving equipment.

Even the same convenient, high-performance options: A synchronizer/reader for instant sound sync. Selectake® for automatic tape positioning. Remote transport controls. A 5 to 45 ips variable speed control. And an update kit for adding more tracks to the mono or two track units.

At their new prices, the 3M Series 79 mono, two and four track recorders are more than competitive for mastering, mixdown, editing or station automation. We don't give you less machine when what you want is fewer tracks.

For the full price and performance story, contact one of the listed dealers or Professional Audio Products, 3M Company, 300 S. Lewis Rd., Camarillo, CA 93010. Ph: (805) 482-1911. TWX:910-336-1676.

We've been there. And brought the answers back.

3M COMPANY

Circle 109 on Reader Service Card

NEWS

been the genius of radio to recognize quickly the need to change and when to change."

News Briefs

Cox Broadcasting—For the year ended December 31, 1972, record revenues of $77,281,437 and earnings of $10,101,587—the latter up 24% from 1971 . . . **Zenith Radio Corporation**—Sales for 1972 were a record $796 million, 30% over 1971, and earnings also a record at $48.6 million, up 55% from 1971. . . . **San Juan Racing Association**—For the third quarter ended January 31, 1973, revenues of $5.4 million and earnings of $914,000, including both broadcast and racing operations . . . **CCA Electronics Corporation**—For the year 1972, sales $5.8 million, earnings $610,000, against $5.4 million and $661,000 in 1971. . . . **Gulf and Western Industries**—For six months ended January 31, 1973, record sales of $893 million and earnings of $42.2 million, the latter up from $33.2 million a year earlier.

Telcom, Inc.—For six months ended December 31, 1972, revenues of $3.3 million and earnings of $90,104, up from $2.6 million and $75,575 a year earlier . . . **Fairchild Industries**—For year ending December 31, 1972, sales of $229,986,045, and earnings $6,187,112 . . . **Theta-Com** announced agreement to supply KCA Cable TV Industries, Puerto Rico, with bill of materials covering about 1000 miles of cable plant . . . **RCA** will build for the U.S. Air Force an airborne TV system that can freeze individual frames, provide data for instantaneous inflight analysis . . . **Ampex Corporation** sold to WCKT, NBC affiliate in Miami, two AVR-1 VTRs and two ACR-25 video cassette systems.

Broadcast Products reported installation of their AR-2000 automation system by WMAL-FM, Washington, and WVIA-FM, Scranton . . . **C-Cor Electronics** moved executive and research functions to greatly expanded facilities, totaling 10,000 square feet, in Science Park, State College, Pa. . . . **Times Wire and Cable Company** announced building of two new manufacturing plants, one of about 100,000 square feet in Meriden, Connecticut, and one a 40,000-square-foot addition to their Phoenix facility.

Century Strand, Inc. has moved headquarters to an expanded plant

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NEWS

at 5432 West 102nd St., Los Angeles . . . **Net Television, Inc.** reported a plant production record for one week with duplication of 611 hours of TV programming.

People

William H. Willis joined Jerrold Electronics Corp. as MSO account executive . . . **Dean A. Bussart** was named general manager of Gulton Industries (Canada) and its subsidiary, EV of Canada . . . **Brian Wills** became manager of Cetec's new European branch, with headquarters at High Wycombe, near London.

James M. Rupp will become vice president and general manager of Cox Broadcasting Corporation's broadcast division, on the retirement of **Frank Gaither,** June 30th . . . **William Siemering** was appointed station manager of public radio station KOCM-FM in Moorhead, Minnesota . . . **Jack L. Williams** became vice president in charge of programming for Television Communications Corporation.

Michael D. Barnett was advanced to vice chairman, and **Robert B. Pfannkuch** to president, of Primary Medical Communications, Inc. . . . **Ed Aiken** went from his job as program director, WNEM-TV, Saginaw, to be program manager at KPHO-TV, Phoenix; both are Meredith stations . . . **Frederick P. Cahill** has joined Warner Communications, Inc. as manager of special projects.

David Freese, formerly director of engineering for Watermark, Inc., has joined Audio Industries Corporation . . . **Jack D. Cox** became manager of Suburban Cablevision, Inc. at Morganton, North Carolina . . . **Robert E. Dod** will move up to general manager of the Alabama Educational Television Network, on the retirement April 1st of **Raymond Hurlbert.**

R. Wayne Wilson was appointed regional community development director for TelePrompTer, for the Northwest region, with headquarters at Bellevue, Washington . . . **Edward J. Kuhlmann,** formerly general counsel of the Cable Television Information Center, became a member of the law firm of Renouf, McKenna and Polivy, in Washington . . . **Lary L. Lindsey** is the new national sales manager for duplicator products of Consolidated Video Systems.

A GREAT NEW VIDEO PACKAGING PACKAGE THE VPM-41

FROM
RICHMOND HILL LABORATORIES
— THE LATEST IN THE VPM SERIES . . . MODEL VPM·41 PORTABLE VIDEO PRODUCTION SWITCHER.

- Color Capable
- 12 Effects
- 9 Inputs + Black
- Self-contained, including power supply
- All electronics integrated

The Model VPM·41 Video Production Switcher offers all of the most wanted features and options, packaged in a smart, functional, rugged case. RHL tops this all off with the high reliability of MICRO SWITCH totally solid state video switches from Honeywell.

This entire switcher package is backed by the Full Three Year RHL Warranty and is available at a very attractive price.

BE SURE. BUY RELIABILITY. SPECIFY. . .

rhl

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Clark, N J. 07066
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Telex: 138245

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The New CP-16/A (with Crystasound).

RADIO 970
POST OFFICE BOX 1000

WAVE
LOUISVILLE, KENTUCKY 40201

TV CHANNEL 3
(502) 585-2201

October 6, 1972

Mr. Norman L. Bleicher
Operations Manager
Victor Duncan, Inc.
11043 Gratiot Avenue
Detroit, Michigan 48213

Dear Norm:

Thank you for your letter of September 13, 1972.

You mention four areas for information relative to news work, using the CP-16/A, and they are as follows:

1. I feel that the CP-16/A is the best news camera on the market today. All of our news reporters feel the same way. It is extremely portable and we are able to shoot pictures much as we do with our Bell & Howell or Bolex cameras.

   I have designed a small "U" shoulder pod of aluminum, padded with rubber, for use with the camera. The light weight of the camera, "U" pod and magazine make for quick and easy shooting, with comfort and ease for the cameraman as well.

2. As to use under adverse conditions, the camera has performed very well in inclement weather and I see no reason why it should not be the same in the winter as in the summer.

3. Service has been the best. Both you and Cinema Products Corporation have been in close touch with us and we are very pleased with the quick service we are getting.

4. News of Interest: In addition to the shoulder pod, I have installed a Sennheiser MKH-815 shotgun microphone, with a shock-proof mount, on top of the CP-16/A camera. The camera is so quiet that the 815 mike does not pick up any camera noise. With no cables and no power pack to get in the way or restrict your movement, the cameraman can really move in and around, getting the right position to get the best picture. He becomes a part of it all.

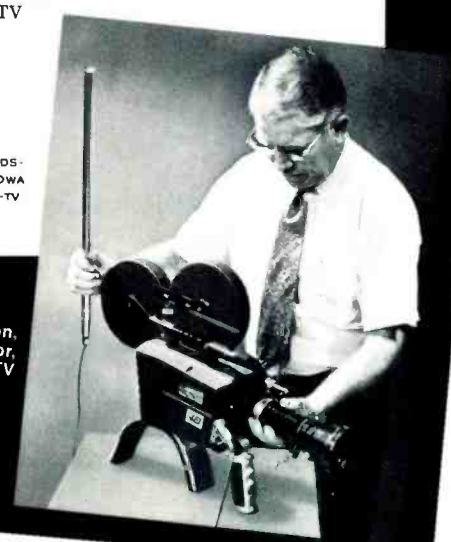
The enclosed photographs may be of some help to explain the "U" pod and the shotgun mike. The cameraman is Larry Sales, a reporter here at WAVE News. The other guy holding the camera and mike happens to be me.

In summing up, I am happy to say that we are very pleased with our two CP-16/A cameras (even the price) and I am looking forward to getting another in the very near future.

Sincerely yours,

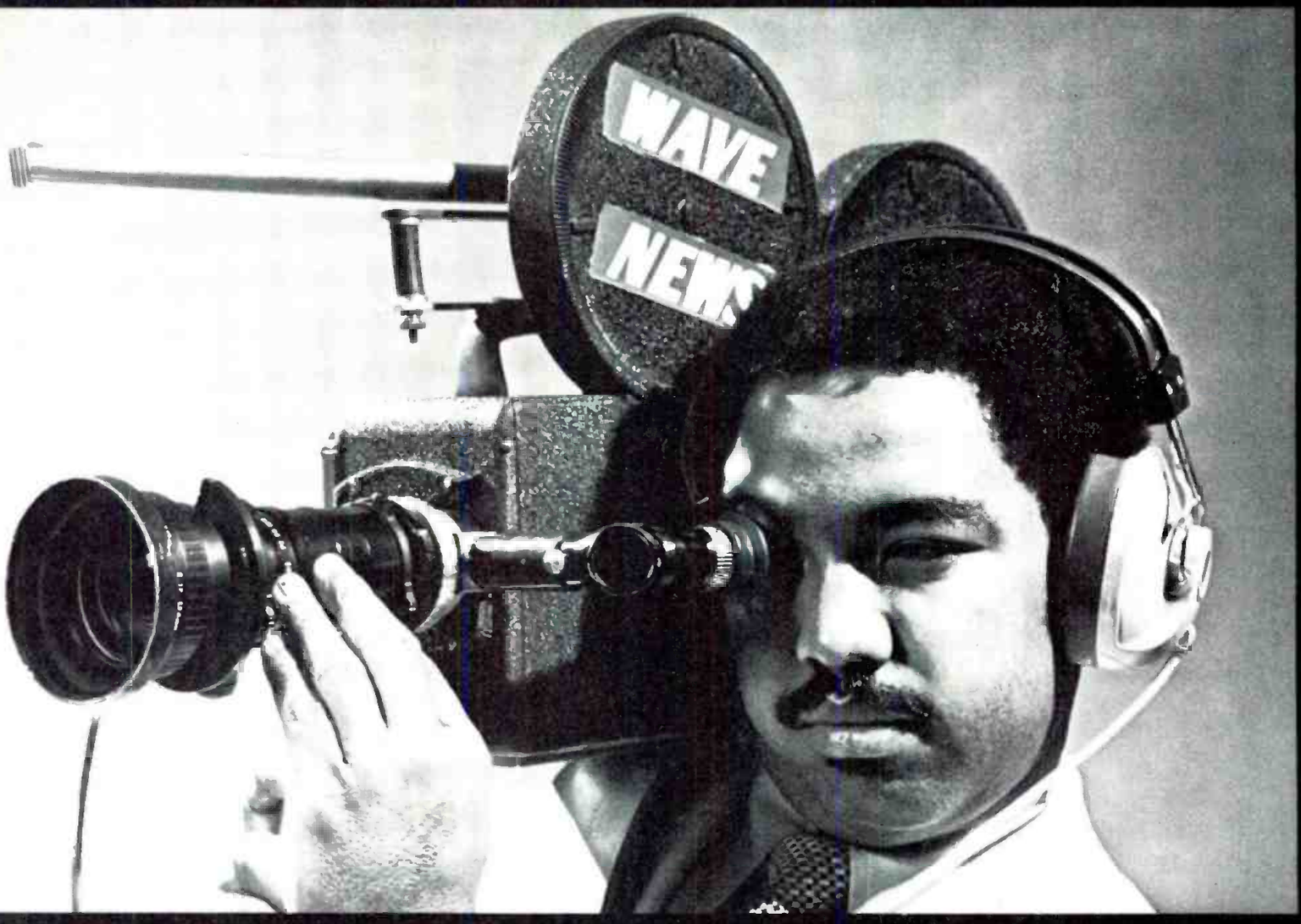
Edward E. Thompson
Newsfilm Director
WAVE-TV

EET:jk
Enclosures

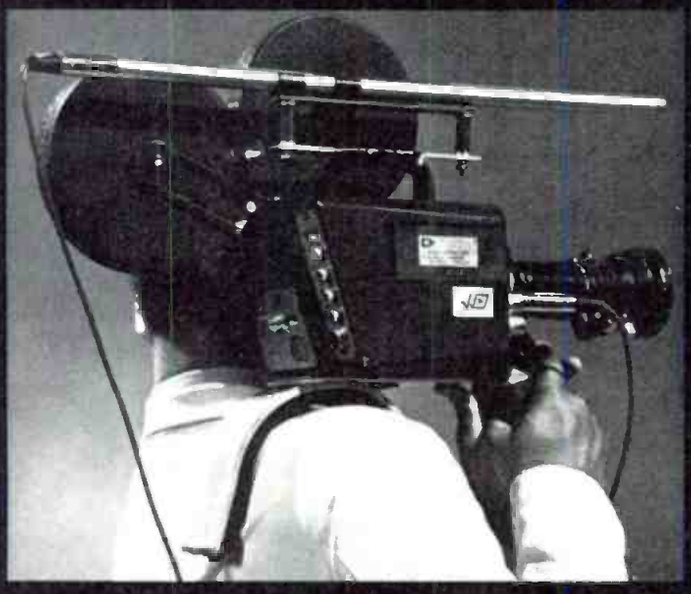


Mr. Edward E. Thompson,
Newsfilm Director,
WAVE-TV

A Cameraman's Kind of Camera.



Mr. Larry Sales, TV-Newsfilm Cameraman, WAVE-TV



To arrange for a demonstration of the all new CP-16/A (with Crystasound recording system) or CP-16 cameras, contact your local professional sales/rental dealer.

For further information, please write to:

cinema products CORPORATION

Technology In The Service Of Creativity

2044 Cotner Avenue, Los Angeles, California 90025
Telephone: (213) 478-0711 ■ Telex: 69-1339 ■ Cable: Cinedevco

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INTERPRETING THE FCC RULES & REGULATIONS

TV/Cable Cross-Ownership

In a lengthy "Opinion and Order," reconsidering its *Second Report and Order in Docket No. 18397* (released June 24, 1970), the Commission reaffirmed its intention to actively effect the provisions of Section 76.501 of its February 1972 Rules prohibiting broadcast-cable cross-relationships. In effect, these provisions do two things. First, they prohibit *ownership, operation, control,* or *interest* of a cable television system with 1) a national broadcast television network; 2) a co-located television broadcast station; or 3) a co-located translator station. Second, they require divestiture of such prohibited cross-relationships by a date certain.

Specifically, Section 76.501 reads as follows:

(a) No cable television system (including all parties under common control) shall carry the signal of any television broadcast station if such system directly or indirectly owns, operates, controls, or has an interest in: 1) A national television network (such as ABC, CBS, or NBC); or 2) A television broadcast station whose predicted Grade B contour computed in accordance with Section 73.684 of this chapter, overlaps in whole or in part the service area of such system (i.e., the area within which the system is serving subscribers); or 3) A television translator station licensed to the community of such system.

b) The provisions of paragraph (a) of this Section are not effective until August 10, 1973, as to ownership interests proscribed herein if such interests were in existence on or before July 1, 1970 (e.g., if a franchise was in existence on or before July 1, 1970): *Provided,* however, that the provisions of (a) of this Section are effective on August 10, 1970, as to such interests acquired after July 1, 1970.

Responding to Petitions and informal requests for reconsideration of Section 76.501 of its *Second Report* by some 25 broadcast interests, the Commission divided its discussion of such pleadings into two parts. First, it challenged and refuted contentions by TV interests that *subsequent acquisitions* of cable interests should be allowed. Second, it appeared to be more responsive to claims by TV interests that their *currently-owned* CATV interests should not be subject to mandatory divestiture.

Subsequent Acquisition of Cable Interests

The Commission appears to be taking a hard line against subsequent acquisition of CATV interests by the networks, co-located TV stations, and co-located translator stations. Premised in its belief that diversification of control of the channels of mass communication is manifestly in the public interest, the Commission asserted that its cross-ownership Rules should continue in force. Citing *Television Factbook* (1972-1973 Edition, p. 75-A), it found that broadcasters held ownership interests in some 37.9% of the country's 2839 cable systems as of March 30, 1972, and seeks to arrest this growth. In effect, the Commission is working to avert the problem it heretofore incurred in its treatment of cross-ownership issues re: 1) radio/television/national broadcast networks, and 2) newspapers/broadcast stations in the same communities and market areas. The Commission appears determined not to let history repeat itself. It posits its strong posture against further cross-relationships on the premise that, although temporary exceptions are occasionally warranted, cross-media control is *generally undesirable.* Based upon the past history of other media, it feels that the trend is, and will continue to be, inexorably towards cross-media control of cable television. As such, the Commission feels that the time to halt this trend is *now,* lest TV interests become entrenched with cable ownership and operations to the point that cross-media control would become irreversible.

Moreover, the Commission refuted contentions by TV interests that, in terms of services and financial assistance, TV stations could greatly assist in the development of CATV. In particular, it came down hard on what could well develop as an incestuous relationship between co-located cable systems and television stations. The Commission feels that the implementation of cable's vital services—"to carry

continued on page 20

for consistent colorimetry

Why all the splash about this newest feature of COHU's Model 1500 Color Film Camera? Instant Black Paint is the broadcast engineer's indispensable assurance for consistent video excellence and that's a resource of quality worth recommending. When film or source colorimetry requires refinement, COHU Black Paint allows the option of fingertip accessibility to program temporary adjustments. Convenience is the key and preset color balance is restored for normal operation by only the touch of a button.

The Model 1500 is already recognized as a popular standard for reliability and color fidelity. The addition of Black Paint is COHU's way of delivering to you the best in broadcast performance at no increase in price. You expect more from COHU, and you get it.

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SAN DIEGO CALIFORNIA

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or not carry certain distant stations, to offer program origination or not, to move speedily or at the slowest pace permitted to develop access channel facilities and encourage their use"—all could affect the audience and earnings of co-located television stations. Also, it is not convinced that financial investment by co-located stations is either necessary or beneficial for the development of cable. In brief, the Commission sees the growth of cable systems, in both size and services, to more likely be inhibited than enhanced via common control with co-located television stations.

The Commission also refused to exempt UHF television stations and ETVs from the general applicability of Section 76.501. Regarding UHFs, the Commission stated that its sole basis for relaxing the cross-ownership ban rests on the *contribution* that broadcasters could make to the development of cable in their service areas. As such, it felt that a Rule which would permit the class of TV stations with the *least* to contribute to such development, but which would preclude entry by those TV licensees with the *most* to contribute, would confer an undue competitive advantage to the "Us" over the "Vs." In addition, the contention by certain struggling UHF stations that cable ownership would buoy them financially is chimerical. With the great financial unknowns in the development of major-market CATV cable ownership may well become a drain, rather than a source, of funds for UHF services. The Commission states that, if the UHF station enjoys the resources to contribute to the development of cable services, it, therefore, should be accorded no preferential treatment over VHF stations of similar financial standing.

Neither does the Commission see any reason for deleting the present ETV-cable local-cross-ownership ban of Section 76.501. It regards the contention by ETV interests that cross-owners could coordinate the programming activities of the ETV station and the cable system to be specious. For justification, it cites the same "service" arguments it utilizes in its cable/local commercial television cross-ownership statement. It also appears to feel that like UHFs, ETVs entering cable ownership would be taking grave financial risks that could adversely affect their current operations.

In sum, the Commission is standing firmly behind its cable/TV cross-ownership provisions in Section 76.501. It reaffirms the basic precepts of same and appears particularly adamant upon arresting any *further* acquisition of CATV properties by TV interests.

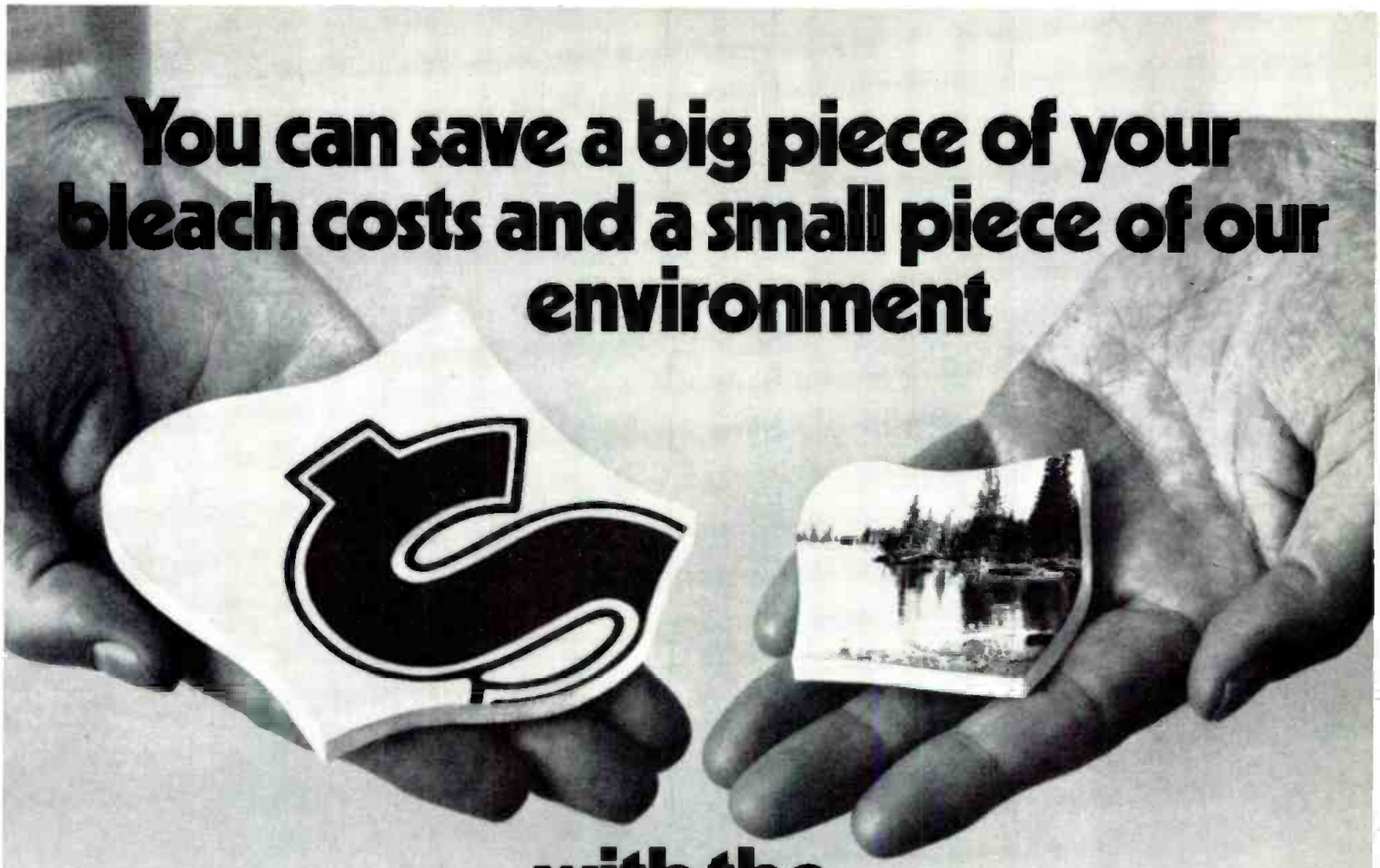
Mandatory Divestiture of CATV Interests

The Commission is clearly less adamant in rigidly enforcing its requirement of mandatory divestiture (see Section 76.501 (b)) of existing cross-relationships than it is in enforcing its Rules prohibiting the subsequent creation of such cross-relationships. Indeed, it cites *Timken Roller Bearing Company* v. *U.S.*, (341 U.S. 593, 603 (1951)), which states:

> Divestiture . . . is not to be used . . . where other effective remedies, less harsh, are available.

continued on page 22

You can save a big piece of your bleach costs and a small piece of our environment



with the Hunt Cine Color Bleach Regeneration System.

Would you believe over a 20% saving on bleach costs? You should, because Hunt has developed the unique, low-cost Hunt Cine Color Bleach Regeneration System. It's reliable, easy to use and completely free of complicated procedures.

The system is based on reuse of your Hunt Cine Color Bleach overflow. By restoring the active bleaching agent. And that means your need for "new" bleach is drastically reduced.

Pollution abatement is another valuable benefit you get from the exclusive Hunt Regeneration System.

Professional laboratories and TV news departments will probably find that the most satisfying part of the Hunt System is its simplicity. All you need is a collection tank for the bleach overflow, the Hunt Cine Color Bleach Test Kit and Bleach Regeneration Chemistry.

This "uncomplicated," low-cost bleach regeneration system is only one reason why you should join the ranks of professionals using Hunt Cine Color Chemistry for processing Ektachrome films.

If you want to do something about lowering your bleach costs, and saving a piece of the environment, you should call a Hunt branch or sales office.

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FCC Rules & Regs

It also cites Section 76.251 of the February 1972 Cable Rules (*Cable Television Report and Order in Docket No. 18397,* 36 FCC 2d 143), which requires all major-market cable television systems to provide, by March 31, 1977, 1) public access; 2) education access; 3) local government access; and 4) leased access non-broadcast channels on a non-discriminatory, no-control-over-content basis. Said the Commission:

> Although this recent development is not sufficient to alter our basic view regarding the provisions of Section 76.501, it does suggest that there may be several more station-system local-cross-ownership situations than we had previously anticipated in which the balance of relevant considerations now weighs in favor of a waiver of the mandatory-divestiture requirement.

Consistently, it invited petitions for waiver of the mandatory-divestiture requirement (fully supported by pertinent facts, views, arguments, and data) from all cross-owners et al of co-located television stations and cable systems that believe "grandfathering" would be appropriate in their case. The final date for filing of said petitions is June 1, 1973. In effect, the Commission is seeking information upon which it can formulate a "rational and consistent" policy for issuance of such waivers. Although it did not specify the grounds for waiver which it would find acceptable, the Commission did state that a finding which would both 1) serve the underlying objectives of Section 76.501, and 2) avoid unnecessary hardship upon the TV interests would be sufficient to warrant waiver.

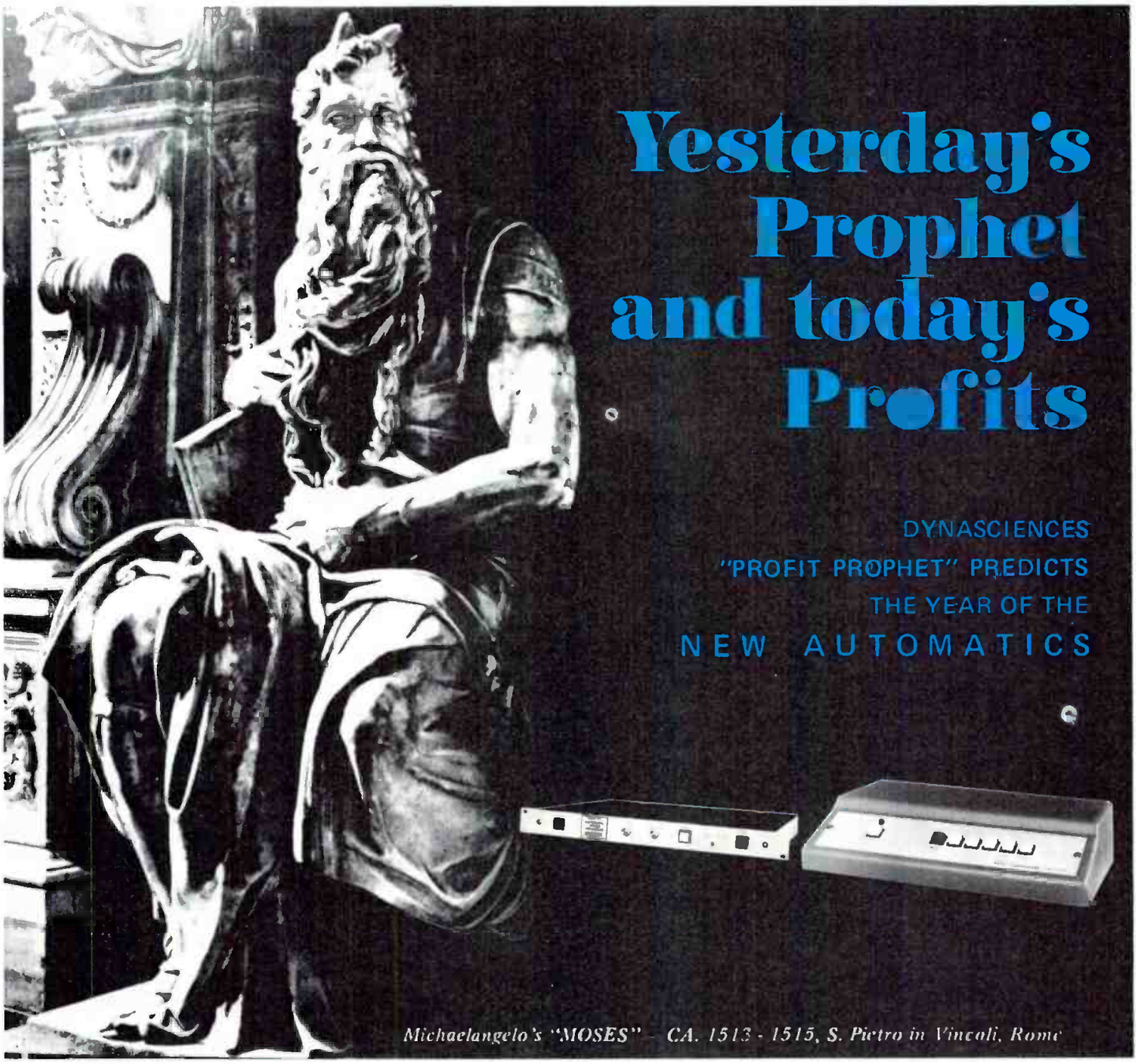
More specifically, the Commission indicated the relevant criteria which it would consider in justifying a waiver. They include:

> 1) The extent of financial loss the cross-owner would suffer as a result of mandatory divestiture; 2) The impact of the station/system cross-relationship upon economic competition of media in the service areas of the station and systems in question; 3) The impact of such cross-relationships upon diversity of control of media of expression in the service areas in question; 4) The quality of service which the system has been providing (regarding broadcast signal carriage, local origination programming, technical quality and reliability of the system, etc.), and the extent to which such system has been enhanced or impaired, by the cross-relationship.

The Commission asserts that these criteria are merely illustrative, not exhaustive, of relative criteria it will consider. Note: Where a waiver of the mandatory-divestiture requirement is granted, the petitioner's interests in the affected television station and cable television system may not subsequently be transferred to a new holder without prior Commission approval.

Perhaps most importantly in this "reconsideration," the Commission has *extended* the grace period for divestiture of prohibited cross-ownerships, et al, from August 10, 1973 until *August 10, 1975.*

Clearly, the Commission, in reconsidering its *Second Report and Order in Docket No. 18397,* is taking a firm stance against future development of TV/cable cross-relationships. Yet, in doing so, it indicates a certain relaxation in its treatment of the mandatory-divestiture requirement of such existing cross-relationships. **BM/E**



Automatic Image Enhancer
Model 875

DEFINITELY NOT A PRODUCT OF THE PAST . . . Automatically maintains picture sharpness . . . comb filter . . . coring . . . threshold control on front panel permits adjustment of amount of pre-enhancement required to inhibit local signal enhancement . . . may be used as Automatic or Standard.

Auto–Controller
Model 1100

PROFITS! . . . An adjunct to Dynasciences Editor-Programmer . . . minimize and simplify the repetitive operations involved in tape-to-tape editing . . . save time . . . reduce operator errors . . . permits tape editor to focus attention on the critical selection and refinement of the edit point locations . . . augments centralized remote control of recorder and playback VTR's, automatic rewind to pre-roll position on both machines, remote control of tone pulse recording, and automatic preview of edit points.

IF . . . you would like to know more about how our "Profit Prophet" can help you, write:

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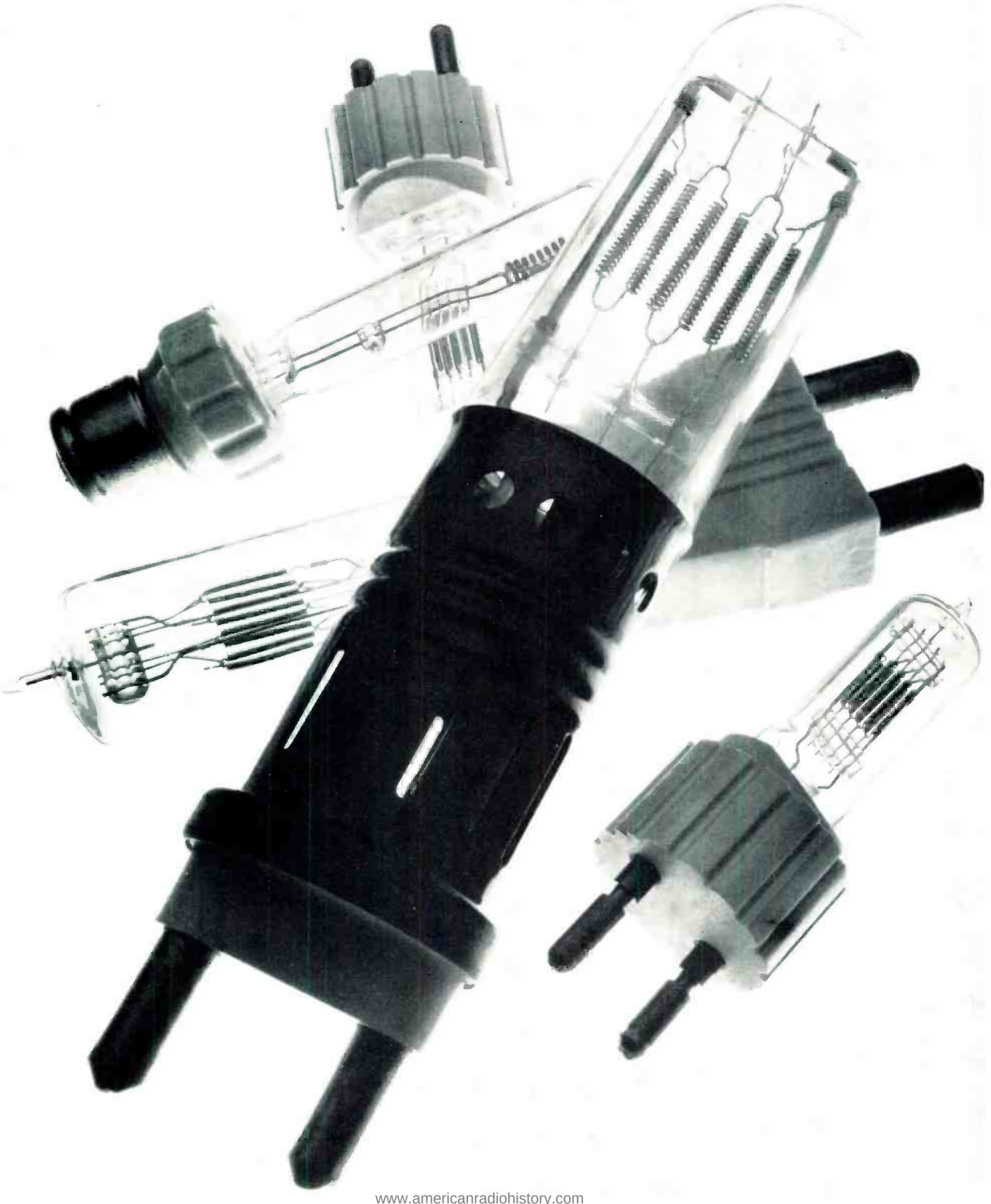
Telephone: (215) 643-0250 • Telex: 84-6358

Circle 118 on Reader Service Card

Some of our substitutes for those big, fat incandescents.



Some of our substitutes for our substitutes.

Those big, fat incandescents blessed the world with a lot of big, fat fixtures and sockets.

So after we came up with our skinny, little tungsten-halogen lamps, the first thing we had to do was set them up on big, fat bases so that they'd fit the old sockets.

Which meant developing a complete line of Substitution Lamps. (You see some of them at the left.)

But soon new fixtures arrived on the scene. These took full advantage of the inherent small size of Sylvania tungsten-halogen lamps.

(Which, by the way, outlast the fat incandescents about 3-to-1, don't blacken and lose brightness with age, and don't fall off in color temperature.)

For the new fixtures, we developed a complete new Standard Line of tungsten-halogen lamps, like the ones on the right.

Whenever studios replace their old fixtures with new ones, they can substitute our new lamps for our Substitutes.

Which is OK with us.

Because both of these lines are so much better than the old lamps, that no matter which our customers use, we feel we've done them a world of good.

And there's just no substitute for that.

We have a brochure on each line. For your copies, write to: Sylvania Lighting Center, Danvers, Massachusetts 01923.

GTE SYLVANIA

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Largest—Ever NAB Convention Witnesses Turning Point in Technology and Regulation

- Helical VTRs challenge quad for first time as digital time base correction technique leapfrogs mechanical transport limitations.
- Digital techniques are used in special effect generators and dominate control circuitry.
- Era of digital transmission coming.
- Workable business programming coupled with computer nets give management access to digital computers; bandwagon rolls.
- Automated audio delivery systems go pocket-sized; consoles stress flexible modules.
- On the regulatory front, it's all roses. Radio deregulation already begun, TV next; complete overhaul of Parts 73 and 74 promised.

"A DIGITALIZED VIDEO SIGNAL CORRECTOR that will enable reproduction of broadcast quality signals from relatively inexpensive helical videotape recorders" was the way the announcement read. Savings of over 70% on tape equipment was hinted at. But to see it, you had to go to Suite K708; Consolidated Video Systems applied too late to get a booth. The K-wing in the Sheraton Park is not the easiest place to find, but soon all one had to do was follow the crowd. Word spread quickly—"it's revolutionary," "mind boggling," "biggest thing since the introduction of the VTR itself,"—it was certainly the hottest item since the cartridge VTR unveiling in 1969.

Those superlatives describe a time base corrector with an exceedingly wide window—one about 30-times greater than other TBCs. Thus it can work with a wide variety of VTRs. The only connector between the recorder and the CVS 500 TBC is the video output of the recorder. How does it work? The composite video signal from the VTR is converted to digital pulses and stored. It is subsequently processed *in time* against "house" sync (or the built-in EIA sync generator), and *in quality* by stripping and reinserting burst information. It locks up in milliseconds. Remarkably, it does this entire analog-to-digital conversion and the signal processing at a cost of $8750.

That the industry is indeed moving into the era of the helical recorder, and that the quad is no longer the only recorder that can be used by broadcasters, was in ample evidence at the 1973 convention. IVC has already penetrated the quad market for several years with its IVC-960 NTSC color recorder/reproducer with insert and assemble editor, etc. During 1972 it announced the VCR-100C NTSC videotape cartridge recorder and demonstrated it at the NAEB Convention in Las Vegas last November. Extending this cartridge technology, IVC hit the NAB show with a complete broadcast cartridge system, the BCR-200, which includes up to ten playback decks and two record/playback units along with a 12-event programmer and other accessories (including IVC-4102 NTSC color time base corrector). This system was ready to compete with the RCA TCR-100 videotape cartridge recorder and the Ampex ACR-25. In fact, it can do more since one-hour tapes can be played. The 12-deck system (with TBC) is priced at $99,000; the six-decker at $66,000. This is less than the quad system and the tape cost is less. Head wear is guaranteed for 2000 hours.

Topping the introduction of the helical automation unit was a special evening presentation by IVC which announced the forthcoming IVC-9000 helical scan VTR for full broadcast applications. This new system, being jointly developed with European partners—Rank in Britain and Thomson CSF in France—is expected to replace quadruplex transverse VTR as the universal standard.

The IVC-9000 is described as combining in a single machine all of the best features of the helical transport and current electronic circuitry. Result is a full broadcast standard in a package that is less expensive initially and one with a far lower operational cost. The unit uses two-inch tape for its strength and transverse rigidity. By using two heads, scan length is only 5¼ inches, compared with the usual 30 inches. Guiding and tracking is easier to accomplish with existing edge-slitting tolerances. Further, because

the tape wrap is 180 degrees, tape-to-head contact at entry and exit points is less abrupt and much longer head life is expected—up to 3000 hours. The 19-degree track angle segments the video image into approximately 42-line increments, compared to 16 for the quad VTR. This reduces the visibility of "first-line velocity errors." Hot-pressed ferrite heads are used, giving a flat response of 18 MHz. The unit operates with a tape speed of eight inches per second, and yields a video writing speed of 1500 inches per second. Use of extra-high carrier and deviation frequencies in mod and demod reduces moiré characteristics on PAL and SECAM. The flat response helps in getting a good linear transfer of FM signals to and from the tape medium. Although the first units will be delivered in Europe, the IVC-9000 presages a new role for helical in the U.S.

Helical for broadcast use was not being played down at the Ampex exhibit as it had been in the past. Formerly signs carefully pointed out that the top-of-the-helical-line, the 7900, was for "closed-circuit applications." This qualification has been removed and Ampex officers report that sales of the 7900 for broadcast use have been substantial, particularly in Europe and Canada.

Offering broadcast level performance on one-inch tape with a helical format was Echo Science Corp. The company showed both a table-top console unit and a portable backpack unit that has been used successfully by the military for three years. Echo Science Corp. is something of a reincarnation of the old Westel Co., which showed promising units at the 1969 NAB Convention and before that in 1965. Under the Echo Science banner, these interesting products may get into the broadcasting mainstream. The WR 201C is a field-proven 38-pound (including batteries) backpack unit that measures 15-in. by 11½ in. by 6.5-in. It's a 30-minute high-band NTSC recorder with a writing speed of 1470 ips. Video scanner assembly is a plug-in module. Response goes to 4.2 MHz. Diff phase is less than two degrees; diff gain is less than 2%. Relative chrominance/luminance delay is less than 15 ns and time base stability is ±3 ns. Unit has one active audio head, but a second head is included for use if auxiliary electronics are added.

The above specs are based on playback on Echo Science's table-top unit, the 411C recorder/reproducer. This broadcast level performance unit includes standard time base correction, continuous velocity correction, insert and assemble editing, and output sync processing. Recording format uses twin heads with a 13-degree scan angle and a 3.7-inch track length.

Promising the ability to convert many helical machines to a quality

FCC Commissioner Wiley meets broadcasters.

More Deregulation Promised Despite Pressures to Curb Freedom

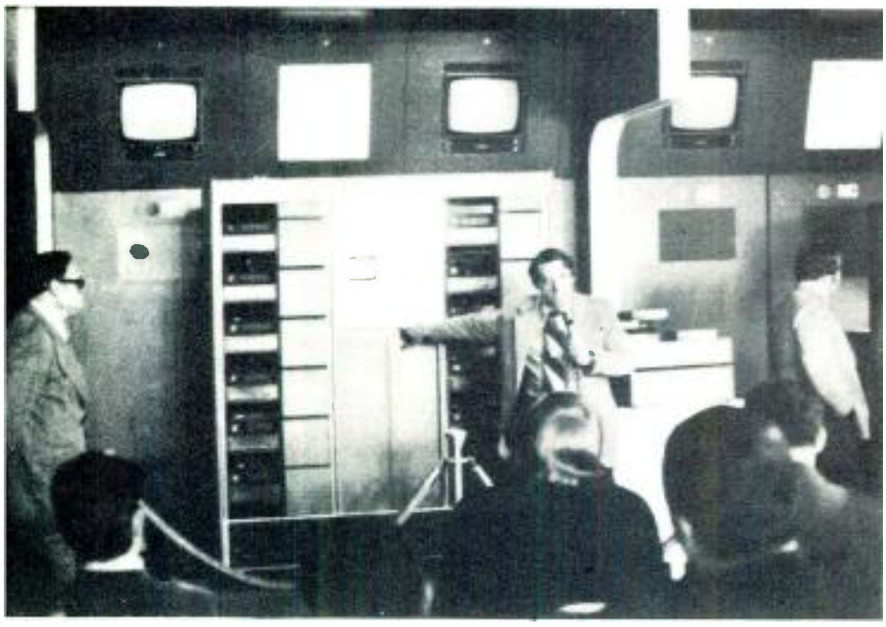
Big issues, or "challenges," as NAB President Vincent Wasilewski referred to them, faced broadcasters at NAB 1973. Sex talk programs, advertising of non-prescription drugs, counter-advertising, freedom of speech, re-regulation, and license renewal topped the list.

There was movement: the First Amendment got spirited defense as broadcaster after broadcaster affirmed that license security should not be brought by silencing the critical microphone. No one, however, wanted to defend the right to air frank sex talk shows under protection of the First Amendment. The Radio Code Board had recommended "that broadcasters take into account the sensitivities of the community they serve in determining when and how to air such programs," but after FCC Chairman Dean Burch said he had no taste for aural discussion of oral sex or other "electronic voyeurisms"—and intimated a court test over purient trash—there was no waiting to see what the polls would yield—executives immediately ordered sex talk shows off the air.*

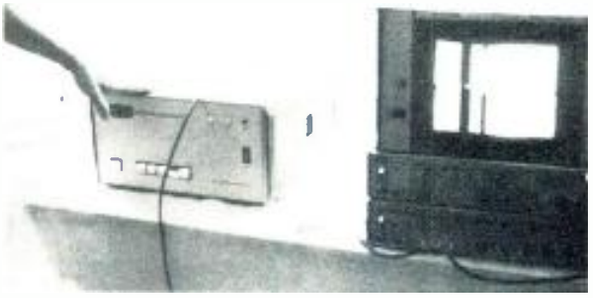
Stiffened rules for commercials on drug remedies were proposed and favorably accepted. The prescription of counter-advertising was declared bad medicine; diagnosis was it would kill the broadcast industry.

And, although Chairman Burch seemed resigned to the fact that American broadcasters were not really very good public trustees, particularly regarding children's programming and fairness, the FCC promised more deregulation: first radio and then TV. Commissioner Richard Wiley and other FCC staffers appeared at both Management and Engineering sessions seeking broadcasters' inputs and promising action. Wiley said the objective is to make rules "simpler, direct, and pragmatic," Wallace Johnson, Broadcast Bureau chief, promised support and not harassment on the part of the Field Engineering Bureau in interpreting the new rules. To the extent that equipment can be demonstrated to do a job, the demands on operators can be relaxed, Johnson and his assistant chief, Harold Kassens, intimated. "Keep those cards and letters coming," the FCC staff pleaded, in an effort to get more feedback.

*Later the FCC slapped a $2000 fine on Sonderling station WGLD-FM for discussing oral sex. The station was in no mood to go to court, however, and paid in silence.



IVC's automatic cartridge player, the BCR-200, uses a helical format.



Show-stopper was Consolidated Video's digital approach to time base correction for helical VTRs.

Television Microtime demonstrated how its TBC can work with various V-lock helicals.

Echo Science gets broadcast quality from its new helical VTR system.

acceptable for broadcast use was Television Microtime Inc. who have been developing circuitry to adapt various helicals to work with the company's Delta 44 Time Base Corrector. Putting out signals for broadcast use were the Ampex 7800 and the Sony 3650.

Quad still predominates

Lest we give the impression that helicals have literally taken over, we hasten to add that quad was still very much in control at the 1973 convention. Both RCA and Ampex conducted little theatres starring the TCR-100 and the ACR-25 respectively. RCA boasted that cartridge units in the field now number 100, and that total savings (in labor and headwheel reconditioning) from use of the cartridge may run in excess of $18,000 annually. Ampex demonstrated the 11 o'clock news show using the ACR-25 and AVR-1.

At NAB 1973, representatives of Deutsches Olympisches Zentrum (DOZ)—the 1972 German Olympics' Committee—presented an award to Ampex for its contribution to the outstanding TV coverage of the Olympics. Some 80 Ampex quad machines were used.

Quad machines were the cornerstone of camera exhibits and of tape manufacturers—3M, Memorex, and Coltape. Developments in quad are continuing. Ampex announced a new accessory for the AVR-1, namely an Editec system that handles all of the editing functions previously done by the Mark IV Editor, such as single-frame insertion, use of cue tones, and the rehearse mode that improves edit accuracy. Three modes of operation are provided: cue read, cue rewrite, cue erase. Further, entrance and exit cues can be shifted easily. Cost: $7500.

A $9500 Identification Data Accessory (IDA) was also introduced by Ampex as an accessory for the ACR-25. Unit permits messages identifying spot announcements to be recorded on the cue track of the cassette. Message is entered via a keyboard. The identification eliminates confusion between similar spots and the message generated can become the station's FCC log—and proof of commercial play.

A new "digvid" world coming

The inexpensively priced analog-to-digital converter and processor introduced by Consolidated Video is a harbinger of an oncoming era of helical VTRs since time base errors can be corrected simply. More significantly, it is a concrete example of the fact that digital techniques may some day replace analog completely. There were other examples of this new technology at the convention. Most notable was that provided by the Comsat exhibit.

Comsat showed a digital tech-

nique for transmitting standard audio and video programs. Called DITEC, for Digital Television Communications System, the method promises substantially lowered transmission costs while retaining the high quality required by broadcasters. The convention demonstration consisted of a digitally encoded live and videotape program being transmitted from the Andover, Maine, earth station to the Intelsat IV satellite located over the Atlantic Ocean some 22,300 miles distant, and then to a 15-foot antenna located on the lawn of the Sheraton Park Hotel. After being decoded digitally, it was fed to monitors in the exhibit hall. DITEC-1, compared to the FM transmission systems now in use with satellites, offers up to a 10 dB saving in power or a 50% saving in bandwidth. Basically, after conversion of the analog video signals into digital form, a single digital carrier is transmitted. A 33.6 megabits-per-second bit rate is used. This is a lower bit rate than that required for pulse-code modulation. Actually, differences between adjacent samples are encoded; thus small sample-to-sample changes require less encoding. Both big sample differences (edges of pictures) and small differences can be accommodated with an efficient bit rate. (Actual bits/samples used in DITEC are: Y, channel 5; I, channel 4; Q, channel 4; audio, 12.) By employing digital transmission techniques, better control can be attained over transmission distortion problems such as differential phase and gain. When DITEC-1 is used on microwave relays, two channels can be carried over a 20 MHz system. Repeater hops do not degrade the signal. The digital system can also work with band-limited cables.

Another example of the impact digital techniques are having on TV could be seen in the new Sarkes Tarzian digital special effects generators. A dramatic circular wipe stopped many broadcasters in their tracks in front of the Sarkes Tarzian exhibit. (More about this unit is contained in the section on video switchers.)

Digital control has been present at NAB for years as a means of simplifying camera control (the PC-100A and the Fernseh cameras, for example), and as a means of simplifying switching in video production switchers, routers, radio automation systems, etc. Instead of discrete wires running to every switch or relay, a multitude of code signals can be sent down one wire. Both VTRs and editing equipment use digital techniques in control. Character generators are built around digital concepts. In fact, the Television Microtime TBC uses digital techniques to switch analog-stored signals about. The difference in 1973, indicated particularly by the Consolidated Video Systems and Comsat exhibits, is that the analog signal may some day disappear. Once cameras are available to convert live pictures to a digital form directly, the new millenium will have arrived. Even audio may some day be processed digitally.

Automatic systems and easy-to-use products more and more prevalent at NAB '73

Whether as a result of the digital revolution, or as a result of sophisticated analog feedback circuits, automation in broadcasting continues to increase. 1973 NAB Convention visitors saw more business automation systems, more radio automation, more sophisticated remote control systems, and more automation in general then ever before. RCA, for example, stressed automated operation of its new TK-45A camera, automatic radio transmitters, a new automatic film cartridge projector (a first), and automatic radio programming—in addition to the automation in its TCR-100 automatic cartridge player. Both CBS Labs and Tektronix showed automatic video transmission corrective systems. Examples of automation will be apparent as we examine other products exhibited. However, automation, per se, is not the reason for its being. Ease of operation, or more flexible operation is the key characteristic sought, and many exhibits stressed the point.

Transmitters stress reliability, automatic operation

Spurred by FCC indications that it does indeed recognize that equipment is so reliable today that it might out-perform operators assigned to monitor performance, there is a trend to more remote control and automation. RCA stressed at its booth that the company's AM and FM equipment, with only minor modifications and additions, provides a transmitter that will operate within FCC rules, switch to an alternate auxiliary transmitter, or shut itself off. It demonstrated a transmitter system that provides an alarm at local and remote points in case of performance deviation. The BW-75 FM Frequency and Modulation Monitor, for example, gives an alert if the transmitter drifts by 1000 Hz and will shut off should the transmitter exceed the FCC limits of ±2000Hz. Another control unit monitors power to +3% or −7% and makes corrections in power.

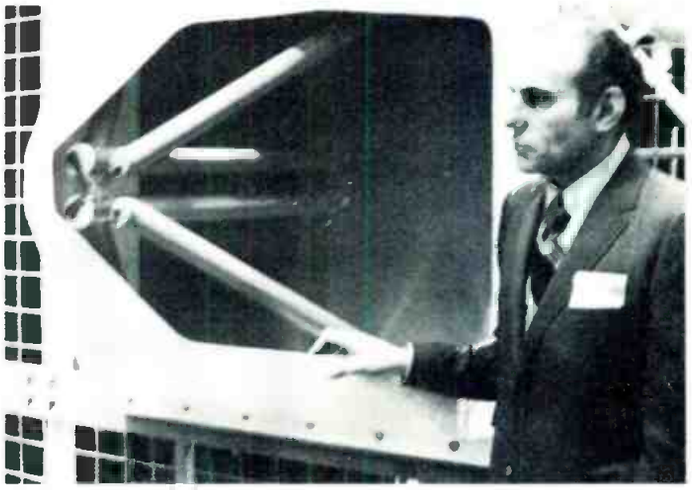
Collins showed a new dual arrangement for its 40 kW FM transmitter. If one unit should drift out of tolerance, the unit would automatically shut down and the other would take over.

A digital control system that can automatically operate the transmitter plant was shown by Moseley Associates. The company's new Model DCS-2 system has three levels of capability. The first level is an operating remote system that can handle 120 channels; 30 channels are provided as standard. System has

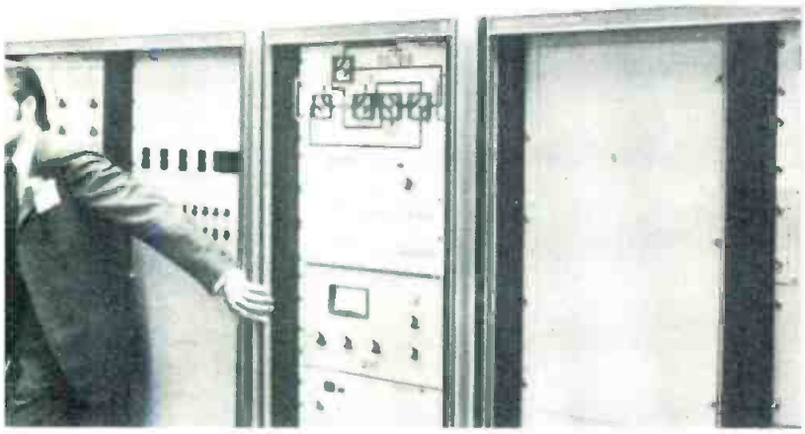
The quality of quad VTRs was attested to by the 1972 German Olympics' committee which presented an award to Ampex during the 1973 NAB.

Wilkinson's new FM 2500E transmitter.

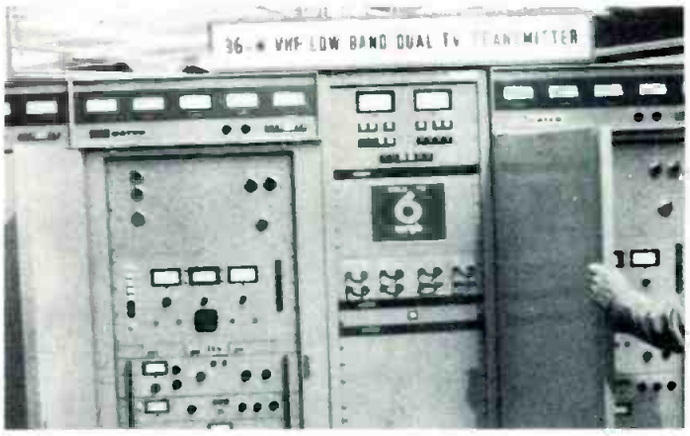
Section of Andrew Corp.'s heliax transmission line.



Close-up of new high-power FM antenna by Jampro for European market.



Collins showed automatically-controlled dual 40 kW FM transmitter.

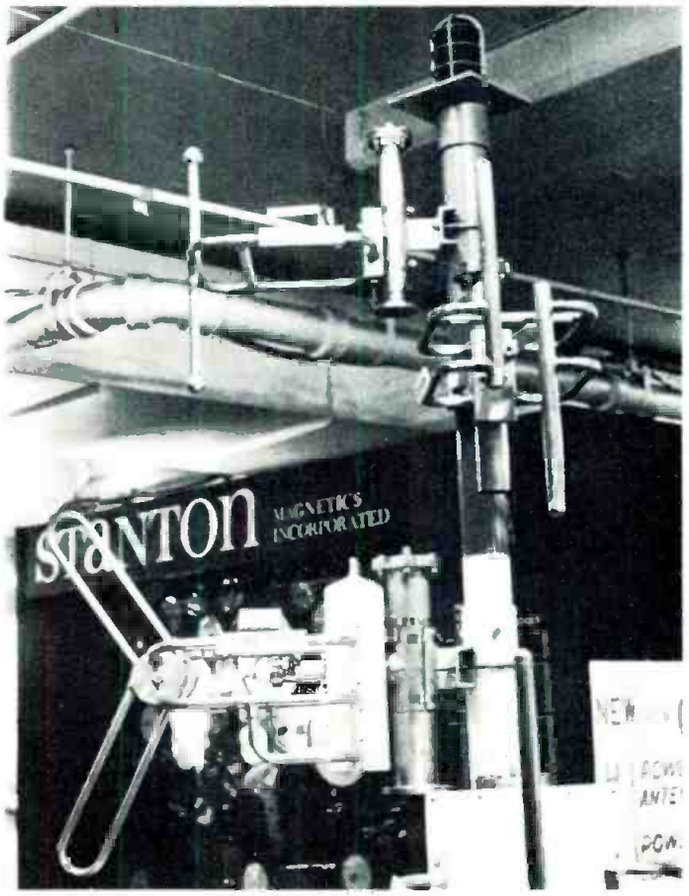


Gates 36 kW dual VHF transmitter.

Continental 50 kW AM rig with plastic doors.

New digital remote control system from Moseley.

McMartin entered the FM transmitter field with this new 10W unit. ►



A variety of Shively antennas.

120 channels for status and alarm and does automatic parameter logging. The second level accommodates a CRT display to preset simultaneously 30 parameters. Software provides established upper and lower limits on each channel. Readings outside limits can flash on the screen, set off aural alarm, etc. At the third level, a computer program is supplied to operate automatically a remote control such as a power level, plate voltage, etc., pending FCC rules revisions.

The control panel includes a keyboard for channel selection and a read-out of channel selected, channel shown, and parameter values (four-digit LEDs). All telemetry inputs are sequentially sampled every 1.5 seconds. Response time is 200 milliseconds. System works with either radio or telephone circuits. A Bell series 3002 unconditioned two-wire circuit is required. Command and telemetry functions are transmitted as audio frequency-shift keyed (AFSK) signals. Fail-safe features are included.

Another digital remote control system was on display in the Telemet booth. Telemet is now the sales arm for the Spantronics system introduced last year at NAB. Brand new in this area was the McBee Labs Automatic Digital Logger. Shown in the Landy Associates exhibit area, the new V11/21 system is completely self-contained and includes a printer which displays and prints date, identification, time, channel number, and meter readings. The system can sample a number of sources.

Among the new transmitters shown was a 10-watt FM transmitter/exciter—the B-910—from McMartin. The modularized B-910 system uses a phase-locked modulated oscillator operating at one-half the output frequency. The output frequency is sampled, divided down to the .8 to 10.8 KHz range, and compared with a frequency in the same range derived from a highly stable temperature controlled crystal oscillator operating at 1/10th the output frequency. Any difference in the phase of the two frequencies is detected to produce a correction voltage to the modulated oscillator. An alarm is triggered if the unit is not in a phase-lock condition. Center frequency stability is given as 1.0 KHz; FM noise, 68 dB below 100% modulation. With the B-110 stereo generator, separation is 38 dB; stereo crosstalk, 43 dB; and FM noise, 60 dB. A low-pass output filter converts the exciter to a transmitter. Prices start (monaural) at $1995.

RCA showed a new 5 kW FM transmitter which includes a built-in harmonic filter. In the AM area, the company stressed the superior audio quality of the 5 and 10 kW units, using the no-modulator Ampliphase system. Ease of lining up and monitoring the two-phase modulated carriers was demonstrated.

Sparta showed two new items: its model 680 FM exciter, and the 701B 1kW AM transmitter. The exciter is billed as so simple and foolproof that field adjustment is never needed. Digital AFC control circuitry is used, and no oven is necessary.

Sparta pushed its 701B AM 1kW unit as the only one-kilowatter with all the important features: 125% positive modulation capability; oil-filled modulation transformer; vacuum capacitor final tank tuning; built-in dummy load, and low-cost 4–500 tubes.

AEL promoted 50kW units: Its recent FM-25/25 approach and a brand new AM-50KD unit which uses only four tubes—a pair of 4CX15000A modulators; a 4CX-35000C PA and a 4-400C IPA. Possible peak modulation up to 130% is claimed. Solid state logic circuits are used.

In the TV area, RCA showed new 30kW and 60kW UHF units which were completely solid state except for the power klystrons. By using four-cavity 30kW klystrons, the intermediate power amplifier can be transistorized. If the IPA fails, the exciter drives the transmitter at reduced power.

One of the most striking exhibits was Continental's 50kW unit with translucent doors.

Among the new products at the Wilkinson Electronics booth were a new all-solid state 60W FM transmitter and a 2500W FM transmitter. The final is a 5CX-1500 pentode rated at 3200W. Gates showed many transmitters but none was more prominent than the 36kW low band dual TV transmitter which occupied considerable space. CCA also showed a broad line—including a UHF transmitter acquired from Ampex. To keep transmitter manufacturers honest, Bird Electronics showed components for RF power measurements —along with some new air-cooled loads.

In the peripheral area, EMCEE showed a 2150-2160 MHz Multipoint Distribution Service (MDS) transmitter which has been FCC type accepted. The newly-created MDS service was the focal point of an inaugural public demonstration on the last day of the NAB convention. The occasion was the meeting of the International Industrial Television Assocation Convention, held in conjunction with the NAB. Acrodyne showed a 100W TV transmitter using a single tube along with various translators.

Rodelco showed an FM translator. Microwave Associates exhibited a line of microwave equipment. Marti stressed STL and Inter-City Link equipment—all solid-state. Communications Carrier Inc. drew interest to its "Straight-thru" microwave transmission system—so called since all amplification occurs at microwave frequencies in the 7-15 GHz band. The system is fail-safe inasmuch as failure of any component does not cause loss of service. It is also distortion-free since very broadband circuits are used, and it is simple because of the few parts used.

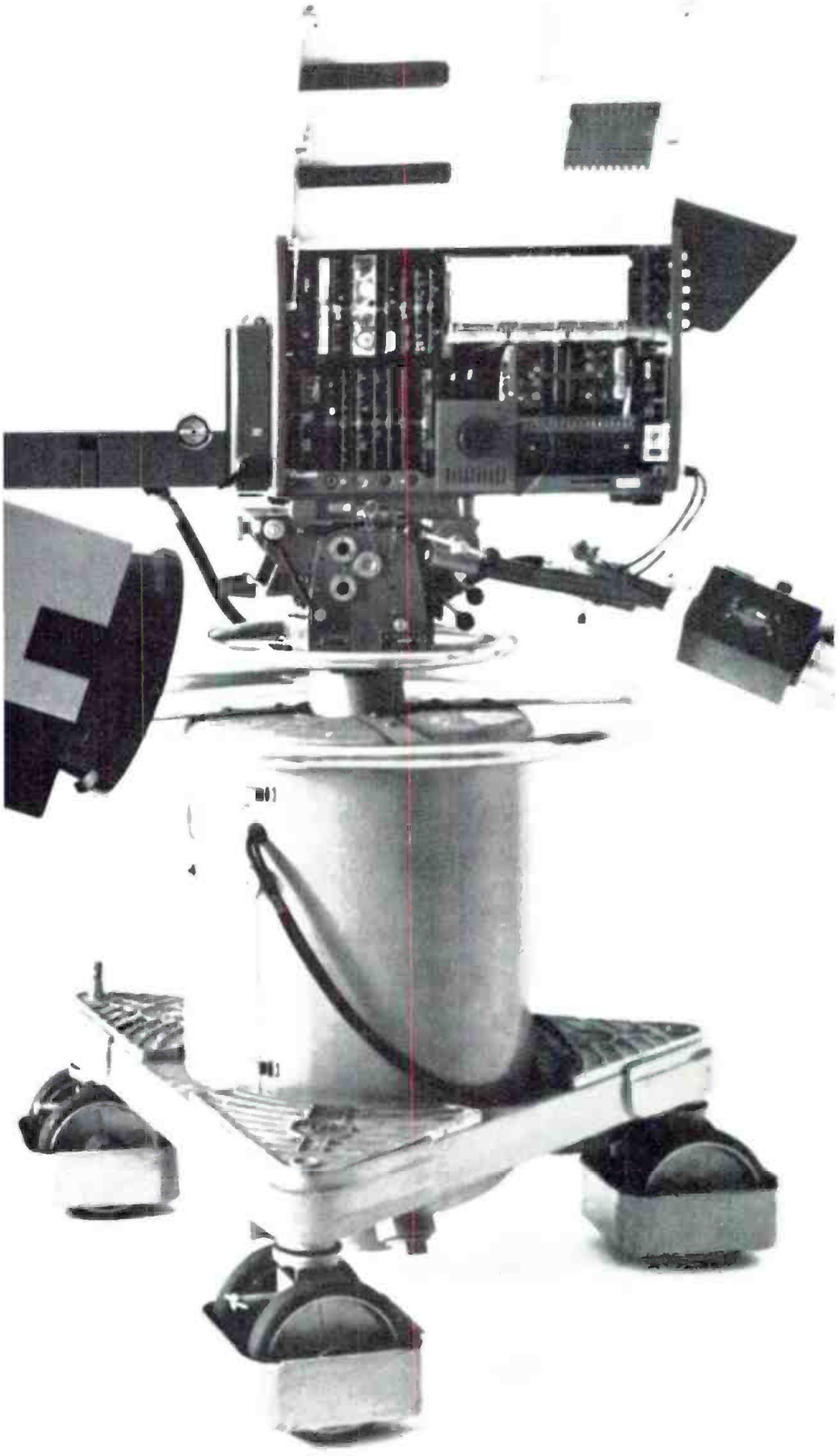
Compact tape cartridges; radio program automation

There was plenty of radio program automation to choose from—Broadcast Products, CCA, Collins, Gates, IGM, Sono-Mag, Schafer, and Sparta had numerous systems on display. Approaching programmed automation systems have been the banks or decks of miniaturized cartridge systems, assembled by Broadcast Electronics and Broadcast Products in particular, so that a series of carts can be played in sequence. Miniature cart systems have been growing in popularity and some have been stacked for continuous playing.

At the 1973 convention, a new approach (shown in demonstration form last year) burst forth. Rapid-Q displayed a series of products that could use the miniature ⅛-inch continuous loop tape cartridge called the CARTRETTE. The

continued on page 34

When we say interchangeability we mean interchangeability.



You can take one, or all, of the twenty modules and interchange them between cameras and maintain picture quality without additional adjustment, balancing, or fine tuning.

Our cameras were truly designed with interchangeability in mind.

You can take a module from one camera and put it in another camera. Or you can take a module from your parts stock and plug it in a camera. In fact, you can take a camera "shell" and put together a fully operative camera in about twenty minutes. The amount of time you save in adjustments and maintenance is remarkable.

Interchangeable modules are only a part of the Fernseh story. We have some other amazing features, too. For example, when you receive one of our cameras, it's ready for operation as soon as you unpack it. And, it'll perform to all specifications because each camera we make is pre-tested. We do something a little extra. We record actual performance characteristics for chromatic response and frequency response on each camera system.

There are a lot of things you should know about Fernseh cameras. Get detailed information by contacting your nearest Fernseh division representative at one of the offices listed below.

Chicago Headquarters
(312) 681-5000
Houston (713) 681-8461
Los Angeles (213) 649-4330
New York (516) 921-9000
Ramsey, N.J. (201) 825-1550
San Francisco (415) 583-9470

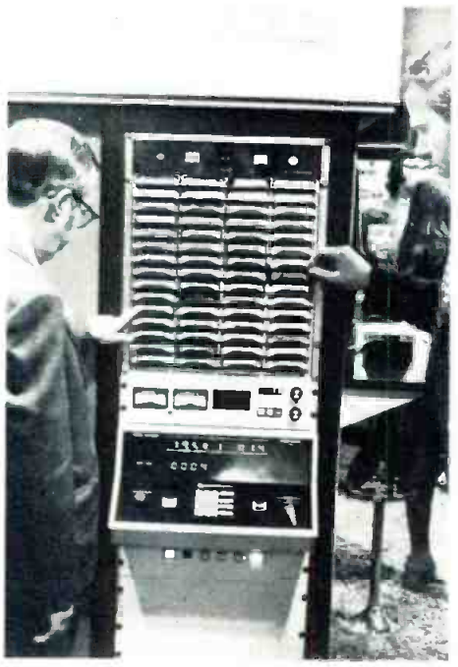
Robert Bosch Corporation Fernseh Division

the wings of vision

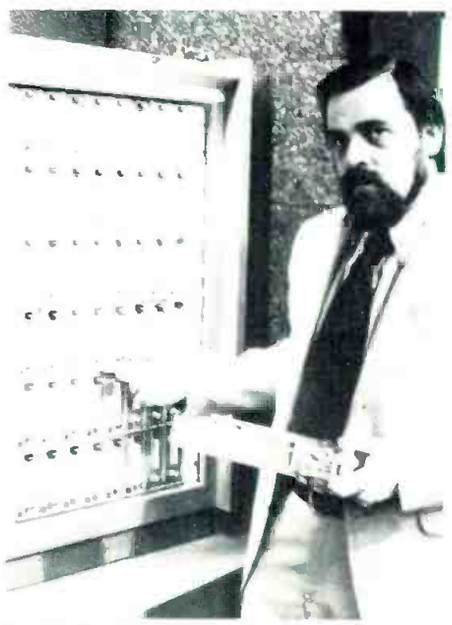
Circle 120 on Reader Service Card

Fidelipac showed a new stable cart.

Econo cart player from Tapecaster.



Multi-cart player from Broadcast Products.



Rapid-Q's CARTRETTE system.

New cart machine from CCA.

small CARTRETTE, which measures 2¼-in. by 2¼-in., is a significant product in and of itself. When put together in a system, they create a new automation system. CARTRETTEs can be used to supplement or replace the ¼-in. cartridge system. The continuous loop units operate at 3¾ ips and are available in loads from 20 seconds to 10½ minutes. The small format became possible because of advances in high energy tape. Lubricated tape is used. CARTRETTE prices range from $1.00 for a 20-second unit to $2.80 for a 10½-minute unit. A unique precision module tape guidance system is used and tape path accuracies are maintained so as to preclude phasing problems in stereophonic systems.

In a multiple playback system, Rapid-Q (Garron Electronics, Inc., Sub. of Visual Electronics) has a system consisting of eight independent playback modules in a 5¼-inch rack frame that includes the power supply and audio switching. This system, with full local control, is priced at $1900 for monaural.

Rapid-Q also displayed a "Full 40" system, providing 48 CARTRETTE playback decks. It can be fully loaded and ready for instant access by a ten-key desk-top control. The system is priced at $8200 monaural. Each deck contains its own motor.

A compact 60-cart instant access system using conventional carts was displayed by Broadcast Products Inc. Separate pre-amps are used and all heads are adjustable from the front. Any cartridge can be monitored while the system is on the air. A front panel control allows selection of any cartridge. A six-event MOS preselect memory is available.

Tapecaster displayed its new series X-700. The playback unit only is priced at $395. Tapecaster showed literature covering a new Mark IV broadcast cartridge—one heavily rigged for maximum rigidity, including a precision machined metal corner post guide to accurately control the tape in both vertical and horizontal planes. Production models were not available by show time.

Lines shown by Broadcast Electronics and International Tapetronics were those that have been on the market for some time. International

Editel showed several compact TV cameras.

Norelco unveiled the PCP-72.

Miniature camera from Asaca.

Fernseh miniature camera looking at Insta-key girl.

Shibaden camera goes portable.

Tapetronics showed a cassette player, but it was obvious at this NAB that the industry has not figured out how to fit the cassette into a largely cartridge world.

The new "Citadel" cartridge units by CCA, which are only 5¾-inches wide, were of more than usual interest since CCA is now an additional source. Although Broadcast Electronics had no new cartridge equipment, the company had a new image: it was in the turnkey studio business. Part of BE's exhibit was a complete studio.

Audio Devices featured its new Audio-Pack cartridge as the most stable cart available and one that would prevent tape skew and, therefore, stereo phase distortion. See *BM/E*, October 1972, for details.

To overcome phase shifts introduced by some of the older carts—or new ones that show great wear—Rapid Q introduced a stereo phase enhancer. This unit, the STE-100, was called the electronic answer to FM degradation due to phase discrepancies between the Left and Right channel signals. The unit is a solid-state 1¾-inch rack mount unit that accepts Left and Right channel signals, analyzes them relative to phase, and dynamically enhances the signal to provide output signals that are of the same phase. This minimizes nulling that occurs from out-of-phase signals and also the "mono-sum" (L + R) signals. The STE introduces no degradation and acts only on signals above 3KHz. The effect was clearly demonstrated as one misadjusted the playback head and switched the enhancer in and out. The unit is priced at $795.

Color cameras: Emphasis is on hand-carried units

The spectacular pictures were produced by top-of-the-line cameras featuring many automatic capabilities, but the most amazing pictures were those produced by hand-held cameras.

Miniature cameras were shown by Asaca (of Tokyo, Japan), Fernseh, and Philips. Compact units were displayed by Editel, RCA, Philips, Gates, and Fernseh. A new compact single-tube camera was shown by Cohu.

The Asaca model, ACC-5000, got perhaps the most attention since it was the most unfamiliar. It produces a high-quality NTSC output and can be directly connected to a VTR without going through a base station. The camera head, using three ⅔-inch pick-up tubes plus four filters, was ultra compact. Electronics consisted of pre-amps and deflection drive circuits. A 1.5-inch CRT viewfinder is incorporated and a 6X electrically-operated zoom lens is included. It weighs 11 pounds. The backpack contains all camera control functions including auto-white control, process amplifier, color encoder, sync and test signal generators, image enhancers, mikes, and power supplies. It also weighs only 11 pounds. A control box carries batteries and a stabilized power supply for AC operation. Cable length between camera head and backpack is 10 meters; between backpack and control box,

it's 300 meters. Unit will be available in the U. S. by August and will sell for $30,000.

Norelco showed several new things in portables: a PCP-90LLL (low light level) version of the PCP-90B and a modified PC-72, called the PCP-72. The PCP-90LLL produced a bright full-color picture in minimal light—less than ½-foot candle. The prototype unit actually produces pictures at levels as low as ¼-foot candle. The camera uses special Norelco "SIT" (Silicon Intensified Target) imaging tubes. Unit also works in full light.

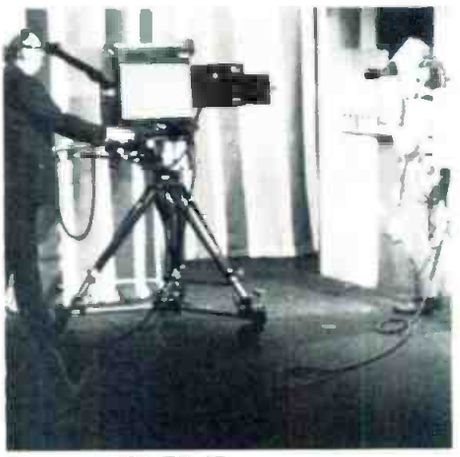
Norelco got a lot of attention for its new PCP-72 with a mini-hip-pack weighing six pounds. The head configuration, weighing 19 pounds, is similar to the PCP-90B, which is the most widely used broadcast portable to date. The PCP-72 requires a camera control unit.

Editel Production Ltd. (Montreal), which has for years modified existing field cameras for portable work, came to NAB with a Portable Color Television News Camera to sell to others. The unit has been designated the ENC-1. It features one-man operation, minimum set-up, battery operation, NTSC or PAL operation direct from the backpack. It's also rugged. Unit uses three standard separate mesh one-inch Plumbicon tubes. Operation from the backpack or a remote control unit is possible. In the latter mode with triax cable, range is up to 3000 feet. Registration accuracy and stability is high. Editel also showed its 20 pound Mark III hand-held camera.

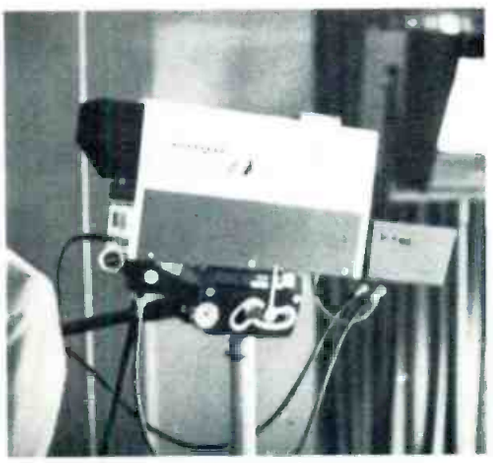
RCA demonstrated a portable color camera that can be converted from a standard studio camera and offered a kit for conversion. Priced at $12,000, it includes two kit housings—one for the camera head optics and another backpack unit for electronics. A camera lens, four-inch electronic viewfinder, intercom, and tally lights are built into the kit housings. The camera head is connected by a 15-foot cable to the backpack which in turn is connected by a cable to a camera control unit. Modules from the TK-44 or TK-45A can be used.

A very conspicuous camera at NAB was the compact Fernseh KCP-40—mainly because Fernseh

Doing a camera line-up on the new Norelco PC-72.

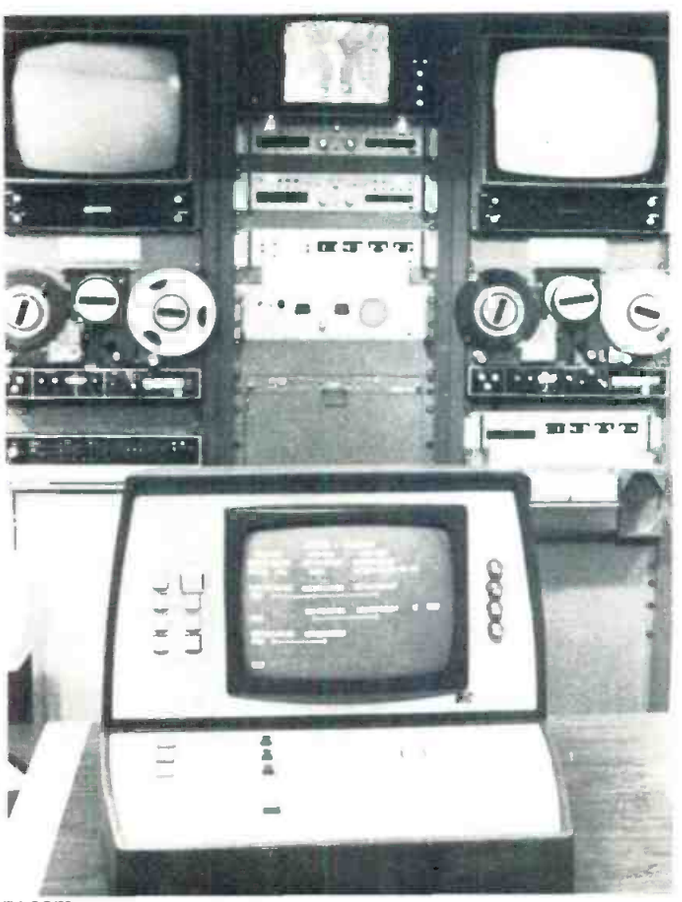


The new RCA TK-45.



New Cohu single-tube color camera.

CMX had editing setup on floor.



View of CDL's PEC-102 editing system.

loaned many of them to production switcher people who wanted to show chroma key, lens manufacturers who wanted to show lenses, and pedestal manufacturers who wanted to show camera mounts. Using three one-inch Plumbicons, and a WRB optical system, the camera gives a maximum sensitivity for low-light-level use. Its ease of operation was demonstrated by the fact that units, wherever they were, worked well. Registration controls are available on the camera head to adjust size, linearity, and skew. Camera can be set up without an oscilloscope because of built-in test signals. A wide range of lenses are available.

In the studio camera category, RCA featured a camera with a new designation, the TK-45A. It's the successor to the TK-44 and includes many of the modifications made on that camera. But, the TK-45A contains more automated operation than has been possible before. There's automatic adjustment to variation in outdoor lighting, an automatic centering control to adjust picture registration, an automatic lens iris adjustment, and a push-button system for maintaining white balance. Black balance is achieved automatically. The camera also has other features.

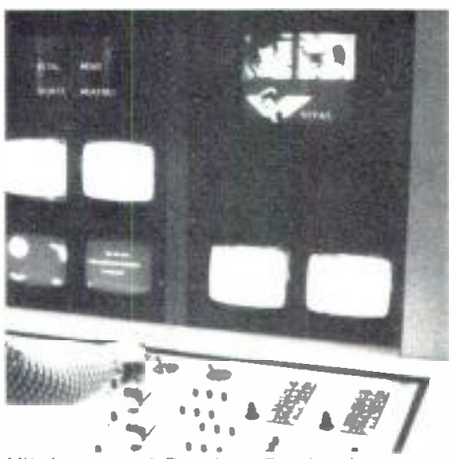
Ampex introduced a new BC-230B camera as an advanced version of the BCR-230. The camera featured automatic centering—a feature that last year was offered by Marconi's Mark VIII. The BC-230B is priced at $60,000.

Cohu unveiled a new single-tube color camera, the 1200 series. A special filter optically encodes color information. Unit is not intended for broadcast use, but camera contains many operational features making it a flexible CCTV unit. One version (121 0A) is designed for color film chain use.

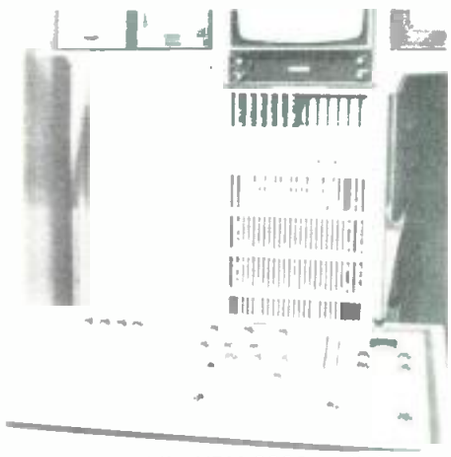
Norelco, Gates, Marconi, and IVC showed studio cameras but, for the most part, models were the same as those shown before.

Tape: count the drop outs

Drop-out rates were the focal point of videotape manufacturers' exhibits. Ampex announced at the convention that it is now providing an individual dropout profile with each reel of its 175 series highband color videotape. Profile follows SMPTE recommended practice counting dropouts of five-micro-



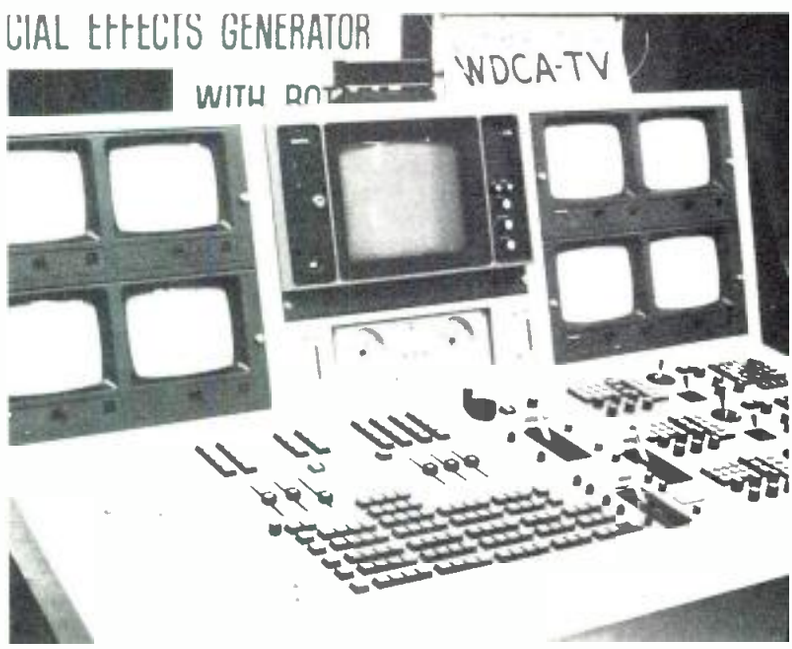
Vital stressed Random Production Programming.



Richmond Hill's VPM-2000 switcher.

Chromatron electronic pallette.

American Data production switcher includes preset control.



Emphasis of this switcher by Visual Electronics for WDCA-TV is special effects.

seconds duration. A dropout is any defect causing a 1/6 dB reduction from reference. Ampex also said it was including a safety band (to protect edges), and a solid-back flange on every reel of 175 tape.

Memorex was counting dropouts of Chroma 90 in its exhibit. It claimed its new back counting reduces dropout to the industry's lowest level. Memorex claims ten per minute maximum average throughout the reel; 15 maximum in any one minute tested in high-band color at 75 to saturation color bar. To demonstrate Chroma 90, Memorex played promotional tapes with solid red backgrounds to also provide a subjective evaluation. Micro dropouts, sometimes noticeable as noise, were not apparent.

Coltape stressed quality tape at reasonable prices. 3M continued to pack in the crowds by showing humorous clips from old Johnny Carson shows—these classics must have had well over 3000 passes, and they're looking better than ever!

But just in case there were dropouts, 3M was there with its Color Dropout Compensator for highband (lost video information is replaced with full color) and, for helical scan recorder users. 3M was promoting the DP100 Dropout Compensator Processing Amplifier. The hottest accessory module to be added to DOC/PROC/AMP is a 3.58 MHz subcarrier regenerator. The output provides synchronization for special effects switching and NTSC color encoding of a camera to provide inserts for helical editing.

In the audio tape area, 3M introduced a new line of acetate-base magnetic recording films—Scotch Brand 337, 338 and 339. An improved oxide coating makes this film comparable to the polyester-based tapes 340 and 341. The acetate backing facilitates edge numbering and additional markings and has better resistance to wear and scratching than previously available acetate-based films.

Videotape cleaners were shown by Recortec and Television Equipment Associates.

Inexpensive videotape editors

Last year rather elaborate computer-controlled editors were in the limelight. This year, exhibitors stressed inexpensive approaches as well. CMX Systems stressed the 300 off-line system which utilizes three one-inch IVC helical units. There is no need to tie up on-line quadraplex machines. Editing was done right on the exhibit floor. (Once editing is completed, automated assembly is done from the original two-inch program from the one-inch workprint.) Datatron showed its $10,000 system using helicals first introduced last year. Central Dynamics showed its PEC-102, introduced last year, but also came up with an inexpensive EDS-200 which requires only two VTRs. EECO equipment was demonstrated by Telemet.

Switchers

Video production boards always draw a crowd the minute someone starts playing with the special effects. This year was no exception. Grass Valley unveiled a 1600 series production switcher which it said represents a second generation design (based upon experience gained in the manufacture of almost three hundred 1400 and 3600 series). It represents new possibilities in special effects capability. The mix effect signals are applied to the input terminal of a new type control element which sums the outputs. The control elements are, in effect, voltage controlled video amplifiers. To obtain a crossfade or wipe between two sources, the gain of one amplifier channel is increased while the gain of the opposite channel is reduced. Mix or fade transitions constitute DC control of the variable gain elements. Wipe transitions employ control signals in the form of variable-width pulses determined by control lever position and type of effects pattern.

In the case of keying or matting operation, the gain of the background channel is reduced in direct proportion to the keying signal amplitude, while the gain of the insert video course is increased in direct proportion to the keying signal amplitude. The effect of this linear type of control is greatly reduced noise in keying situations, compared to conventional electronic switching methods. The improvement in keying is particularly noticeable when using the chroma key. Grass Valley also says matted inserts have considerably less color crawl since the background and insert channels are turned off or on by signals having rise times comparable to normal video transitions. Soft wipes are easy to produce. The new switcher will be available in September.

Vital Industries has impressed NAB audiences in the past with big-capacity switchers—some with three mix-effect systems such as the VIX-100-4. Vital expects the future to require ever more sophistication in production, calling for more and more switching, inserting, chroma keying, wiping, and dissolving. When all are done simultaneously, preset switching is necessary. This year Vital introduced the concept of Random Production Programming, which means combining all video switching functions such as direct cuts, dissolves, wipes, quad splits or eight splits, key inserts, and chroma keys into one operation. How? By using a small programmable controller, the RPP-100, which Vital promises soon.

Preprogramming special effects with digital control was also discussed at the RCA exhibit. RCA said its efforts were tentative—it was seeking advice from attendees as to what they would like.

Central Dynamics showed a new production switcher, the VSP-1250, and one of its features is soft wipes—of which Grass Valley also boasted.

Softwipe was the main feature of another special effects switcher, this one from a new company, Beston Electronics Inc. (Prairie Village, Kansas). Beston's Model 650 Special Effects unit ($4000) permits the soft wipe on all patterns that use horizontal only, or for horizontally and vertically added patterns. It uses an internal additive mixer allowing multiple mixing productions.

New from Richmond Hill Labs is the VPM-41 production switcher—a fully portable color broadcast unit priced at $5000. The VPM-41 is described as an expansion of the VPM studio unit, the VPM 2000 shown last year.

Visual Electronics showed a custom switcher built for WDCA. It stressed a human-engineered layout and unique special effects.

Despite the heavy competition in the switching and effects field, the item that was closest to a show stop-

continued on page 40

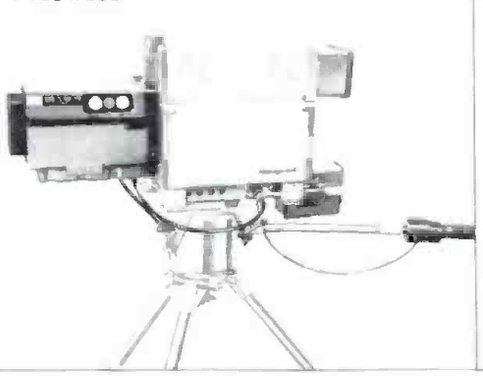
Canon offers the perfect zoom lens for the camera of your choice

P10 x 20B1

P17 x 30B1

P17 x 30B2

PV10 x 16B



PV17 x 24

PV10 x 15

More and more people are discovering how significantly superior Canon Zoom Lenses are for TV broadcasting purposes. Their outstanding color characteristics, even in dim light, is one of the many reasons why Canon was chosen for telecasting the Munich Olympics.

Canon's wide range of excellent zoom lenses encompass three types of operation control—all-servorized, via flexible cables and by effortless push-pull rod control. And it can be attached to fit and operate with any make of TV camera.

Shown on this page are only a few examples of the quality lenses Canon has available to more than meet your particular demands. Specify Canon to stay ahead.

The following are Canon TV Zoom Lenses for the Plumbicon® color cameras currently available on the market:

Size of image tube	Lens	Image format covered
1½" Plumbicon® color camera	P10 x 20B4 P17 x 30B1 P17 x 30B2	17.1 x 12.8mm (21.4mmφ)
1" Plumbicon® color camera	PV10 x 16B1 PV10 x 15B2 PV17 x 24B1 PV 6 x 18B1	12.8 x 9.6mm (16mmφ)

® Reg. TM N.V. Philips of Netherlands.

The Canon TV Lenses Naming System

P10 x 20B

- Glass Compensation for Beam Splitter
- Minimum Focal Length
- Zoom Ratio
- Application

Applications	Image Format	Pick-up Tubes
P	21.4mmφ	1½" Plumbicon
PV	16mmφ	1" Plumbicon

Apart from the above, Canon has available TV zoom lenses for 3" or 4-1/2" image orthicon cameras and can also build special lenses to fit your requirements.

Canon

● CANON U.S.A., INC.: 10 Nevada Drive, Lake Success, Long Island, New York 11040, U.S.A. (Phone) 516-488-6700 ● CANON U.S.A., INC.: 457 Fullerton Ave., Elmhurst, Illinois 60126, U.S.A. (Phone) 312-833-3070 ● CANON OPTICS & BUSINESS MACHINES CO., INC.: 3113 Wilshire Blvd., Los Angeles, California 90005, U.S.A. ● CANON AMSTERDAM N.V.: Gebouw 70, Schiphol Oost, Holland ● CANON LATIN AMERICA, INC.: Apartado 7022, Panama 5, Panama ● CANON INC.: 9-9, Ginza 5-chome, Chuo-ku, Tokyo 104, Japan

Circle 121 on Reader Service Card

per was the Sarkes Tarzian Cinematte II rotary digital effects device. Hundreds of transitions are possible from patterns generated by digital logic circuits. A rotating wipe was one of the more eye-catching effects shown. One of the virtues of digitalized special effects generators is the stability offered. A circle never turns into an ellipsoid—unless you want it that way.

One of the more unusual products was the Chromatron, called the Electronic Palette. It is a small self-contained device to produce controllable animated patterns in motion and in full color for backgrounds, attention getting purposes, etc. System is made by BJA Systems, Inc., Oreland, Pennsylvania, and was shown by Landy Associates, Cherry Hill, New Jersey. Demo we saw was noisy and the patterns didn't have good stability, but the product should be investigated further. Although TV station automation systems were prominent last year, we saw little new in this area this year. CDL, Grass Valley, and Vital showed pretty much the same systems as last year—some of which are just now being installed.

Spotted everywhere at the show—encoded chroma keyers. CDL and Richmond Hill had new ones. Others showing such units were Telemet and TeleMation.

Audio/video routing switchers were exhibited widely. Dynair drew attention to its simple modular (6 x 10 or 12 x 1) expandable unit by calling it the patch cable eliminator.

Datatek showed the D-400 video-audio routing switcher incorporating 20 x 10 or 20 x 15 (in x out) matrixes as building blocks. A variety of control systems are available: momentary, pushbutton, thumbwheel, rotary, telephone pushbutton, telephone dial, BCD data.

A distribution switcher expandable between 10 x 10 to 1000 x 1000 was featured by American Data Corp. A single 5¼-inch rack drawer houses up to 200 crosspoints (audio or video or both). Each drawer is further subdivided into 10 x 10 or 10 x 1 matrixes. The 10 x 1 format is compatible with BCD data. BCD decoders are used to reduce the number of control wires. American Data boasts construction that eliminates ground current and crosstalk, although all manufacturers list very acceptable specs in this area.

Telemet showed its 7930 A/V switching system which works on 30 x 4 frames. Control features are similar to those described for Datatek.

Distribution amplifiers were plentiful. Datatek showed a differential input unit to avoid time modulation of the output pulses and spurious signals. Lenco also had a differential input unit to meet various system requirements. Distribution amplifiers with a variety of features (subcarriers, continuous phase control, breezeway clamp, regenerator, etc.) were shown by Lenco.

Among several new pieces of video processing equipment was the NTSC chroma keyer decoder (Model 4706) by Telemet. Using new circuitry, this unit is designed to put an existing RGB chroma keyer in the line to provide zero horizontal delay chroma keying. The unit works from differently encoded sources (cameras, VTRs, remotes). A comb filter eliminates chroma crawl.

Character generators

There were no new developments in character generators to stand out this year. CBS Labs did have a new bulk storage system to enhance its Vidifont capabilities. Systems Resources Corp. showed Chiron II, first introduced last year. Broadcast Electronics showed two models of Titlemaster gear—the model 1500 and model 2400. Datavision was part of the Television Equipment Associates booth. TeleMation expanded its election display system to work in a more universal mode. New in the field was Beston Electronics which showed an inexpensive system with storage capability for election vote display.

Film telecine

There is usually something new and interesting at the NAB Conventions in the telecine area—in the past years we've described instant-start telecines and automatic 16mm cassette-loading units such as the Hokushin in 1971. Years before that there was a Fernseh flying spot scanner slide unit. But none of this equipment has ever made it in the U.S. market for one reason or another. The usual reasons are cost and changes needed to adapt the equipment to U.S. commercial station operation.

This year there were two unusual telecine products: the RCA automatic 16mm film cartridge player (TCP-1624), and the Marconi "integrated" telecine which wraps many features into one compact unit.

The RCA unit was a demonstration model designed to get attendees' reactions. It can play an uninterrupted sequence (up to 24) of 16mm film cartridges playing commercials, newsclips, or other short subjects. Each cartridge contains

continued on page 42

RCA film cartridge player.

New TeleMation telecine control.

Neve Consoles cost less than you think.

You're looking at a Neve PSM (Portable Sound Mixer), fully fitted with 12 input channels. Cost? Only $10,650. If it's partially fitted, the price drops even lower.

In fact, you can buy a Neve Broadcasting Sound Control Console for as *little* as *$5,500.*

Flabbergasted? Probably — if you know what goes into any Neve Console, and what you'll get out of it.

A money-saving suggestion: compare broadcasting consoles — feature by feature. You'll find that Neve actually costs less than most.

Don't just compare price. Compare performance and quality. For example, any Neve Console (small, large or in between) gives you a total harmonic distortion *guaranteed to be less than 0.075%.*

What's more, typical certified tests have shown less than 0.02% on every channel.

Neve equips broadcasters with everything from compact portables and circular DJ desk installations to giant, ultra-sophisticated TV and radio consoles. R.F. interference? Not with Neve. Our consoles are designed to block it, even in intense fields such as those in Chicago's Hancock Building and the Empire State Building in New York.

Need a customized console? Regardless of the size, we'll install it in your studio *in hours* — not weeks. We'll do it on the day we promise. No waits. No frets. No bother with in-studio modifications later. Before it reaches you, a Neve Console is thoroughly tested, totally perfected.

The sound of Neve is worldwide. Our audio control consoles are now used for broadcasting, music recording, ad commercial and motion picture production in major studios in 27 countries. Why not find out exactly what we can do for you — before you pay too much for too little?

Neve

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Rupert Neve of Canada, Ltd., 7528 Bath Rd., Malton, Toronto, Ontario, Canada. (416) 677-6611
Rupert Neve & Co., Ltd., Cambridge House, Melbourn, Royston, Herts, England.

Write for Bulletin B-2

Circle 122 on Reader Service Card

World Video's 17-inch Trinitron monitor.

Telemet had a new NTSC decoder.

Digital clock sync system from Time and Frequency Technology.

Monitor combinations from SC Electronics.

two minutes of film. Cartridges are loaded into a 24-section circular magazine. It contains two film transports—in effect, two individual projectors—so that while one projector is running a film the other is rewinding the previously shown film and cueing up the next one. Start-up is instantaneous, with no pre-roll of the film and transition from one cartridge to another occurs in 200 milliseconds (which is nearly imperceptible to the TV viewer). Production is planned for late 1974.

The Marconi unit was described in some detail in *BM/E*, March 1973, page 36. The unit is impressive in its capability and compatability with U.S. practices. It remains to be seen if Marconi feels it can establish a U.S. market.

A new telecine, highly competitive to the Cohu 1500 introduced two years ago and the RCA TK-28 introduced last year, was unveiled by TeleMation. The three separate-mesh vidicon TVF-3000 features automatic black level, horizontal and vertical aperture correction (as optional plug-ins), gamma correction, built-in waveform monitor, built-in servoed neutral density wheel with AGC, remote color balance control, and the ability to operate with TeleMation's digital encoder.

We aren't sure whether the servoed neutral density wheel in combination with AGC provides the same degree of automatic white level as does the Cohu, for example. The latter maintains peak video level by changing both target voltage control and the neutral density filter which controls light levels and resets them when picture fades to black. The RCA TK-28 also operates to correct, automatically, color errors in the original film.

Spindler & Sauppé showed a variety of selector-slide projectors and dissolve combinations.

Measuring, monitoring, correcting

There were plenty of solutions to quality problems at the 1973 NAB Convention. On display for TV were VIR correction systems, automatic differential phase and gain correctors, phase equalizers, and waveform correctors, color matched monitors, and a variety of sophisticated measuring equipment including frequency monitors and sensitive RF amplifiers.

Dozens of exhibitors had digital clocks which often doubled as some kind of a time reference. The most sophisticated was the Digit-Sync Clock System shown by Time and Frequency Technology Inc. It is a master-slave digital time keeping system. The Master Clock (Model 720) keeps the time and synchronizes remote clock timers, large LED time displays (for program control), event timers, etc. Numeric time data can be fed into video monitors. A master oscillator with a time error of less than three seconds a year can be used. Or, a TFT Model 735 WWV/WWVH Time Code Receiver can be used as a source of precise time information. Remote clocks can operate as bi-directional timers for count-down purposes. TFT has several proposed radio and TV station installation arrangements to show how this

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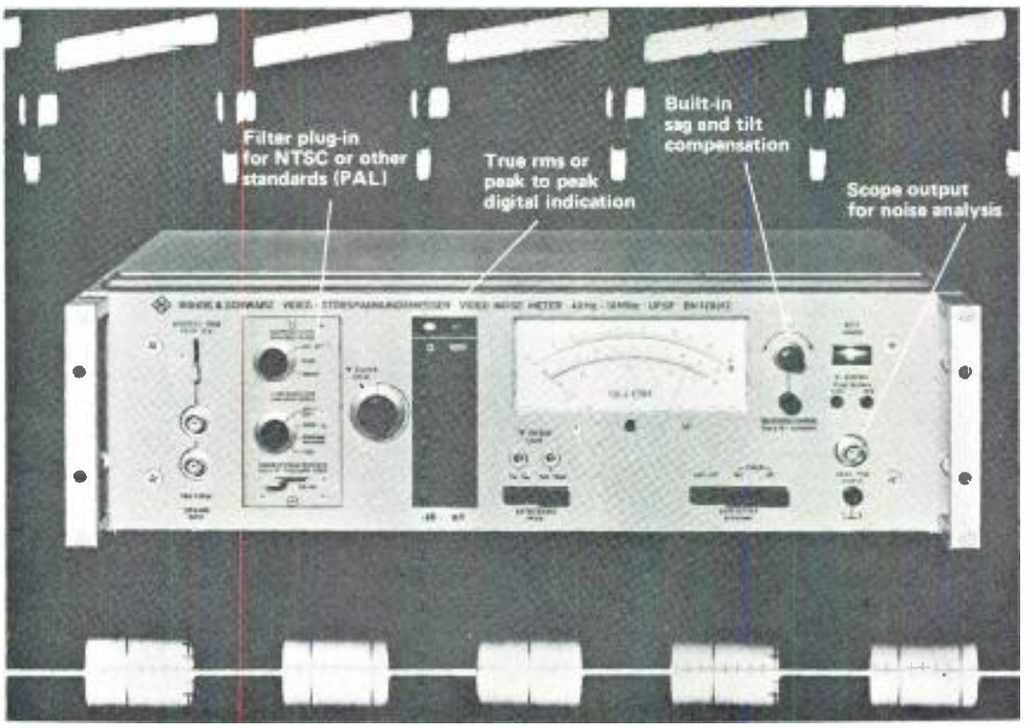
Measure and analyze video noise accurately (0.5 dB)

A



B

Video Noise Meter UPSF

40 Hz - 10 MHz (±0.2 dB) / 10 Hz - 17 MHz (±3 dB)

Oscillogram at A shows presence of noise in sync and video together with tilt. After passage through UPSF, signal is shown in oscillogram at B. Sync, blanking and part of video have been gated out. Remaining video shows noise clearly without any trace of tilt.

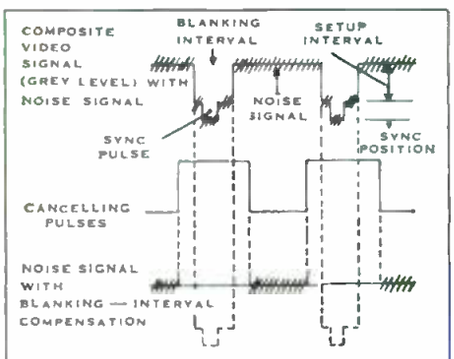
Features

- Meets requirements of all U. S. black and white and NTS color systems
- Measures noise voltage in the presence of sync and blanking pulses
- Can measure down to -85 dB S/N
- True rms measurement using semiconductors – no thermocouple, no thermistor; thus instantaneous indication
- Easy to read linear scale for both peak to peak and rms modes of operation
- Same instrument can be used for NTSC or PAL by changing plug-in filter
- Input impedance: 1 MΩ shunted by 30 *pF*, or 75 Ω bridging
- Completely solid state
- High accuracy (±0.5 dB) and repeatability

Applications

Measure video noise voltage on:

TV Cameras
Film Scanners
Video Tape Recorders
Radio Links
Coaxial Lines
TV Transmitter
TV Receivers
TV Translator



Principle of noise-voltage measurement with H or V internal blanking

The UPSF Video Noise Meter is designed to measure the unweighted and weighted noise voltages occurring in 525-line or 625-line TV transmission systems. It has the unique advantage of measuring low level components in the presence of high level horizontal or vertical sync and blanking pulses (see line drawing). The same instrument can be used for the NTSC and other TV standards by changing the filter. These plug-in units contain a bandstop filter as well as the color subcarrier filter, preventing any residual color subcarrier in the test signal from being picked up. High and low pass filters are selectable to assist in analyzing the video noise. The UPSF can also be used as a true rms voltmeter over its frequency range.
This improved solid state model is completely free from drift. Built-in sag and tilt compensation eliminates error sources. Built-in calibrator.

ROHDE & SCHWARZ

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Circle 123 on Reader Service Card

system can be used. TFT also showed its complete line of frequency and modulation monitors for radio and TV.

One of the more interesting developments was the introduction of almost identical VIR correction systems by two companies: CBS Laboratories and Tektronix (*BM/E*, March 1973, page 32). Both insert a Vertical Interval Reference signal at a point in the transmission link where the video signals can be verified. The corrector can be located at the receiving site and it will adjust the signals to match those which existed at the point of verification. Systems are ideal to correct distortion caused by transmission lines. The approach can be applied to monitor what happens in a station, i.e., before and after the transmitter. At NAB, the Tektronix demonstration showed three color monitors. One reflected the desired signal parameters; the second showed what the picture looked like with burst-to-chrome phase shifts, reduced burst amplitude, etc.; the third showed the picture after the automatic correction which, of course, matched the first monitor. The most discernable difference between the CBS Labs system and that of Tektronix was that the former includes adjustments for four factors plus an option, while the latter has six. CBS adjustments: burst vs. chroma phase, burst amplitude, overall gain, chroma gain, and optional set-up. Tektronix includes these five plus sync gain.

Another new item shown by CBS Labs was the Automatic Differential Phase and Gain Corrector. The DPT Model 2300 removes these distortions from color programs automatically, much as manual corrections have been made in the past, but it updates the corrections more often. Samplings of the VITS stairstep are made every frame and corrections are continuously made during all of the picture-video time. CBS has received a patent on the technique.

The Matthey Chroma Corrector, shown by Television Equipment Associates, drew special attention. The unit not only monitors color pictures, but corrects amplitude variations within ±40% and delays up to ± 100 ns. Price is $1575.

The color on color monitors was the subject of interest at the Conrac and Tektronix exhibits. Conrac set up a display to demonstrate how matched color can be obtained on professional monitors. Precision colorimetry is possible by using matched phosphor CRTs.

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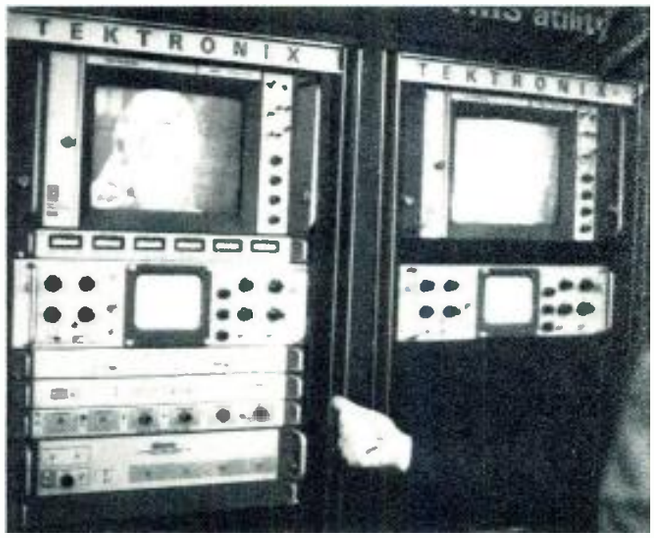
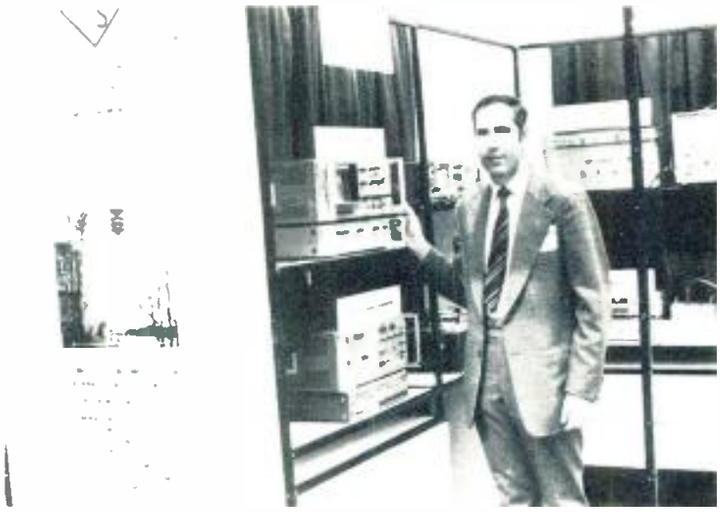
New CBS Labs VIR Correction System.



Tektronix VIR Correction System.



Rohde and Schwarz includes new sweepers.

Belar demonstrates modulation monitoring.

Automatically it's Revox.

The economics of successful station operation demand completely reliable automated program sources.

And where reliability counts, more and more manufacturers of automated programming equipment have come to rely on Revox. Such prestigious names as the Schafer Electronics Corp., CCA, Gates Division of Harris-Intertype Corp., Sparta Electronics Corp. and International Good Music (IGM), all employ Revox tape recorders as an integral part of their installations.

If your operation depends on ultra-reliable, high performance tape equipment, shouldn't you be using Revox too?

More proof that Revox delivers what all the rest only promise.

Revox Corporation, 155 Michael Drive, Syosset, N.Y. 11791. Calif.: 3637 Cahuenga Blvd. West, Hollywood 90068
England: C.E. Hammond & Co., Ltd., Lamb House, Chiswick, London W4 2PB. Available in Canada.

Tektronix also talked about selected phosphors in its Trinitron tubes. Phosphors used in the Tektronix 650 and 670 monitors fall within the chromaticity range specified for CCIR or PAL, but not NTSC (as do home receivers). However, professional monitors have maintained NTSC standards and matrixing. Tektronix now incorporates a correction matrix which allows viewing programs with chrominance characteristics more in keeping with modern home receivers. The 670, incidentally, uses the 17-inch Trinitron.

The single-gun Trinitron has been selected as the CRT for a new series from Conrac, the 5000 Color Monitor. It is available in the 12-inch size at $1295; larger units in the 5000 series—19-inch and 25-inch—use negative black matrix

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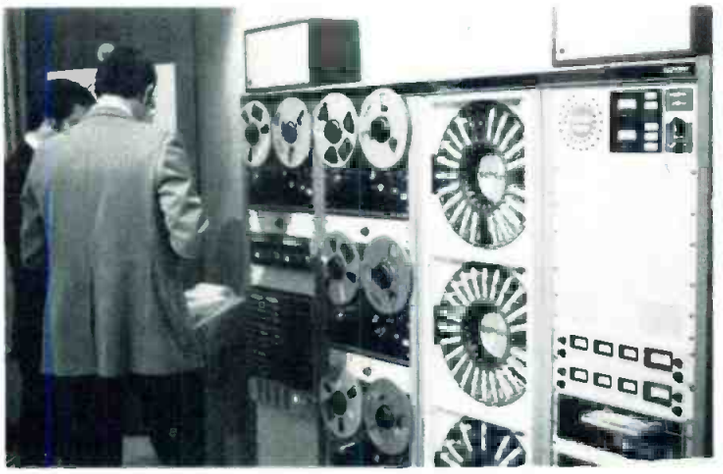
Business automation systems were prevalent.

IGM introduced the BAT system.

Sono-Mag's Alpha programming automation.



Schafer's 902 system has switch memory.

Close-up of IGM's Insta-cart.

Grass Valley's TV switching automation system.

Sparta radio automation comes in modules.

Ain't nobody else can give you an S/N ratio up to 72 dB. Nobody.

We call it the Scully 280-B Professional Recorder/Reproducer. Not a very fancy name. But it's so new, we haven't had time for anything else but a number.

Briefly, here are the high points, new electronics for up to 72 dB S/N ratio on full track .25" tapes. And a greater dynamic range than you've ever been used to.

Two-track quarter-inch and four track half-inch 280-B lays on a crisp, clean 69 dB on an NAB weighted basis.

We've built in some other choice features, too. Like an OPTAC™ optical motion sensing system that gets rid of deck plate sensor mechanisms. Plus a new mother-daughter board architecture for super easy maintenance.

The spec sheet has all the details.

For more information contact your Scully Distributor or write direct to Scully/Metrotech.

Circle 125 on Reader Service Card

Tele-Cine's 30 to 1 Schneider lens was a first.

Rank showed new flexible Varatol lens.

Angenieux lens for 16mm film cameras.

New Canon dual zoom lens has 34 to 1 ratio.

shadow mask CRTs.

World Video introduced at the show a 17-inch color monitor using the Trinitron. SC Electronics introduced a series of triple-six monitors and 12-inch units (monochrome). The company also showed a new moderately-priced TV tuner and demodulator.

On the broad instrumentation front, Tektronix, Rohde and Schwarz, Marconi, and Telemet had impressive exhibits.

Tektronix showed, in addition to the VIR correction system and the picture monitors mentioned, a full line of NTSC generators, vectorscopes, waveform generators, CATV monitoring equipment, general purpose items useful to broadcasters such as oscilloscopes and digital frequency counters. R&S showed a number of products covering transmitter performance measurements, VTR performance, RF sweeping, VSWR test and field strength measuring. Most of the instruments had been around previously except for the type HFV (VHF and UHF) field strength meter, and a tracking unit working with the Videoskop III video sweep generator to measure frequency response of systems.

Telemet's line included for the most part equipment introduced before: VIT kit sets, demodulators, NTSC generators, etc.

Among equipment for measuring radio performance was a digital antenna monitor (to measure digitally phase and current ratio) from Delta Electronics, as well as that company's impedance bridge. Potomac Instruments Inc. showed field strength meters. Techniques for measuring modulation (AM and TV) were demonstrated live using off-the-air signals at Belar's booth.

Automation/computer business services

Reports of stations reverting from automation to live personalities are frequent as talk-radio grows in popularity. Actually, these reports aren't quite precise: a station may cut back on, or drop, a programmed music format, but it's not likely to abandon automation gear completely. Judging from equipment available at the NAB Convention, one could get into automation to any degree desired—there's no need to be all or nothing.

Thus, one could buy a simple rack of automatically-operated Carousels or reel decks for programming sequences or, on the other hand, a multiple cart player to play commercials, IDs, time and weather, etc., between live studio segments. We've already mentioned the compact multiple carts displayed. Let's look at the systems offered.

Reflecting the options available in automation is the Schafer 900 series. The 902 is a relatively simple system using a switch memory. This provides a standard format of 24 events or two-12s. A digital clock provides the time base for controlling formats. Additional

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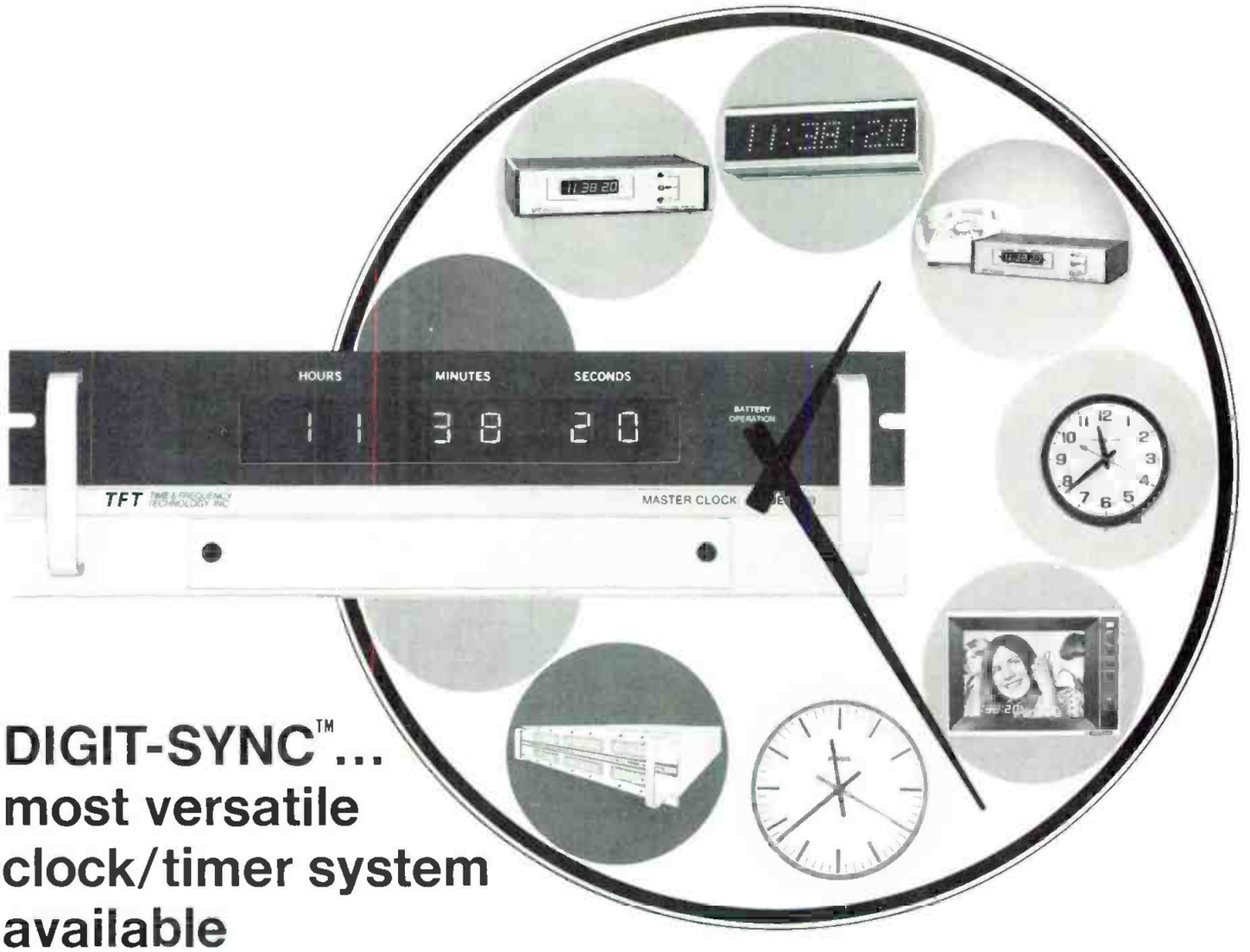

DIGIT-SYNC™... most versatile clock/timer system available

Now, with TFT's DIGIT-SYNC clock/timer system you can synchronize any number of remote digital clocks, impulse clocks, event timers and synchronous motor clocks, and impose time data on a video signal, with an accuracy of one second per month. Or, as an option, three seconds per year.

And installation is easy. Unlike other systems that need more than 20 conductors for remote time display, DIGIT-SYNC uses a single pair of shielded wires to transmit time data and supply DC power to auxiliary units.

In addition, serial time data can be sent over voice band channels, or recorded on tape for time coding of information.

What's more, you can expand DIGIT-SYNC into a system of virtually any size or complexity. Power failure protection is provided by a 12-volt back-up battery.

. . . plus the growing line of TFT frequency and modulation monitors

Since the first TFT monitor was introduced in 1971, TFT has become the standard of technical excellence in frequency and modulation monitoring: more than 350 radio and TV stations now use TFT instruments, with good reason.

For example, all TFT monitors give you remote monitoring without an RF amplifier on the front end. This means less interference from the intermodulation products of unwanted signals. You also get digital frequency readouts, digitally settable peak flashers, exceptional long term accuracy, and unequalled solid state reliability.

TFT monitors comply with all relevant FCC requirements for local and remote monitoring.

For more information about DIGIT-SYNC and TFT's growing line of monitors (more are on the way), call your local TFT sales representative. Or contact us at the address listed below.

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Circle 126 on Reader Service Card

memory panels can be added for additional formats. The 902 can be expanded to become the more flexible 903. This system includes MOS memory and a keyboard display system. Unlimited mixing of sequential and time-oriented events is possible. For a complete computer-controllable system, Schafer has the 8000 system.

Some of the features of the IGM 400 pre-packaged time-insertion audio control unit reflect the flexibility available. The audio controller of the 400 permits talk features to be scheduled on a real-time basis with music automatically filling the balance of the time. It is unnecessary to estimate in advance the number or length of musical selections. The 400 has six inputs, four of which are used for talk features and two for music. The unit, with two reel-to-reel decks and a 24-cart Carousel, sells for $9256. The IGM exhibit also focussed on the 500 system for overall flexibility and a new unit, the 740. The system runs two 48-tray Instacarts. A computer-like programmer holds up to seven days of programming—63 inputs are possible.

Sparta stressed that part-time automation is possible and promoted the Spartamate I as the way to do it. This unit, as an expandable starter, includes in one rack the 1052 automatic program controller (12 inputs, 52 events); two Revox A77 Mark III decks; three Century carts; a digital clock, plus interface gear. Spartamate II includes two Carousel players and a random-access selector, the RS 250.

As an economical approach to full or part-time automation, Broadcast Products showed two compact programmers, the AR-100 Mini-Mate and the AR-10 Micro-Mate. The former has 8 inputs and programs spots in sequence or time insertion. The latter, for more limited automation (or SCA), accommodates five sources; it can time-insert IDs, but not commercial spots.

Full automation systems, in addition to those mentioned, above were shown by CCA, Gates, RCA and Sono-Mag (Systems Marketing Corp.).

CCA stressed mini-units ($6800) and maxi-units ($15,000). Sono-Mag's Alpha system featured an English display on a CRT and the ability to program up to 10,000 events. Most automation systems were, of course, connected to logging systems.

In the area of communications loggers, one of the new wrinkles this year was the use of time code generators to encode time without requiring an extra recording track. This was the approach taken by Metrotech. Its new logger, the 400, stores 600 hours on a single

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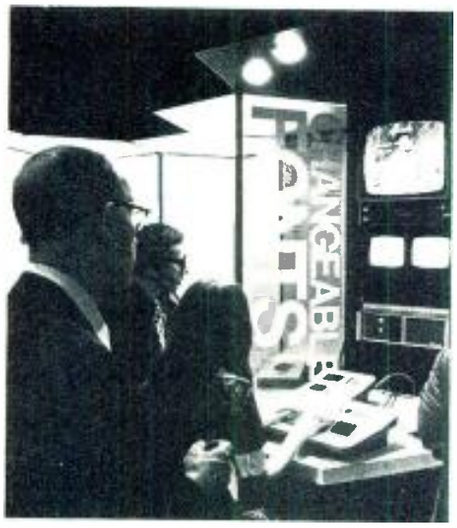


CBS Vidifont generator has new bulk memory.

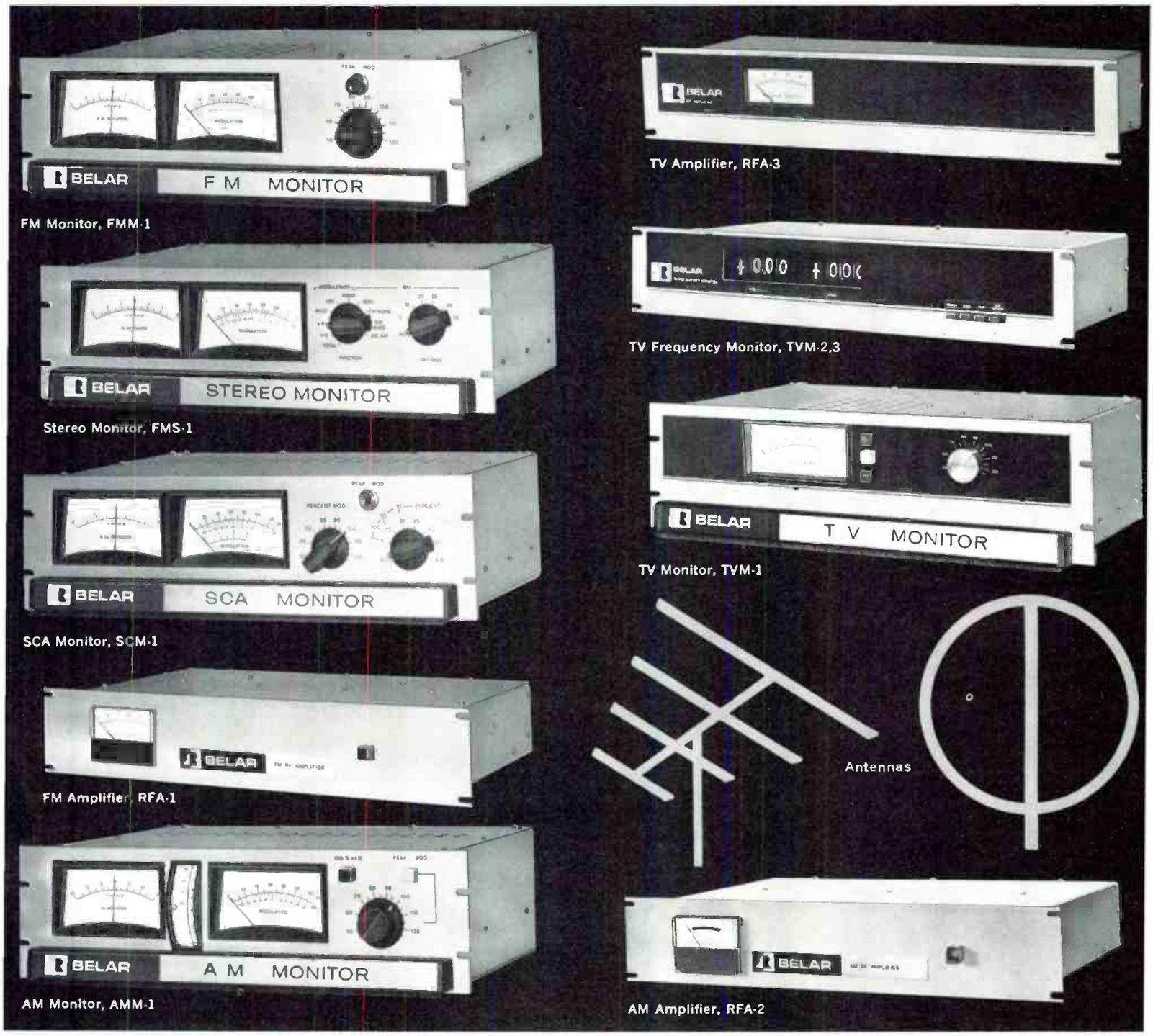
High-style enclosures from Emcor.

New prompter from Cello-matic.

Low-dolly by Vinten at Listec booth.

Subscription TV system from Blonder-Tongue.

WHERE ACCURACY COUNTS ...COUNT ON BELAR AM FM TV



The secure feeling that you have purchased equipment that will accurately do the job you intended it to do is most comforting. When you buy Belar AM, FM, or TV frequency and modulation monitoring systems, you'll know that feeling. You'll know that you have the right equipment that will give you ease of operation, functional checks and unquestionable ACCURACY. And you'll measure all your program material, including the peaks accurately.

Call or write today for more information. We know you'll make the right decision and BUY BELAR.

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Where Accuracy Counts . . . Count on Belar

Circle 127 on Reader Service Card

7200-foot reel of .5 mil triple-play tape. The TCG model 4400 multiplexes an encoded time on the recording track which is seen visually on the digital reader on playback. Tape-Athon also showed new loggers.

Both IGM and Sono-Mag showed business automation systems as well as program automation. Business automation was the exclusive service offered by Broadcast Computer Services, Compu-Net, Data Communications Corp. (BIAS), and IBM. The activities of the first three companies are well-known in this field. The 1973 Convention marked the first time that IBM arrived with what it called a Radio Station Management System. This system uses the low-cost IBM System/3 Model 6 computer. The program shown was designed for CBS. It will be available for shipment to others by July 6, 1973. The radio station management system is divided into seven interrelated sections: sales order entry and modification, availabilities, scheduling logging airtime entry, billing and accounting, sales analysis, control, and maintenance. The control section provides automatic procedures for keeping track of all commercial announcement transactions.

The IGM BAT 1000 System gets its name from *b*illing, *a*ccounting, and *t*raffic system. BAT 1000 gives the broadcaster an in-house minicomputer with cathode ray tube inquiry display imprinter; a complete system including software and a turnkey-type of installation including all the training that is necessary to run the equipment and operate the software. The BAT 1000 stores a week's schedule in the memory with any or all items available for inspection. When orders reach their end dates, they are automatically deleted from the program schedule by the computer. The system can be run by one person. The basic unit sells for $22,950 or leases for $527.85 a month.

A system for keeping track of vertical and horizontal spot rotation for optimum mixing was shown by a new exhibitor, Raymar Associates, Inc. from San Francisco. Raymar showed paper and display systems for instant data retrieval for traffic/sales programming/accounting/studio operations.

Here and there on the exhibit floor

The NAB Convention had its riddle product: what item was most ubiquitous yet practically unseen? No, it was not camera dollies or lenses or lights, but Insta-key. Insta-key, a synthetic, non-reflective, bonded fabric, distributed by American Scenic Company (Greenville, S.C.), was that invisible blue stuff wherever you saw chroma-key demonstrations. Miss Insta-key cloaked in a full-length cape appeared "bodiless" on cameras at booths of Gates, Philips, Fernseh, RCA, and others.

Lenses didn't exactly go unnoticed at this convention. The biggest news was the Schneider lens at the Tele-Cine booth. A new 30 to 1 zoom series was available to fit most RCA, Fernseh, Philips, Ampex, Gates, and Commercial Electronics Inc. cameras. The 30 to 1 is unusual in its small size (see picture) and weight and reasonable cost. It can operate both as a studio camera or in the field. It's the longest continuous zoom range of any announced so far. Tele-Cine also showed a new 10 to 1 TV-30 series which fits smaller cameras.

A new generation of lenses for portable or hand-held TV cameras was also shown by Rank Precision. The new series, called the Cook Varitol, makes it possible to shoot right angles from very close-up situations. Another feature of the Rank exhibit was the Varitol 30 television lens which combines an 18-inch minimum optic distance from the front of the lens, a 16mm-160mm focal length, and a keystop of 2.2. It utilizes new glass formulas and improved coatings and is available for all major broadcast cameras.

Canon showed a 34 to 1 double zoom lens: the front zoom portion gave a 17-times ratio and the rear zoom, a 2-times ratio. It is available for all one-inch Plumbicon TV cameras. The range of focal length is 24/800mm. For 1¼-inch Plum-

continued on page 54

FASTEST HANDLING SINGLE SYSTEM SOUND CAMERA IN THE WORLD.

Canon Sound Scoopic 200. A single system sound-on magnetic news documentary camera. Designed for the TV news cameraman. Without compromise. And with features long demanded . . .

REFLEX VIEWING through a 135° rotating mirror shutter. No beam splitter. **No loss of light at the film plane.**

FULLY AUTOMATIC THRU-THE-LENS METERING with manual override control. F stops visible in the viewfinder. Instant open and return diaphragm for fast focusing.

FILTER SLOTTED 12.5-75mm Canon zoom lens. Filter changeable in seconds.

REGISTRATION PIN MOVEMENT. Assures perfect framing.

ELECTRONICALLY GOVERNED MOTOR. Insures accurate sound speed.

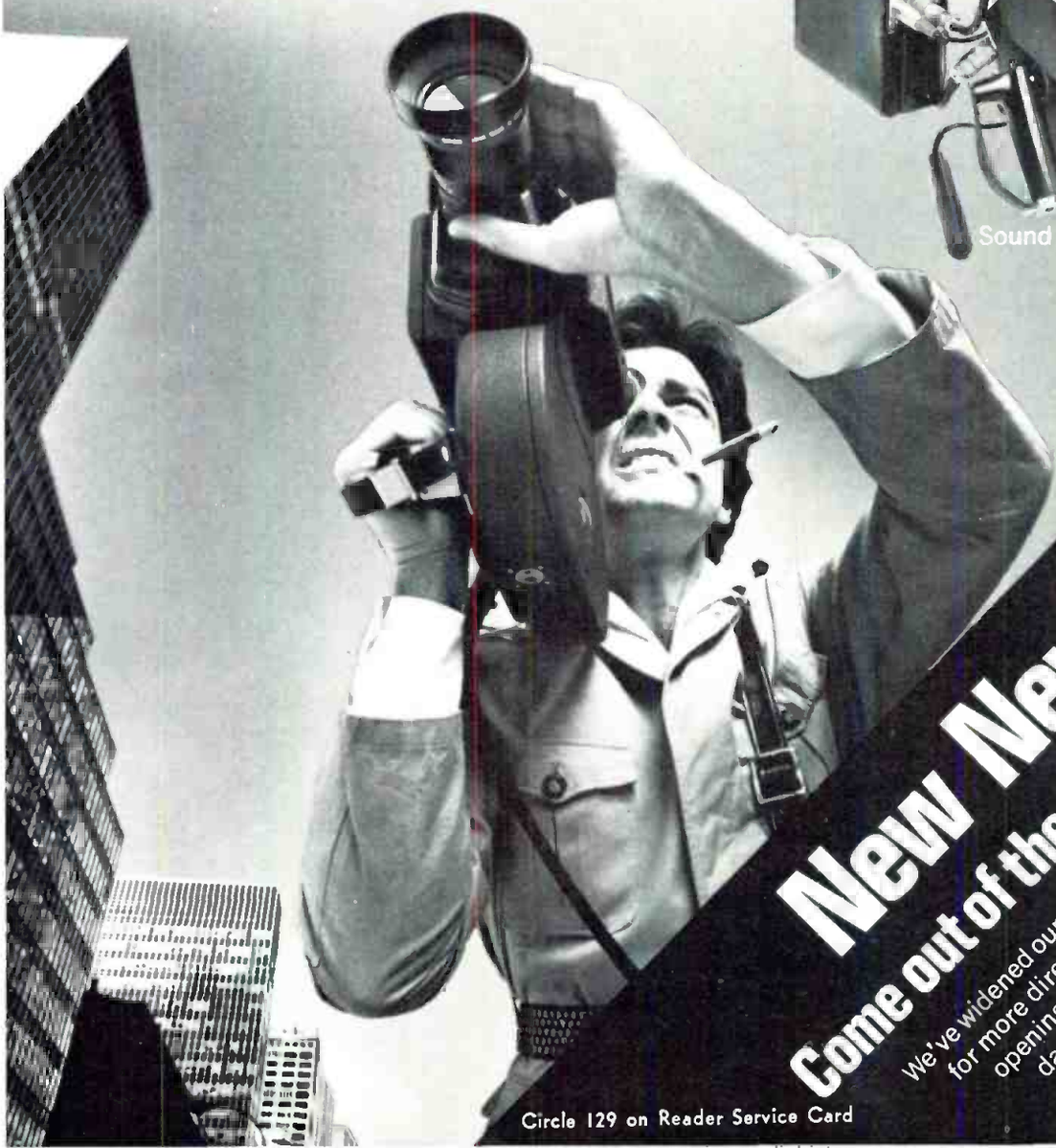
MODULAR TWIN SOUND HEADS. Snap in and out in seconds.

LIGHT WEIGHT. 12 lbs. 6 oz. Including body with film chamber, lens, exposure system, sound heads and take-up spools.

LOW PROFILE bottom load design for 200 feet daylight spools. Shoot from cars, doorways . . . anywhere.

AND MORE. A 6 lb. 14 oz. over-the-shoulder amplifier/camera power pack in a single unit. With advanced automatic gain control with manual override. VU meter. Dual mike input. And a fast rechargeable battery that powers the camera, meter and amplifier through 2000 feet of film. Recharges in under 5 hours. Batteries interchange in seconds.

Feature for feature, Canon Sound Scoopic 200 adds up to getting the news faster than ever. See it in action at your Canon dealer. Or write us for more information.



New New New

Come out of the dark with great shots!

We've widened our rotating mirror shutter angle from 135° to 170° for more direct light to the film. And we've changed the lens opening from 2.5 to 1.8. Now you can shoot in much darker areas than ever before.

At Canon we make good things even better.

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New York 11040

Circle 129 on Reader Service Card

bicon color TV cameras, Canon showed a new 12X TV zoom lens.

Angenieux showed its 15 to 1 TV lens with an extremely wide angle and close focusing feature. The majority of its display, however, was given over to lenses for 16mm motion picture cameras. Among the new lenses shown was an automatic iris zoom lens—the 10 x 12 AV30DA.

There was also some new prompting equipment about this year. Cellomatic Production Corp. (London) showed the Autocue unit described as the only flare-proof prompter in the world. That's because there are no lights shining on the script sheet. Autocue is a CCTV system—a vidicon picks up the script and it is projected on a monitor which is hung onto the studio camera lens. Cellomatic, with sales offices at 1546 Broadway, New York City, also showed a caption card scanner (feeding into a studio camera) and an interesting animation projector. Animation is created using still photography—a dual 1000-watt light optical system allows projection of composite images by superimposing one light source over the other. Eight optical effects are possible with the system.

Q-TV showed an economical CCTV system, the VPS-100. The monitor image, like the Autocue, could be superimposed over the optical axis of the taking lens.

Fax-Net Inc. demonstrated radio for the deaf. As you might guess from the name, the system uses facsimile equipment.

Among the more interesting unusual displays was a demonstration of BTVision Inc.'s over-the-air subscription TV system. Price, program, and a "barker" channel are separated from the program channel in the BTV system. If you like what you hear, you press a switch and the decoder unscrambles the program sound and picture. At the same time, a thermal printer within the unit prints the price and program number on a ticket. At the end of the month, you mail in the tickets purchased along with your payment and nobody will take away your decoder.

A frame-freeze video storage

continued on page 56

Change is in the air.

Now you can get more from your telephone. In the studio. On location. In the office.

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But with all our increased flexibility and innovative service offerings, one thing hasn't changed: Bell System dependability. Automatic test equipment monitors performance at our place, and we correct most troubles before you notice them at your place. And if you do need to call for help, it's never Long Distance. With us, it's always a local call.

For the whole story of how modern communications can help broadcasting performance and profits, telephone your Bell System Communications Consultant.

AT&T and your local Bell Company.

tube was an attraction at the RCA Electronic Components display. Two black-and-white TV monitors were refreshed 30 times a second with a signal captured by a vidicon tube and stored on the RCA C22041 silicon target storage tube. The storage tube holds a picture for about ten minutes. The Components group was also stressing a way to reduce "cavity inventory." Called the "tube and cavity" approach, the idea is to match a Cermolox power tube to a cavity. By so doing, you don't have to worry about filament resonances.

Lighting row: Colortran and Sylvania

Kliegl demonstrated its Q memory control system.

For the most part, the exhibits of Innovative Television Equipment and Quick-Set looked a lot like previous years since its hard to come up with something new in camera mounting equipment. Listec did catch attention, however, with its new low-angle dolly made by Vinten. Vinten also had some new pedestals on display at the Listec booth. Power Optics also had an unusual item: a X-Y coordinate system for moving cameras over scale models.

Among the other items on display at the 1973 NAB show were a silver, fixer, and bleach recovery system to make money out of photographic processing waste. The system was shown by Profit Recovery Systems. A series of attractive rack

systems for consoles and other equipment was shown by Amco. Amco's line was "standards with styling at a price you can afford."

In the area of lighting, memory systems, large and small, were in vogue. Kliegl Bros. demonstrated its Q-file Memory, as well as a two-scene preset system. Skirpan Used CRT/light pen control and stressed solid state dimmers, as did Berkey Colortran. Century Strand and Mole Richardson stressed lights rather than control.

Audio at the NAB

The center ring, of course, was taken up by the bevy of very pretty girls bathing in studio lights in front of video cameras. The scene was replicated on monitor screens in exhibits throughout the convention hall. Between the cameras and the monitors were often VTRs or video cart machines. Also near center-stage were giant transmitters and impressive video switchers.

Audio equipment was rarely in the center ring for understandable

3M Series 79 Synchronizer for editing.

New ITA professional reel recorder.

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reasons, but it was in the show and showing a lot of life. Many station engineers today, particularly in radio stations, believe that the audio section is now (or should be) a focus of technical advance (the other side of the coin is that it is a focus of trouble and dissatisfaction). It is clear from the earlier part of this report that transmitters, for example, are by and large stabilized in design, reliable in operation, and reasonable in price. Audio has, to some extent, missed that kind of shakedown. This is partly the result of the steady upgrading in audio standards, and partly a hangover from the old AM engineer and management attitude, now fading away, that the audio chain couldn't be less important.

Whatever the reasons for the state of audio broadcast equipment, the station operator or engineer who is in a replacement mood, whether to catch up with the progress of the art or to reduce trouble from the aging of his equipment, can plug holes in his system, or start all over, at a wide range of prices. The most interesting new items at the NAB show were in the areas of tape recorders and consoles. The other audio elements were there too, and the total effect gave assurance that the audio section can be raised to the state of the art in a variety of ways, a matter of special interest to FM station operators who are competing for the young public with its high audio expectations.

Lineup from Revox.

New Electro-Sound ES-505 professional recorder.

New logger from Tape-Athon.

Open-reel machines: At the top

The general level of open-reel tape performance has shot up in re-

cent years, and the show gave us another look at the fairly familiar top-grade machines of Ampex, 3M, and RCA. Aimed straight at the broadcaster was 3M's new M79 Series of machines using ¼-inch tape and available in 2- and 4-track configurations. The control system on these machines looked extremely well throughout and adaptable to day-to-day broadcast routine.

Also on display were some multi-channel machines designed primarily for recording studios. Such machines, especially up to the four-channel level, are beginning to attract good-sound-minded broadcasters who like the audio creativity possible with multi-channel mix-down. The latest big-firm machines give the station operator full assurance of audio at the top.

The number of smaller firms bringing out high-performance tape machines aimed specifically at the broadcaster, like the 3M series noted above, is an important sign of the times. New machines were put on view by Electro-Sound, International Tapetronics, Scully-Metrotech, L. J. Scully Manufacturing Co., Sparta, Telex, Tape-Athon, Studer (new to U.S. and available here through Gotham Audio of New York), and Revox who was on hand with its not-brand-new but important machine. Any one of these machines is likely to make a dramatic improvement in radio station audio quality, if the machines now in use are matching (or perhaps no longer do match) the standards of seven to ten years, or more, back.

Beyond performance standards, these machines, almost to a man, are remarkably well engineered for easy, strain-free day-to-day use. They have reduced the chances for operating goofs or tape mishandling to the lowest level ever, and in general give the operator a breeze of a task.

For example, Electro-Sound's new ES-505 series has a built-in test generator for quick daily check-out. It also has motion sensing of the tape; push the play button when the tape is in fast motion and the machine brings the tape to a stop, goes into play with no snaps or jerks. The same effect is provided on the new Scully-Metrotech 280B series with an optical motion sen-

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New Scully-Metrotech 280B series.

Systems from United Research Labs.

sing system the maker calls "Optak." The 280B machines are particularly compact, easy to get into, easy to use.

L. J. Scully's new LJ-10 has motion sensing built into its mode logic circuits, as has the Studer A80, with a memory bank in the completely solid-state motion control system that stores, commands, and issues them in a logical order for safe and easy tape handling. The motion sensing system on the Studer A80 is also opto-electronic, scanning the rotation of the right-hand tape guide roller. This highly sophisticated machine, widely used in Europe, has electronic control of the torque on both reels, fed by tape tension sensors, to keep tension on the tape constant and proper in all modes.

Most impressive about the new machines are the performance specs; for several years the best professional tape recorders have

been pushing against performance limitations in an area where further advance comes hard. But the latest high-quality machines have, in many cases, managed substantial advances.

For example, RMS flutter is becoming available in a number of machines in the range below about 0.07%, and that is excellent. Frequency specs, of course, cover the entire audio range within a dB or two. Signal/noise is in the 60-70s.

The Revox A77 has carved out a niche of its own in FM broadcast stations. Less expensive than the others mentioned, it has supplied many smaller FM stereo stations with a very high-quality per-dollar ratio. Though obviously not as sophisticated mechanically or electronically as, for example, the far more expensive Studer A80, the Revox has satisfied the audio need in many cases. Tape-Athon's new Model 1001 demonstrated outstanding good motion by playing a music program at 15/32 ips, without obstrusive flutter. This makes

New Centurian console from Sparta.


Consoles galore from CCA.


Custom console from McCurdy.

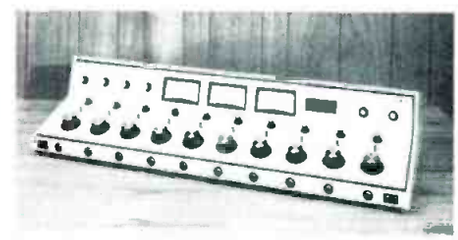
continued on page 62

the machine usable for high-density storage, as well as for high-grade playback at standard speeds.

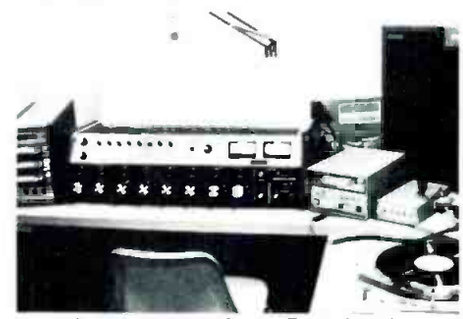
Mention of the "L. J. Scully Manufacturing Co." above needs comment. It signifies the re-entry into tape-recorder making of Larry Scully, a long-standing pioneer of the industry in disc cutters and tape machines, who, some years back, sold his line of tape machines to Metrotech. The excellent new machines bearing the Scully-Metrotech brand, noted above, indicate that we are going to have a bit of a "Scully vs. Scully" battle, with both sides having plenty on the ball. The "original Scully"—or L. J. Scully Manufacturing Company—has been set up in Bridgeport, Connecticut, and the first model in the line, the LJ-10 mentioned here, cues us to expect state-of-the-art machines from this source. Nagra was on hand with its long-established portables, including the more recent miniatures that cram high quality into two-hand size.

Pick-up equipment from Micro-Trak.

Fairchild/Robin economy console.



New stereo unit from Collins.



Turnkey systems from Broadcast Electronics.

Consoles—You name it

If tape machines are pushing hard on the performance frontier, consoles are pushing a little harder (and, lacking the inherent slippage of the tape recording process itself, a console can be just a little more "state-of-the-art" than a tape machine).

Besides the advances in performance specs, there is the broad widening of console versatility, in the sense that a console can now be found that fits just about any operation need, without extra, unneeded

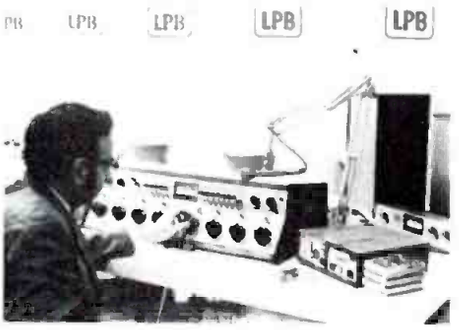
capability that adds unnecessarily to cost.

For example, there is the brand-new Fairchild/Robins Model 30001, a five-channel economy monaural console, priced at $750, but built with many of the same modular units that go into the top-of-the-line stereo model, the 30082. Both are in Fairchild/Robins new 30000 series introduced at the show, and available *off the shelf*. This modular approach, now fairly widespread as *BM/E* noted in the December audio issue, gives the simpler consoles essentially the same performance quality as the more complex and expensive ones. *One set of specifications covers the whole line*. And very good specs they are.

Similar versatility, with uniformity of performance, was evident in Collins Radio Company's brand new line of consoles. In two configurations, ten-channel and six-channel, the eight models in the new line can be converted from mono to stereo at any time by adding plug-in amplifiers. Collins, like all the others noted here, has thought hard about what a broadcaster needs to perform all the console functions. The result is a very complete set of monitoring, cueing, and other operational features.

Portable consoles have usually suffered, as far as quality goes, in comparison with the larger desk or cabinet units. That is not true any more, at least for a number of the newest portable units. Take the Neve PSM series of portables, introduced at the show. These units are a totally different breed from what we used to accept as a "portable." Specs of the PSMs match this maker's large cabinet models—and those are specs very close to the technical limits of the art, distortion all the way through of 0.02% at 20dBm output, for example. Again, the modular concept is used to excellent advantage; you can buy as few or as many channels as you need, up to the maximum for which the unit has physical space. In the case of the PSM, the total is 8 or 12 stereo or mono channels, depending on the model. Each channel has adjustable equalization, with a "presence" control and high and low filters, plus a dazzling set of control facilities, including output selection switch and pan pot, foldback mix, auxiliary mix, phase reversal button, fader, and others.

Audio at RCA.



Economy systems from LPB.

Also in the "portable" but high-quality category were the Lamb control units, from England, demonstrated in a mini-studio set-

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Custom consoles were promoted at Neve.

up by Revox, along with Beyer microphones and the Revox tape machine. The listen-back, when *BM/E* visited the "studio," was highly satisfactory, and the whole operation took up one corner of the area.

Also new at the show was Gates' Stereo 80 console, with 18 inputs switchable to eight mixing channels and, again, a full complement of switching facilities and extremely low distortion.

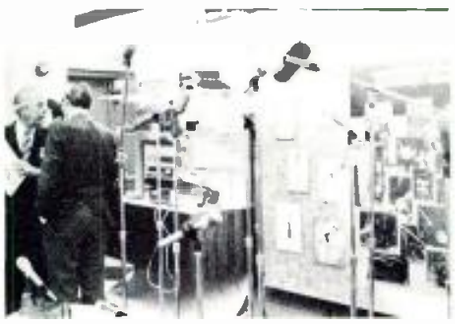
The spectrum of console choice was further widened by a number of other excellent, but somewhat different, approaches to console design, like the McMartin series, well-laid-out for applications where a desk-top unit with large, vertically-mounted rotary fader controls, is wanted. McMartin's specs are up to top with the rest of the best. Spotmaster's Model 8M20 looked similar in external design philosophy.

McCurdy Radio's line was there to show another approach to styling, with low, nearly horizontal panel for slide or rotary faders. Again, performance was not a main factor in choice, since splendid performance was available here too. Another console maker using the low sloping panel approach was United Recording Electronics Industries, showing a modular line with a great many features aimed carefully and thoughtfully at broadcasting.

And a third new line in this very-low-profile, very compact console category was introduced by the new "conglomerate," Cetec, with its Langevin Series 10 Audio Control Center; it has ten stereo inputs (20 individual inputs), switching to one or two output channels, and the other operational features needed

Preamplifiers from Micro-Trak

Turntables from Gotham



Microphones from Shure

for broadcast use. Cetec products were shown at the TeleMation booth. In the same stylistic vein was a new console from Sparta. It is so new specs aren't available—you'll hear more about it in the future.

At what must be near the bottom end of the console price (but not quality) scale was the new S-9B shown by LPB Inc. and quoted at $475, with eight inputs, four controlled, and a very compact form which ought to make it attractive for many smaller operations. LPB also showed its larger consoles, including the S-15, with 19 inputs, eight mixed, two output lines.

Microphones, pickups, auxiliaries

The trend in microphones toward the higher-quality designs was most evident at the show. Gotham Audio showed the Neumann condenser and dynamic models. AKG's line was supplemented by the new CK-8 short-shot-gun condenser model, for high directivity, and the new C412, one of the first condenser microphones with four switchable patterns: omni, figure 8, cardioid, and super-cardioid.

Revox, as noted already, showed the Beyer microphone line, and new there was the very compact M301 dynamic with super-cardioid pattern, intended specifically for broadcasting. Shure Brothers had on display many models from its very extensive line.

Microphone quality is hard to demonstrate under show conditions, but a rising emphasis on quality is emerging unmistakably according to conversations with the microphone makers. Sales to broadcasters are clustering more and more in the upper part of the quality spectrum. All the microphone exhibitors at the show had a range of models that included a number at the top of the quality scale.

Disc pickups were covered by two firms that make what are surely the main workhorses of broadcast disc playing: Shure and Stanton. The current models of both makers are pretty familiar; it would be very hard to beat either the Shure V-15

continued on page 66

or the Stanton 500 or 681 series. Although neither firm was saying anything for publication about future models, there are rumors that both are well-advanced on new designs that cover comfortably the range up to 40 or 50 KHz, in anticipation of use with the discrete four-channel disc system. Such pickups will naturally be splendid performers on two-channel discs too. Thus it seems likely that when, or if, a discrete four-channel FM system comes into use (an event now shrouded in uncertainty), the disc playback equipment will be available from a number of best-known sources: Panasonic and JVC have already announced pickups for the system.

In the area of studio equipment—arms, turntables, preamplifiers, etc. —Micro-Trak showed a very complete line. This includes the new "T" line of loudspeakers, with models designed for different monitoring applications.

In sum: Audio is alive and well

The fact that the audio side of the show had so much life and thrust, even under the shadow of the much more exciting and important video and transmitter exhibits, demonstrated again the upsurge of maker and consumer interest in sound quality, evident at so many of the recent consumer and industry trade shows. An exploration of NAB '73 was completely convincing of the fact that the industry is responding to a strong audio interest. The broadcaster who wants good audio can get it—in fact, by reasonably easy choice, and by spending what are small sums compared to the cost of most video and transmitter equipment, he can have superb audio.

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Circle 175 on Reader Service Card

Maintenance & Calibration of the Low-Cost Color Teleproduction Center, Part I

by Oliver Berliner

Do yourself a favor and (if you're a cable operator) provide a desperately needed additional service, that CATV subscribers will bless you for, with the procedures suggested here.

HAS IT OCCURRED TO YOU that most people have no idea how to set the *brightness, contrast, color intensity* and *hue* of their television receivers? (Do *you* know . . . for sure?) With test equipment every cable operator should possess (and every sophisticated CCTV colorcaster, too), the CATV system can make possible the "calibration" of every subscriber's receiver. Not only will this provide the obvious benefits of greater television enjoyment, but it will reduce complaints of "poor picture" from subscribers.

Why not transmit on a spare channel, or on your origination channel, a half hour (for example) of test signals to permit subscribers to set up their receivers? These transmissions could take place at say, 9 a.m. and 9 p.m. daily. They might consist of a ten-step staircase followed by NTSC colorbars alternating in five-minute increments for a half hour. Superimposed over the "step" pattern for the first minute out of each five-minute segment might be a "billboard" as shown in Fig. 1. For the first minute of each five-minute colorbars transmission, you might superimpose the description shown in Fig. 2.

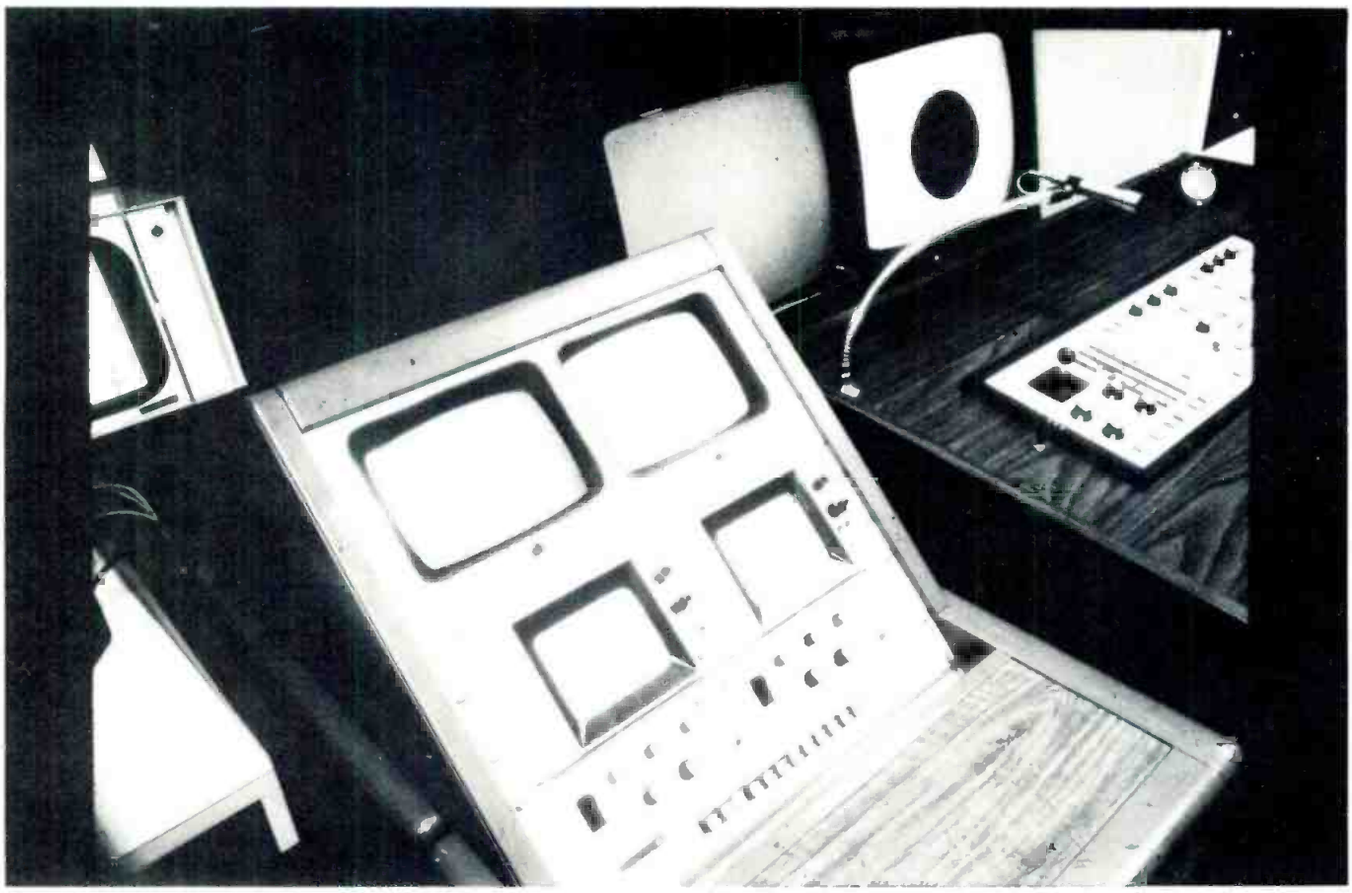
"But these test generators are expensive!," you cry. Well, if you're a cable operator doing program origination, surely you'll want to calibrate your *own* studio monitors . . . unless you want to look as *bad* as possible in comparison to the commercial stations you carry. Believe it or not, monochrome monitors are used for the bulk of camera setup work, and *they* must be calibrated *before* you set up your color cameras. Then, your (calibrated) color monitor is used for precise camera-matching comparisons. In most instances you needn't purchase a colorbars generator because your camera's encoder already contains one.

Your local newspaper should be only too glad to mention in each daily or weekly TV program listing the service that you offer your televiewers. It goes without saying that you will find it worthwhile to transmit these patterns, along with multiburst, throughout the day to test system quality at whatever points your technicians require. Multiburst is a beautiful quick-check on your studio's and transmission system's frequency response, the pattern displayed being that of Fig. 3A. The burst pattern usually consists of a white flag followed by short-duration oscillations at .5 MHz, 1.25 MHz, 2 MHz, 3 MHz, 3.58 MHz and 4.1 MHz.

Using a monitor of bandwidth known to be flat far higher than these frequencies, the display will then quickly indicate the system's frequency capabilities. The burst wherever you cannot differentiate the white from the black vertical lines is the bandwidth maximum of your system. Fig. 3B is a waveform display of the multiburst. Note that the waveform monitor shows a slight falling off of linearity at the higher frequencies (wedge-shaped instead of rectangular-shaped display). It is not recommended that multiburst be used by cable subscribers for they may very well end up blaming the cablecaster for their receivers' bandwidth limitations. Fig. 4 shows both waveform and picture display of the previously described "step" pattern.

The waveform monitor is your best friend in the television studio. It tells you things that a video level meter either cannot reveal or discloses very inaccurately. Quick confirmation of this may easily be achieved by setting a camera's iris or target control to "automatic" and observing picture quality (on your color monitor) and output level (on your waveform monitor). Compare your waveform monitor's indication with that of the meter on the camera control unit. Most likely their indications of picture intensity will be quite divergent. Then, turn the camera's control to "manual." You will no doubt be able to manually improve picture quality to a very noticeable degree—as observed on your color monitor and in reliance upon your waveform monitor. In addition, the WFM will display picture disturbances and "spikes," not shown on any meter, sync-pulse intensity, some scene lighting deficiencies, picture strength in *each* portion of the scene

Mr. Berliner is president, Telaudio Centre, Burbank, California.



and, of course, *true* video output level of the camera, program line or videotape recorder to which it is connected.

Whereas there are now WFMs inexpensive enough to permit you to buy one with *each* camera and another for the program line, you may wish to augment them with one of the more costly units that is capable of displaying Vertical Interval Test Signals (VITS). One of the niceties of television is that it permits system testing during program transmission without interference. The networks are virtually always transmitting VITS, and many local stations transmit them via their microwave from studio to transmitter to test transmitter quality (as received back at the studio). These VITS are available to you, the cableman. Use them! They are customarily transmitted simultaneously on lines 18 and 19 of the *odd* fields, and also on the same lines of the *even* fields. Furthermore, there is nothing to prevent transmission on lines 16 thru 21 . . . or any of the first 21 lines which comprise the vertical blanking interval. (These lines are not displayed on the TV screen.)

A WFM equipped for VITS display permits you to select any line, from 16 to 21, of either field, and to see what is being transmitted at those times. You will be amazed to see multiburst, $\sin^2$ pulse, "window," staircase, 2T bar, 12.5T bar, and (oh, my gosh) VIR signal. To prevent these innumerable simultaneous tests (inserted by an inexpensive VITS Inserter device) from "splattering" into the program area, they are transmitted at reduced intensities. Let's look at some of them.

Instead of full-intensity transmission, the multiburst usually consists of a 100 IRE-units *burst flag*, whilst the multiple bursts are at only 70 IRE intensity. You might look for this on line 18 of field one. On the corresponding line in field two, you should expect to see colorbars saturated 100% but of 75% amplitude. Now, if at the same time you were to look at line 19, field one, you may see (the ever-present color reference burst plus) modulated five-riser staircase followed by 2T $\sin^2$ bar (.25 microsecond duration) followed by 12.5T modulated $\sin^2$ pulse (1.571 microseconds), all this preceding 18 microseconds of white ("window") at full level. The *modulated* staircase can measure burst phase errors in stabilizers and clampers, plus incorrect white-clip level. The 2T pulse is useful in checking frequency response by comparing its height with the height of

Control room of United States Gypsum Co.'s TV production center is good example of a well-equipped operation. Photos top and left show TV switching and audio control areas. Three large monitors are line, camera 1, and camera 2. The small monitor, next to the larger ones, is a cross-pulse monitor for checking tape tracking, tension, and overall VTR stability. The camera control unit shows monitors for each camera and two Tektronix 528 scopes. Gray box behind turntable in audio area is a tone oscillator for setting audio levels.

Audio and visual rack is shown in photo below. (It's located behind the audio console.) The video rack contains, below the VTR monitors, a 3M drop-out compensator, a Dynascience image enhancer, a Tektronix test set 146 including sync generator, stair step, bar dot, and color bar generator. There's also a Tektronix oscilloscope between the VTRs.

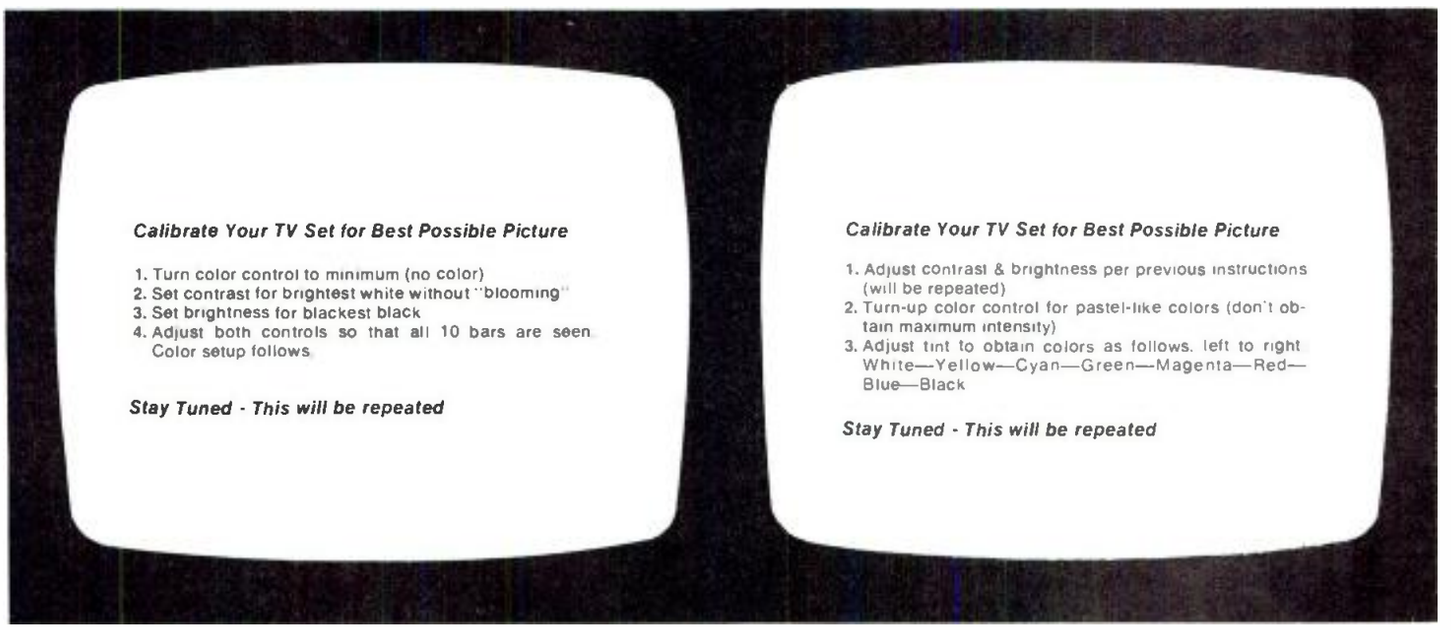


Fig. 1. Superimposed viewer instructions over first minute of staircase pattern transmission to help subscriber set his receiver luminance.

Fig. 2. Superimposed viewer instructions over first minutes of colorbars pattern transmission to set receiver chrominance.

Fig. 3A. Multiburst test signal gives quick check on system's high frequency response.
Photo courtesy Ultra Audio Products.

Fig. 3B. Waveform monitor display of multiburst. Note slight high-frequency roll-off creating wedge pattern.
Photo courtesy Ultra Audio Products.

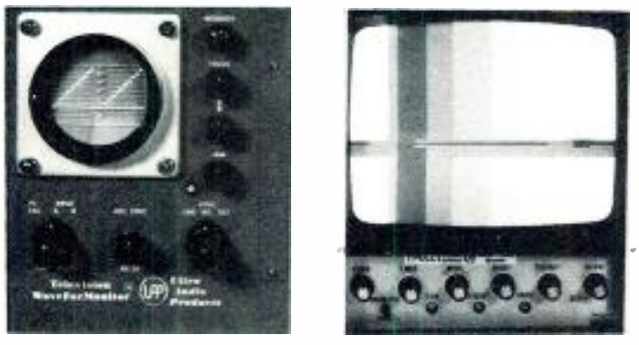


Fig. 4. Waveform and picture display of ten-step staircase pattern. Video monitor in pulse-cross mode shifts display, shows horizontal blanking and equalizing pulses from the sync generator.

the window, but this is usable only in response to 3 MHz. Beyond this frequency, we must use the 12.5T pulse as we enter the "chrominance area" to check relative chrominance/luminance gain and delay which cause saturation errors and color registration problems. Delay distortion, such as observed when colors "bleed" to the right side of the screen, means chrominance delay . . . and color misregistration.

The 18 microseconds of bar signal is under the control of a 2T sin-squared filter. If it is undistorted the system can be deemed free of "tilt" (low-frequency distortion), smear, and streaking. There is a special graticule useful in checking 2T and 18-microsecond signals. It is called the *K graticule* and, in the case of the former pulse, it allows comparison of the rise and fall times of the 2T pulse against the gradations printed on the K-factor scale. If the slope(s) of the pulse does not parallel the printed slope, meaning the rise and fall times are not symmetrical, quadrature distortion is present.

Truly, the waveform monitor is your best friend . . . and your best investment. Here's food for thought: One of the reasons that multiburst is transmitted in both fields during VITS-casting is that, if it were inserted in only one of the two fields, certain receivers might show *flicker*—very low-frequency fluctuations—because of AGC level changes from field to field (30Hz).

To conclude Part I, let's return to VIRS . . . Vertical-Interval Reference Signal, which are proposed to be transmitted on line 20, both fields. It consists of the customary 12 microseconds of horizontal blanking with color burst. Then the reference signals begin: (1) 24 microseconds of 3.579545 MHz at zero degrees phase (the same as the color burst should be) and with the same 40 IRE units of amplitude, but beginning at the luminance reference point on the graticule (50 IRE, known as "Y-level"). To put it another way, the chrominance reference bar is of 40 IRE amplitude modulation and is generated at the 70 IRE level. Equipment in the system that shifts the phase relationship of color sync and chroma-bar will be exposed via the VIRS by comparing the burst phase of these two.

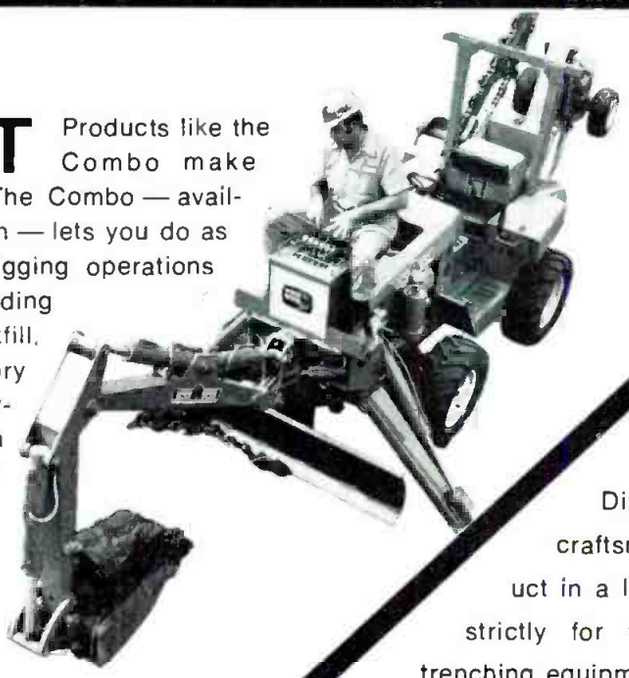
Next follows 12 microseconds of Y-level at 50 IRE intensity. Now, if the chroma-bar is not sitting precisely at this Y-level point, the luminance/chrominance relationship is upset and must be corrected. Finally we observe 12 microseconds of black-reference (7.5 IRE level), and with this at 7.5 and luminance-bar at 50, luminance level is normal. Added to all this is 3.5 microseconds of "front porch" going into horizontal blanking and we have the total time of one TV line—63.5 microseconds. In closing it must be pointed out that distortions observed via the VITS may be caused by the television stations and not the cablecaster's equipment. But you won't know it until you've compared various stations as seen on your system.

This series will continue with Part II . . . covering, among other things, all the equipment you need for studio-equipment repair and maintenance—and the way to go about it. **CM/E**

WHAT MAKES DITCH WITCH THE LEADER?

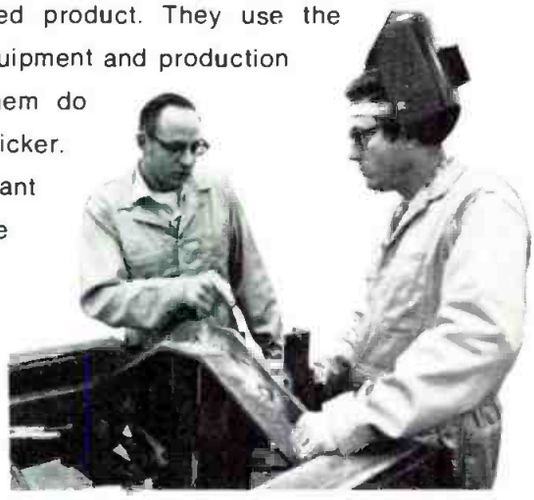
PRODUCT

Products like the Combo make Ditch Witch the leader. The Combo — available only from Ditch Witch — lets you do as many as five different digging operations without changing or adding attachments. Trench, backfill, do backhoe and vibratory plowing operations or hydraulic boring — all with the same machine. The Combo is available in 30-HP, 37-HP and 65-HP models. All its components are tried and proven and each incorporates design superiority which enables Ditch Witch to outsell all its competition combined. The Combo lets you keep equipment costs down by doing more jobs with one machine. Let us show you what a Combo can do on your job site. There's no better way to see why Ditch Witch is the leader.



PEOPLE

Ditch Witch factory workers are craftsmen who build a quality product in a large, modern plant designed strictly for the efficient production of trenching equipment. Starting with top-quality raw materials and components, Ditch Witch experts shape the parts and carefully assemble them into the finished product. They use the most up-to-date equipment and production techniques to help them do their job better and quicker. But there's another all-important element necessary. It's a genuine concern for doing their best — a conscientious attention to every detail. And it shows in every Ditch Witch trencher. With people like these on the Ditch Witch team, it's not surprising that Ditch Witch is the leader.



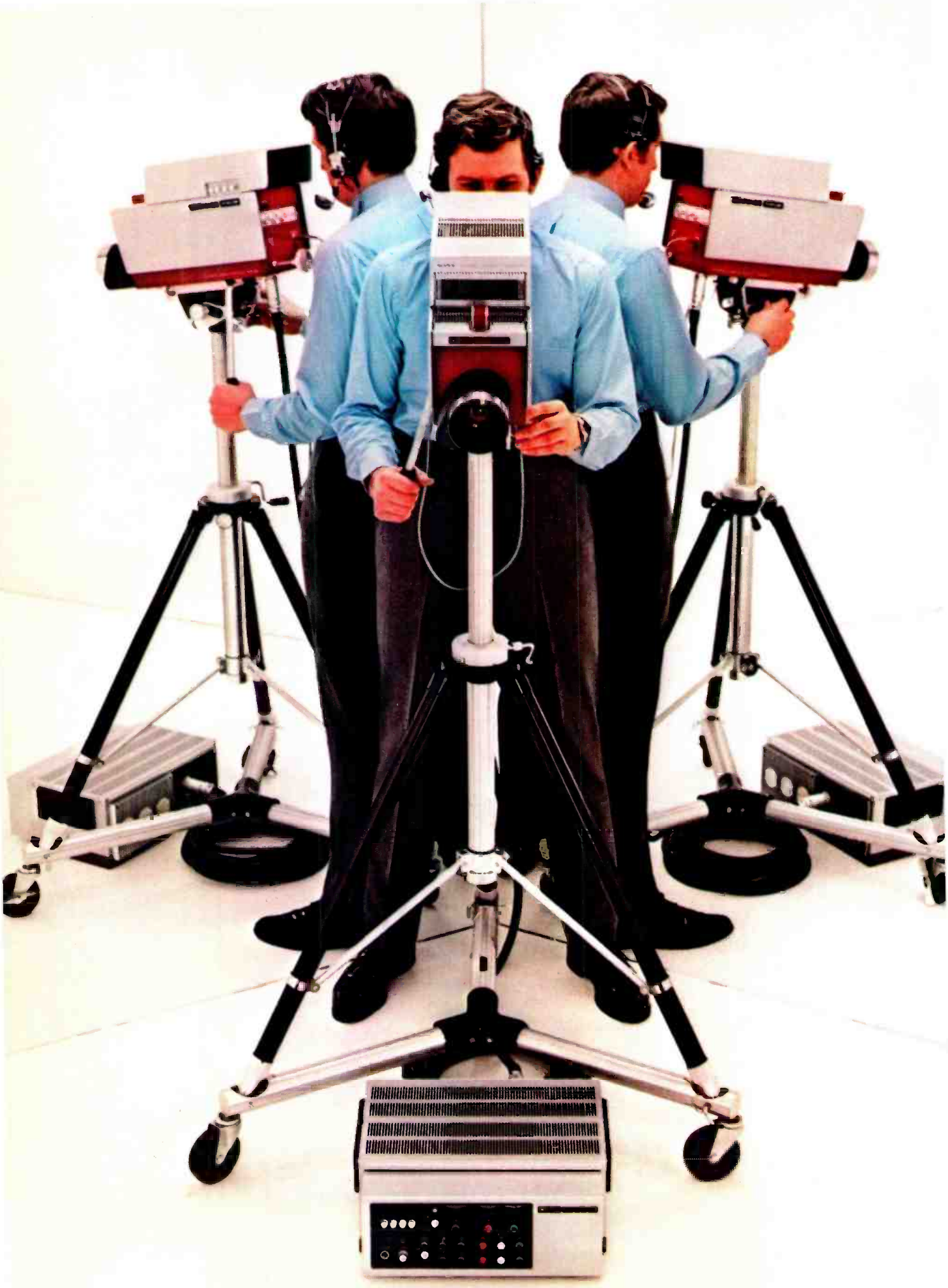
FOLLOW THE LEADER!

DITCH WITCH

. . . offering a full line of trenching equipment from 7-HP to 65-HP.

CHARLES MACHINE WORKS, INC., P. O. Box 66, Perry, Oklahoma 73077

Circle 176 on Reader Service Card



Introducing: The new Sony DXC-5000B color video camera.

It really puts you in control.

Meet the color video camera that gives you life-like pictures . . . right out of the packing carton! We call it the Sony DXC-5000B Color Video Camera . . . you'll call it great!

This is the color camera that gives you professional results . . . first time out . . . whether you're an old timer in VTR or just getting into this dynamic business. Fits right into just about any application like business, industry, CATV, medicine, science and any educational TV system. With its Tricolor Balanced Two-tube System featuring a Color Dissector Tube Assembly, the Sony DXC-5000B delivers faithful color signals . . . always.

Hook up the DXC-5000B and you'll quickly appreciate its features like the manual and automatic gain control, the master and individual white balance controls (with meters), the master and individual pedestal controls, the master and individual level controls, and a special aperture control, which we call an image enhancer.

Pound for pound . . . and the DXC-5000B weighs only 27 pounds . . . you'll find this color camera a rugged, compact, reliable performer under just about any and all operating conditions.

If you're thinking about the next step after black and white VTR, the obvious answer is color. And if you're looking for a color system that delivers quality, look into the new Sony DXC-5000B Color Video Camera . . . it's the one that gets you operational just as soon as you get it unpacked!

For more information on the Sony DXC-5000B Color Video Camera, mail the coupon today. It'll get you right into the picture.

SN-103A

SONY®

Sony Corporation of America
Video Products Dept. BME-053
47-47 Van Dam Street, Long Island City, N.Y. 11101

Gentlemen:
Please send me more information on your DXC-5000B color video camera.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

PHONE (AREA CODE) _____

CITY _____ STATE _____ ZIP _____

See us at NCTA Show

Circle 177 on Reader Service Card

For demonstration:
Circle 178 on Reader Service Card

U-matic* Proves Easy to Operate, Economical for Meadville CATV

Pioneer in local cable programming switches to Sony videocassette equipment

ONE OF THE NATION'S FIRST cable television companies to initiate its own programming has added Sony U-matic videocassette equipment to record and cablecast a wide variety of events for four hours each day.

Meadville Master Antenna, Inc., serving the television needs of over 8000 families in the hilly Meadville area of northwestern Pennsylvania, has been in operation since 1953. The cable brings 12 channels, including its own daily programming on CTV-13, Channel 13. It began programming over five years ago.

Jim Strickler, the knowledgable, straight-talking Meadville cablecasting director, admits he selected Sony U-matic because of the economics. "The U-matic is one of the easiest, most inexpensive means

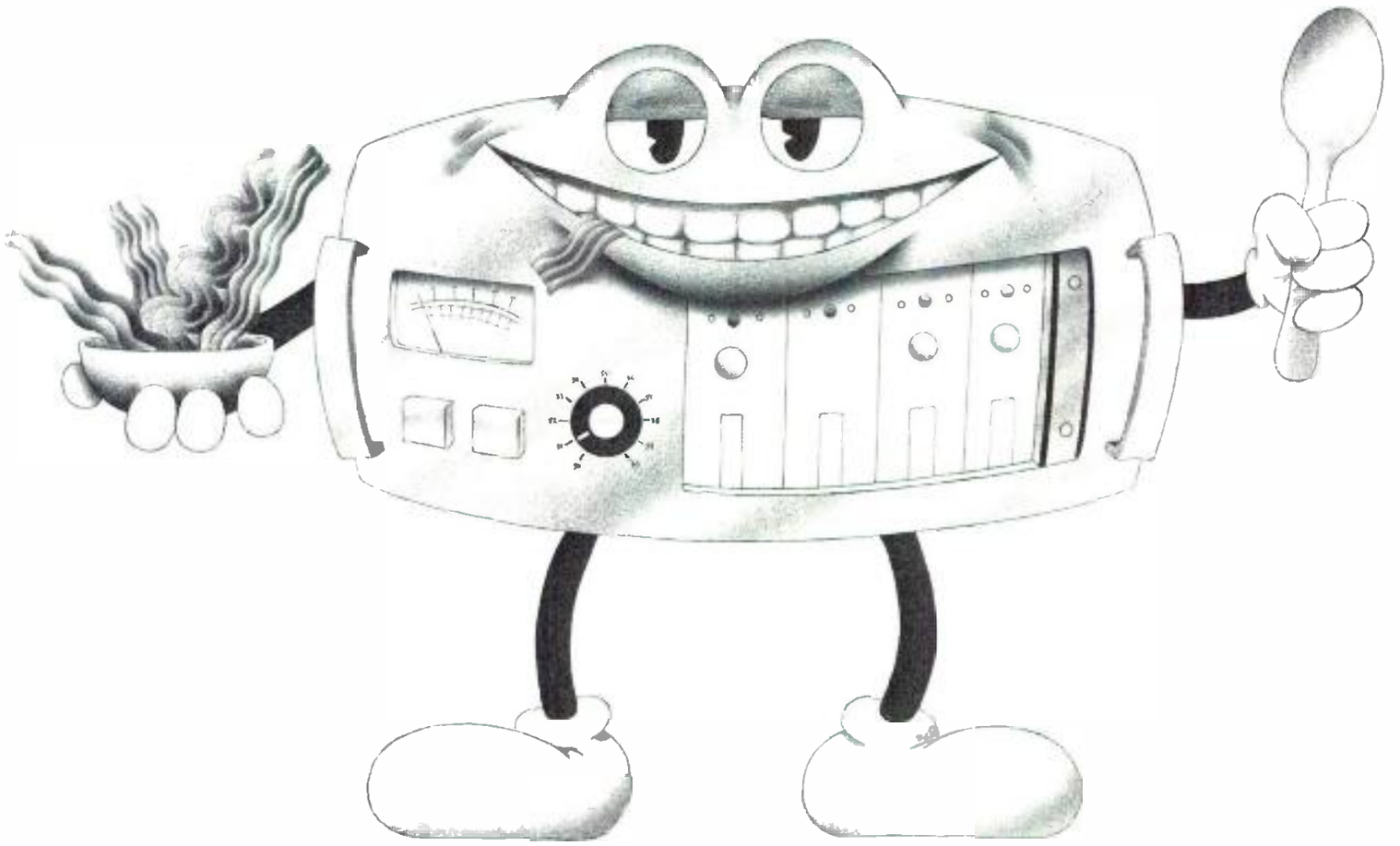
continued on page CM/E-12

*Trademark of Sony Corp.

Meadville's Sony U-matic videocassette system is located in a special drawer/cabinet in the modern control room, so that it can be conveniently pulled out when operational.

Maintenance cost has been insignificant, despite the fact that 20% of the programming and all of the commercials are currently on videocassettes.

Have You Met Our Co-Channel Beat Eater?



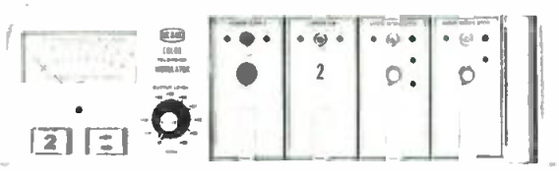
It's EiE's phase-lock color television modulator, a very important unit in your CATV system—important because it eliminates the co-channel beats which result from direct "off-air" pickup in strong signal areas. By synchronizing the modulator output to the interfering broadcast signal, our CTM2 Phase-Lock Modulator allows you to "reclaim" and utilize those cable channels which have been vacated.

The model CTM2 is only one in a series of broadcast quality EiE color television modulators which includes: the CTM1 standard modulator; the CTM3, for microwave applications; and the CTM4, a phase-lock version of the CTM3.

All CTM series color television modulators feature modular design, low differential phase and gain distortion and minimum group delay. Spurious beat suppression on all channels is in excess of 60 dB below visual carrier at +60 dBmV (maximum output) without the use of external bandpass filters. An optionally available network provides group delay predistortion characteristics which conform with FCC transmitter requirements.

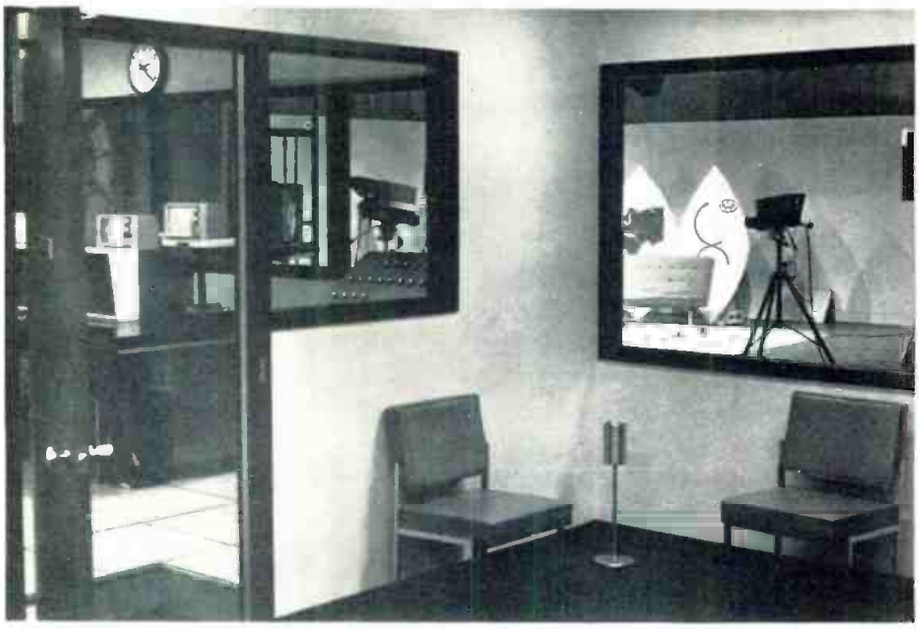
Call or write today for more information on EiE's complete line of headend equipment.

Electronic Industrial Engineering, A Division of RCA
7355 Fulton Ave., N. Hollywood, CA 91605
(213) 764-2411



EiE Electronic Industrial Engineering
A Division of RCA

Circle 179 on Reader Service Card



Organized in 1953, Meadville Master Antenna, Inc., including CTV-Channel 13, is one of the cable television pioneers. They have led the way in such developments as the increase from three to five channel capacity in 1957; utilization of aluminum sheath cable to provide 12-channel capacity in 1963; and system extensions in 1964 and 1965, establishing the feasibility of long distance 12-channel service. The studio is attractive and well equipped.

Jim Strickler, left, Meadville cablecasting director, meets with B. J. Smith, host of Channel 13's "World Wide Travel Show" on one of the company's expansive sets. The CATV company has been presenting highly successful regularly scheduled programs for five and one-half years.

of initiating program origination. It gives cable companies in the small, less populous areas of the country a way to start without the huge capital investments that would take many years to recover.

Strickler moved into videocassette equipment cautiously, with limited enthusiasm. "We had been working with quite complex and quite expensive equipment. Each unit** costs five to six times as much as the U-matic. Our problems were continual hooking, flagging, and an occasional vertical bounce. Everything would work fine with a unit, and then a mechanical problem would put it on the shelf for a week or more. The U-matic now provides many of the same features as the complex equipment, costs significantly less, and has eliminated many of these problems."

**Ampex helical VTR models 7800 and 5800. Meadville also has an older 7500 unit.

No hooking and flagging with U-matic

Strickler estimates that the yearly maintenance cost for one unit of his older equipment is almost as much as the total cost of one U-matic unit. "We could use the Sony for a year and throw it away for the same money," said Strickler, who has no intention of throwing it away. "The hooking and flagging are virtually nonexistent, and maintenance has not cost a significant amount, despite the fact that 20% of the programming and all of the commercials are currently on videocassettes.

"Furthermore, an important plus is the fact that a system with existing equipment can add a U-matic unit for backup, which brings much needed stability to the overall operation."

The U-matic has, of course, limitations. One can't do assembly edits. In fact, it's not easy to cue at all accurately with the U-matic, and the cue time varies

continued on page CM/E-14

AMPEREX PLUMBICON*
TV CAMERA PICKUP TUBE

This is the tube
that was in the camera
that revolutionized TV broadcasting
seven years ago.

This is the line, the only line that includes all four types of one-inch camera tubes currently used in today's TV cameras.

Amperex, who gave the TV industry the Plumbicon camera pickup tube seven years ago, is the only manufacturer of all of the four types of one-inch pickup tubes used in today's TV cameras.

Recognizing the obligations that have accrued to us as the number one source for the component that is the heart of the TV camera, we extend an invitation to anyone who is contemplating the purchase or the design of a TV camera system to discuss his specific requirements with us, with complete confidence in the objectivity and validity of our recommendations. Whatever the application —color or black and white, telecasting or video-taping, CCTV or CATV, industrial, educational or medical, surveillance security or military reconnaissance.

Electro-Optical Devices Division,
Amperex Electronic Corporation,
Slatersville, Rhode Island 02876
Telephone: 401-762-3800

Amperex

TOMORROW'S THINKING IN TODAY'S PRODUCTS

Sold through
North American Philips Electronic Component Corporation

*Trademark of N.V. Philips of The Netherlands

Weekly programming fare from CTV-13. This summer, schedule will start at 6:00 p.m.

depending on where one is on the tape. But Meadville operators have learned how to adjust for these variabilities and allow a different time for pre-roll depending on what the tape counter is registering.

The bulk of CTV-13's programming is taped for later play—or replay of repeated programs. When the tape complement consisted of two reel-to-reel units and one cassette, the practice was to put commercials on the cassette unit and the programming on the reel-to-reel. For back-up protection, the commercial was also ready for play on one of the reel-to-reel units. The cassette unit has worked out so satisfactorily that another has just been purchased. Since flagging is less, the cassettes will be used for both programming and commercials.

Most of the commercials going on the cable are locally-produced by Meadville Master Antenna. Much of it is shot in the studio on the company's standard helical units which have edit capability. The finished products are then dubbed to the cassette format.

Readers may recall that Meadville did experiments with shooting commercials using 16mm film equipment several years back. This turned out to be too time consuming. Now film commercials are used only if they are supplied by the advertiser or agency.

CTV-13 does not, incidentally, do a locally-produced news show. Frequently, however, some in-depth reports are done on a subject of local interest. Material is taped, either in the studio or on location, using a remote van.

Going onto tape are the daily "Dottie Armour Show" which includes interviews with interesting personalities as well as reports on interesting events in the area. There is some fairly heavy religious programming done locally—using ministers from two different groups. Generally, the religious leader comes to the studio and tapes two segments at a time.

Quite a number of programs have been produced in cooperation with two local colleges. In fact, many of the programs are produced by students from Allegheny College's Communications Department who are working for credit. These students will interview college luminaries, do documentaries, etc. A local professor also does a regular series on political or world affairs. These are cablecast for the enjoyment of cable subscribers. The professor gets a personal satisfaction out of doing them, but frequently assigns students taking his courses at the college to watch them. All of this taping is done at the Meadville studio.

A program, "Understanding Children," is produced for cable viewers by psychologists from nearby Edinboro State College. In this instance, tapes are made at the college and shipped in. Edinboro has both Ampex and Sony U-matic equipment, so compatability is no problem.

One of the few programs that is done live is "Lucky 13," a telephone game show with prizes. This program is so popular that supporting advertising comes easy—thus tape figures in doing the commercials.

Nonetheless, it's difficult for a cable company to achieve profitability with its own programming," says Strickler, whose career has provided insight into many ins and outs of the television business.

TV advertising a new medium to local businessmen

Networks and TV stations in major metropolitan

continued on page CM/E-16

Whatever happened to Craftsman?

Everything....We Grew!

I've watched us grow to be Magnavox' CATV Division with the most useful spectrum of passive cable TV products available. I'm Bob Greiner, general manager of passive operations and your needs are my first priority. You need a full and complete line of *specialized* passive products for *specific* system jobs! That's what we have and will continue to provide; from transformers to splitters to taps, even the "F"-connector has more special varieties here.

We're set up to give you personal service whether you want ten connectors or thousands of taps. With Eastern and Western distribution centers we can fill your requirement faster and at more competitive prices.

This is our team, they're here to serve you....
Just tell them how!
Call us toll free

Bob Greiner

In the East **In the West**

800-448-9121 800-448-5171

In New York, (315) 682-9105 Collect

Magnavox
catv division

Circle 180 on Reader Service Card

areas sell to advertisers who are comfortable with television. "However, it's not so easy in most CATV markets," says Strickler. The local car dealer or men's store owner is used to looking at his message on the printed page. You can't blame him; it has been his whole orientation until recently.

"He can sit down with the local newspaper people and design an ad, then pin it on his bulletin board and look at it for a couple of days. You can't do that with the cable TV commercial—it's all over in 60 seconds or less. It's a whole process of education, and we're coming along nicely," Strickler reports. His objective is for advertising to cover the costs of local programming before too long.

Despite the ever-present technical and cost problems, CTV-13 has continually expanded its local programming, and recently has decided to acquire other available programs to balance its total program schedule; a feature-length movie is now shown four days a week.

Ultimately, Meadville Master Antenna will convert to 27 channels and expects to add special educational and other programs for its viewers. The Meadville system has already been the subject of several complimentary stories in *Life*, *TV Guide*, and various industry magazines, pointing to the progressiveness of its operation.

Prospects are bright for Meadville Master Antenna's cablecasting operations to play a big part in the fast developing cablecasting field. **CM/E**

A Successful Telephone Game Show

One of the most successful long-run shows is CTV-13's "Lucky 13," a television viewer interaction game show featuring prizes and cash for participants. Although "Lucky 13" started out as a two-week gimmick show, it became a success immediately and was extended to 13 weeks—then 26 weeks. It now looks like it will run forever. Strickler is a little embarrassed by its success and he takes greater pride in some of CTV-13's other programming efforts. But viewers like it—and the show produces much needed advertising revenue.

Briefly, "Lucky 13" offers a cash jackpot to the viewer if he knows the exact amount in the pot when called. Subscribers to be called are picked randomly. The jackpot is not large—it is increased one or three dollars at a time. But the winner gets a crack at bonus prizes of merchandise. This merchandise is not bartered in exchange for commercial plugs; CTV-13 buys all merchandise outright. It does sell commercial time. Strickler figures viewership is extremely high since 70 to 75% of the time those called know the answer (this percentage may drop to 60 in summer months). The show goes on twice a day at 3:30 and 6:05 p.m. Strickler suspects some housewives have a party line going to share information on the jackpot's amount. If a pot goes uncollected at 3:30, it rarely goes past the evening show. Strickler doesn't mind one bit, he's glad to be able to give away 10 to 20 prizes a day. It means no trouble selling ads.

Canadian Cable Meet Will Dig Into Management, Programming, Technology. and Show Latest Equipment

OPENING TUESDAY, MAY 22, at the Four Seasons-Sheraton Hotel, Toronto, and running through Friday, May 25, the 16th Annual Convention and Exhibit of the Canadian Cable Television Association will offer registrants a very full program of sessions, panelled by outstanding Canadian and American experts, and scrutinizing the most important aspects of cable management, programming, and technology. In addition, an equipment exhibit will let registrants see the latest products from about 50 Canadian and American manufacturers who constitute a roster of top-line cable equipment makers in both countries.

Registration for the meet opens at 10 a.m. on the 22nd, and the first public activity is the opening of the trade show and reception for registrants from 5:30 to 8:00 p.m. that day. Convention sessions on subsequent days will generally consist of a business meeting, a programming meeting, and a technical meeting, running concurrently morning and afternoon.

The business session on May 23 is a joint meeting with the Law Society of Upper Canada, at which registrants will be informed about the jurisdiction, licensing policies, practices, and procedures of the Canadian Radio and Television Commission and the Department of Communications.

The concurrent technical session will cover the technical problems of program origination; and the programming sessions will be called "How To," with a high-talent panel of film makers and cable programmers to offer advice.

Guest speaker at the luncheon on the 23rd will be Dr. Eugene V. Rostow of Yale, who prepared the Rostow Report on Communications for then-President of the U.S., Lyndon B. Johnson.

Registrants who have specific questions they would like to ask CRTC or DOC can go to Information Centers set up by both organizations, staffed by department heads and other officials, and open from 2:00 to 4:00 p.m. on the 23rd and 24th.

There will also be a Group Insurance Information Center and a CCTA Information Center, both also open from 2:00 to 4:00 p.m. on the 23rd and 24th.

Business session on the afternoon of the 23rd will include a lecture by Mr. Chris Johnson of the Ontario bar, Legal Counsel, CRTC, on procedure at CRTC hearings; a lecture by Mr. J. W. Lawrence of the Quebec bar, General Counsel, CTRC, on the regulatory and licensing power of the CRTC, followed by a panel discussion on issues in CRTC administrative practice.

A concurrent technical session will include a talk on two-way terminal services by Mr. John J. Sie of Jerrold Electronics, followed by a panel discussion on the state of the art in converters, with personnel from Jerrold, Oak, Magnavox, and other engineering sources.

The programming session will consist of a series of workshops, each with an outstanding program professional as group leader, which will consider the following topics: technical problems in programming; how to encourage the public to perform; program budgeting; stimulating community groups to use cable; and advertising, pros and cons.

May 24

A Thursday morning plenary session will have a panel of cable and broadcast executives to respond to the question, "How Is The Marriage Working?" Later in the morning, the business session covers cable marketing; the technical session will consider transmission methods, with speakers on use of satellites by CATV, and on microwave surveys and techniques.

Of important interest is the programming session Thursday morning on controls on political or controversial broadcasting and cablecasting. Among the panelists are John D. Hulton, managing director of CRTC; Murray Chercover, president and general manager of the CTV televison network; and Henry Geller, special assistant to the Chairman, FCC.

Guest speaker at the May 24 luncheon will be the Honorable G. Carton, minister, Department of Transportation and Communication of Ontario.

Highly interesting on the technical side are a series of discussions and demonstrations set for the afternoon of the 24th on test procedures for cable, including showings of spectrum analysis, and tests for envelop delay, frequency, cross-modulation, etc.

May 25

A "hot" topic will take up the final session of the convention on Friday, May 25, at 2:00 p.m.: subscription TV, with suppliers of various pay systems describing their equipment. **CM/E**

NCTA Announces Program For Annual Convention, June 18-20, Anaheim, California

Under the general theme, "CATV, The Choice Medium," the National Cable Television Association has announced a full slate of technical and business program topics for its 22nd Annual Convention, which will run June 18 through 20 at the Anaheim Convention Hall, Anaheim, California. Advance of the technical program indicates over 40 technical papers. Full advance information on the show will appear in the June issue of CM/E. Registration forms and program information: NCTA, 918 16th Street, NW, Washington, D.C. 20006.

"All of a sudden our day-to-day work turned out to be something special.

"Of course, our job is to make improvements. But we didn't realize how successful we had been until we stepped back and took a look.

"Take super 8 for example. Eastman Kodak Company made better and better super 8 film to meet the increasingly critical requirements of the market. At first, it was an innovation for the general consumer. Then we realized how important it could be in other applications. So we supplemented it with special cameras and projectors for use in television and even CATV.

"Or take our exciting new film stocks in 16 and 35mm. Generations of development continue to give birth to entirely new emulsion technologies.

"Better films need more flexible, more useful projectors. So our company developed the Eastman 16mm television projector, model CT-500. It fills the need for a fast-forward, fast-reverse machine...the first projector designed for truly efficient film use in television.

"That's where we are right now, and we're anticipating a lot more. We've set our goals very high.

"We've found the best way to make the future happen is to work hard at it today."

Judith Schwan. Superintendent of Emulsion Research
At Eastman Kodak Company.

STATE OF THE CABLE UNION

By Dean Burch

Address of the chairman of the Federal Communications Commission before the Southern Cable Television Association, Mobile, Alabama, April 2, 1973.

(Italics were added by editors)

I will talk today about recent developments and problems in the cable field—a sort of State of the Cable Union speech.

In our 1972 Report, the Commission sought to blueprint a communications structure in which cable would play a vital role in supplying new, local, different material. Broadcast television will continue to be supported by advertisers and will go on providing the kind of mass appeal programming that attracts large audiences. In my judgment, it will remain both an economically healthy and powerful communications force.

As to cable, the *Commission is looking to the larger operators to originate their own programming,* the expectation being *that the product will be different* from that presented on broadcast television. The door *has been conspicuously opened wide for cable to get into subscription or pay*—the hope being that somehow again new choices will be provided for those willing to pay for something not available on regular TV. And, by requiring systems to provide access facilities and channels, *cable is being nudged into serving as a significant voice of the local community.* We have *perhaps used regulation to compel the provision of services* that do not pay their way, but we have also *cleared the way for the development of services that will be profitable.* Finally, there will be a satellite in your future that may—with increasing numbers of cable homes—make possible cable networks.

Viewed in this light, the *distant-signal limitations in our 1972* plan take on new significance. They are part of *the larger* plan to move the cable industry away from conventional television and into the role of *innovator.*

I'm not suggesting that the Commission's package ought to send you to dancing in the streets. But it is an act of genuine creation—a new industry has been conceived.

And it is something you can take heart from. It *is* a whole brand new ball game. Cable has broken out of the deep freeze and has been certified as a separate communications force in its own right.

But this is clearly the beginning, not the end, of the cable story. Very little has been settled completely or for all time. There are lots of *issues that are open and other problems that* are *hanging* over. Looking down the road, I see no let-up in cable's *fight for position.*

This past year the industry probably experienced a slower growth rate than many of us would like. The reasons for it are varied. For one, big city franchising has been very slow. The Bostons, Detroits, Clevelands, and Chicagos are now caught up in a tangle of confusion. They seem not to know which way to go. They are pulled by system operators, plagued by local citizens' groups, adrift in a sea of pamphlets and studies.

On top of this, we are witnessing more state regulation. Maybe in the long run this will work to your benefit because state cable commissions may *turn out to be advocates of broadband communications networks.* But it will slow things for the short term. In New York, New Jersey, and Massachusetts, for example, the initial response of the state boards has been to declare a moratorium on cable activity. The cable industry continues to expend resources and energies fighting state regulation. Maybe state *regu-*

Stop the bull.
Everyone ships a bad reel occasionally.

Including us:

Very infrequently, to be sure. But cable-making is *not* quite an exact science yet. So absolute guarantees are worth about as much as the paper they're written on.

Now let's get on to the important thing: what do we do if you *do* get a bad reel? Talk it over at length? Painstakingly re-check the cable? Start negotiations on complicated adjustments?

Yes, all that.

But *later*. What we do right away is re-ship. That's right away.

When cable perfection can be absolutely guaranteed, we'll be the first to do it. Meantime, we simply promise not to leave you hanging. Ever. And that *is* an absolute guarantee.

SYSTEMS WIRE AND CABLE INC.

Phoenix, Arizona (602) 268-874
Rome, N.Y. (315) 337-7080
TWX-910-951-1533

PLEASE MAKE NOTE OF OUR NEW PHONE & TWX NUMBER

All we make is cable . . .

That's why we make it better.

Circle 182 on Reader Service Card

lation is unavoidable; maybe it would be better for the cable leaders to come to terms with it, work out the best conditions possible, and get on with the business *at hand.*

We at the federal level have done our share to keep cable from busting out—or, as we prefer to say, we have been keeping cable going at an orderly rate. No new system can get going, or an old one upgrade its signal lineup, without a license from us—called a certificate of compliance. The machinery allows time and opportunity for objection, and the process has not been disappointed. Broadcast objection has been the rule, not the exception. So, processing has at least been heavy, if not slow.

But the picture is not as bad as some in your industry would have you believe. And there is something to be said for orderly deliverance over pell-mell breakout.

For the first six months, the going was sticky; the last six has been a period of substantial advance. Anyway, here are the numbers, and you can judge for yourself: 2200 applications have been filed and put on public notice; 900 or so have been granted; and the next 100 look promising for a quick turn. More than that, the outlook is good for continuing upward movement because our Cable Bureau will get a start on doubling in size after July 1.

We think we have pretty much shown that we are, and mean to continue, delivering on our obligation. But we are much troubled by one crucial problem—copyright. Its importance is obvious. While your future in the long run may well depend on the development of new services, you rely heavily on the carriage of broadcast signals—particularly distant signals—to gain vital subscriber penetration during initial periods of operation. Your right to carry those signals must be secure. If it is not, the foundation for cable operation is shaky. And that is particularly distressing at this point in cable's history—when it needs lots of investment monies to build the big city franchises.

The solution cannot come from the courts. Cable would then be an electronic crap game subject to the vagaries of litigation and the whims of continuing court haggling. The courts can only say yea or nay—black or white. The courts cannot meld copyright with communications considerations. The results of copyright litigation can be a crazy quilt pattern patently against the public interest.

Just one example: Under *Fortnightly,* a cable system in San Diego can carry 14 Los Angeles signals so far as copyright is concerned—but not under the FCC's plan which greatly restricts the number of such Los Angeles signals. Under the FCC plan, a system in Riverton, Wyoming, markedly serves the public interest when it brings all the Denver signals via microwave to this underserved community; under the recent *CBS v. TelePrompTer* decision, the system could be enjoined from carrying these signals without the consent of the many copyright owners of programs on the signals.

Nor can the courts be blamed for this situation. The court in the *CBS* case was at pains to point up its dilemma:

"The complex problems presented by the issues in the case are not readily amendable to judicial resolution. As the Supreme Court said in *Fortnightly,* 'We must take the Copyright Act of 1909 as we find it' and do the best we can. We hope that the Congress will in due course legislate a fuller and more flexible accommodation to competing copyright, anti-trust, and communications policy considerations, consistent with the challenges of modern CATV technology."

We have made an all-out effort to secure such legislation. We broke the impasse over cable by fashioning a solution that would give all the contenders a fair shake—the cable industry: the right to carry some distant signals; the broadcasters: some assurance, by limiting distant signals, that their markets would not be inundated by large numbers of outside stations; the copyright owners: some payment for the use of their product by cable; the public: the best material that creative minds would be induced to provide for healthy broadcast and cable industries flourishing simultaneously.

Crucial to this agreement—the so-called "Consensus Agreement" of November 11, 1971—was the consideration that there would be validating Congressional action in the copyright field. By the terms of that agreement, the three contending parties—cable, copyrightowner, and broadcasters—undertook to support copyright legislation that contemplated compulsory licenses at a schedule of fees that you would all attempt to agree on. You also all agreed to compulsory arbitration if agreement on fees could not be worked out.

Negotiations looking to the possibility of agreement have not worked out. Nor have all sides been fully agreeable to arbitration. But it would serve no useful purpose to try to assign blame at this point. What is absolutely vital here is a breakthrough—an agreement among the parties that facilitates legislation.

I intend to do all in my power to effect a fair resolution of this knotty problem. I take heart from Senator McClellan's strong determination to move this matter forward.

But we need and must have the full cooperation of the industries. And . . . I take this opportunity to say: You *must* come to copyright terms. For that is what cable has agreed to do, that is what it is expected to do, and that is what it must do if it means to get into the fabric of American life. There is no other way to regularize your industry—to give yourselves the sound base for future growth. **CM/E**

Don't buy any CATV equipment before you get the Facts.

You can get the facts by contacting a representative of the EiE Division of RCA. Or by joining us in booths 85, 86 and 87 at the Anaheim NCTA Convention, June 17-20.

Then we'll have a chance to get acquainted with you. And acquaint you with what we have to offer.

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You'll see *proof* of the profitable services our bi-directional cable tv systems can provide.

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And you'll see what can happen when a company like EiE joins up with a company like RCA. In terms of total systems capability, technology, and stability.

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Kodak Shows Improved Super-8 Videoplayer; Says It Will Be On Market This Year

It's real: The Super-8 videoplayer has moved from the "feasibility model" of October 1971 to a well-performing model that Kodak promises to sell in the fall of 1973.

VIDEO RECORDING TECHNOLOGY took an important new turn with the unveiling early in April of what Eastman Kodak described as a viable, soon-on-the-market Super-8 videoplayer, a device which accepts Super-8 film cassettes and turns out a video signal that can be fed to a standard television receiver, or into any video program channel.

The standard Super-8 cassettes used by the videoplayer are the same as those used on Super-8 projectors, which makes programming recorded in Super-8 form more flexible, as to distribution methods, than any other breed of recorded video.

The models demonstrated at a press conference on April 6 in New York, and at the SMPTE Technical Conference the following week in Chicago, performed far better than the "feasibility model" Kodak showed a year and a half earlier. *BM/E* found the resolution good, color fidelity excellent. A Kodak spokesman put the resolution at 280 horizontal lines, in color. The quality of the sound was very poor but this is, of course, more a question of philosophy than of technology: most makers of video program devices (including the standard TV receivers through which the videoplayer was being seen and heard) are united in the opinion that sound quality is of no importance in a video machine.

The one video fault evident was a slight tendency to jitter, and Kodak personnel said that this would very soon be eliminated. (Actually the problem was flicker which can be corrected optically.)

It seems likely, therefore, that the Super-8 videoplayer will become a genuine alternative for users of recorded video programming before the year is over. It is not intended for the home market; with a price of $1195, Kodak is aiming it for the cast cable TV, school, business, institutional, and military markets. The machine will come into direct competition with, for example, Sony's U-matic and Norelco's cassette machines, and all the others out for the bucket of gold at the end of the videocassette rainbow.

Presuming that the first impressions of good quality hold up, and that no serious problems of durability in use develop, the Super-8 player will have persuasive attractions for a variety of users. Business, military, and school "communicators" may find it handy to have a recorded video program that can be thrown on the cafeteria wall, or fed into a CCTV system, or bank of TV receivers, whichever is most convenient at any given location.

Usability as a program source in broadcasting or on cable, with the Super-8 player constituting a very inexpensive kind of telecine unit, depends on further modification promised by Kodak. In any case longer scrutiny of the *quality* is needed to help determine the suitability of the system for broadcast and cable origination use.

The essence of the system is a flying-spot scanner which is driven to follow the continuously moving film. There is no intermittent motion. The vertical drive is tied to the film motion by a sensor and electronic system that reads the speed of the film sprocket holes and continuously adjusts the vertical scanning to match. This also makes it easier to allow for different film speeds: readjustment of the scanning circuits is not needed when film speed is changed.

Threading is automatic, with a built-in take-up reel onto which played film winds. After a program is played it is automatically rewound back onto the cassette. The system uses 50-, 100-, 200-, and 400-foot cassettes.

The RF section provides a carrier on Channel 2 or 3 which is modulated by the program. There is also an output for the video signal, for feeding directly into a video program channel.

The unit is pleasantly compact at 8 inches high, 26 inches wide, and 15 inches deep, and weighs approximately 35 pounds. Using it is extremely simple: it has the operational virtues of cassette systems, with the cassette simply dropped into the mechanism and front-edge push-button control of all functions.

There is, at the least, a large promise here of a better way to handle some applications of recorded video programming. **CM/E**

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Circle 185 on Reader Service Card

University Originates Programs For Local Cable Companies

An unusual partnership between a state university and several area cable operators is producing a wide variety of local programs for cablecast, while giving students front-line experience in TV production.

IN WEST CENTRAL MISSOURI, Central Missouri State University is providing 15 hours of weekly programming to an audience of approximately 3900 homes in the communities of Warrensburg, Knob Noster, and Whiteman Air Force Base, Missouri. Programmed weekly from CMS-TV, university studios, are three hours of instructional programming for university credit, three and a half hours of children's programming, two and a half hours of news and sports, one and a half of "free" films, one hour of "Quiz Bowl," one-half hour public officials' forum. In addition to this, a half-hour community awareness program and a half-hour homemakers' program go on alternate weeks, as do two half-hour music programs, one contemporary and the other religious-folk. Area high schools alternate a half-hour slot on Fridays with their own programming produced at the university studio under the guidance of Mass Communication majors.

During the fall, all home university and university high football games were played on a three-day delay. The 1972 Homecoming Day Parade was cablecast live. All home university basketball games and wrestling matches were presented live, as well as women's basketball games and the Women's Basketball Regional Tournament.

Planned this summer are remote cablecasts from the community swimming pool, golf course, and tennis courts.

CMS-TV Sports Coordinator and Business Major Dave Jovanovic (center) interviews CMSU Head Football Coach Howard Mahanes (left) and CMSU Sports Information Director Dean Vogalaar on weekly "Sports Spectrum."

Officials who have appeared on public affairs programs have been the Warrensburg's mayor and city manager, the Chamber of Commerce head, Missouri Senator William Cason, Missouri Governor Christopher "Kit" Bond, the County sheriff, as well as others from the planning and zoning commission, and renewal associations.

This whole CMS-TV operation began less than four years ago, when the then-college programmed a half-hour of news and interviews daily over the Cypress Cable Company (of Warrensburg) Channel 7. Later a message wheel was added to fill the other channel time with 24 separate visual announcements about campus and civic events. The audio is provided by the university FM station, KCMW-FM. During the summer of 1972 plans were firmed up with the Telesis Corporation, cable systems owner, to provide programming to the Warrensburg Cable, Knob Noster/Whiteman AFB Cable, and Clinton, Missouri cable systems. The links to the Warrensburg, Knob Noster, and Whiteman systems were completed this winter. Clinton will be completed this summer. The Telesis systems are fed with CARS microwave. There is a hard line to the Cypress cable.

Plans are in the works for microwave expansion to other systems in the state, as well as bicycling of videotape to still other systems.

In addition to the special programming described, there is the responsibility for covering local events. The 40 university students in Mass Communications and other disciplines have already been working with the communities in programming of local interest. Daily news coverage, particularly, provides a great service to Knob Noster and Whiteman AFB, as both communities have only weekly newspapers and no radio stations.

More instructional courses for university credit through viewing television are on the way, providing the opportunity for the aged, mothers with small children and the invalids, as well as area citizens, to attend college at home.

The CMS-TV operation also provides excellent opportunity for university and high school students to gain production experience in television. These students are supervised by two graduate assistants and one full-time manager. **CM/E**

If your future depends on cable TV . . .

there are a few things you ought to know:

Information about opposing forces and the moves they are planning. Information about your competition and the growth opportunities they're exploring. Information about your industry's fight for survival and profit. Information about local franchise bidding and negotiation, about regulatory trends, about new markets and equipment, financing and programming.

Now there's a way to get all this information—from *one* source, in *one* convenient format. It's all in **Broadband Communications Report**, the first truly comprehensive publication exclusively devoted to cable TV and broadband communications.

BCR comes to you from the publishers of Broadcast Management/Engineering and Cable Management/Engineering, the authoritative publications on broadcast and cable equipment. To create BCR, we brought together knowledgeable editorial people with experience in every aspect of the industry.

You get the news you need to know about current action in every broadband communication area. Not just about the FCC, but also about the latest developments on the local level. Not just about cable TV, but also about broadband nets, satellites, private channel TV, data communications, videocassettes. Not just about franchises, but also about new technology, new programming ideas, new forms of public access.

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How does BCR get all this information about an industry as fragmented as ours? Simply by exploring more extensively than anyone else. We review countless published reports. We cover local, state, and federal hearings and meetings. We scan news releases, local newspapers, speeches, academic papers. We prowl the corridors of Washington. We interview idea-makers and policy-makers in depth.

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All You Ever Wanted to Know About Production—Just Ask

by Douglas Gratton

Part Fifteen of a series—Production for Syndication: Rehearsal on Live TV; Final Shooting on Film

YOU MAY RECALL that I concluded my last column by mentioning that I now planned to discuss "sound" or "audio" in all its dimensions—or should I say, echoes. Well, you will have to wait. I've just spent some time with an interesting and novel CATV production procedure here in the Big Apple, and I thought that you would be interested to hear about it.

The background to the project is that certain multi-system operators know not only that they have to get into the program origination business, but they also see it as an opportunity of deflecting into program syndication by selling their slightly-used shows to people like you! Sort of heating up cold coffee rather than brewing up a fresh pot. But, as we all know, there isn't too much money in CATV production, so the producer has to aim for limited production values just as he has had to learn to settle for slightly muddy coffee. But the technical quality has to be good—and in glorious color! And there is the rub! Because, my friends, you can engrave this little syllogistic aphorism into your mind or onto the Control Room door:

#1 There is good color!

#2 There is cheap color!

#3 But there is no such thing as good, cheap color!

So next time that you trip off to a trade show and see the "new, super-duper, low-cost, superb quality color camera at $555.55," the first step is to determine if there has been some kind of new technical miracle involved. If not—and miracles are not quite so frequent in this Age of Agnosticism—then ask the friendly salesman to see NOT the first generation control room monitor quality, NOT the second generation E.E. master quality but try looking at the quality of the third generation release dubs on a standard receiver. And bear in mind that, if you need more than 50 release dubs of the EE master, you have to make some third generation dubbing masters which, in turn, will give you fourth generation release dupes. Now go back and try to find that friendly salesman who sold you that "low-cost, superb quality" camera. Like the flim-flam man of old, he has folded his booth and moved on to the next town of suckers. After all, you can only sell so much Panacea Snake Oil! So why not diversify in color camers? People always want something for nothing and they won't wake up to the fact that a cheap camera is a cheap camera until it's too late! Now, before you start getting angry with me, don't forget that my terms of reference are program production for eventual syndication. The low-cost camera is fine for live origination programs.

So how can you produce a low-budget, but high-technical quality, CATV program? Well, hang on to your hats, folks, but the answer is . . . film!

Here's how:

#1 The producer has a basic informational/service format program — hobbies, "do-it-yourself" home repairs, etc.

#2 After pre-production, the show goes into principal production.

#3 In a TV studio, the show is blocked and rehearsed by a three-camera crew of film and tape people all mixed up together.

#4 The program is blocked and rehearsed on monochrome one-inch videotape.

#5 The videotape is played back and closely viewed by one and all. (Even Frank, the coffee delivery man, stayed to watch!)

#6 Without burning up the talent, the program is re-blocked and refined through the use of the rehearsal tape.

#7 When the Director feels that the moment is nigh, the TV cameras are rolled out and film cameras are rolled in! Same crew, however!

#8 The actual program is shot on 16mm reversal with double-system sound.

#9 The Director wraps it up by doing any inserts, "reversals," and "safeties"—but the shooting ratio still stays close to 1:1. Two to three shows a day can be shot in this manner.

#10 The next day the film is edited single strand. No A and B rolls. And when I say "the film," I mean the actual scene-exposed film. No workprints, no dailies."

#11 The double-system single-strand film is then transferred to two-inch high-band color. And, baby, when you're there, you're home. I suppose that you can make, what we kids used to say, a "zillion" copies from that. And, as for the quality of the color, well, Eastman Kodak has a certain degree of experience in this matter . . .

Time wise . . . I suppose that you could do the whole thing from a Monday to a Monday. Money . . . my guess is about $3K for a 25-minute show, plus creative costs. Add these two items to the color quality, and it makes a good deal.

Next month, mics. But I would appreciate if you would send in your comments, questions, and criticism. This is the 15th article and all that has happened is that someone has written in from Missoula, Montana, and a high school student asked me about the slo-mo disc that is used for "instant replay." As the life guard said while sitting 100 miles from the sea in the Sahara Desert, "Great beach . . . but it's very lonely!" **CM/E**

TPT Wins "Blue Sky" Boulder Cable Franchise

A cable franchise so loaded with prerequisites for the city of Boulder, Colorado, that a number of cable firms backed out of the contest, has been awarded to TelePrompTer Corporation, one of the two firms that stayed in. Here are some of the provisions the city asked for, and got, from TPT, in what the city's negotiator called "the best cable package in the country." Two percent of gross subscriber fees for the public access channel; renegotiation every three years; a channel for qualifying non-profit groups at $1 a year; full public disclosure of finances; a subsidy for low-income subscribers; methods for arbitrating disputes.

The losing bidder, Community Telecommunications, Inc., set up a cry that TPT had "hornswoggled" the city with unrealistic promises, based on overblown income estimates. But, Boulder's officials seem happy with their deal.

Rand Issues Reports To Help Cities Set Up Cable

City officials involved in decision-making on cable are being offered aid by a publication of the Rand Corporation, "Cable Television: A Handbook for Decision Making," recently made available at nominal cost from Rand at 1700 Main Street, Santa Monica, California. "Cable . . . demands more decision-making by local communities than most technologies have required in the past," said Dr. W. S. Baer, leader of the team that produced the handbook. In addition to the handbook, Rand is issuing a number of more specialized report on various aspects of cable; a list is available there.

Report on Jacksonville Tells City's Cable Options

A report based on a six-month study of the outlook for cable in Jacksonville, Florida, prepared by the Cable Television Information Center, defines for that community the costs, income prospects, owner-

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ship options, and other characteristics of cable systems on three levels —basic, intermediate, and advanced. Leaving the city to decide what kind of service it wants, the report nevertheless gives comprehensive insight into how each choice would be realized, and what its probable result would be. This includes much that should be useful almost anywhere. In two volumes totalling 319 pages, it is available from CTIC, 2100 M Street, N.W., Washington, D.C., at $15 each.

Simulation Program Draws Cable Plans from Computer

A different kind of aid to planning a cable system is the simulation program developed by the consulting firm of Whitewood/Stamps, 55 Chapel Street, Newton, Massachusetts. The user puts on an input form the basic information: homes passed, subscriber rate and penetration, aerial miles built, etc. Run through a computer, the program prints out such information as: when does cash flow turn positive?, what is ratio of operating revenue to operating expense?, is the distribution of equity optimal? A complete print-out costs $100—the whole thing can be done by mail.

Bill Seeks to Make Cable Public Utility, Under FCC

A bill introduced into the Senate by Sen. Williams (D. of N.J.) would make cable television a public utility under full jurisdiction of the FCC. This would avoid future challenges to the FCC's authority, liked by National Cable Television Association. However, NCTA is opposed to the public utility part of the proposal, wishing to avoid state regulation. Cities will also oppose the bill, which seems slated for an uphill fight.

Center To Help Minorities Get Into Cable

A new organization, Cablecommunications Resource Center, set up in Washington, will aid minorities to participate in cable by acting as adviser, clearinghouse for information, source of engineering, marketing, and economic data. Director is Charles Tate, editor and co-author of the handbook, "Cable Television in The Cities."

Pressure to Get Cable TV Out of Programming Grows

On April 12, the Massachusetts State CATV Commission voted as a policy guideline, "the separation of ownership of cable from the ownership of programming and other services originating over the system." The guideline was adopted by a vote of 4 to 2 with one abstention. This does not mean that the state will adopt a rule to this effect immediately (extensive hearings are planned), but it does indicate movement in an area that is highly sensitive and controversial.

Speculation that the forthcoming Nixon cabinet-level Task Force study on cable TV would take a similar stand rose from an article to that effect in the *New York Times* on April 16. Later, the *NYT* published a letter from Sidney Dean, Jr., well-known cable TV consultant, which also supported separation of control of content of any sort from ownership. Dean argued the history of broadcasting proves that common programming-delivery ownership reduces diversity.

FCC Clears TPT

In granting TelePrompTer a CARS license for Elmira, N.Y., last month, the FCC said the way was clear to grant other TPT applications and certificates of compliance. The Commission observed that TPT's new management has taken measures to prevent a recurrence of past actions that had resulted in criminal convictions.

On October 20, 1971, TPT and its former president, Irving Kahn, were convicted of federal conspiracy and Kahn was convicted individually of perjury as a result of illegal payment to several Johnstown, Pa., city officials. The validity of the Johnstown and Trenton, N.J., franchises will be reviewed at a future date, the FCC said.

The FCC also cleared up the matter of unauthorized transfer of control when the new management took over. Due to the unusual circumstances, the FCC said the seriousness of the violation was mitigated to some extent. It noted the new group had kept the FCC advised of events from the beginning.

CM/E

BROADCAST EQUIPMENT

Electronic timer for video systems puts high-definition numerical indications directly on a video monitor. Model G-77 accepts input from any video source, has a built-in time reference based on a crystal-controlled oscillator, superimposes exact time information

on the video program. Position of display, size, intensity, hold, start and reset are switch-controllable. ODETICS, INC. **275**

Video disc recorder will hold up to 570 frames, has variable recording and playback speeds from one to 60 frames a second. Model 9108 has one-frame freeze, can record fast and play slow or vice versa, is intended for instant

sports replay, record storage, mug shots, track photo finishes and other similar applications. Material is instantly erasable. $18,000. MOXON, INC. **276**

FM stereo modulation/frequency monitor has three meters for simultaneous monitoring of the left and right channels and the frequency deviation of the 19 KHz pilot carrier. Model TBM-2200A, in addition to basic modulation percentage of each channel, measures channel separation, main/subchannel crosstalk, 38 KHz carrier suppression, and s/n ratios. MCMARTIN. **278**

Professional audio recorders operate

at 7½, 15, and 30 ips, but are capable of variable speeds by virtue of a new DC servo capstan assembly. The series incorporates features of M79 multitrack series, including the "Isoloop" drive. They are available in ¼-inch and ½-inch models, for one- two- or four-track configurations. 3M COMPANY. **279**

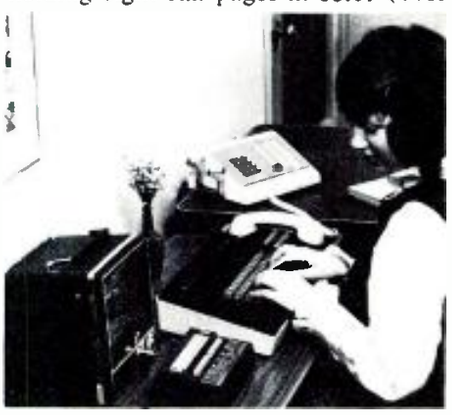
Miniaturized solid-state UHF/VHF home TV antenna is mounted in a circular "radome" only 21-inches in diameter, which is electrically rotatable through 360 degrees. Model 5MS440 includes a pre-amplifier with interference filters, and a remote-control unit allowing the antenna to be rotated

from the side of the TV set. Weighing less than six pounds, the antenna can be on the roof or in the attic or a closet. RCA. **277**

Video recorder care kit includes swabs and special spray cleaner for getting dirt off recording and play heads. Model QM-5 also has micro-wipes for cleaning capstan and control stack with complete safety, and static-free, lint-free cloth for larger surfaces. NORTRONICS. **280**

Super-16 motion picture camera benefits from the 20% increase in picture area. Super-16 ACL comes with camera head, motor, battery, power cable and other accessories, and is ready for immediate delivery. $8495. ECLAIR. **281**

Low-cost video character generator displays encoded messages, from any number of keyboard inputs, on a general message channel. Model D-100 Datacaster is intended for cable operators who maintain a general community message channel, has a memory holding eight full pages in color (over



4000 characters). Each input keyboard can directly access the headend over a standard telephone line. METRODATA CORP. **282**

Uninterruptible power systems are available with ratings from 500 VA to 10 kVA. Each system includes battery charger, inverter, automatic relay or solid-state switch. Models up to 2000 VA have sealed, maintenance-free batteries, provide full-load back-up operation for up to 20 minutes. $1825 to $11,300. TOPAZ ELECTRONICS. **283**

Color genlock sync generator supplies horizontal and vertical drive, composite blanking, and composite sync, plus burst flag and color subcarrier. Model

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PRODUCTS

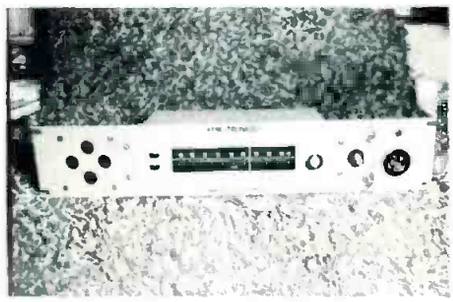
5000 will synchronize an entire video system to be an external source, is rated at ± 10 Hz NTSC stability over 30 days, less than ± 1 Hz/sec change. Phase lock ties in unit vertically, horizontally, and to the burst in less than one second. $995.00. VACC. **284**

Fused disc coaxial cable is available in .750 inch size, in addition to the previously released .412 inch and .500 inch sizes. Cable has guaranteed im-

pedance of 75 ohms, SRL level no worse than 35 dB from 5 to 300 MHz, is available with copper or copper-clad center conductor. GENERAL CABLE CORPORATION. **285**

Chrominance level corrector, used with 12.5 T or 20 T modulated sine-squared pulses, provides in-line manual correction for chrominance/luminance gain errors. Model 1478 has a program channel and a monitor channel; the latter allows corrections to be previewed before they are applied. Gain errors are read directly from front-panel controls. TEKTRONIX. **287**

FM EBS receiver has a built-in audible alarm with provision for additional external alarm. It has built-in monitor amplifier and speaker. The alarm is



switchable to operate only during carrier interruption, or to start with the first interruption of carrier and continue until reset. $149.50. TRI-TRONICS PROFESSIONAL ELECTRONICS. **286**

FM band dry termination uses a highly durable resistive element in a stream of forced air. Model DPTC-10KFM handles 10 kW, weighs 37 pounds, covers DC to 110 MHz, is available for other power levels up to 75 kW (larger sizes). $1500 up. ELECTRO IMPULSE, INC. **288**

High-power engine-generator sets are powered by v-12 diesel engines. Model DES-550 is rated at 550 kW standby and 475 kW continuous duty. Model DES-500 is rated 500 kW standby and 425 kW continuous duty. Both accept a load in 5 to 10 seconds, with output voltage regulated to ± 1% from no-load to full-load. Momentary kVA generator rating covers starting inrush. ALLIS-CHALMERS. **289**

Motorized zoom lens has 5 to 1 range, one-inch diameter. Model V18-90M has f/1.8 aperture, polyurethane drive gears, is made of corrosion-protected aluminum in a steel-cage assembly. $710. VICON INDUSTRIES. **290**

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The EDS – 200 uses SMPTE precoded tapes to ensure excellent edit accuracy • Controls two VTRs plus external source • Programmed micro-computer control • No-overshoot high speed search • For quad or helical VTRs • Units may be linked for multi-machine control.

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NEW LIT

For copies of these literature offerings, circle number for appropriate items on Reader Service Card.

"Application Guide for Forced-Air Cooling of RCA Power Tubes" is a technical treatment of requirements and methods, describing analysis of ambient conditions, design of proper cooling systems, etc. RCA. **200**

Equipment for television test and measurement is the subject of a new short-form catalog, TV-2, which includes complete technical description and application notes on each instrument. Rohde and Schwarz. **201**

Full line of trenching equipment is covered in pocket sized brochure; models range from 7-hp handlebar to 65-hp four-wheel drive. Ditch Witch. **202**

Sixteen-page catalog, in color, shows **consoles, desks, and instrument cabinets** for broadcasters in the Econo-Rack line. Amco Engineering. **203**

Professional broadcast items, including phono pickup arms, turntables, preamplifiers, loudspeakers, are covered in new catalog. Micro-Trak Corp. **204**

Pocket-sized "Tool and Equipment Catalog" of 148 pages lists more than 2000 items useful to job foremen, linemen, technicians in the CATV, telephone, and power industries. Anixter-Pruzan. **205**

A series of six catalogs presents electronic components according to application, as follows: 1) communications components; 2) industrial power components; 3) microwave devices; 4) instrumentation components; 5) computer components; and 6) research and scientific products. Amperex Electronic. **206**

A new 16-page bulletin, STP-473, **"Standard Test Procedures for High Voltage Power Supplies,"** shows loading methods, set-ups for voltage calibration and for static and dynamic output voltage regulation. Spellman High Voltage Electronics Corporation. **207**

Three publications that may aid **TV camera designers and users: 1)** technical bulletin on the 8507 and 8507A vidicons; 2) application note #AN-4906, "Upgrading an Intensifier Vidicon camera to SIT-Tube Operation;" and 3) application note #4907, "General Information and Guide For RCA 3-inch Image Isocons." RCA. **208**

Data sheet describes cassette tape recorder with speech time compression and expansion, "Varispeech." Lexicon, Inc. **209**

"Tech Topics" is a bi-monthly technical publication covering new developments and applications of switches, plugs, connectors, indicators, adapters, jack panels, etc. Switchcraft. **210**

Two brochures cover **cells for lead-acid stationary batteries.** Gould. **211**

A set of 16 application notes describe **how to test and service two-way radio equipment,** using the FM-10 Frequency Meter/Signal Generator. Among the topics are: frequency measurement; deviation measurement; audio distortion; 20 dB quieting sensitivity; and others. Singer. **212**

A 200-page handbook, **"The RF Capacitor Handbook,"** discusses in comprehensive detail basic design considerations and uses of RF capacitors, including high-frequency circuit design, characteristics of different designs, test methods, ways of increasing gain and power, bandwidth, and many others. Available from American Technical Ceramics, 1 Norden Lane, Huntington Station, N.Y. 11746, for $4.95.

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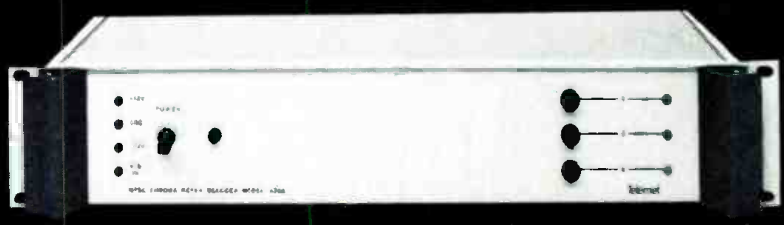

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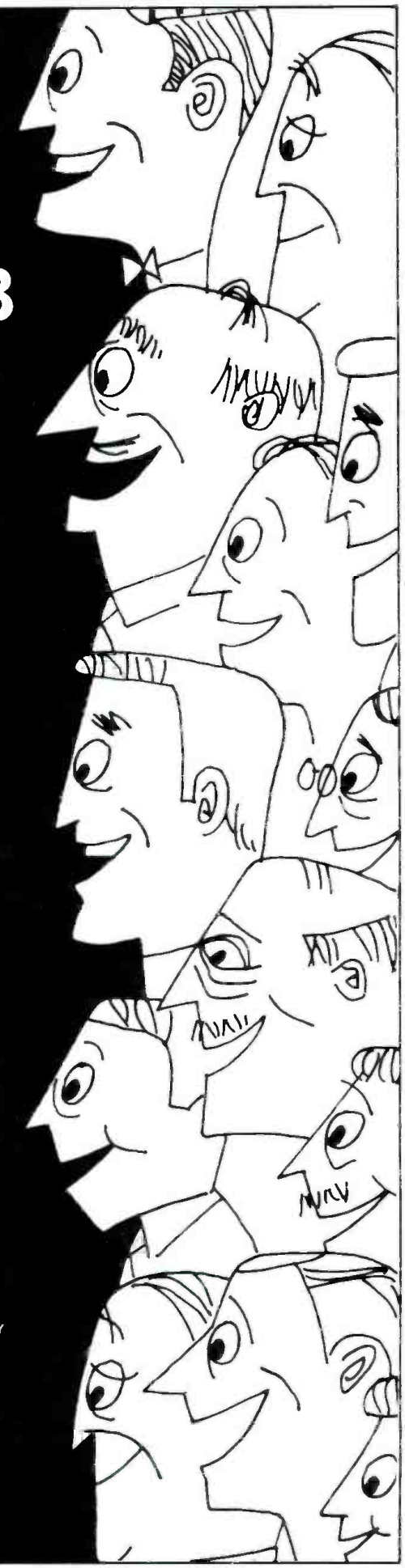

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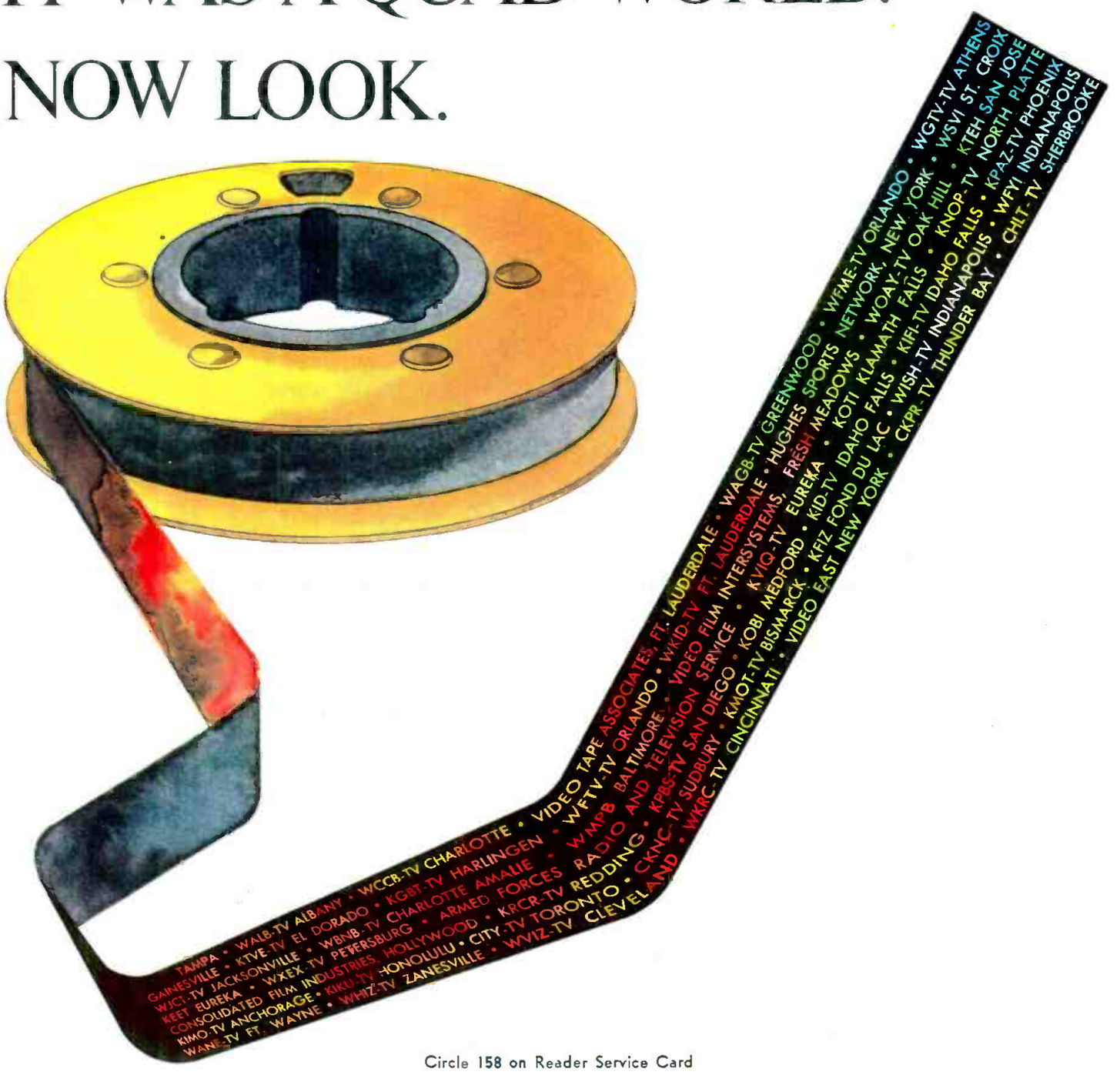

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