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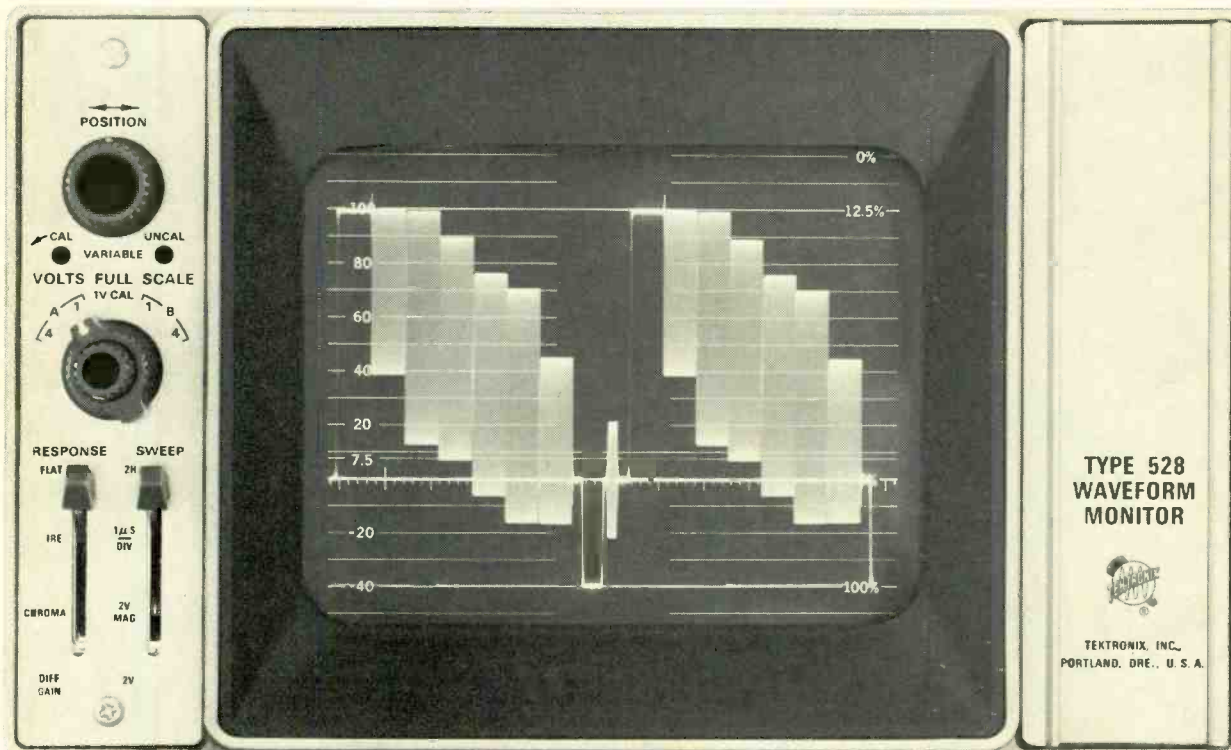
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committed to progress in waveform measurement

Circle 101 on Reader Service Card

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Mother Nature Needs You: Last year, BM/E's NAB issue cover portrayed Senator Pastore saying "The most cataclysmic thing in America is television. We've got to clean it up."

This year the roles have changed. The editors join illustrator Art Suduth in saying "Television has got to clean up America." Radio too. The call to action has been sounded by NAB Board Chairman Walbridge and Dr. Barry Commoner—see NAB Convention Floor recap, page 22.

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820 Second Ave., New York, N.Y. 10017, 212 661-0450

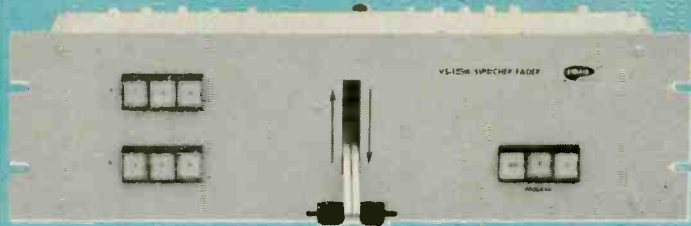
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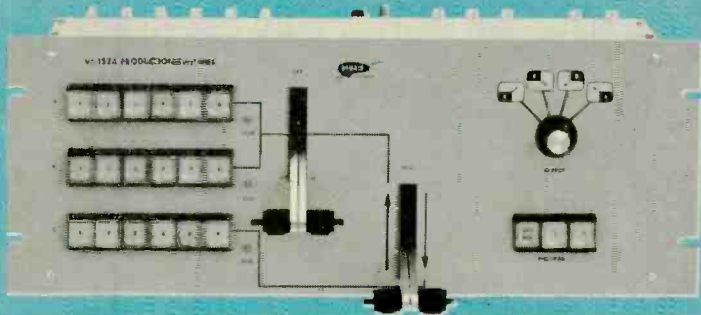
BM/E, Broadcast Management/Engineering, is published monthly by Mactier Publishing Corp. All notices pertaining to undeliverable mail or subscriptions should be addressed to 820 Second Ave., New York, N.Y. 10017.

BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities. These facilities include AM, FM, and TV broadcast stations; CATV systems; ETV stations, networks and studios; audio and video recording studios; consultants, etc. Subscription prices to others: \$15.00 one year, \$25.00 two years.

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MODEL VS-152A PRODUCTION SWITCHER

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BROADCAST INDUSTRY NEWS

Channel monitor gets quick CATV viewer feedback

It could be "the sole source of audience data within a decade" for that 85% of all American households predicted to have cable TV by 1980—according to Paul K. Murphy.

Murphy, vice president and director of research at Television Testing Company, was speaking about the new CATV channel monitoring system developed by H & B Communications Corp., a subsidiary of H & B American Corp. which joined with Audits & Surveys Inc. to form the Television Testing Company.

In operation right now in Santa Maria, California, the monitoring system can sense the channel setting of any specific TV set within a cable system, and relay that information to a central computer.

The sensing unit is a small box attached to the telephone pole carrying cable signals to homes. It detects viewers' channel settings and sends the information back along the data transmission system to the data processing system—at the local CATV station. The central command unit calls for

the data to be selected for transmission by the sensing unit.

A pushbutton attachment can be installed so that subscribers can communicate directly with the command unit.

Program ratings could, of course, be accurately measured by the system. But, marketing may get the larger boost. Addressing the Annual International Congress of the American Marketing Association, Murphy pointed out that the command unit computer could be programmed to print out the names and addresses of households tuned in to a channel at the time a commercial appeared. Within seconds, the sponsor would get the printout list of people who had seen the ad—making follow-up a lot more efficient and a lot less expensive.

The system would also provide instant tabulation of viewer response to such things as research questions asked directly on the programs—the computer would simply record the pushbutton responses from viewers.

"Merging data processing and electronic technology with the methodology of marketing research," Murphy added, "could

lead to some entirely new methods of audience measurement and measuring advertising effectiveness in the 1970s."

One other benefit this system's two-way communication may afford: the viewer's click turning off his set might be heard back in the studio.

Complaints bog copyright bill in subcommittee

Months have passed, the copyright bill (S.543) has been waiting for action in Senator Pastore's Senate Communications Subcommittee, and criticisms have piled up. (For details of the bill, see *BM/E*, February, 1970, page 6.)

Because of its many precise requirements, the CATV provision of the bill has been called more a regulation than legislation.

It first imposes copyright liability on all CATV systems, and then provides the systems with automatic, but compulsory, copyright licensing. Fees, based on gross revenue, would be paid to a kind of central pool, then distributed among the copyright holders.

It is too detailed, according to the FCC, and deals with matters better left to the Commission's regulatory functions. A particular gripe is that the bill would eliminate all FCC provisions which conflict with the bill's provisions.

In a statement from a subcommittee of its Committee on Copyright, the American Bar Association said it was "opposed in principle to compulsory licensing except in extraordinary cases."

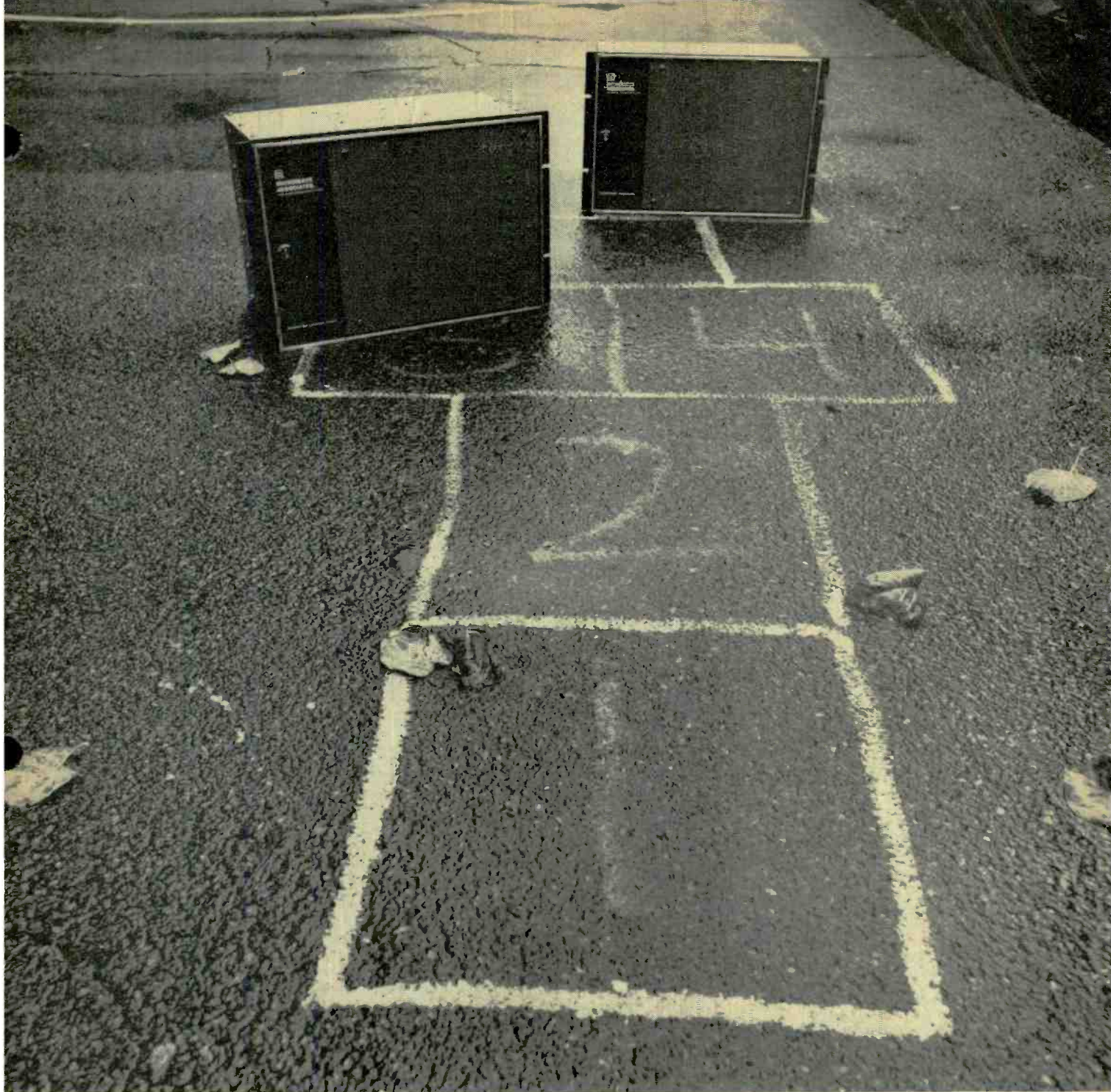
Association of Maximum Service Telecasters president, Jack Harris, predicted disastrous results from the bill, including an inundation of local TV in small markets with distant city signals. Only the major market CATVs would get any benefit from the copyright provisions, added the chairman of NAB's CATV negotiating committee, William Fox.

Defending the bill, the NCTA urged its adoption as a compromise "in the public interest," and expressed disappointment in the

SBTV makes getting there half the lesson



School-Bus Television has come to New York's Finger Lakes region. In buses equipped with Ampex videotape recorders and CCTV monitors, children in grades two through ten get lessons during the long ride to science museums and field trips. What keeps their interest? "Birth of a Volcano," "The Universe," and hours more.



The big jump in short hops

This is the year, as you all know too well, for going over the arithmetic on owning your own microwave relay equipment.

Last year we sold our relay links because they were all solid state, put-out beautiful, stable color, and because they were economical. The relay links meet "proof of performance" standards, and are ultra-reliable, even when operating unattended in remote areas. Customers bought the links because they

came single or dual, at 2, 7, or 13 GHz, for STL, TSL, network, inter-city, spurs and portable TV pick-up. But that was last year.

This year, we also sell on straight price versus leased line charges. Write. We'll even help with the arithmetic. The lease cost of a year or two might pay for your own system.



MICROWAVE ASSOCIATES
Burlington, Mass. 01803

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FCC's negative reaction.

FCC Commissioner Robert T. Bartley added his support by refusing to endorse the letter of criticism sent by Chairman Burch (and endorsed by all the other commissioners) to Senator Pastore's subcommittee. The lone dissenter thought the bill was at least good enough to be better than no copyright revision at all.

Color EVR debuts

In a move to grab the lion's share of the educational, industrial, and home video playback market, CBS president Frank Stanton introduced color EVR (electronic video recording) in New York City on March 24. Before several hundred newsmen and industry leaders, CBS executives demonstrated their system for playing video program material through any standard color or b&w television receiver. Images are recorded on film in a seven-inch cartridge which doesn't require threading, thereby simplifying use by nontechnical personnel. Film may be run at normal speed, in slow motion, or even still-framed.

During the demonstration, color reproduction was good, with resolution comparable to typical 35-mm network movies. Black-and-white EVR had been demonstrated in late 1968 ("EVR—Newest Visual Medium," *BM/E*, January 1969), but the monochrome unit shown then is now obsolete, said EVR division president Bob Brockaway, having been superseded by the new compatible color-b&w version, which will sell for the 1968 price, \$795. Unit has video input for camera, audio jack for mike, video output for driving TV receivers.

Motorola president Elmer Wavering, also present, described his firm's job as hardware makers, building Teleplayers (their name for unit) for the EVR cartridges. Like firm's Quasar TV receivers (which were used as monitors during the demo) Teleplayers are modularized for ease of servicing. Motorola is exclusive licensee for manufacture of EVR playback units in North America through 1971.

EVR inventor Dr. Peter Goldmark of CBS Labs said cartridge can hold up to 25 minutes of color programming, 50 minutes of b&w. Luminance information is recorded on half the 8.75-mm wide film, while chrominance signals are en-

coded as black-and-white information on the other half. A monochrome film contains separate programs on the two tracks. The video pickup device is a flying-spot scanner. Two magnetic sound stripes are furnished, the second being useful for bilingual programs or commentary added to educational material.

Brockaway said EVR is aimed first at the educational/industrial market; it's a high-volume medium where many copies of a single program are desired and one-to-one dubs are economically impractical. Further, only CBS will make up recorded cartridges. But the home-entertainment market hasn't been ignored. 20th Century Fox chairman Darryl F. Zanuck told newsmen he'd recommend that his company sign an agreement with CBS to transfer all Fox movies to EVR cartridges five years after their theatrical release.

The demonstration, held during the IEEE convention week, was made on the first dozen Teleplayers off the Motorola assembly line. Delivery to customers begins Sept. 1, while CBS begins cartridge production shortly thereafter.

According to CBS and Motorola, EVR offers ease of operation, a higher density of information storage for the amount of space used than any other audiovisual medium, and better economics than video tape or any other existing system. Either conventional film or tape programs may be transferred to EVR cartridges by the CBS method.

Videotape player updated

Even as CBS showed color EVR on the east side of Manhattan, Sony demonstrated an improved cassette player for helical color video tapes to IEEE visitors on Gotham's west side during the third week in March. Display models were different from prototype shown at last fall's NAEB convention ("Easy-Load VTRs Add to Market Muddle," *BM/E*, January 1970). New player handles two new cartridge sizes—100 minutes and 30 minutes. Sony claims agreement with other world videotape firms to cooperate on standard for videocassette. Companies are Sony, Matsushita, and Nippon Victor (Japan), Telefunken and Grundig (Germany), Zanussi (Italy), Philips (Netherlands) and North American Philips (U.S.).

Sony's video cassette machine

is self-threading, shows good color, but uses unusual 3/4 inch tape running at 3.15 ips. and is therefore noncompatible with all other VTRs. Player is said to be priced as low as \$350, will go on sale in Japan this year, in U.S. in 1971.

NAB board chairman Walbridge defends broadcaster freedoms

As they prepared to gather at this year's NAB Convention, broadcasters were urged "to fulfill the greatest role that time and circumstance have thrust upon them."

This exhortation came from the NAB's chairman of the board, Willard E. Walbridge, speaking before the Association of Broadcasting Executives of Texas.

The role he saw broadcasters fulfilling was that of defending themselves as well as the public against critics of broadcasting, both inside and outside of the government, whose "wild cry" must be "met and defeated with the action and the ideas and participation of broadcasters and of all the free media."

"The fact is," Walbridge said, "the anti-broadcast activists don't trust us because they don't trust the public to evaluate its information and make up its collective mind in the paths of progress. Broadcasters do—and they have no fear of giving the public the bad news with the good."

Referring to angry broadcaster responses to government criticism, subpoena servers and attempts to bring about government judgment of broadcaster performance, the NAB chairman said broadcasters "are ready to stand or fall on the issue of our freedom—because we know that the freedom of all is involved."

FCC debates satellites issue, calls for applications

The FCC has asked for satellite system applications to be submitted as soon as possible.

There was considerable debate about what acceptance policies to adopt. Commissioner Lee opposed the "open" policy advocated by the White House (see *BM/E*, March, 1970, page 8). Commissioner Cox preferred a single multipurpose facility instead of the many systems which the Commission has chosen to foster.

Among the questions debated

“The right
equipment



MODEL 8900 TV MODULATOR

makes the
difference”

especially when
it comes from the leader
in CATV product
development

ANA-31

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In CATV, equipment mistakes can be critical — take Modulators, for example. There are several available on the market, but there is only one which combines all the necessary “right equipment” features to do the whole job efficiently — the Anaconda Electronics’ Model 8900 TV Modulator.

The Model 8900 has built-in quality. The reliability of its all solid state circuits is reflected in the unexcelled visual and aural fidelity of either monochromatic or color signals from VHF sources, microwave sources and local origination.

Low distortion-differential gain of $\pm 1/2$ dB and differential phase of ± 1 degree insures excellent color transmission. The 8900 Modulator

features a built-in metering system for ease of operation and maintenance, that is, no external test equipment is required for instantaneous monitoring of our critical functions: video carrier modulation, sound carrier modulation, external line voltage level, and internal B + power supply level. Another “right equipment” feature is a convenient, front panel control/indicator which will accurately set the output level to any desired setting in incremental steps of 1 dBmV from +50 to +60 dBmV. Because of the extended broadband response of built-in circuitry, the envelope delay difference between the picture carrier and the color sub-carrier frequency is at an absolute minimum, thus assuring true color

reproduction.

The FM Modulator employs positive “no drift” circuitry to maintain the 4.5 MHz center frequency within ± 1 KHz. Further flexibility is achieved with the provision of audio or 4.5 MHz sub-carrier inputs making the unit ideal and convenient to use for the application of either local origination or direct microwave signal input.

The Sound Modulator employs a unique phase cancellation technique to generate the sound carrier which insures rejection of the lower sideband by as much as 80 dB.

It's the RIGHT EQUIPMENT — It's the Model 8900 TV Modulator, built and backed by Anaconda Electronics.

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were which broadcast bands to allocate to satellite use. The 800—806 MHz band, proposed by Comsat, was rejected, while there is a possibility that 470—890 MHz (as suggested by the National Academy of Science) might be reserved. Also in the running is the 11.7—12.7 GHz band.

In deciding to accept applications now, the FCC left open many policy questions, trusting that information requested in the applications will help turn theory into practical data.

Also, in a Notice of Proposed Rulemaking, the FCC asked for comments on open policy issues—such as what should be the role of AT&T in the domestic satellite field.

Echoing White House concern, the FCC mentioned possible stodginess AT&T might have in developing new technology, since it is tied in to present ground communication systems so thoroughly.

Expecting to file applications are AT&T, the three networks, Teleprompter, Comsat, Western Union, Microwave Communications and Data Transmission—although it is going to take a while for them to gather all the information needed for each application. After the forms start coming in, the Commission expects to set a deadline for acceptance and will then decide whom to choose.

Competing applications are not anticipated (hence no delay for litigation) and the FCC expects to approve applications for broadcasting and cable TV systems within a reasonable time.

Then it should, apparently, take two years for the applicants accepted to get their systems going.

IN BRIEF...

A full scale video tape recorder department has been opened by F & B/Ceco, Inc., New York. Edward Burns, a long-time audiovisual specialist, will head the new department, which will include sale, rental and service of products from the major VTR makers, and, eventually, a VTR studio.

The CCTV camera equipment business of Fairchild Camera and Instrument Corp. has been sold to the Riker-Maxon Corp.

Assets of the Bioelectric Instruments Div. on Technicon Instruments (Tarrytown, N.Y.) have

been purchased by General Microwave Corp. The business includes manufacture of medical electronics equipment.

Radio and TV sales were down January 1970 from the record set in Jan. 1969, according to the EIA Marketing Services Dept. In distributor sales, color TV was down 26.1% for the month, b&w down 16.2%, phonographs down 46.7% and radios down 21%.

The majority interest in Nationwide Cable Television Corp. (a subsidiary of Cable Communications Corp.) has been acquired for an undisclosed amount of cash by TeleVision Communications Corp. (TVC).

A TV receiver in Tokyo's New Otani Hotel during Expo '70 is equipped so as to suppress the Japanese sound track and restore the original to English language movies. Just turn off the volume and the "multiplex TV sound transmission system for bi-lingual TV broadcasting" plays the sound carried on a small slice of the regular transmission band.

How much time syndicated programs devote to trade-out announcements (airline plugs, etc.)—that's what the NAB has asked syndicators to summarize for broadcasters. NAB chief counsel John B. Summers made the request in letters pointing out that stations are under an FCC requirement to log such plugs as commercial time in advance, when filing for license renewal.

How many universities in the U.S. have scholarships reserved for minority students in communications? According to an NAEB survey of 147 colleges and universities, part of NAEB's effort to encourage more minority group activity in educational broadcasting, only eight universities offer scholarships reserved for minority group students in the field: Boston U., Colorado U., U. of Denver, Drake, Penn. State, Stanford, Syracuse and West Virginia.

Broadcasting research grants of up to \$1000 each have been awarded by the NAB to 11 projects covering different aspects of American commercial broadcasting. Among the winning projects: "Television Viewing and Aggressive Behavior," "The Impact of TV Blacks

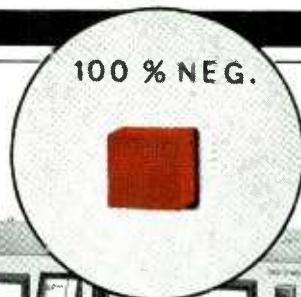
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on Children," "Radio and Dissemination of New Music," and "Youth: Political Beliefs and Mass Media Behavior."

One hundred hours of radio marathon raised more than \$45,000 for two orchestras recently. WCLV's 57-hour drive got \$30,566 for the Cleveland Orchestra while WONO-FM raised \$16,000 in 52 hours for the Syracuse Symphony. Individual gifts ranged in size from \$1000 down to \$0.06—the latter donated by the six-year old daughter of Syracuse's principal flutist.

Continental Electronics has become a subsidiary of Resalab, Inc. Continental will continue its work in the high power transmitter field—it accounted for the first one-million-watt medium-wave broadcast transmitter installed back in the early fifties. Resalab, involved in "information transfer," aims at advancing the state of the art in that field.

Business notes: Cox Cable revenues, which rose 14% in 1969, are predicted (by President J. Leonard Reinsch) to be still higher at the end of the first quarter of 1970—nearly 175,000 subscribers account for the growth. **Griffith Electronics** changed its fiscal year to approximate the calendar year—but they still lost \$60,000 for the last eight months of 1969 plus January of 1970. RCA sales in 1969 were 2% higher than 1968, but profits were down a bit. Meanwhile, the company has established a new division to handle development and world-wide marketing of radio-TV broadcast equipment. **DMI** has set up a national network (in 27 cities) of distributors for its CCTV products. **Audiotronics Corp.** has announced a preliminary agreement with **Standard Radio Corp.** of Japan to make and sell videotape recorders and cameras conforming to the new half-inch format—they will be marketed under the Setchell Carlson brand name (a subsidiary of Audiotronics). **Anaconda Electronics** has now moved into its new Anaheim plant: four times as much room for the telephone and CATV manufacturer. **CCA Electronics Corp.** brought radio station WABY (Albany) subject to FCC approval. It's the start of a planned move into ownership of facilities in AM, FM, TV and CATV by this broadcast equipment maker.



If that red light is flashing — two things are for sure:

1. You have a negative modulation problem. **2.** The BELAR AM Monitor caught it for you, because the 100% Negative Peak Indicator Light is exclusively BELAR's. And it's independent of any calibration procedures.

In fact, the BELAR AMM-1 AM Monitor is loaded with special, exclusive features.

Like the digital frequency deviation meter with analog display, the carrier level meter, the modulation meter, BELAR's built-in modulation calibrator, exclusive ± 20 Hz frequency calibrator, and off frequency alarm drivers.

This monitor is immediately available and immediately usable, with the same guaranteed performance as BELAR's FM and TV monitors, and all BELAR broadcast equipment.

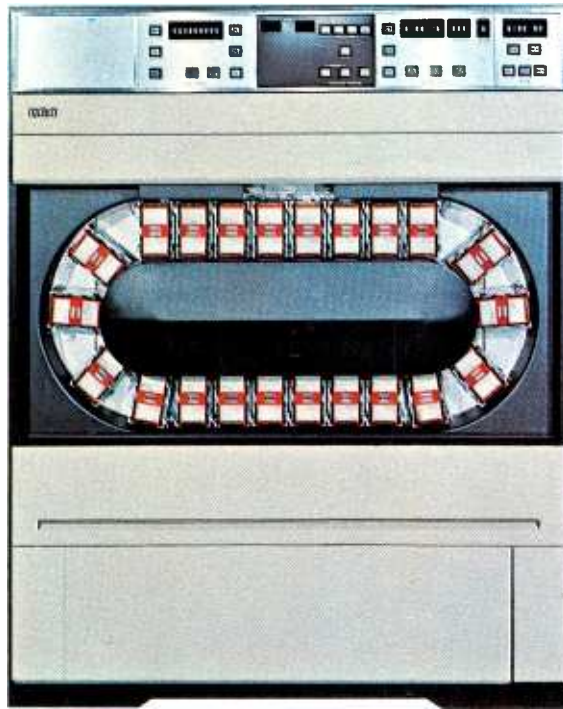
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The station break



The automatic station break



A bunch of VTR's.
Film chain. People.
Flying fingers. A late
cue. A noisy picture.
A cut-off ending. Pic
but no sound. Panic.
Go to black. The
Station Break, complete with make-good.

Or. RCA's Television Cartridge Re-
corder. One man. One button. And one
perfect Automatic Station Break after
another.

So the people and equipment you've
been tying up are free—for more re-
hearsal time, for new production time,
for wherever you need them.

And you get consistently good pictures.

RCA's TCR handles 22, 3-minute
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to run nine sequences
of eight events each.
Could be nine station
breaks. Could be the
night shift.

The TCR works off
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TR-60 or TR-70 reel to reel recorders.
The TR-70 and TCR can cue each other,
or devices like your film chains. And
later, you can add modular electronics
that let the TCR stand alone.

You can automate your station breaks.
Now. You can get the nucleus of a full
automatic programming system. Now.
Your job has its problems. Our
job is finding
solutions. Automatically.

RCA

INTERPRETING THE **FCC** RULES & REGULATIONS

FCC Ousts Telcos from CATV Ownership

The FCC recently decided that telephone companies—long the bastions of channel service to CATV systems—will no longer be permitted to own and/or operate CATV distribution systems in communities where they provide regular telephone service.¹ This decision deserves special treatment in *BM/E*'s coverage of the Commission's expanding regulation of the CATV industry (see this column, February and April, 1970, January, March, April and July, 1969).

Background

It may not be questioned that the FCC has authority to regulate CATV systems,² nor that it has authority and jurisdiction over telephone companies providing channel service to CATV systems.³

In the *General Telephone* case, for example, the FCC (pursuant to authority contained in Section 214(a) of the Communications Act) ordered telephone companies that provide local distribution of TV signals for CATV systems to file applications for "construction certificates" for all CATV channel service construction underway, and also to cease and desist from further construction and operation of existing facilities until such "§214 Certificates" were issued. Upholding the Commission's authority, the U.S. Court of Appeals noted that the paramount interest was in "preserving the Commission's capacity to respond to changes which necessarily emanate from a dynamic industry."

Recent Developments

CATV-telephone company agreements are inherent in normal CATV operations, because the usual CATV system consists of a "head-end" or reception and re-transmission facility, plus the distributive cable network from the "head-end" to the consumer's residence. The cable network

is generally provided either by channels constructed and leased by telephone companies ("telcos"), or by the CATV operator's own cables attached to the utility poles or underground conduits controlled by telcos and/or other utility companies. Since communities usually will not permit duplication of poles or conduits, the CATV system must normally use those belonging to the telco.

Now, ominous emanations from the FCC providing for the gradual withdrawal of telcos from CATV ownership control should evoke unbridled jubilation from independent CATV operators. In its *Final Report and Order in Docket No. 18509*,⁴ the FCC has virtually eliminated telco ownership and operation of CATV distribution facilities.

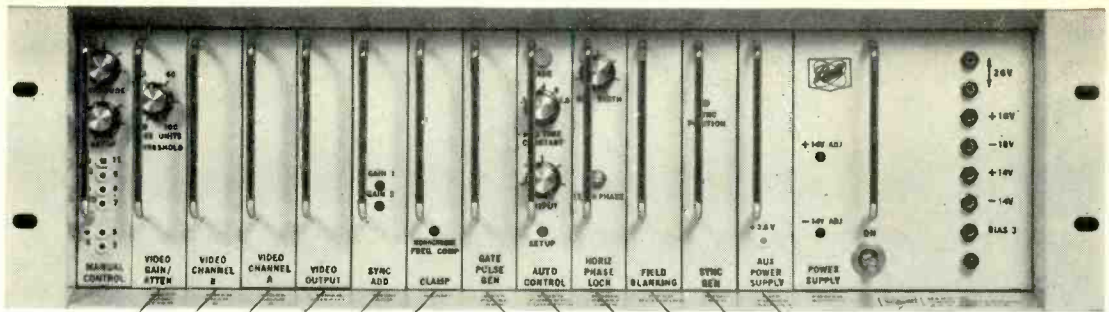
Final Order—No Telco CATV Ownership

In its *Final Report and Order*,⁵ the Commission declared that the central problem was the anomalous competitive situation between privately-owned and telco-owned CATV systems.

Repeated charges that telephone companies in many communities have favored their affiliated companies—in providing access to pole lines and conduit space—have not fallen on deaf ears; the FCC's *Final Order* now establishes specific provisions for providing pole or conduit access to the independent CATV operator:

We believe that the public interest in modern and efficient means of communications will best be served, at this time, by preserving to the extent practicable, a competitive environment for

1. *Final Report and Order in Docket No. 18509*, 18 RR 2d 1549 (1970).
2. *U.S. v. Southwestern Cable Co.*, 329 U.S. 157 (1968).
3. *General Telephone Company of California v. FCC.*, 16 RR 2d 2001 (1969).
4. *Id.*, fn. 1.
5. *Id.*, fn. 1.



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the development and use of broad-band cable facilities and services and thereby avoid undue and unnecessary concentrations of control over communications media either by existing carriers or other entities. We are of the opinion that the presentation of such competition will best be assured by the exclusion of telephone companies in their service areas from engaging in the sale of CATV service to the viewing public except where no practical alternative exists to make such service available within a particular community. In view of the foregoing, it shall be our policy to bar all telephone common carriers from furnishing CATV service to the viewing public in their operating territory except when, for good cause shown, a waiver of this policy is granted.

Accordingly, the Commission now requires telephone companies seeking §214 Certificates to show that the proposed CATV operation is unrelated to, or unaffiliated directly or indirectly with, the applicant telephone company. Also, telephone companies are not allowed to provide CATV service directly or indirectly to the public through pole attachment or conduit rental arrangements with their affiliates.

Telcos May Continue Leasebacks

The Commission in a recent Order, granting a §214 Certificate to the Illinois Bell Telephone Company to provide cable distribution service to a local CATV independent operator, made clear that "We have not adopted, nor do we foresee adopting, any rule or order which would preclude a telephone company from providing CATV channel distribution facilities to non-affiliated operators."⁶

Divestiture of Telco-Owned CATVs

Strengthening the anti-monopolistic thrust of this portion of the Order, the Commission states it will be "necessary that telephone common carriers be also required to discontinue providing CATV service to the public," by such methods within four years (probably in late 1974 or early 1975, depending on the final effective date of the Order).

Few Waivers Contemplated

The Commission foresees few waivers to its new rules; and those few will be granted as to service in rural areas and "communities of low population density." However, with the rapid growth of CATV, independent operators can be expected to fill the gaps rapidly in most sizable communities in the United States.

Some Effects of the New Rules

Many existing CATV systems will be affected by the forced-divestiture provision of the Order; therefore, in all probability, independent CATV operators will soon be bidding for existing telephone company systems, hoping to obtain in-place systems at bargain rates.

Of greater importance to the independent operator, however, is the FCC's "solution" to the common difficulty of obtaining pole line attachment agreements from local telephone companies:

6. In re Illinois Bell Telephone Co., 18 RR 2d 583 (1970).

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- COLOR MONITOR MATCHING**—Moderator: Charles Abel, KFMB-TV, San Diego
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- JCIC AD HOC COMMITTEE ON COLOR TELEVISION—A STATUS REPORT**—K. Blair Benson, Chairman
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- A SYSTEM FOR LOW-COST FRONT-SCREEN BACKGROUND PROJECTION**—James W. Hulfish, Jr., Spindler & Sauppe, Inc., Glendale, Calif.
- FCC/INDUSTRY TECHNICAL PANEL**—Moderator: Benjamin Wolfe, Post-Newsweek Stations, Washington, D.C.

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Telephone companies in seeking §214 Certification must document that the CATV system to be served has available, at its option, pole attachment rights or conduit space at reasonable charges and without undue restrictions on their use.

Conclusion

Telephone companies are now: (a) virtually excluded from any ownership of CATV Systems; (b) precluded from providing CATV service to the public through pole attachment or conduit rental arrangements with telco affiliates; (c) required to divest themselves of existing telco-owned systems within four years; and (d) required to show, if they propose to furnish CATV distributive service to an independent operator, that the operator has available, at his option, pole attachment rights or conduit space at reasonable rates and free of harsh usage restrictions.

No doubt, the new rules will increase competition for CATV franchises among independent operators, and the forced divestitures will create new opportunities for acquisition. As always, your counsel should be consulted for additional comments.

BM/E

This section, providing broad interpretation of FCC rules and policies, does not substitute for competent legal counsel. Legal advice on any given problem is predicated on the particular facts of each case. Therefore, when specific problems arise, you would be well advised to consult your own legal counsel.

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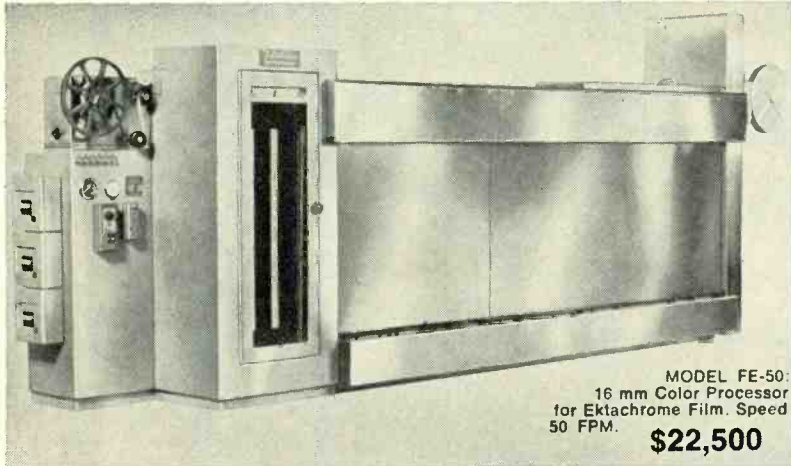
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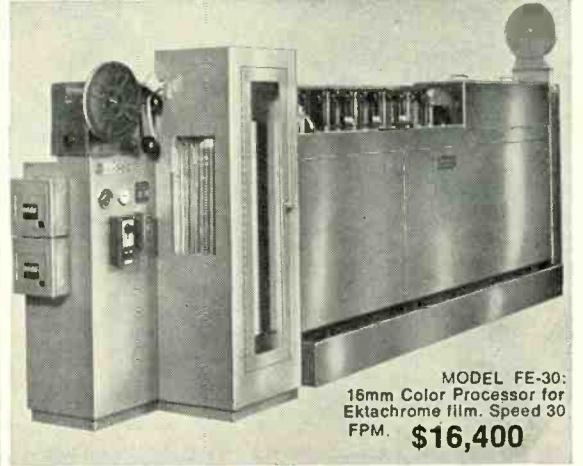
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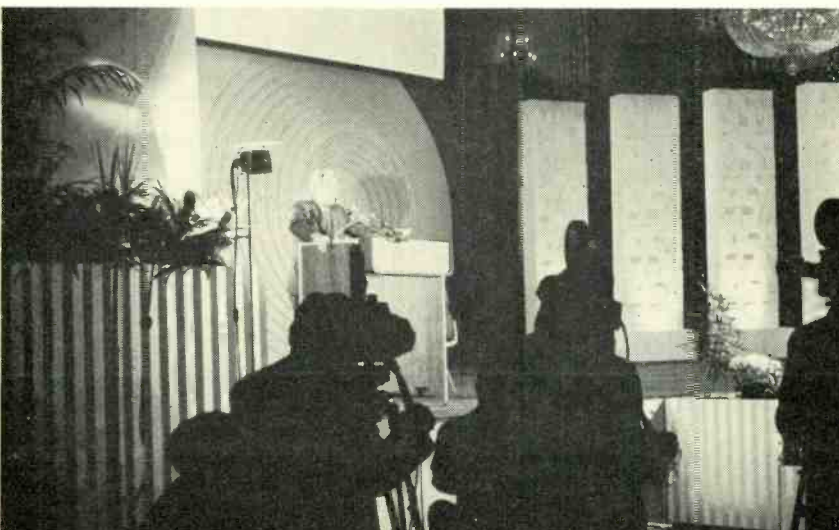
- Burch and Klein show sensitivity to industry problems
- Help save environment, communicators urged
- Satellites will increase capacity to serve.

JARRED BY DISRUPTIVE FCC jolts and nettled by the continual carping by critics, broadcasters showed their pique at the NAB 50th Anniversary Convention. Principal defense against

the growing attacks from pressure groups was to fall back on the testimony of the viewing and listening public. "They like what we are doing," broadcasters told themselves again and again.

Not unanimously, though, according to some of the news directors present. Local news offices have not been immune to the contagion of accusation that was supposed to be

Continued on page 24



Herb Klein, upper left, warns broadcasters by speaking against ownership break-up and subpoenas. Burch, upper right, said any broadcaster doing a good job need not fear losing his license.

Dr. Barry Commoner, left, warned broadcasters life would end if we don't observe ecology laws.

on exhibit floor...

New Generation Broadcast Gear

- New Ampex VTR reveals totally new concepts
- Automation and digital control are trend for '70s
- Color from b&w film; EBR produces 16mm color transfers.

THE SECOND HALF-CENTURY of broadcasting got off to a running start at the 1970 NAB Convention and very little time was spent looking back. Ampex marked the occasion by unveiling a truly third-generation

videotape recorder and several giant steps toward full station automation were demonstrated to the 5,498 broadcasters attending the convention. Much of the new equipment, designed for eventual computer control,

can be operated by unskilled help today. The new Ampex videotape recorder for example, requires no pre-roll. The instant pictures come up in .0002 second. Pressing a wrong

Continued on page 26

On the exhibit floor, Broadcast Electronics, immediate right, issued commemorative coins. Ampex, far right, showed a new generation VTR. ABTO, below, demonstrated color TV from black and white film.





Delegates to management sessions in Grand Ballroom stop to order copies of book about first 50 years of broadcasting.

directed to the *network* news operations. News directors have been getting it in the neck even in Iowa. Apparently some viewers have failed to discriminate, as Vice President Agnew originally did, when he singled out the eastern liberals for his invective. "Anytime somebody hears something they don't like, they call us," said Jack Thomas, news director, WOC-TV, Davenport, Iowa, who spoke at the workshop session on news, April 7.

While the flow of criticism is not likely to dry up—columnists Amory, Shayon, Gould, and Doan get paid too well to resist, said Dale G. Moore on opening day—broadcasters were assured that the Executive Office of the United States had no intention of pressing any further criticism. Said Herb G. Klein, President Nixon's Director of Communication, "The original intent of the criticism has been accomplished . . . the points Vice President Agnew made are now being discussed within the industry." Klein thought there was too much reaction to the criticism: "There never was any conspiracy to harass the media," Klein said.

Many broadcasters, appeared ready to believe this and found additional hope that the future might be less bleak when Klein said it was proper that the print and electronic press should be the natural adversaries and critics of government.

Klein warned the audience most when he said he thought the Department of Justice was going too far in subpoenaing reporters' notes and films.

He drew applause when he said that if any rate cutting for political office seekers is awarded by Congress, it should apply to all media. He also drew hearty applause when he charged that former Vice President Humphrey erred in thinking news considerations are affected by

advertising. "Sponsorship improves the opportunity for broader and better coverage," Klein said.

The Nixon aid scored the one-to-a-market concept, saying "Joint ownership of the media should not be feared." It was Klein's judgment (after 25 years of observation) that the best TV news staffs are found at stations owned by newspapers.

In speaking of the future, Klein said that the President is squarely behind the speedy introduction of domestic satellites.

Burch: Not Protectionist, Not Disruptive

The chairman of the FCC, Dean Burch, showed great circumspection in his first direct meeting with the broadcasting industry. Hoping to avoid being guilty of "the common malaise of sweeping generalizations and glowing phrase . . . with little substance," Burch walked the tight-rope carefully, but showed sympathy for broadcasters. The *Chicago Sun Times*, the following day, said Burch warned broadcasters that the FCC would not tolerate low standards of public service broadcasting. This was part of the Commission Chairman's speech but he also allayed broadcaster' apprehensions by declaring his conviction for "the absolute necessity of preserving stability in an industry requiring large investments . . ." He warned, however, "the FCC will provide the public the opportunity to challenge the minimal operators."

The broadcaster must run on his record and it is too late to upgrade when a competitor appears on the scene. "In that case he must run the risk of losing to a better applicant," Burch declared.

Burch conveyed the impression that his chairmanship would avoid dis-

ruptive practices but that he would not be labeled a protectionist.

On the subject of media ownership, he declared an open mind and asked for cooperation so that Congress would have facts.

One half of the Commissioner's brief talk was a plea for broadcasters to determine how they could serve the country's most valuable asset—children—in cognitive education and in drug education.

Service in such areas would mean broadcasters are "repaying the public for the use of airways," Burch said, and will encourage the FCC to avoid kicking the industry first in one direction and then in another for the claimed purpose of making it walk straight. In return for the industry's responsibility to the public, Burch promised to create a climate that would allow broadcasters to flourish and maintain healthy growth.

Wasilewski Cries Chaos

Whether Dean Burch's statements backed up by assurances of goodwill by Herb Klein will mollify broadcasters in the coming months remains to be seen. It is doubtful that broadcasters will take a quiet wait-and-see attitude.

"They will no longer be a silent majority," said Dale Moore on Sunday, and in the keynote address, NAB President Vincent Wasilewski pledged that the association would be an alert watchdog in warning the FCC against making regressive decisions such as the WHDH case in the future.

Wasilewski blasted the FCC proposal to break up radio-television and newspaper ownership in the same market without ever demonstrating that there is a problem of concentration and without producing *any* factual research.

Another alarming issue cited by Wasilewski is the threat to independent news reporting.

The attempts of the government to subpoena news records, the recommendation for a government-appointed surveillance body to watch over the news media (President's Commission on the Causes and Prevention of Violence) and the recommendation that reporters be licensed (by a member of the same Commission), are examples he said should cause broadcasters to remain forever vigilant in maintaining a free press.

"Professionalism in broadcast news will assure continued public confidence," Wasilewski reminded the convention goers. "Credibility of

broadcast news has been the industry's most important asset," he said and urged continued objectivity as the first objective.

"A game plan is being developed for an improved image of broadcasting this coming year," the NAB president said. "It's indeed ironic that the industry which is most generous in contributing to the public good seems to receive the least credit for it," Wasilewski said, pointing out that automobile and appliance makers and telephone companies do not give away the free service broadcasters do. He urged that suggestions be sent to Willard Walbridge, NAB Board Chairman.

To help counter critics, Wasilewski called for leadership and commitment on the part of broadcasters in a number of areas to improve society. His list included: help to the less fortunate, respect for law in the traditional sense, a contribution to solve the problems of a deteriorating environment, help to young people in solving problems constructively, aid in stopping use of subverting drugs, evidence that ethics and morality are the only guarantees to worthwhile personal life.

Save the environment: not only salvation but survival

It was no new thought to broadcasters that one way to improve the battered and tattered image of broadcasters was to get on the anti-pollution bandwagon. As NAB Chairman Walbridge had made evident before, there's a public explosion of indignation about pollution and broadcasters have a real opportunity to serve.

But Dr. Barry Commoner gave broadcasters a more urgent reason than mere service. With impressive didactic skill, Dr. Commoner showed that life itself is threatened with extinction if the nation doesn't stop violating the integrity of ecology laws which state that everything is connected to everything else. We have overstressed some cyclical eco-systems so far that they may come to a halt, Dr. Commoner said.

"Human life and, indeed, steel plants need oxygen," the Washington University scientist said, and then pointed out that we have already reduced the oxygen content of western Lake Erie and many rivers to zero.

"It will cost billions to restore balance in nature's process," Dr. Commoner said, and just as pollution has overstressed nature's ability to respond, the remedy will stress drastically our economy. (President Nixon's commitment of \$10 billion for



Retired FCC chairman Rosel Hyde (right) receives the 1970 Distinguished Service Award from NAB president Vincent Wasilewski.

Convention Capsules

"Critics do not have the foggiest notion of how broadcasters operate, of the economics of this business, how finely drawn is the line between success and failure in programming. They do not understand the many roles broadcasters play or the limitations imposed on them by the audiences they must serve. . . . Whatever understanding and support we can hope for will have to be generated by this industry itself."

—Roy Danish, T. I. O. Director

"The penalty of broadcasting's success is that we now find ourselves being given a great deal of attention by legislative, executive, judicial and administrative agencies. . . . The task ahead is to help make broadcasting a conduit to social justice, world peace, fiscal stability, and the modernization of local, state and national governments. . . ."

—Groyer C. Cobb, former Board Chairman, NAB

"The cure for the problems of Black Radio is in more jobs, greater income potential, training, management guidance, encouragement and dignity. Blacks must have 'an equitable piece of the action.' The time for excuses such as 'there's nobody qualified,' or 'we tried and it didn't work out' are over."

—Stanley M. Gortikov, President, Capitol Industries

"Radio that doesn't fully communicate has not reached its full potential. Broadcasters are going to have to think about controlling disease, not just selling pills."

—Jack Thayer, KXOA, Sacramento, Calif.

"Stations do not have one-way signals and must listen to what their audiences are saying. The real key to successful programming is to get actively involved in community affairs."

—Tom Campbell, KYA San Francisco, Calif.

sewage treatment was judged only a short-range solution.)

Hard choices have to be made, according to Dr. Commoner, such as increasing the cost of electricity, restricting the use of aluminum and high-powered automobiles, cutting off fertilizers to farmers. Industries and individuals will be hurt; taxes will have to be increased to provide for increased health care.

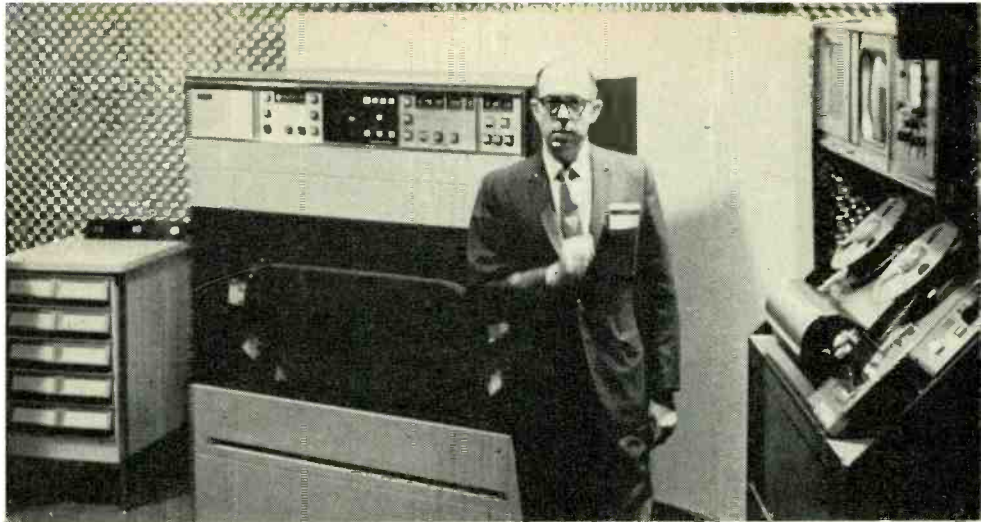
"Productivity is designed to pollute," declared Dr. Commoner, "and pollution is a cost of business that doesn't show up on industry's account books." How the nation is to pay for pollution control is an enormous

decision that should involve the public directly. The value judgments are too important to be entrusted to a few, Dr. Commoner said.

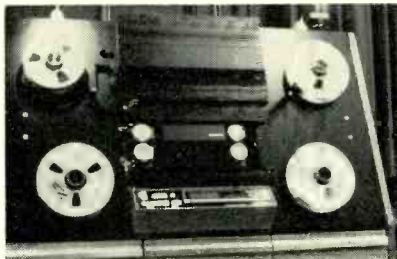
Informing the public is the broadcaster's job; providing the facts is the ecologists job, the scientist said, and he urged that broadcasters spread facts.

The text of Dr. Commoner's message (which is too long to report here) visibly shook many broadcasters present. Chairman Walbridge in closing the session said "You have just heard Paul Revere." He asked

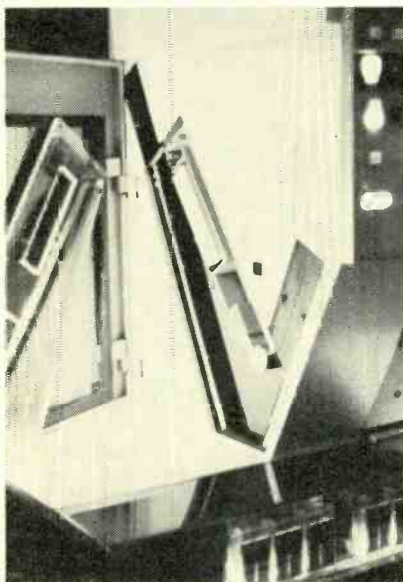
Continued on page 61



293



295



294



296

RCA cartridge VTR (292) was operating and fully automated. Third generation VTR from Ampex (293) is shown with remote control console. It uses vacuum for tape control as does the new prototype Ampex cassette VTR, a portion of which is seen at left (294). A new quadruplex tape duplicator (295) was also shown by Ampex. DMI had a new model slow-motion disc recorder (296). Numbers are for Reader Service Card.

button can do no damage—any “self-destruct” commands are rejected by internal logic.

Digital control circuitry that can understand computer language has pervaded much of the new equipment.

A quick rundown of some of the highlights include:

- The new easy-to-operate third generation Ampex AVR-1 videotape recorder (tape is controlled by capstan and vacuum columns, not reels).
- A working preproduction model of RCA's videotape cartridge system and an experimental demonstration

videotape cassette system from Ampex.

- A computer-controlled radio automation system from Schafer.
- The new ABTO process for showing color pictures from black and white film.
- A prototype high-speed contact printer for quadruplex videotapes, from Ampex.
- A new 3M electronic beam recorder capable of making 16mm transfer film from color videotape.
- A new production switcher from GE that can do six-way splits without re-entry (parallel video process-

ing is used).

- A new alphanumeric font for character generators from Visual that has some class.
- New color cameras—a new PC70S-2 from Philips and working models of the previously announced digitally-controlled PC-100 and the Minicam, PCP-90; a new three-Plumbicon model from Ampex with 1000-hour stability; a new high-contrast studio camera from GE, the PE-400; a new light-weight go-anywhere color camera from GE, the TE-201; and from Germany, a newly imported three-tube color camera made by Fernseh (also digitally controlled).

Not all the goodies were glamorous. Like Envirco's solution to extend VTR head life. The answer is to surround the videotape machine with a laminar flow air chamber. It pushes filtered air out of the VTR, keeping dirt away from the critical head wheel. Another example of a simple solution to a trying problem was McMartin's Electro-Peak—a CRT modulation indicator which shows true program peaks for only \$125.

New Concept in VTRs

“This year's NAB was the most important for Ampex since 1956 when we introduced the first practical videotape recorder,” said Larry Weiland, v-p and general manager of Ampex Video Products Division. This was no overstatement. In the Normandy lounge exhibit area were four brand new broadcast videotape recorders plus a new model in the VR-1200 line.

Top billing went to the AVR-1, described as a third generation videotape recorder. The AVR-1 is adaptable to station automation through the use of digital control circuitry. It has improved reliability and simplified maintenance. The AVR-1 starts instantly. Reel take-up and feed can lag because the new tape transport, consisting of a capstan tape loop and a vacuum column, requires only the capstan to be up to speed. (Light-sensing elements in the tape vacuum columns adjust the servo-controlled reels to maintain uniform tape feed to the columns.)

The AVR-1 can record non-synchronous picture source material. Its output is continuously synchronized and automatically adjusted for maximum picture quality. High- or low-band modes are picked by the machine automatically; threading is automatic. Air guides are used in the tape path to reduce tape wear. Single frame editing is possible.

The next logical step in station automation would be the automatic playing of videotape spots and Ampex showed its solution to this problem—the ACR-25 cassette recorder system. Although capable of doing the same job as the RCA cartridge system, Ampex used a vacuum loading and transfer system rather than a mechanical system. The cassette design also differs from the RCA approach.

The cassette system plays up to 25 commercials or other program material ranging in length from ten seconds to six minutes. (RCA cartridges go three minutes).

The ACR-25 has two tape transports (the experimental model at the convention had only one) and while one is playing a cassette, the other is automatically loading and cueing the second cassette. It takes less than ten seconds to switch between cassettes. Run up time between activation of the play mode and appearance of a color synchronous picture is .2 seconds.

The Ampex cassette is 2½ inches high, four inches wide and six inches long. Spools can be loaded or unloaded at the push of a lock/release button on top of the cassette. The new vacuum loading device is priced at \$165,000 and deliveries are expected to begin in mid-1971.

To help produce multiple copies of cassettes, Ampex also showed at the Convention the industry's first high-speed videotape duplicator built to accommodate quadruplex standards. The printer is basically a reel-to-reel duplication device but short segments for cassettes can be programmed.

Called the ADR-150, the unit can handle up to five slave reel systems at the same time. The printer makes possible tape distribution of programs competitive in price to film, Ampex said.

The printer uses a dynamic transfer system (see *BM/E*, April, 1970, page 18) in which a high-coercivity mirror-image master tape is brought into direct contact with standard tape. The duplication process occurs in a magnetic transfer chamber located in the center of the tape paths. Degradation is insignificant. Vacuum chambers permit easy tape threading, gentle tape handling and positive tape control through the magnetic transfer chamber. The price of the printer starts at \$79,950. Deliveries begin early in 1971.

The first videotape recorder designed for program logging and verification was also shown by Ampex. The Model VL-7404 logging recorder can record up to 38 hours on

a standard 9¾ inch reel containing 3000 feet of one-inch-wide video tape.

The logger records continuous audio and every 32nd field of video information and operates at a tape speed of 0.24 inches per second, record, and 0.6 inches per second for real time playback. A compressed playback of 32:1 is possible. Still frames can also be viewed. The unit, priced at \$5,900, is patterned after the model 7500 helical scan recorder.

The fifth videotape recorder entry by Ampex was the VR-1200C which was described as combining the design advantages of the VR-1200 series with the editing capabilities of the VR-2000.

RCA Cartridge System

Design advances in videotape recorders were the order of the day at RCA also. The key product at RCA's exhibit was the pre-production model of the TCR-100 videotape cartridge system which caused quite a stir last year.

The TCR-100 is programmed for a sequence by loading the cartridges (up to 22) onto the belt-like changer in the order which they are to be played. The sequence (eight at any one time) is entered on a control panel. Cue signals entered on the last cartridge of a sequence can automatically start up a reel-to-reel recorder or a film projector, or can cue a live program segment.

Use of the TCR-100 can free as many as three videotape machines needed during breaks, or up to 12 needed for news shows. The TCR-100 will record programming and play it back.

In addition to the cartridge system, RCA unveiled a new high-band TR-70C reel-to-reel videotape re-

recorder. Use of integrated circuits has improved the reliability comparable to that realized when designs went from tubes to transistors, RCA said. Pre-roll has been cut to one or two seconds by a new servo system. The TR-70C also incorporates a new headwheel alloy, Alfecon II, designed to improve quality, uniformity of color pictures and headwheel durability. Fourth generation dubs are undistinguishable from the master tape, RCA claims. Price is \$93,500.

Data Memory, which exhibited for the first time last year, was back with its portable disc recorder priced at \$69,500—almost half that of Ampex devices. Unit is packaged in rugged field cases for easy portability. Single disc is used and heads and disc are warranted for 500 hours of use. An A-B demo at the booth, reel-versus-disc, showed good picture stability and no color break-up.

Visual, who's had a hard time getting any kind of toe hold in the high band color VTR market, tried price cutting; \$55,000 on its VA 50 unit and \$25,000 on the portable record-only model.

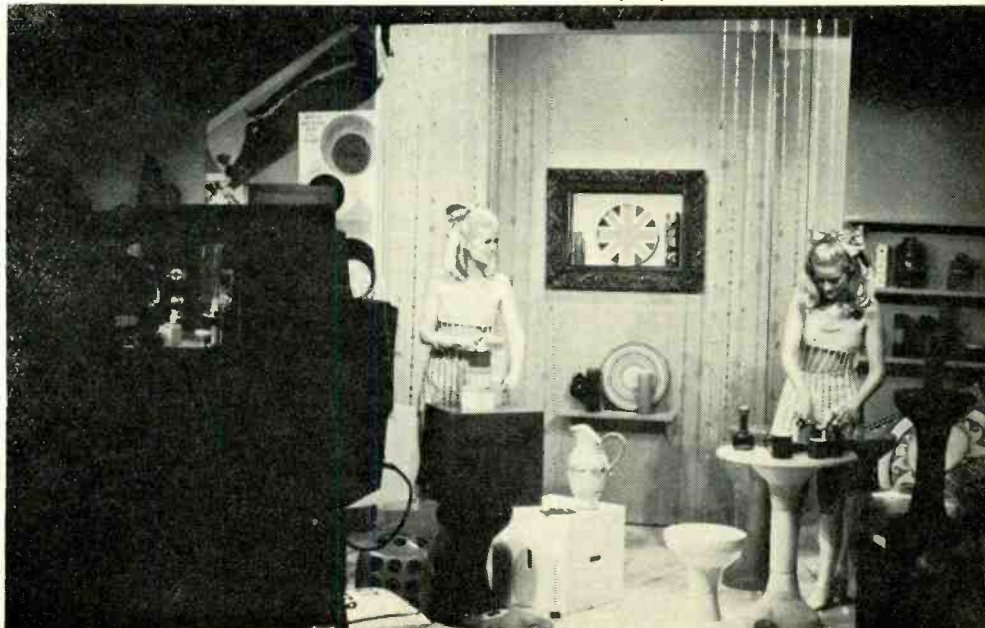
IVC was busy promoting its model 900 helical scan VTR, priced at \$18,000, as capable of producing broadcast quality color. Output is not true NTSC signal but close to it.

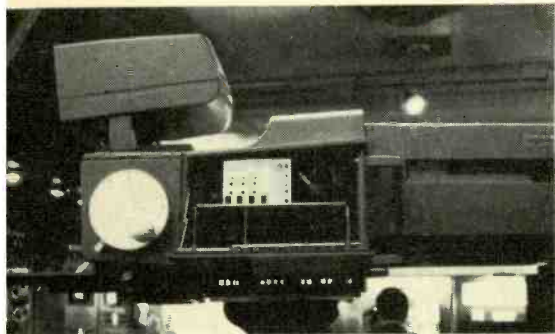
Color Camera: Still New Entries

If you thought the color camera market might be settling down, forget it. There are still some price gaps to be filled and manufacturers are determined to plug the gaps.

Ampex unveiled a new three-Plumbicon camera, the BC-230, priced at \$57,500. The big feature was the camera's stability—1000

IVC three-Plumbicon color camera for \$39,600 focused on twins (297).





Top to bottom: New color cameras were Philips PC100 (298); the Ampex three-tube BC-230 (299); the GE light-weight TE-201 (300); and Commercial Electronics' low-light level SEC vidicon unit (301).

Top to bottom: Frivolity in front of the Philips cameras; the imported Fernseh camera (302); and the RCA TK-44A demonstrating how color can be changed without upsetting gray scale values (303).

hours without re-registration. Ampex said it borrowed know-how from space technology to do the job. Much of the circuitry, using ICs and hybrids, is in the camera head rather than in the camera control unit. This means a smaller cable since the critical controls are all in the camera.

One-inch Plumbicons were used. Ampex stressed the new BC-230 and the four-tube Marconi. No two-tube cameras were shown.

Other brand-new cameras included two entries from GE: the high-contrast (120:1) PE-400 and the light-weight TE-201.

The high-contrast ratio is achieved by inserting an automatic gain controller in each of the four channels. White flare is avoided. Circuits are set for white at 75 IRE units. If the scene goes to 200 IRE units, gain control compresses white to 75 to 105 IRE units—there's distortion of white but no flare.

The TE-201, weighing 22 pounds (without viewfinder or lens) is designed to go anywhere. It's sensitive to low light levels, accommodates varied color temperatures and can be operated by nontechnical personnel (controls are in camera control unit).

It's priced at \$29,605, complete, and includes three one-inch Plumbicons, a 10-to-1 zoom lens, viewfinder, camera control unit and the GE TV-115 color encoder.

The color encoder permits improved signal-to-noise ratios at low-light levels and is offered as a separate product to all camera owners. It contains a digital color bar generator, burst flag generator and test pulse generator. Camera set up without a vectorscope is possible.

Color Masking, Low-light Level Big

Color masking circuitry, which permits color matching between cameras without upsetting the gray balance, was a feature stressed strongly in the demonstrations by RCA and Philips. The GE PE-400 also has this feature.

Low-light level operation was boasted by every camera exhibitor (because of low-noise, high-gain FET preamplifiers) but the camera that won this contest hands down was Commercial Electronics CEI 270 unit which operated at 10 foot candles with the lens stopped down to f/5.6. The CEI-270, introduced at NAB last November and reported in *BM/E*, April, 1970, page 34, uses SEC vidicons made by Westinghouse.

Others in the Line-up

Philips showed the latest version of the popular PC-70, the PC-70S-2, dubbed son of PC-70. Its standard features were comb-filtered contour enhancement, and low-light sensitivity without noise. The separate channel color masker for adjusting hue and saturation was listed as optional.

Biggest attention at Philips was focused on the sleek, sculptured PC-100 which was shown in mock-up form last year. A new generation camera, it uses digital control techniques and a small triaxial cable 1/10th the weight and cost of conventional cable. Camera has all of

the features of the PC-70S-2 plus anti-comet-tail Plumbicons which prevent blooming during panning of bright objects. There was some question last year whether the anti-comet-tail tube would be perfected in time for use with the PC-100, but Philips says they will be in the first units scheduled for delivery this fall. Price is \$89,850.

Production models of the much-heralded one-man PCP-90 Minicam were also in use at the Philips exhibit.

Visual was showing the VP-3 which was introduced last year. RCA highlighted the TK-44A of which over 200 have now been delivered. RCA's color masking circuit is called Chromacomp and has individual controls for red, blue and green and the complimentary colors, magenta, cyan and yellow.

IVC put its \$39,600 three-Plumbicon camera through the same tests as others and outside of a little more noise at low-light levels, it looked good. The IVC/EMI camera demonstrated a new feature this year, auto-center control, which maintains full color registration over long periods of operation.

One from Germany

Not daunted by all of the foregoing, Fernseh, GmbH, of Germany, launched at NAB an effort to sell in the U.S. its KC U-40 color camera.

The demonstration, helped by vivid color shown on \$5500 Fernseh monitors, was impressive. The camera is small, 70½ pounds, and fast interchange of lens is possible. A tiltable viewfinder and a quarter-inch cable (for up to 490 feet) made the unit easy to handle.

The camera was sensitive: it operates with three Plumbicons on the separate luminance principle. In this WRB system, focus is determined by the white signals. A neutral gray filter and conversion filter turret adapt to outdoor illumination and various color temperatures. Turret is handled by remote control. Cameras can be controlled remotely by a simple digital two-wire system. Sales representative is Robert Bosch Corp., Broadview, Illinois.

Video Control

A sync generator with programmable pulse widths was a feature product at TeleMation. The new TSG-3000 series uses the digital design concepts first incorporated into the TSG-2000 for high time base stability and low jitter, but has several added new features: program-

mable pulse widths, built-in bar and dot generator and, in the TSG-3000GL genlock version, genlock circuitry.

Horizontal pulse transitions can be changed in 70-nsec increments and the trailing edge of the vertical blanking pulse can be altered in half-line increments. The built-in bar dot generator aids linearity adjustments and color convergence.

The digital genlock unit includes two new modes—"ratelock and crashlock." Ratelock is constant rate; crashlock provides instant vertical, horizontal or color lockup. The unit stays phase-locked without color burst.

Grass Valley showed a new routing switcher designed for ABC, New York, that could route 200 sources to 200 destinations without signal degradation and with the utmost reliability. Video path lengths were kept constant in the new system. The 40,000 crosspoints considered necessary by conventional methods have been reduced to 17,000 in the modularized routing approach which provides an individual path to each user.

The concept evolves around destination orientation. The switch and control modules have a single output (10×1) so a malfunction in one module does not affect other users. Switches are solid state CA3046 ICs from RCA.

A new video processing and age amplifier, the Mark 11 designed to work with helical scan recorders was shown by Ball Brothers.

Flexible routing switchers that could be expanded were introduced by TeleMation. The 12X type video and audio switchers both employ electronic crosspoint switching and can be ordered in multiples of 12 inputs and 12 outputs. Looping video input circuits and available output combinations permit expansion to most configurations.

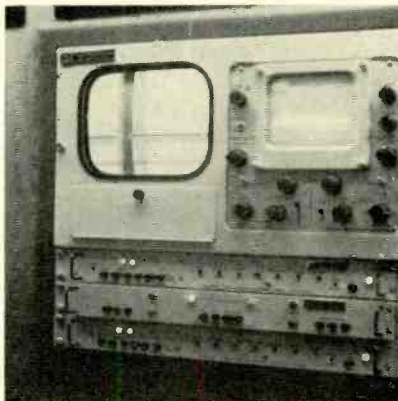
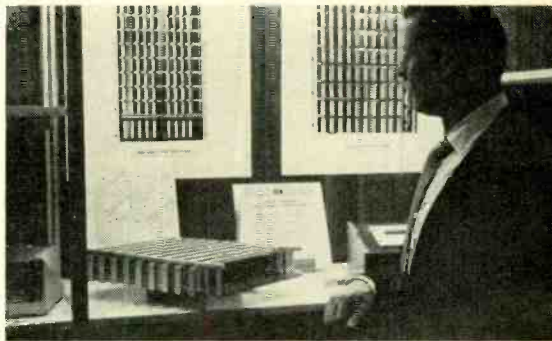
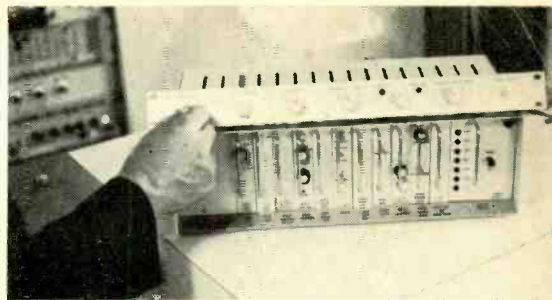
Emphasis on TV Production

Everybody wants to do production with style, be they a budget-starved education or secondary market station or a prestige flag-ship operation. Manufacturers have been accommodating.

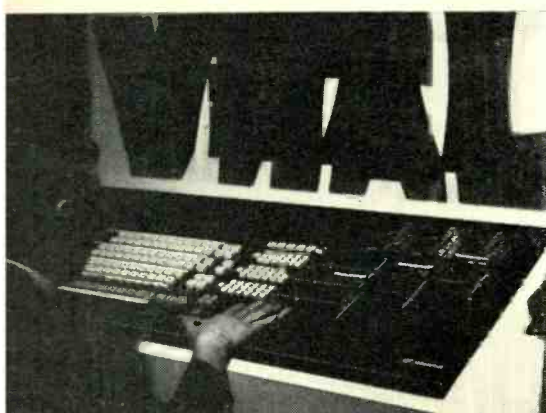
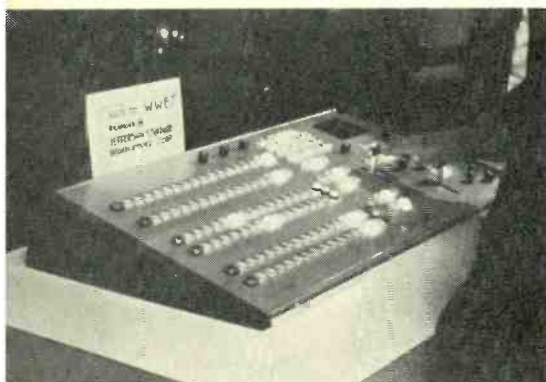
Alma, for example, showed a special effects generator, the model 7600SE, capable of handling color to broadcast standards at \$1500. For this you get eight distinct wipes and four operational modes.

Dynair showed a new special effects generator and low cost production switchers.

Elaborate production switching was a central attraction at Central



Top to bottom: New video processor, the Mark II (304), from Ball Bros.; the new routing switcher (305) from Grass Valley; the new TeleMation sync generator TSG-3000 with programmable pulse widths (306); and the new production switcher from Telemet (307).



Top to bottom: The audio control console from Ward Industry (308) is in foreground of booth showing Ward, Richmond Hill and Riker products. Second from top is new flexible Central Dynamics switcher (309) and below it, the Vital switcher (310). Bottom shot shows Dynair's low-cost switcher (311).

Dynamics, Cohu, Grass Valley, Telemet, Ward, Vital and Visual.

GE's program switcher, the TS-400, was capable of mixing six TV pictures simultaneously without re-entry. This is possible through parallel, rather than sequential, video processing.

Sarkes Tarzian caught visitors' attention with a "Rotec" effect: you punch up a four-way split and then rotate the whole thing.

A new sophisticated type face for titling generators was shown by Visual. Letters were made up from many segments, eliminating roughness and serifs. Built in edging was a feature of the V-1000 \$20,000 Data Vision system. Visual also has a new tape cartridge for storing messages.

A new low cost electronic titling generator, the TCG-225, was shown by TeleMation. It displays up to 25 characters, stationary or crawling.

New Ideas for Film

Something really new at NAB was the first public demonstration of the ABTO process for getting color from black and white film. The demo lived up to the advance billing (*BM/E*, March 1970, page 23, and April, 1970, page 25). The simplicity of the system—the grating for insertion into the 16 mm camera and the encoder and light modification for the telecine chain—was intriguing. So is the method of marketing planned by ABTO. The system is not for sale; they'll loan you the equipment if you pay 6¢ a foot for film shot—or \$9000 for 150,000 feet of film annually. Price is less for greater footage.

How to make sure a fast-breaking news story gets on the air with sync was shown by RCA. The sound track is handled separately from the picture print and it's all possible using RCA's FR-30 double film system in conjunction with the TP-66 film projector. The FR-30 handles the audio on a sprocketed 16 mm film-tape to which sound is transferred from quarter-inch tape recorded at the news scene. Synchronous motors interlock the picture and sound equipment.

A super 8 projector, a Bauer T 22, was an interesting feature of the TV film system shown by Fernseh. Heretofore, super 8 has not been available in the U.S.

Listec got attention by showing a photo only of the 16 mm film cassette telecine system now used in Japan broadcasting. Listec will be the U.S. distributor.

As an aid to improving film shown on TV, Eastman Kodak demon-

strated a film preview room. The screen size matched a TV set, the projector was equipped with a 5400K lamp, the screen luminance was designed to be 40 foot lamberts (without film), and the ambient light was held between 5000K and 6000K at three foot lamberts near the screen. If the film doesn't look good under these conditions it won't be any better on the air. Specifications are available from Eastman Kodak.

A low-cost slide projection system was shown by Spindler and Sauppe which permits large background images behind a TV newscaster. The slide projector is the company's standard twin dynamic dissolve system with a 3000 lumen lamp. The front projection feature becomes possible through the use of a super high gain screen. Complete system costs \$3200 to \$4075, depending on the size of the very directive screen.

Automation Does Everything But Make Coffee

Automation has gotten a big play at NAB for several years, but 1970 was different. There was evidence that the industry was getting closer to ultimate automation—the complete takeover of daily operations by the computer. Extensive use of digital logic, made possible by reliable ICs, has brought the industry closer to full computer control.

Heretofore, all the pieces have been around but not assembled into a system. Preset memories have done automatic switching and log preparation for the engineering and programming departments and business computers have helped sales and accounting departments with availabilities and billing. But now companies are talking about computerization of all these functions into one integrated system.

Sarkes Tarzian made a theatre out of half of its exhibit area and every half hour put on a TASCOM show to persuade management to think computerization. You don't even need your own computer with the TASCOM system, hence the appeal to broadcasters regardless of size.

The TASCOM approach gives you a simple data terminal and puts you on line with an elaborate central computer which stores and processes your data (confidentially).

Reports are generated through your data terminal and presented either as hard copy print or on a video display. Availabilities, for example, can be read out instantly showing unsold spots, costs, ratings, demographics, as well as sponsor adjacency.

When buys are made, transactions are confirmed automatically. When spots are aired, verification is generated by the Sarkes Tarzian APT-2000 computer (not new) which controls the station's master control. This same info goes into the invoicing file and sales journal for automatic billing and processing.

Broadcasters who were complaining about being behind four and five months in billing paid close attention to the Sarkes Tarzian story and also flocked to the Broadcast Computer Service exhibit and the BIAS (Broadcast Information Automation Systems) suite to see what these business systems could offer.

Two other companies, GE and Schafer, stressed heavily the role of the computer in automation systems. GE pushed, primarily, computer control of a television station's programming operation via a small GE computer, but said this was simply a logical step toward complete station automation, including computerization of business functions and eventual computer control of the transmitter. GE predicted full automation of most TV stations by the end of the seventies.

In the GE/BAC system, the computer keeps track of upcoming events, alerts the equipment to be used, pre-rolls VTRs, does the on-air switching and prints the log. A PAC 30 mini-process computer is used along with a DataNet 765 monitor display, the TS-301 distribution switcher and a manual override panel.

The start toward automation, GE said, was the purchase of the TS-301 distribution switcher (\$35,000). The rest of the automation equipment could be added later (for approximately \$150,000).

Other exhibitors promoting automatic TV switching heavily were Visual, Ward Industries, and Chrono Log. These systems were similar to those shown last year, except that Chrono Log has put vertical rules in the CRT display to make upcoming events easier to read.

Radio broadcasters found that Schafer was now using computer control in its new 8000 system which is programmed in plain language through a teletypewriter.

The 8000 system can run AM and FM operations separately, handle as many as 48 different formats, operate a digital clock and an audio clock, operate up to eight random access spot locators, and up to 12 music transports, switch in and out of network, and automatically print both the program and operating logs. The Schafer booth attracted conventions.



Visual display of Chrono Log's programmed video switcher (312) has new vertical rules for clarity.

Below (top to bottom) new from IGM (313) was Insta-Cart, a 48-cart tape deck, and a random-select memory to control its system. Soco-Mag v-p W.E. Moulic operates new DP-1 digital programming system (314) shown by MaCarTa. Broadcast Products' AR-100 Mini-Mate (315) is small automation system in single rack.

Below (reading from top to bottom) is GE video switcher (316) controlled by GE mini-computer. Alpha-numeric program logging system by Gates (317) was shown at their automated radio station. Ampro's Insta-Tape multi-cart deck (318) was automatically programmed, commercials logged as aired.



Equally crowd-collecting was the Gates automated radio station, which included everything from software and input gear (reel-to-reel and cartridge source equipment and a programmer), a 1-kW transmitter and monitoring equipment, and automatic printers for the program and transmitter logs. Gates also showed the new Viatron System 21, an alphanumeric logging system with a CRT display and hard-copy readout.

Software was shown and played by Seeburg, which offered samples of its taped music service.

The engineers at IGM have developed a new random-select memory using MOS ICs, providing 200-step memory and control, and audio switching for up to seven sources. Seen at Chicago, the memory is programmed from a 10-key keyboard, and has digital readout.

The keyboard route was also taken by Sono-Mag (MaCarTa) in its new digital programming system. It's a solid-state memory with a minimum of 2000-events storage capacity for system programming, and selection of any of 24 carts in any of eight Carousels, as well as real-time events. You program through the keyboard; there's a digital readout above. The system's compatible with external ASCII code equipment.

RCA had a working sample of its audio automation systems on hand, using both reel-to-reel and cartridge sources.

For limited applications, two firms showed smaller automation systems. Insta-Tape's Mini-Mate is really semi-automation; a 12-cart player with a programmer keyboard. Broadcast Products displayed a similarly-titled Mini-Mate Model AR-100 rack full of two 10½-inch reel-to-reel Teac transports, one Carousel and a single-cart machine.

Insta-Tape also showed its tape cartridge logger-printer system which provides a hard-copy record of carts played on the air.

New from Sparta was the model 726 automatic program controller, a part of the Sparta-Mation system, which handles up to seven inputs. It features overlap cueing (audio override) for a live sound.

Transmitter: Solid-State and Super Fidelity

In TV, the design trend seems toward i-f modulation in uhf exciter. Gates and Philips rounded out their respective lines by showing new uhf rigs, while RCA introduced a solid-state uhf exciter and a new vhf transmitter.

New from Gates is the BT-55U, a 55 kW vapor-cooled uhf TV transmitter. The exciter uses i-f modulation (like new Gates vhf models) and is all solid state. The only tube in the rig is the final, a five-cavity internal klystron. I-f modulation makes possible good color fidelity, says Gates.

Philips showed its new PTU-55A uhf TV rig with i-f modulation.

Nestled in the corner of RCA's vast booth was the new solid-state uhf exciter-modulator, which can be retrofitted into any recent RCA uhf rig. IC op and diff amps provide a high degree of stability, and RCA quotes 30-day stability of differential phase at 2°, differential gain at 0.7 dB, and variation of frequency response with brightness at 0.75 dB. The crystal oscillators are temperature compensated, and the exciter uses such high-reliability devices as metal film resistors, step recovery devices, and dual-gate FETs.

For translator service, EMCEE showcased its new model TOA-1000A 1-kW uhf amplifier, which will handle either NTSC or PAL color. The final is a relatively inexpensive TH-331 ceramic tetrode. Designed for unattended operation, the TOA-1000A has automatic VSWR protection, a fast-acting power supply crowbar circuit, and automatic turn-on and recycle. EMCEE says six of these translators will be delivered this summer to New York City TV stations to provide service to that area north of Manhattan which will be blitzed with ghosts during construction of the World Trade Center.

New AM Designs

Known for conservative, efficient fire-bottle design in AM transmitters, Continental has finally gotten into semiconductors. They surprised everyone with their 316F/315F 10/5 kW AM model, which has only two tubes. The exciter is totally solid state, uses no modulation transformer and has 100% modulation capability from 20 to 20,000 Hz.

RCA's 50-kW Ampliphase design has been known for years for its wide frequency response and low distortion. Now RCA has produced a lower-power (5/10 kW) version of that design. The BTA-5L/10L has a solid-state exciter, using tubes only in the IPA and PA stages.

Bauer (new subsidiary of Sparta) showed a rugged 3-kw AM transmitter (all HV components in oil). Why such an oddball power? Use two in parallel for 5-kw fail-safe operation,

says Bauer, offering a newly designed ferrite rf coupler. If either rig fails, station output power is down only 3 dB.

CCA showed its 50-kW air-cooled model 50000D, and a 1-kW model capable of modulation on positive peaks over 125%. The kilowatt was running into a dummy load and you could watch the peaks on a scope.

In FM, three 20-kW models were on display. Gates introduced its new H-3 line with power outputs from 250 watts to 40 kW. All use the solid-state TE-3 exciter. Conventioneers saw the 20-kW FM-20H3, which has Vari-Line plate-tank tuning in the single-ended final. Neither mica nor vacuum capacitors are needed in the circuit; a portion of a parallel tubular 2½-inch copper transmission line (silver plated for rf efficiency) is varied to inductively tune the line.

Collins showed the 831G-1, a 20-kW FM transmitter using a direct FM solid-state exciter followed by three tubes.

The third 20-kW FM transmitter at the show was AEL's FM-20KB, a two-tube model that doesn't require neutralizing. It has motorized digital tuning and a memory fault annunciator to aid troubleshooting.

Gigahertz Gear

There was some microwave equipment on hand: Raytheon highlighted its KTR-3A transistorized long-haul heterodyne system for intercity relay use. It handles NTSC color TV with up to four 15-kHz audio channels. Except for the traveling-wave tube, the KTR-3A is solid state with complete front access, thus may be installed against a wall. The transmitter features automatic insertion of 70-MHz carrier (with manual override) on loss of received carrier.

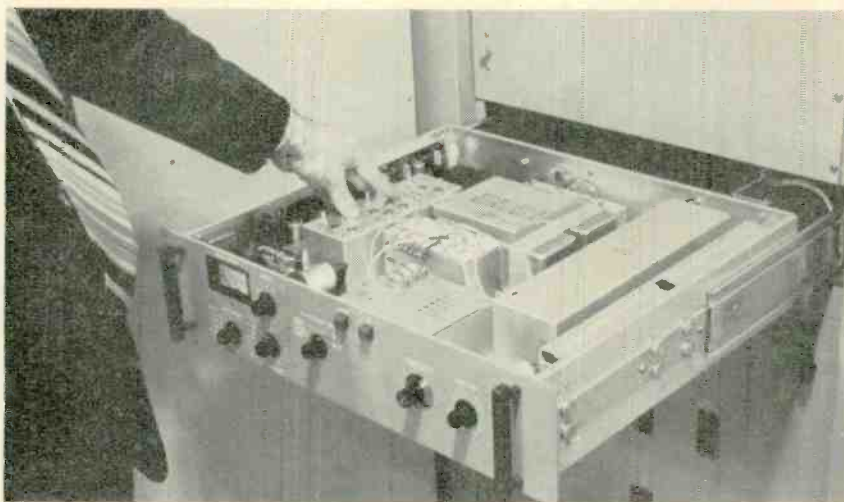
Microwave Associates showed its B-Line solid-state FM microwave system for color TV, with auto changeover. It operates in seven bands from 0.7 to 13.25 GHz, with transmitter powers of ±20 to ±35 dBm (depending on frequency). Receiver noise figure is from 5.0 to 6.5 dB with a low-noise amplifier. Also described at the booth was the Eye-in-the-Sky system which gets video from a helicopter-borne TV camera back to earth. That setup is used by New York City police for crowd and riot surveillance.

For Radio Remotes

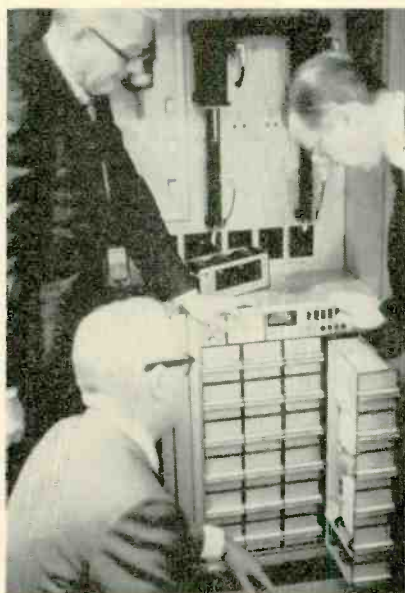
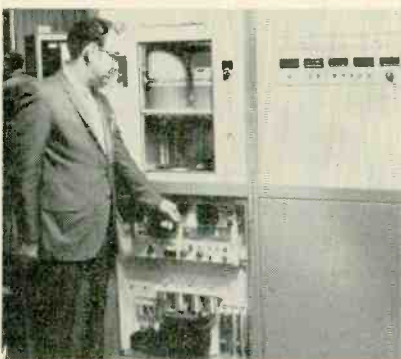
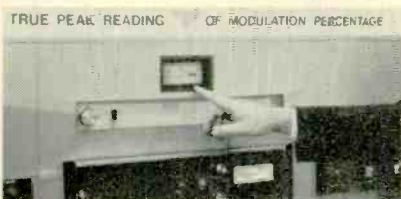
Moseley introduced an all-solid-state remote pickup link, model RPL-2. Rf power output is 30 watts



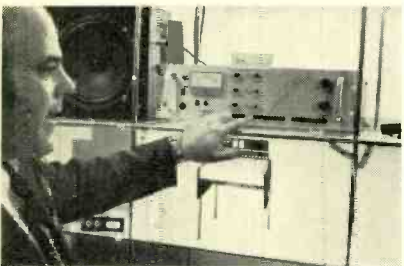
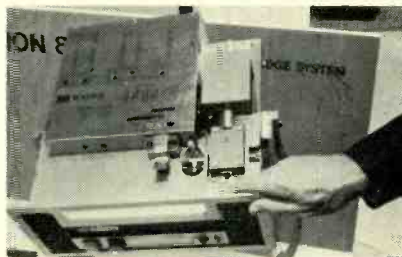
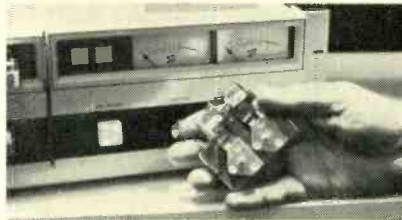
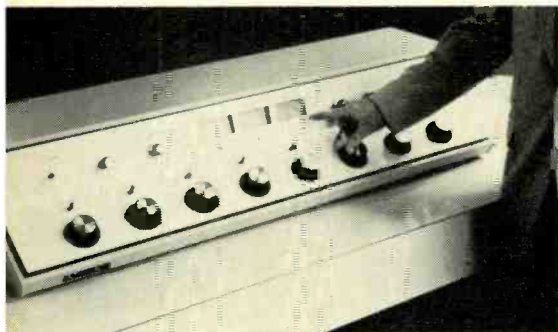
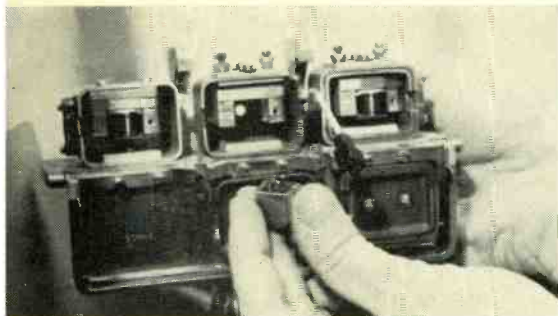
Wilkinson Electronics (319) showed FM exciter, stereo generator, plus console and turntables.



Exciter-modulator of new Gates uhf television transmitter (320) pulls out for testing.



(Top left) Unusual from McMartin was Electro-Peak aural mod monitor (32) using CRT. (Center left) Continental showed new solid-state exciter and 10/5 kW AM rig (322). (Bottom) Alvin and Shirley Fishman (WAEF Cincinnati) examine CCA's water-cooled 50-kW AM transmitter (323). (Center) Heart of RCA uhf TV transmitter line is new exciter-modulator (324) using i-f modulation. (Right, top to bottom) Rust showed Autolog digital remote control and logging system (325). Pretty girl graces AEL 20-kW FM transmitter (326). Lots of interest was found in RHG MRS-7 microwave link (327). George Marti showed aural STL equipment at Marti Electronics booth (328).



in the 160 MHz band, and 20 watts in the 450 MHz band. The transmitter operates on either 120 Vac or 13.5 Vdc, uses direct FM, modulated voltage-controlled crystal oscillator, and a varactor tripler. The final consists of three transistors in parallel for redundancy protection. Specifications for system (transmitter input to receiver output): frequency response within 1.5 dB and harmonic distortion less than 1.3% from 30 Hz to 12,000 Hz and S/N ratio of 55 dB.

Also shown by Moseley was the PCL-404, a 5-watt solid-state aural STL for the 890-960 MHz band. The receiver uses double conversion, and the overall system is flat within 1 dB from 30 Hz to 15,000 Hz. Also shown was the companion system for putting telemetry on the carrier of an AM broadcast station, which Moseley pioneered (*BM/E*, April 1970, page 46).

Another new aural STL was introduced by Marti—the model STL-8 for AM or FM stations. Transmitter rf output is 8 watts in the 942-960 MHz band and audio frequency response is within 0.5 dB from 40 to 15,000 Hz. Both transmitter and receiver normally operate from 117 Vac but will switch to a 12-volt battery in emergencies, and will charge the battery during normal operation. Marti also showed its new RMC-2AX remote control and telemetry system for AM or FM. Telemetry is done by subaudible tones added to an AM carrier or FM subcarrier, or a wire line.

Like Christmas Morn

McMartin's booth was jammed with new goodies to delight the radio man. Unusual was the TX-600 Electro-Peak modulation indicator; it's a CRT which displays a vertical green bar that is deflected to the right just as the pointer of a VU meter. Unlike the VU meter, however, the phosphorescent bar has no inertia and thus displays modulation peaks more accurately than any other method. It may be the answer to the overmodulation problem.

New vhf aural TV products from McMartin included an off-air receiver, a modulation monitor, and a mod mon calibrator. In FM, McMartin showed a modulation monitor calibrator, an SCA demodulator, an rf amplifier preselector, an SCA signal generator, and a solid-state rf amplifier.

Newest product from McMartin is the TBM-8000 AM modulation monitor; it's still undergoing FCC type

(Left, top to bottom) Nortronics (329) demonstrated head-rebuilding and plug-in updating service for Ampex gear. New from Collins (330) was three-channel stereo/mono console. Extending VTR head life was feature of Envirco air-filtration accessory (331). Prototype of automatic cassette player (332) was unveiled at Schafer booth. Gotham Audio v-p Eli Passin programs EMT's PDM compressor-expander-limiter (333). (Above, top to bottom) Visual displayed Rapid-Q cartridge tape decks (334). New from Sparta was HS-2 true tangent head mount for cart machines (335). Gates introduced new rfi-proofed Criterion 80 cart system (336). QRK's Bob Brugh demonstrates rumble test performed on every turntable (337).

approval tests. Features include digital readout, logic circuits, optional analog output for remote metering, or digital output for driving automatic logging gear.

The Rust booth featured the new ALD-1RA Autolog, a combined automatic printout logging and digital remote control system for AM, FM, or TV. The system handles 24 parameters plus time of day and a calibration reading. It commands the remote control to each position, then prints out the reading.

Moseley showed a new solid-state digital automatic data printer, model ADP-220, which handles 20 parameters and time of day. It prints out a full set of readings every ten minutes but may be manually overridden at any time.

Serendipity

An unusual item from a heretofore audio company was the new automatic antenna heater-control system by Gray Research and Development Co. It gives aural and/or visual indication of rain, freezing, low temperature, heater operation, and heater failure, for elements of FM or TV antennas.

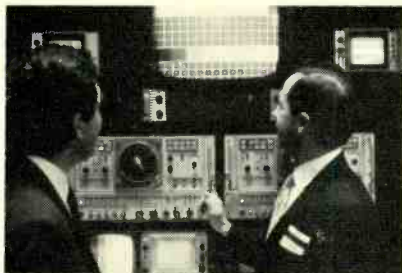
Belar introduced what seems the first and only device of its kind. The Mod Minder is an FM modulation limiter which samples transmitted rf and reduces audio gain ahead of the transmitter when overmodulation occurs. Attack time is 1 μ sec and compression ratio is better than 30:1.

Andrew featured a 6 $\frac{1}{8}$ -inch coax transfer switch with four positions, for re-routing rf power at FM and TV stations. The active area is sealed and may be pressurized to 15 PSIG.

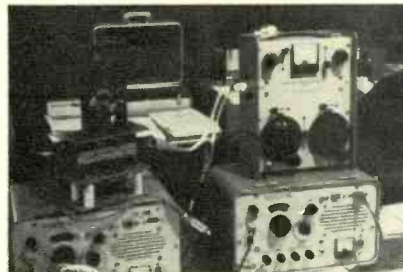
FM and SCA Receivers

McMartin introduced two new relay rebroadcast receivers for both main-channel and SCA service. The TBM-1000A receives one station; the TBM-1005 can be switched between five. Both are crystal controlled and use a cascode FET rf stage, an i-f filter, and a counter-type detector. McMartin also introduced an educational FM/SCA receiver with a self-contained speaker. A similar educational SCA receiver was displayed by Johnson Electronics. It has a self-contained speaker and a whip antenna (as well as a jack for an external antenna).

Promotional receivers were on display by Sarkes Tarzian and Fix-Tune. The Sarkes Tarzian FM/SCA receiver is pre-tuned to station frequency and bears station call let-



Top, new programmable signal generator for testing CATV headend from Tektronix (338). Bottom, the Gardner Colorgard meter (339) for matching monitors at 6500K at the Television Equipment Associates booth.



Potomac Instruments, top, showed FIM-21 AM field intensity meter (340). Delta showed bridge method of measuring current in directional antenna (341).

New lens from Canon (342), top, and new lens from Rank (343), below.



Colortan, softlight, top, folds for storage (344); Century-Strand shows new barn door (345).



Technical Sidelights at NAB

Dr. Dennis Gabor, CBS Labs scientist and father of holography, told engineers that 3D TV via holography is technically possible, but impractical. The eye won't accept human figures 10 inches high as realistic; they'll have to be life-size to be believable, he said.

How to match color monitors was the subject of a panel discussion by TV experts. Conclusions:

- FCC rule specifying that monitors be matched to illuminant C was written for black-and-white, not color.
- New industry standard for

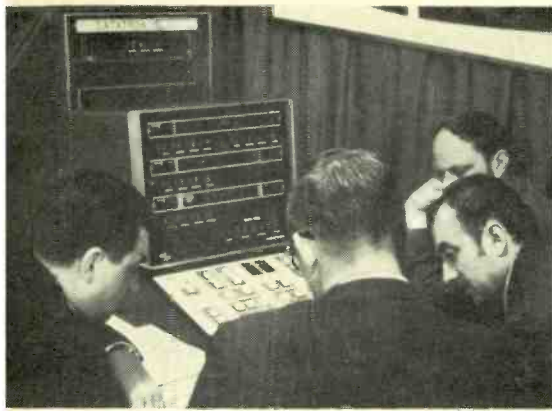
color seems D6500, which SMPTE accepts.

- Black-and-white monitors have bluish white, while color monitors set to D6500 have pinkish white. Public must be re-educated to accept warmer white.

- Service technicians should use a color-balance instrument when installing and servicing home receivers.

- You can make a b&w monitor match D6500 color with a filter, such as ABC and BBC use.

- Ambient lighting near monitors must be about 5 footlam-berts of D6500, providing color anchor for viewing operator.



Above, top to bottom: Andrew Corp. coax transfer switch (350). Power Optics auto camera servo (351). Moseley RPL-2 remote pickup link (352). 3M EBR for making color 16mm film (353). New stylized character generator font from Visual (354).

Left, top to bottom: Datatron's editing system at work (346). Inexpensive front-projection system from Spindler & Sapppe (347). New cable tester from BIW (348). Inexpensive titler system, TelsMation (349).

ters. It contains a speaker and has a headphone jack.

The Fixture line includes AM and FM single-frequency receivers (some with SCA), both ac powered and hand-held battery models. These are furnished with station logo. Also on display were variable-frequency AM, FM, and stereo models.

Audio: Sophisticated Consoles

Recently appearing in radio studios is the three-channel stereo/mono console for AM-FM simulcasting; there were several at the show. Collins' 212-L1 has eight stereo faders and 16 inputs, with three VU meters, program amplifiers, and outputs: left, right, and mono. Mono is, of course, the sum of L and R. A stereo monitor amplifier facility is provided, with a headphone jack for the mono output.

Gates and CCA also showed new three-channel stereo/mono consoles.

Although RCA supplies stock audio consoles (including a three-channel stereo/mono version), the firm hasn't been well known for its custom products. RCA displayed a highly sophisticated and versatile four-channel console built for WPIX (TV) New York. On each input it contains such features as input selection (high or low level); submaster switching; high and low frequency boost and attenuation; pre- and post-mix echo send, foldback, and cue; and vertical attenuators.

Fairchild Sound was on hand, showing examples of its custom console capability. And Sparta displayed a new B Series of audio consoles with separate monitor and cue facilities.

Two mikes were featured. The AKG D-900E dynamic shotgun (North American Philips) has several accessories: pistol grip, stand adaptor, windscreen. Vega's model 55 wireless mike for studio pickup uses a flexible wire about ten inches long as antenna for its FM system. The transmitter is the size of a pack of soon unbroastable cigarettes, can be concealed in the performer's clothing.

CBS Lab's audio-processing equipment (Volumax, Audimax, etc.) came to Chicago in new slimline packages. Additionally, the new model 4000 Volumax (for AM stations) has an automatic speech asymmetry control which switches polarity and keeps the higher peak on the positive modulation side. Result: louder sound, but no negative over-

Continued on page 54

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More on Quad Stereo

Scheiber process demonstrated; a partly compatible disc; realistic tapes; a limited FM multiplex system.

AN OVERFLOW of nearly 300 audio engineers (including some top industry names) sat through almost three hours of discussion, milling around RCA Recording's Studio A in Manhattan during several demonstrations of four-channel stereo on St. Patrick's Day.

In the featured presentation, the audience heard a disc made by Peter Scheiber's secretive and controversial process of matrixing four channels into two without increasing bandwidth requirements. (See "Quad—The New Sound in FM Stereo," *BM/E*, February, 1970.) The disc had been cut from a four-channel tape played through Scheiber's black box (which is actually gray). To prove its compatibility, the disc had been played the day before over WNYC-FM New York, although without publicity.

The disc sounded good, and the pseudo four-channel reproduction was more appealing than

a two-channel rendition. During the first part of the tape, however, a marching band sounded poor, like a two-channel system with switched time delays for speakers three and four. Then came an electronic-music segment, with bleeps and blurps popping out all over the place, in what sounded like a time-sequential four-channel process. A two-channel, air-check tape made from the WNYC broadcast sounded compatible.

Near the meeting's end, the two-channel Scheiber disc was played back through four speakers, and A-B'd with its four-channel tape mother. Most of the audience squeezed into room center trying to decide which was true and which was artificial four channel (they hadn't been told). Due perhaps to crowd noise and the absorptive presence of bodies in the hall, most of these present mistook the Scheiber disc for a true four-channel medium.

Scheiber's explanation of his process was unclear. He uses a mathematical matrix to add the four channels in quadrature, 90° apart. The entire quadrature is rotated 22° to provide compatible mono and two-channel stereo. Scheiber said he uses a gating process to emphasize one channel and achieve directionality at the expense of the other three. The system seems to produce maximum separation where program material demands, and minimum where stereo information is redundant. Scheiber spoke of the psychological dominance of the selected channel, and said it changes with the dynamics of the music.

Meanwhile, other developments indicate that Scheiber and partner Tom Mowrey, who form Audiodata Co., are attempting to license major hi-fi firms to utilize the four-to-two matrix, which is applicable to tape, disc, and FM. Negotiations with Fisher Radio Co. had reached the point where Fisher, Scheiber, *FM Guide* publisher Harry Maynard, and WNYC general manager Seymour Siegel announced a March 16 press demonstration of a Scheiber broadcast on WNYC-FM. At the last minute the demo was cancelled, and now it's understood that Scheiber and Mowrey are negotiating with several hardware firms.

A Quad Disc

Jerry Minter, of Components Corp., had no demo material for the AES meeting, but explained the disc process he's been working on since 1958. His system uses the conventional 45/45 system

FM Broadcasters Hear New Quad Stereo System

During the NAFMB Convention at Chicago in April, Jim Gabbert of K-101 San Francisco demonstrated a new four-channel FM system developed by a San Francisco engineer, Lou Doreen.

Whatever you call it, surround sound, environmental sound, emotional sound or quad sound, it's coming; it's so fantastic it can produce tears, Gabbert said. He and Doreen staged a demonstration to prove the effectiveness of the four-channel medium. No tears were produced on the spot—the speakers were too harsh, apologized Gabbert, but listeners were impressed nonetheless. "It sure ought to scare the pants off any AMers," quipped one listener.

The Doreen system is fully compatible with mono and stereo broadcasting and even permits SCA at the same time. Actually, Doreen has two approaches: The simpler one can live with existing FCC rules but some high-frequency rolloff is experienced. Full 40-dB separation is maintained between midfrequency L and R, but high frequencies go mono above 8000 Hz. For the optimum system, FCC rules would have to be changed to permit a subcarrier at 95 kHz. Doreen is hopeful of single-station quad experiments. If the FCC demurs, tests may take place first in Canada and Mexico. Full details weren't revealed because of pending patents, but Len Feldman, who's been associated with the Halstead system (see *BM/E*, Feb. 1970, page 20) called the Doreen system authentic four-channel sound that doesn't require major rule changes.

Moderator John Eargle (center) fields an audience question. The panel included (left to right) Jim Cunningham, Jerry Minter, Eargle, Peter Scheiber, and Len Feldman. Despite multi-mike setup on stage, speech-reinforcement system at RCA Recording's Studio A was monophonic.



Photo by Eric Small, AES

for the front two channels, and copies the stereo FM method for channels three and four, multiplexing them on a 38-kHz subcarrier through a balanced modulator. Minter claimed to have found cartridges capable of reproducing 50 kHz.

The Minter system uses filters in the playback to remove AM sidebands of the suppressed 38-kHz subcarrier. Without filters, playback is straight two-channel, or mono, depending on the cartridge used. The system also uses a pilot-tone compressor/expander to improve the S/N ratio.

Four Discrete Channels

The most pleasant part of the St. Patrick's Day audio engineering meet was when Jim Cunningham (of Chicago's Eight-Track Recording) played some of his tapes with four completely separate channels. He clearly indicated the difference between classical and pop quad material. In a classical recording session, mikes one and two are up front in the hall, for direct sound; three and four are in the rear, providing ambience only. The pop quad tape (such as psychedelic rock or "Switched on Bach") treats all four channels as discrete carriers; sometimes each carries program material completely different from the others. Cunningham's classical recordings of symphonic music were full and impressive, conveying the spaciousness of the concert hall they'd been recorded in. His gimmicked pop tape was exhilarating; and the ping-ping/pong-pong effect of a circling motorcycle and a jetliner taking off turned many heads. Cunningham explained some of the studies he's made of room reverberation and four-channel mike placement. He prefers to record from eight mikes, mixing down to four.

FM Multiplexing

Leonard Feldman of SCA Services Co. spoke briefly of the stereo FM multiplexing system proposed by William Halstead and himself. He had little to add to the story which appeared in the February *BM/E* article mentioned earlier, but pointed out that the Halstead subcarriers would produce only first-order sidebands, which would be down the FCC-required 20 dB, therefore causing little crosstalk to mono and two-channel stereo program channels. Feldman also mentioned

the McMartin-proposed multiplex system which was covered in the earlier *BM/E* story. Both would add channels three and four to two-channel FM by multiplexing in the SCA frequency area around 67 kHz.

Conclusions

The AES meeting revealed the sonic beauty of four discrete channels as demonstrated by Cunningham's tapes. Pure quad is a definite improvement over two-channel stereo; close your eyes and you're in a concert hall.

It also became evident that neither the Halstead nor the McMartin FM multiplex system is truly compatible, since mono and two-channel listeners don't get channels three and four. Furthermore, in those systems the last two channels have frequency response of only about 8 kHz, rather than the 15 kHz of one and two. While Minter's disc appears to have equal frequency response in all four channels, it isn't compatible since mono and two-channel listeners don't get channels three and four. And no one seems to know whether the high-frequency subchannel information will be erased by the wear of the playback stylus.

If anything was resolved, it was the distinction and requirements of classical and pop recordings. The volume of classical recording is quite low—say 5% of the total recording market—while pop music constitutes by far the majority. It is unlikely that pop record artists and producers would be satisfied with two inferior channels in a four-channel system. Therefore any quad system which can't provide four equal-response channels seems to have little chance of adoption.

Most disappointing was the Scheiber material and his confusing explanation. While certainly compatible and harmless, his process seems little more than a toy. In fact, several observers thought they could do as well with two-channel material and delay springs for speakers three and four. The Scheiber pseudo-quad system is pleasant, but no substitute for the real thing. It sounds like two and a half channels.

At this point, tape seems the only way to realistic four-channel stereo. But then, that's what was said in 1956 about the two-channel medium.

BM/E

What To Do With All That Channel Capability

It's easy to conceive of uses for more channels and the ultimate national grid is envisioned. How to get there is less certain.

CRITICS OF THE WIRED CITY concept have been saying that program diversity does not increase proportionately with the number of channels—so why all the fuss? Seven to ten channels of entertainment are supposedly sufficient to satiate anyone's tastes. Beyond that you're merely duplicating.

Broadcasters might wishfully draw such a conclusion but economists are figuring differently. The latter are calculating the cost of bandwidth via cable and are saying that cable distribution may eventually be so cheap that surplus channels will be available for individual subscriber requests for the asking.

To see it this way, one has to get over the hangup that the industry evolves around a scarcity of channels and that the game is attracting maximum audience attention to only a few programs. Rather, attention should be directed to channel distribution costs and how bandwidth can be sold to a multitude of customers.

Economists and systems engineers at the 1970 IEEE Session on "Broadband Communications Network of the Next Decade—Cable Television" did just that.

Distribution of at least 40% of all U.S. mail can be handled via CATV-BCN systems at a cost of ten cents a letter according to the calculation of William B. Gross, GE, Philadelphia. Such mail is not the kind you write to Aunt Polly, but, rather, business-type transactional mail, average

length 150 words. Readin and readout is handled by an alphanumeric typer. Two thirds of this mail cost is wrapped up in a subscriber readout but if such equipment costs no more than \$125, the local BCN system can make a profit. Gross figures 0.338 cents per message goes to the national interconnecting service and 9.662 cents is available to the local BCN service area. Of this, 6.607 cents is tied up in subscriber equipment. The local BCN is estimated to collect \$71.36 a year per subscriber. Total business envisioned is 86.4 billion messages at 150 words each.

The reaction of postal delivery mailmen to this distribution scheme's announcement is unknown—they were on strike that day. Their load may not be greatly lightened since Sears' catalog could not be economically delivered via this method. However, Gross does consider remote shopping via TV possible—and hard copy catalogs are really no longer necessary since the local BCN service could store it on microfilm and pull a page out upon demand—or could they? (See the bottom of page 43.)

By Gross's calculations, subscriber facsimile reproduction would not be economically feasible or necessary for the 40% of the mail he contemplates handling. The short mail messages (150 words) can be handled by group synchronization techniques which allow 18.5 kilobits per second to be transmitted. This rate requires 45 kHz channel bandwidth per 100 subscribers. Assuming a BCN system has 11,000 subscribers, one 6 mHz TV channel must be given up for the instant mail delivery service.

Gross sees the system for handling this mail evolving in three stages. Phase one assumes the local BCN system is connected to AT&T for the long-line interconnection. Phase two assumes a leased party-line microwave system. Full service, phase three, envisions microwave and satellite service.

The full service system includes 15,000 local CATV-BCN systems capable of receiving satellite transmission, plus 200 regional stations that can transmit and receive, and which include regional party-line microwave links. The ten-cents-a-letter figure applies if the full system is in operation. Phase two costs for message transmission alone are about twice as expensive (.70 cents) and phase one costs are four to eight times as high. Phase one's costs vary depending whether the message is transmitted during the daytime or

Table 1. Possible Future Demands on CATV Distribution Systems

| Service | Equivalent Bandwidth |
|--|----------------------|
| 1. Commercial TV (entertainment, sports, foreign language, news) | 12-100 TV channels |
| 2. Cultural TV (ETV, STV) | 3-10 TV channels |
| 3. Instructional TV | |
| elementary | 4-10 TV channels |
| grammar, jr. h.s., h.s. | 8-20 TV channels |
| undergraduate university | 10-100 TV channels |
| graduate university | 4-10 TV channels |
| 4. Continuing education | 10-100 TV channels |
| 5. Local origination | 0.1-10 TV channels |
| 6. Weather, stock market | 0.1-2 TV channels |
| 7. FM radio | 20-100 MHz |
| 8. Facsimile | 0-30 kHz |
| 9. Polling, instructional feedback | 3 kHz-1 MHz |
| 10. Surveillance and traffic control | 0.5-4 TV channels |
| 11. Shopping, meter reading, alarms | 100 kHz |
| 12. Public safety | 1-10 TV channels |
| 13. Remote pickup back to headend | 5-50 TV channels |

stored for nighttime delivery. Gross feels that there's sufficient demand for the more expensive high priority mail today so that the new service can evolve smoothly from phase one to phase three.

In what was described as a scenario for the future of cable television distribution, Nathaniel E. Feldman depicted 400 channels as possible by 1990. This capacity will come about as amplifiers gain bandwidth and reduce cost—due to semiconductor advances. Lower cost amplifiers can be spaced more closely to compensate for attenuation of higher frequency. Thus 100 channels ten years from now may cost no more than 20 channels today. If four cables are installed simultaneously (at a cost about 2.5 times that of a single cable) 400 channels are possible.

Some of the possible uses for this capability are enumerated in Table 1. Feldman would allocate 30 to 100 channels for re-runs of prime time programs "so that TV watching, like movie going, could become more discriminating; one would consult viewers or friends about a program before committing to it." Feldman says this extensive repetition would invoke no additional program preparation cost. Presumably, total entertainment viewing would hold up so that program sponsors could maintain the audience on which advertising rates are currently based. The additional channels would be merely a convenience factor for the viewers.

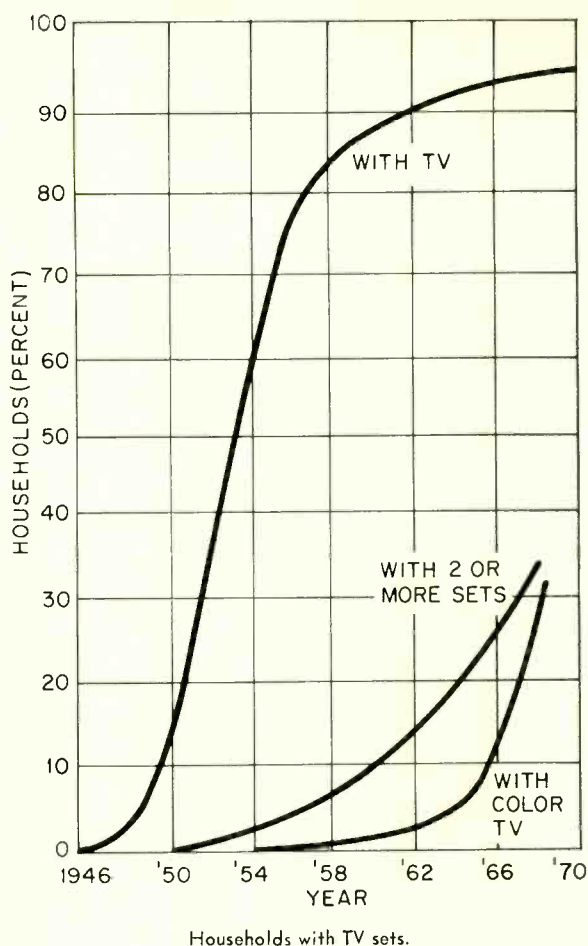
On the face of it, this may not be true. To win evening viewers, the non-prime-time programs may improve in audience appeal. This would thus dilute the viewership of the program since there just are so many hours a day in which TV can be watched—already a TV viewer spends three hours an evening in front of his set. Possibly some of the 40-45% of the population that are not viewers on any given day could be wooed to their set but there has to be some limit on increase—a ten percent increase is the most that could be expected.

Most of the extra channels available in Feldman's scenario are devoted to instructional TV and continuing education. Feldman recognizes that the home environment will have to become more disciplined and motivated to make ITV in the home work, but first he suspects experiments in teaching techniques will overcome this obstacle.

More ITV integrated with on-the-job training is seen. Feldman thinks that ITV should be committed to the simple goal of effective self improvement—ten to 100 channels could be used for this.

Should the community desire for local programming become as great as the desire for local school boards or local government, some 35—50,000 headends and systems may evolve within the next 20 years. Geographically, 15,000 headends cover the U.S., but more would be necessary to service subdivisions of metropolitan areas.

Access to the local distribution networks should be available to anyone, according to Feldman, and local interest and special audience pro-



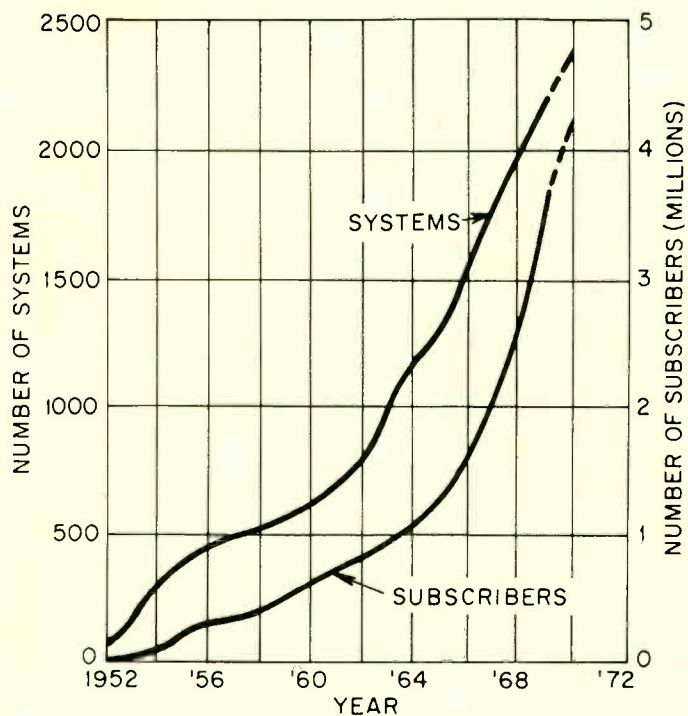
grams should cost in the \$20-\$65 an hour range—with CATV operations functioning as a rental agent of camera and VTR gear.

Some Obstacles in the Path

Although the systems analyst and economist can contemplate tomorrow's use of CATV-BCN systems, today's chief engineers are in somewhat of a quandary as to which way to go. I. Switzer, chief engineer of McLean-Hunter Cable TV, Ltd., describes the problems.

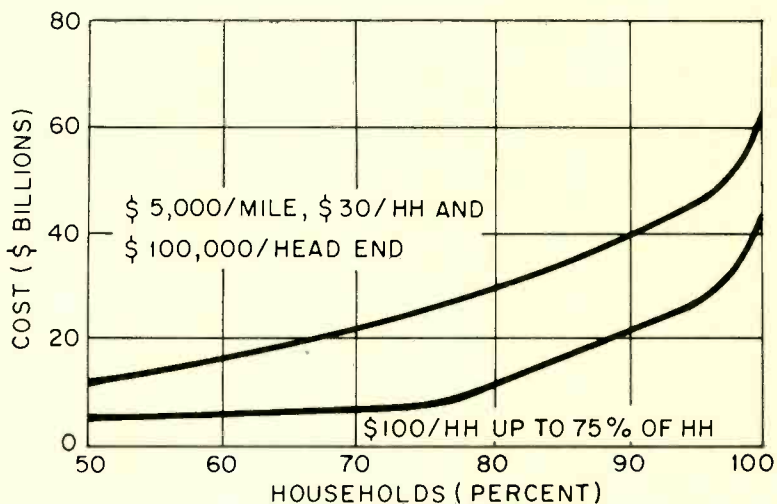
Uhf—Tuners are inconvenient to use, receivers will not handle adjacent channels of uhf satisfactorily (inadequate rf selectivity and front-end loading occurs, image rejection is poor and there may be local oscillator radiation). Cable losses are high (losses at 890 mHz would be 2000 dB in a large system). Use of 100 amplifiers in cascade presents cross modulation and intermodulation problems as well as equalization problems. Furthermore, uhf amplifier technology is not yet available.

Extended band vhf—Vhf channel allocations were planned to be free of second order harmonic intermodulation problems. Image and local oscillator problems were eliminated by the separation



CATV growth has been substantial. Theoretically, the number of headends can reach 50,000 which is the number of distinct neighborhoods in the United States.

Cost to provide CATV to 50% of households is \$11 billion. It rises to \$66 billion for 100% saturation. Lower curve is cost per household only.



channels. Use of nonstandard channels brings back all these problems. Household receivers can't handle midband, lowerband or high band without converters. Radiation into or out of the cable can interfere with other communication services. There is no conclusive evidence to indicate whether converters should be on top of the receiver or further up in the system.

Multi-cable systems—Initial capital costs are high, as are maintenance costs. There is susceptibility of cross feed from cable to cable. All technical problems such as direct pick up are doubled with dual cables.

Direct video multi-cable (hi-level TV at hf frequencies)—Capital costs are high. Adding channels is expensive. Home installations are costly (multi-cable bundle has to run right to receiver). Systems are susceptible to crosstalk.

Switched systems—High cost results from interconnecting switching centers. Optimum capacity is hard to figure.

Systems approach—Requires full cooperation of receiver set designer which is unlikely at this stage.

Switzer is pessimistic about a resolution in the near future. He says there has been inadequate professional research to completely evaluate all of the possibilities. Says Switzer, "Now that we

have used up the capabilities of the (12-channel) receiver, we do not clearly see in which direction to go."

The giant research facilities in the U.S. have disdained the subject except perhaps to favor switched systems over broadband frequency division multiplexed systems. Switzer says no cable operator has the resources to afford large scale experiments or pilot installations the costs of which can be written off.

Switzer concludes, "We face now a problem similar to that faced some years ago when decisions had to be made on technical standards for color television, stereo radio, and even the basic television system itself. A number of alternative and complementary systems have been proposed. A significant economic potential and consequence has been demonstrated. A number of highly publicized but very unscientific demonstrations have been staged. It is possible that some government agency might sponsor the research and investigation necessary to arrive at firm recommendations on multi-channel, broadband systems, or that industry co-operative effort might be arranged. Without such a large scale, intensive investigative effort, it is doubtful whether we will see a rapid development and proliferation of broad band, multi-channel systems in the Spectacular 70s." **BM/E**

Akron Cable Viewers First to Shop at Home?

Akron Cablevision, which will fire up in September, hopes to be the first to offer a shop-at-home-service. With 40 channels of capacity and a return communication link for two-way service, the TeleVision Communication Corp. system has the capability.

But it won't offer grocery shopping. TVC's initial plans have been shot down by economics and a little market research. The company found the mark-up on groceries is so slight that a minimum order of \$25 would be essential—this sounded too high to be realistic. Furthermore, housewives told TVC they were not sure they'd like buying by TV—how would they be able to pinch the fruit and poke the meat? So if TVC does move in this area the product will be one with a higher mark-up. Gordon Fuqua estimates that whatever the product, the volume should be around \$4 million annually to make it pay off.

The Akron system will be one to watch even if shopping at home doesn't pan out right away. The cable plant will incorporate three new features: a transponder device for every subscriber, a return cable which permits, in effect, two-way communications, and a computer to control and readout the subscribers transponder. Each subscriber transponder has an identifiable encoder which the computer can query continuously.

So if it is not a "buy" message that is sent back to the home office it can be something else—a fire or burglar alarm are two possibilities available to Akron customers. The computer will automatically relay the alarm.

And if the subscriber should happen to not pay his bills, the computer will be able to do something else. By remotely controlling a coaxial switch in the transponder device it will disconnect him!

Build an Emergency Remote Amplifier

By Leonard C. Watson

You'll find this single-mike amplifier a useful backup for remotes.

ALTHOUGH I HAVE the utmost confidence in semiconductors, there's always a bit of worry when you send out a radio remote crew with no backup amplifier. Using spare parts, you can avoid such worry by building a simple emergency remote amplifier with the following specifications:

Input: single mike channel, low impedance.

Output: +4 VU into 600 ohms.

Size: slightly larger than a pack of cigarettes.

Cost: \$15 or less.

The one I use was built at a cost of \$1.12 for the metal case. The heart of the unit is a four-stage transistor amplifier removed from a defunct portable tape recorder. With only a slight modification, the amplifier will drive a telco loop.

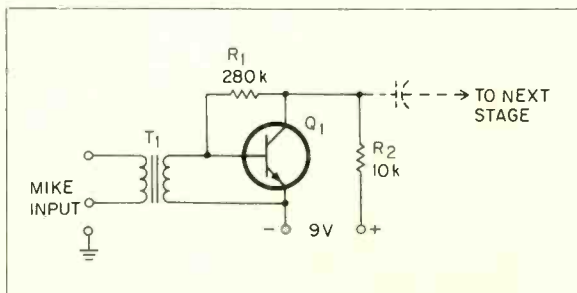
Depending on the circuit, the tape-head input can be fed directly from your mike. Most low-cost tape recorders use low-to-medium impedance playback heads. Such an input circuit provides an adequate match for a 150-ohm mike. You'll have to make some changes in the equalization components, however.

In the unit pictured, a preamp was used to drive the amplifier, bypassing the first stage on the circuit board, along with the tape-head equalization circuit. I removed some unused components, and mounted the preamp right on the amplifier card. The diagram shows the circuit I used. Q1 can be any low-noise audio transistor, such as the RCA SK3038. The specifications for T1 vary with your design. A good starting point is a 300-to-3000 ohm input-interstage model.

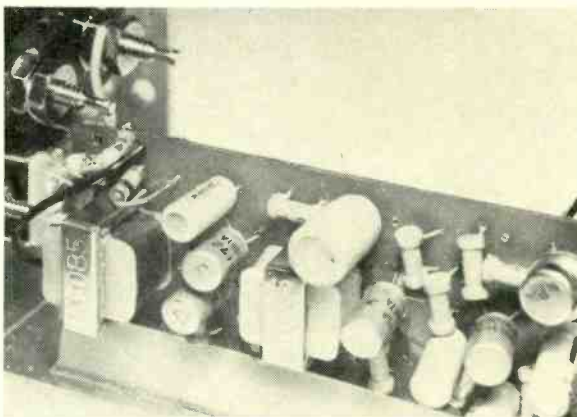
After wiring the preamp, I found only a few changes remained necessary in the output. The circuit board contained a 500-to-3.2 ohm matching transformer, which I replaced with a miniature 500-to-500 ohm line model. Then a 3-dB pad was installed in series with the line to provide isolation.

Physically, the amplifier fits nicely into a 2 × 2 × 4½-inch plastic box. The input transformer case was soldered directly to the mike connector. Binding posts were attached to the back, along with an on-off slide switch. The battery was installed behind the circuit board in the picture with a small clip. The amplifier I used requires 9 volts and an alkaline battery is recommended.

To conserve space, I omitted a volume control and a level indicator. The gain was set to feed +4 VU into the line when the amplifier was used

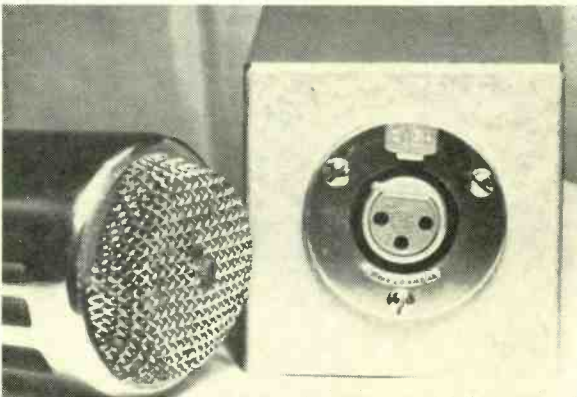


This mike preamp replaces first stage in tape amplifier.



Remove circuit board from tape recorder and mount in box.

Finished amplifier isn't much bigger than dynamic mike.



with a Norelco D119CS mike working close. A miniature connector on the rear panel parallels the output pad for a small transistor-radio, hi-Z earphone, which tucks inside the unit. A small VU meter could also be installed but at the expense of space.

With a little ingenuity and luck, the finished product will be a good backup unit. Mine proofed out ±3 dB from 150 to 7000 Hz, with noise down 45 dB, which is more than adequate for emergency news and sports work.

BM/E

Leonard C. Watson is an instructor in radio and television at Morehead State University, Morehead, Ky.

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And TeleMation's got it all — from the industry's best selling camera to the most complete and sophisticated television production systems. And everything in between.

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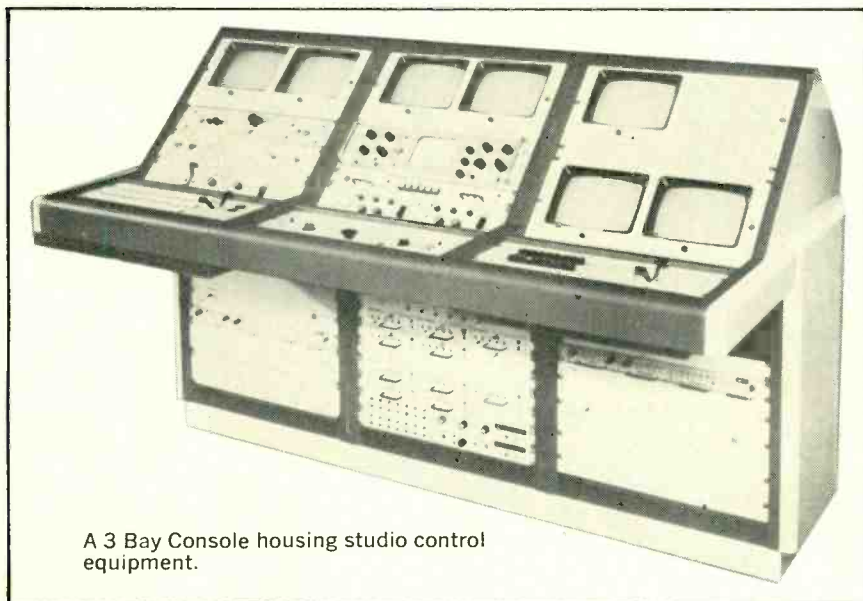
Talk to TeleMation.



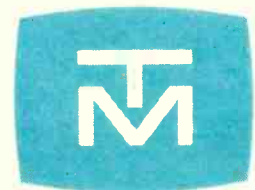
Our best selling TMC 2100 Series Camera.



TSG 2000 all digital sync generator and . . . new TSG 3000 — The industry's first programmable, all-digital broadcast sync generator.



A 3 Bay Console housing studio control equipment.



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(801) 486-7564

Talk to us at NCTA Booth 3-27
Circle 116 on Reader Service Card

BROADCAST EQUIPMENT



Cordless headset for classrooms

Inexpensive, easily installed classroom broadcast system with listen-respond capabilities is available from Sharpe Audio Division of Scintrex, Inc. Cordless system uses simple loop antenna and will accommodate large classes while allowing student mobility within loop. Needs as little as one watt to energize all headphone microphones within loop; headsets equipped with volume controls and battery-saver switches; antenna ends plug into virtually any amplifier loudspeaker extension socket. Each headset is inductively coupled to the existing magnetic field within the loop confines; has hum rejection of 60 Hz.

Circle 291 on Reader Service Card

Helical VTRs

New AV series of slant-track tape machines from Sony uses half-inch tape format (Japan EIA Type 1) which may become first non-BC standard. AV-5000 (shown) records and plays back in either color or b&w up to one hour, has slow motion and stop action in playback, camera insert edit capability, audio dub after record, and optional rf modulator. Model AV-3600 handles b&w only. VideoRover II is portable, battery-operated VTR system including hand-held TV camera with zoom lens and electret mike, connected to a shoulder-mounted or back-carried b&w VTR. Camera viewfinder shows picture being recorded or played back, allowing quality video check

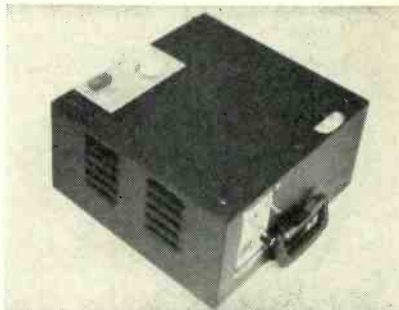


in the field. Maximum recording time is 30 minutes. Sony.

Circle 277 on Reader Service Card

Instant replay video/disc recorder

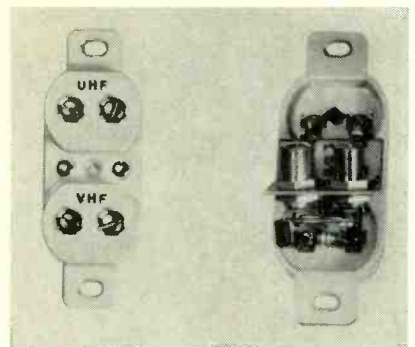
Model 1310 video/disc recorder, low-cost, slow motion and stop action; can be plugged into any CCTV or video monitoring system; records a ten to 20 second segment direct from camera or from videotape recorder and plays back immediately



at two to 60 frames per second—any of the 600 frames can be frozen indefinitely. Recording surface has infinite replay life even at stop action; push-button controls fail-safed to prevent damage from mistakes; unit weighs 34 lbs, power equipment 115 Vac, 60 Hz; input and output signals are 1.5 p-p, 75 ohms; delivery immediate on lease/purchase plan. A/V Equipment Division, Newell Industries.

Circle 276 on Reader Service Card

Uhf/vhf tapoffs



Master antenna TV tapoffs with separate uhf and vhf outputs from a single all-channel trunkline; match 75 ohm trunkline cables with 300 ohm TV set inputs; use 300 ohm screw outputs and are recommended for fringe and medium signal areas. Model P-5112 has 12 dB isolation with 0.9 dB vhf loss and 1.5 dB uhf loss; P-5117 has 17 dB isolation with 0.5 dB vhf and 0.7 dB uhf loss; P-5123 has 23 dB isolation with 0.6 dB vhf and 1.0 dB uhf loss. Immediate delivery. JFD.

Circle 275 on Reader Service Card

Broadcast Equipment

Continued on page 50

Norelco introduces custom mixers from stock.



MD16RF8

Now dozens of custom console configurations assemble from 4 unique modules. Result: the first custom consoles with mass-production price, reliability and delivery.

- Current dependent mixing allows for console configurations from 8 inputs with 1 output, to 16 inputs with 8 outputs.
- All Norelco MD consoles utilize Danner silicone encapsulated attenuators.
- Up to 4 echo send/return channels.
- Switchable equalizers providing high end, low end, and presence equalization.
- Panpots on each input channel (MD16RF8 only).
- Switchable input sensitivity.
- Stereo monitoring facilities.
- Built-in 5 frequency oscillator.
- Prelisten, talk-back, and program-distribution channels.
- All connections via floor level screw type terminal strips.
- Insertion points for external signal processing equipment.
- Detailed individual test reports accompany each Norelco custom mixer, assuring guaranteed performance.

Your Norelco MD mixing console can be operational in a matter of hours. Many versions in stock for immediate delivery.

Norelco MD8R1: \$6,648

Norelco MD16RF8: \$22,950

PERFORMANCE SPECIFICATIONS

Freq. response: 40 . . . 15,000 Hz \pm 0.5dB

Distortion: less than 0.5%

Gain: 101dB

Output level: + 18dBm

Relative noise input: better than -120 dB

Cross talk: better than 80dB

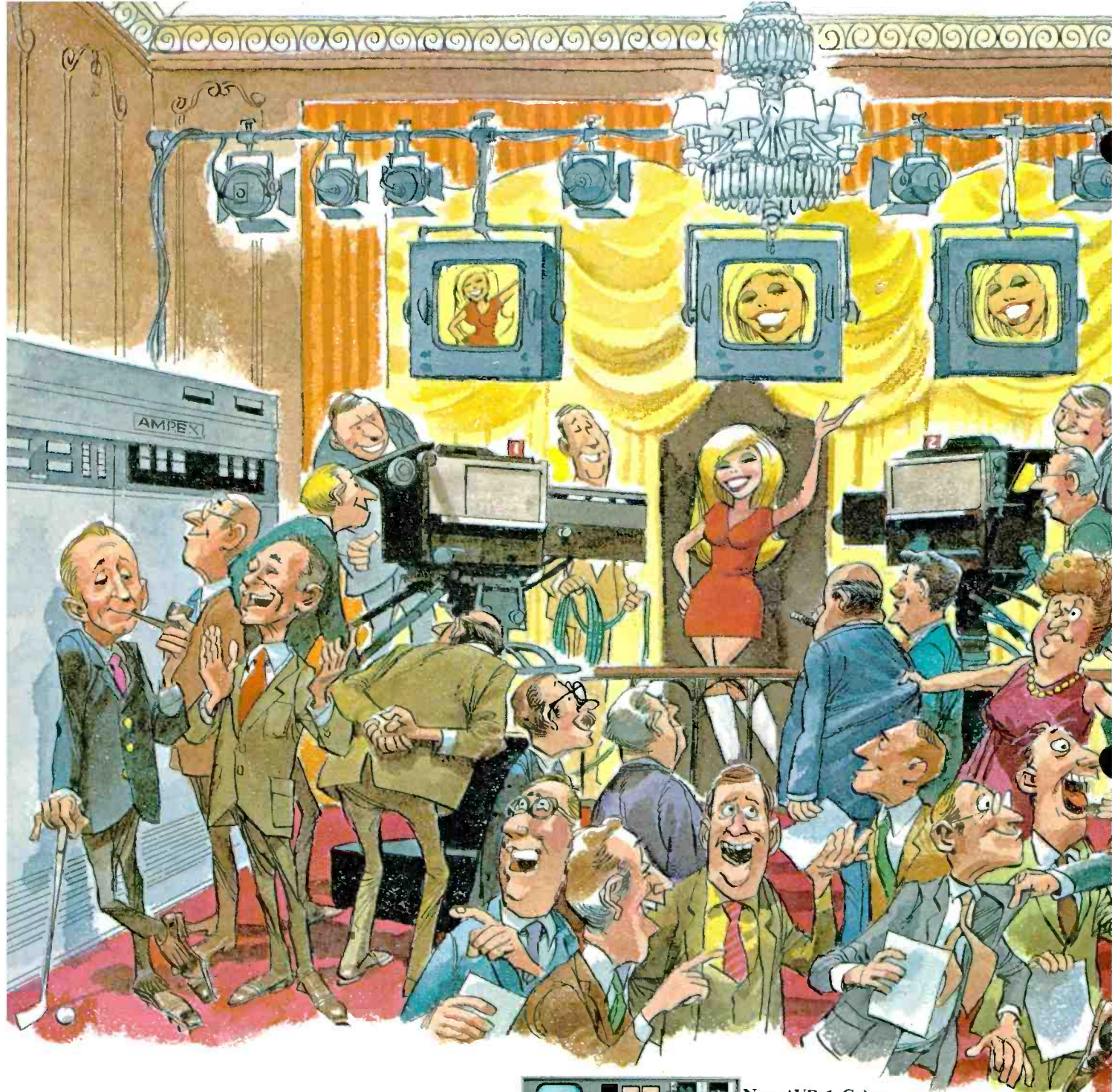


MD12RF4 Console provides 12 inputs, 4 outputs and 4 switchable equalizers for \$10,470.



One Philips Parkway, Montvale, N.J. 07645 (201) 391-1000

Circle 117 on Reader Service Card



They're here!... Automated scene stealers from Ampex!

Introducing the new, completely automatic generation to the television scene.

The revolutionary AVR-1 recorder. A totally new concept in videotape recording. Designed from the ground up for the automation age!

And here's another scene stealer—the most stable, hands-off color camera. The new Ampex BC-230, with the sharpest, most brilliant picture in television. Fewer controls, greater simplicity.

Ampex is the first to unveil the totally automatic TV scene from camera to antenna. To get the complete picture, just call your Ampex Sales Representative, or write: Ampex Corporation, 401 Broadway, Redwood City, California 94063.

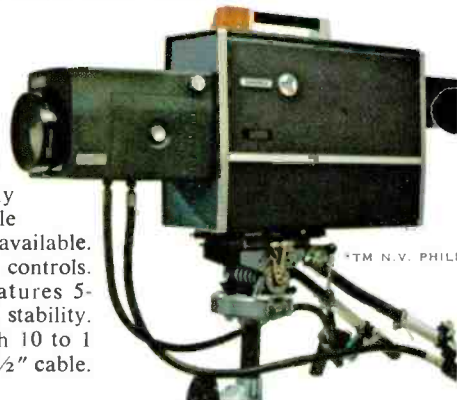


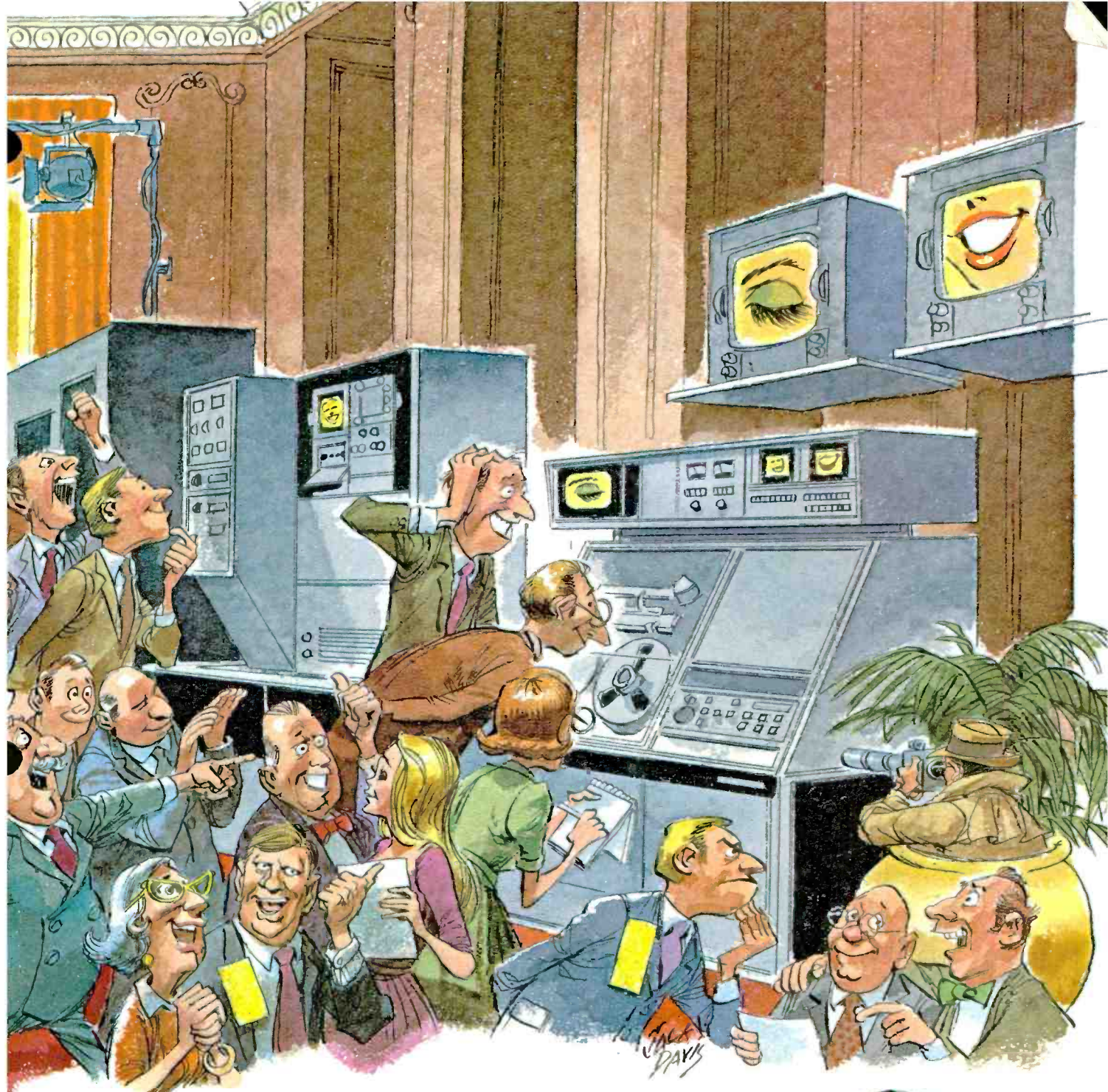
New AVR-1 Color Videotape Recorder

Designed for automation—delivers "instant video" (just like a camera). The ultimate in reliability. Easy threading with precision vacuum tape control. Automatic standard selection on playback. Editor, band-by-band and line-by-line autochroma, auto tracking, velocity compensator and other automatic functions available as simple plug-in options.

New BC-230 Color Studio Camera

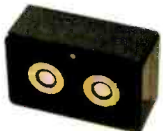
Gives brilliant, sharp color at only 25 foot-candles. The most versatile three-tube Plumbicon* camera available. Allows faster setup with fewer controls. Requires less adjustment. Features 5-minute warmup and long-term stability. Weighs only 60 lbs.; 77 lbs. with 10 to 1 zoom lens, and uses lightweight 1/2" cable.





**New ACR-25 Cassette Recorder and
ADR-150 Contact Duplicator**

New video cassette recorder features exclusive Ampex 6-minute refillable cassette. Adds unmatched versatility to your broadcasting operation. New high speed duplicator copies 30-minute program in only *three* minutes! Provides economical, mass duplication of spots and programs for national syndication and fast distribution.



VS-600 Production Video Switcher

Top performance for studio, master control, or network control. Modularized switch matrix and control logic, amplifier, tally control and power supply. Serially-coded control system requires only a single small connecting cable. Control panel can be located up to 1500 ft. away. Available in standard and custom designs.



**Complete line of VHF
and UHF Transmitters**

Latest state-of-the-art design in modular transmitters and translators with solid state circuits. Low level modulation and low level sideband filtering. Available with hot standby, parallel operation or exotic system control.

New, complete "Director" line of antenna systems including all transmission line components from one manufacturer.

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We're betting our Automatic Programmer for Television (APT) is equal to any challenge you can throw at it. And more.

Years ago, we got the jump on the industry with a television first. A computer controlled automation system that works. Experience has widened the gap. And today, nobody can touch Tarzian competence in television automation.

We say our APT can handle your stickiest television automation problems. Care to Challenge us? Either way, you win. Call Russ Ide, collect: 812/332-7251.

Sarkes Tarzian, Inc.
Bloomington, Indiana
47401



Circle 119 on Reader Service Card

Broadcast Equipment

Continued from page 46

Color from b&w TV kit

Model 11 Introductory Electronic Color Kit provides videotape demo, compensation filter and instruction book explaining and demonstrating the "subjective color" process which can be used with any b&w closed-circuit TV monitor. Kit requires no electronic modification and brings low-cost, limited color to present



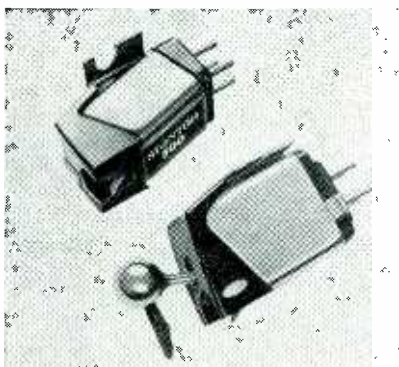
b&w industrial TV systems. \$125, available in 10 days. Color-Tel Corporation.

Circle 278 on Reader Service Card

Phono pickup cartridges

Model 500 AL "ultra-rugged" cartridge for use in such formats as "top forty" where long life and easy maintenance are needed; replaceable stylus, rugged armature. Stanton Magnetics. Shown on top in photo below.

Circle 285 on Reader Service Card

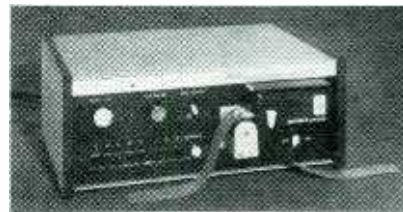


Model 681SE elliptical cartridge, shown bottom in picture, the "best of two worlds"—claiming the sensitivity of ellipticals and ruggedness of spherical configurations; interchangeable stylus and "longhair" dust brush. Stanton Magnetics.

Circle 286 on Reader Service Card

Multimedia programmer

Media Mix Programmer, compact,



27-channel, punched-tape multimedia programmer, solid state with built-in 1000 Hz synchronizer, controls three complete Dynamic Dissolve Systems plus options; dissolve can be programmed to instantaneous "cut," 2½ sec., 10 second, or infinitely variable "lap dissolve." Local and remote manual control as well as completely automated presentations possible. \$1495. Spindler & Sauppe.

Circle 279 on Reader Service Card

Another \$30,000 color camera

Model TE-201, 22-lb live color TV camera with clip-on 17-lb viewer, produces professional quality color pictures down to low-light levels;

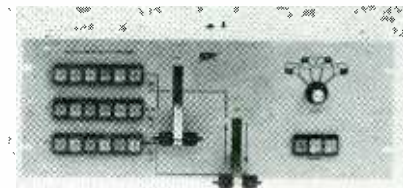


operable by non-technical personnel who handle viewfinder contrast and brightness controls while other controls are at the rack; all circuit boards, transistors and ICs are plug-in. Included in the \$29,605 price are the camera head and viewfinder, a 10—1 zoom lens, three GE-produced one-in. lead oxide pick-up tubes, camera pan-and-tilt head and pedestal, 50 feet of camera cable and remote operator's control panel including 9-in. monochrome video monitor and color encoder. GE.

Circle 280 on Reader Service Card

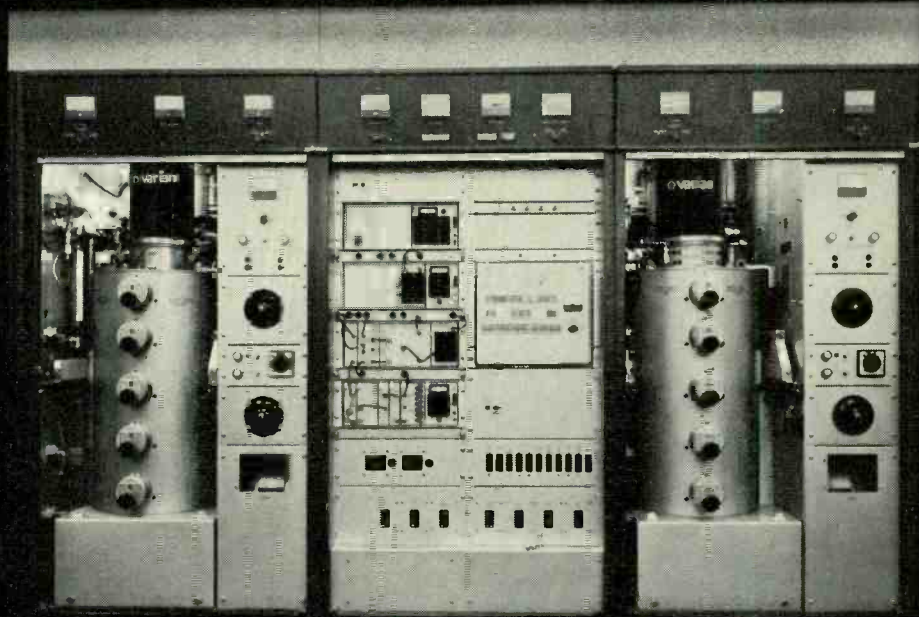
V-I production switcher

Model VS-152A low-cost vertical-interval three-bus mix/effects



Circle 141 on Reader Service Card →

England's ITA took our integral cavity klystrons.



And left them alone.

The extra reliability essential for unattended transmitter operation. That's what the Independent Television Authority (London) saw in Varian's high gain 5-cavity klystrons.

That's why our integral cavity tubes were selected to power ITA's twenty-four transmitters directly from solid state drivers. (Since launching its pioneer UHF color telecasting throughout the UK last November, ITA's network has grown to twelve stations.)

Not that Varian was any stranger to the business. Since building the first UHF TV klystron in 1955, Varian has made more of them—over 1500 in a 1—than anybody else, anywhere. In doing so, our product has provided more than 1½ million operating hours for over 30% of all UHF TV

stations in the United States. We've backed it with an exclusive 24-hour service capability anywhere in the U.S. and service availability throughout the free world.

And with the strongest, longest guarantee in the business.

The Varian integral cavity klystron makes sense anytime. But especially where it has to go it alone. Why not get what you need in UHF TV klystrons from more than 30 Electron Tube and Device Group Sales Offices around the world? Or talk to the Palo Alto Tube Division, 611 Hansen Way, Palo Alto, California 94303. In Great Britain, contact EMI-Varian, Ltd., Surrey, England.



production switcher capable of professional programming with instantaneous switching, fade-in, fade-out, lap dissolve, superimposition and special effects; accepts six non-composite and two composite video inputs; automatic preview connects to monitor; model designed for mounting on standard 19-in. console arm. \$1795. Dynair.

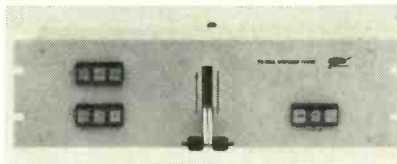
Circle 281 on Reader Service Card

V-I switcher-fader

Model VS-150A vertical-interval two-bus video switcher-fader for professional studio programming, including instantaneous switching and split-arm controls for fade-in, fade-out, lap-dissolve and superimposi-

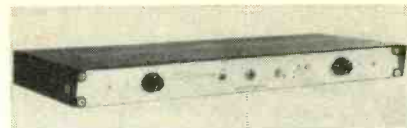
tion, with any degree of signal mixing. Mounts on standard 19-in. console arm. \$750. Dynair.

Circle 282 on Reader Service Card



Monitor amplifier

1 $\frac{3}{4}$ in. rock-mount amp with low distortion, dual-channel level controls and headphone jack mounted on front channel; two rear panel output and input jacks per channel; 30 W/channel rms continuous into



eight ohms at 0.05% THD (40 W/channel into 4 ohms); IM distortion under 0.3% .01 W to 30 W at eight ohms; hum and noise 100 dB below 30 W output; bandwidth ± 1 dB 5—50,000 Hz at 30 W. \$225. Crown International.

Circle 283 on Reader Service Card

Training TV production center

TV Educator Model 945 production center includes videotape recorder, two view-finder cameras (both with zoom lenses, tri-pods, cam-link TV pan heads and dollies) three five-in. preview monitors, a line receiver monitor, switcher fader special effects control center, EIA sync generator, intercom system, audio mixer, two mikes and other equipment; contained in mobile cart console;



lease purchase plain available. Video Engineering.

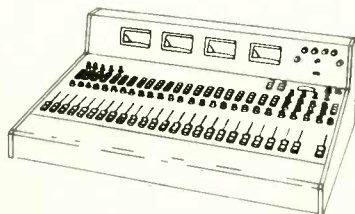
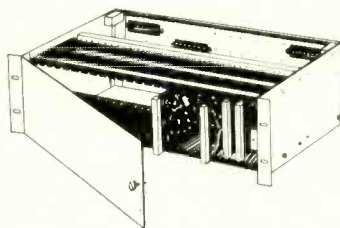
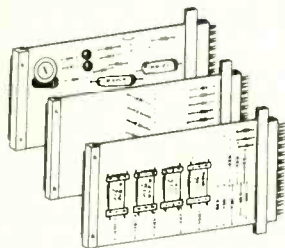
Circle 284 on Reader Service Card

Four-watt transceiver

Useful in remote pickup and staging, the Hallicrafters series HC-400 hand-held FM transceiver works in the 450-512 MHz band, uses nickel-cadmium batteries (12-V supply) and has field-adjustable continuous squelch. All models have excellent selectivity provided by helical resonators used instead of coils in inter-stage tuned circuits. Tone squelch



TOTAL CAPABILITY = FAIRCHILD INTEGRA II SYSTEM!



Capability No. 1: Easily integrated audio components.

Capability No. 2: Simple and efficient construction.

Capability No. 3: Practically any complex audio system can be designed.

Capability No. 4: Remote control of audio functions (optional).

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Capability No. 8: Complete freedom from contact noise, distortion, frequency discrimination and mechanical problems.

Capability No. 9: Noise-free and bounce-free perfect switching.

Capability No. 10: Space-age standards of component design and manufacture assure highest reliability.

Capability No. 11: Complete line of accessories.

Capability No. 12: Compatible with your existing equipment.

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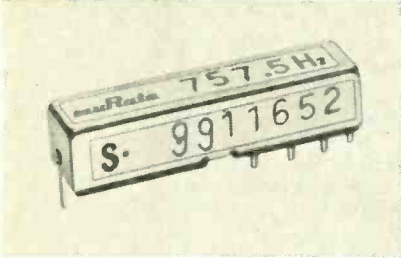
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circuit uses active filters rather than reeds. Up to six tones may be field-selected. For dependability, transceiver uses epoxy fiberglass PC boards and silicon transistors. Automatic deviation limiter in transmitter prevents overmodulation. Hallicrafters.

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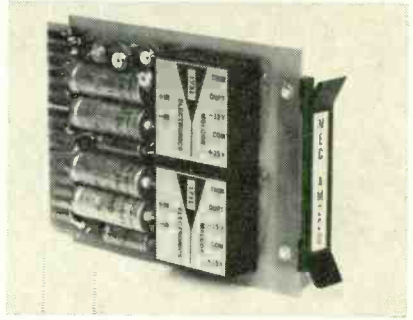
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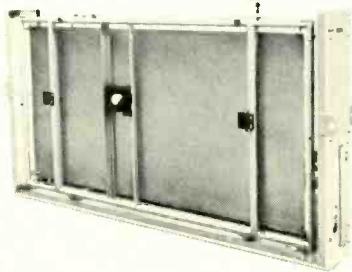
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Phone: 942-6666 Area code 301



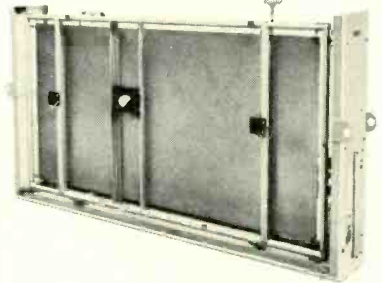
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NAB Exhibits

Continued from page 36

modulation. Audimax has an expanded return-to-zero function and adjustable recovery time for optimum compatibility with program format.

New in the U.S. and shown for the first time (by Television Equipment Associates) was the BIG-1 Program Control Amplifier from Amalgamated Wireless of Australia. This limiter has an attack time of less than 50 μ sec, and a 25-dB control range, and an independent positive peak-level control. It also maintains gain stability during program pauses. Compression ratio is 50:1.

At least three new turntables were on hand: Gray showed the two-speed 1012-A, which starts in 60 msec, and has an inbuilt strobe disc. It's available with Gray's Micro-Track arm or the well-known viscous-damped type 206. QRK claims instant start and 20-year life for its three-speed model 12C. And Sparta announced it is making its own turntable.

Telex showed a new headset with reduced head pressure to minimize user fatigue over long periods of time.

Audio Tape: Medusa-like Cartridge Decks

Only 11 years old, the cartridge machine has been the workhorse of radio since its introduction. Latest mutation is the multicart monster, which stacks several decks on a common drive shaft and motor; several appeared at the Conrad Hilton. Biggest was IGM's Instacart, which contains 48 three-minute carts, uses four motors, provides back-to-back random access, and a running light to indicate on-air carts. Ampro's model 712 plays any of 12 carts (up to 40 minutes each) in two stacks. RCA's multicart machine is similarly versatile, but specs weren't available at presstime.

Gates premiered its new Criterion 80 cartridge tape series, featuring rfi-proofed electronics, a rugged transport and standard 1-kHz cue plus optional second and third cue tones. Broadcast Electronics showed its new Spotmaster Ten 70 line of cartridge decks with heavy-duty motors, micro-adjustable precision head brackets, and a manual fast-forward mode which stops on 1000 Hz tone.

Sono-Mag/MaCarTa exhibited its model 521 twin-cart playback system which has two independent

playback positions driven from a common motor. (A minicart?) Sparta showed its new Century 1000 cart system with solid-state control logic.

In the reel-to-reel field, Tape-Athon's 1400 recorder/reproducer appeared with 14-inch reel capacity, allowing up to 16 hours playing time and unattended operation. Four-channel-conscious Telex displayed its Viking model 230 transport which can be had with optional four-track heads and electronics. Nortronics explained its new head-rebuilding service for Ampex head assemblies. The heads are remounted with one set screw and quick-disconnect plugs, making maintenance and troubleshooting easier.

A first from Schafer was a prototype broadcast cassette transport. Reaction was mixed, but some broadcasters thought it might be useful for dubbing news tapes from field reporters with portable cassette machines.

Less Test Gear

If there was as much test equipment at NAB '70 as in previous years, it was less visible. The big companies, Tektronix, Marconi, and Rohde and Schwarz were there, but not Hewlett-Packard.

Tektronix showed a new insert generator for CATV testing as well as its full line. There were no spec sheets on the new gear but it would check variations in chroma and luminance from various stations as received at a CATV headend. Convergence and other tests could also be made with the insert generator that was programmable to run through a series of tests.

Marconi showed a full line of transmission test equipment and a new programmable modulation meter. Rohde and Schwarz emphasized its TV demodulator introduced last year. Potomac Instruments pushed most heavily its FIM-21 solid state field intensity meter as a more sure instrument than the 20-year-old tube models which have performed reliably, if not most accurately. Delta showed how to use common point impedance bridges in directional antenna measurements.

Television Equipment Associates were displaying a distortion and noise meter imported from Australia (.003% to 100% distortion and -94dBm to +32dBm levels) and a \$500 IRT color monitor comparator set for 6500K, the recommended standard.

Let There Be Light

Newest products from Bardwell and McAlister, Century Strand and Mole Richardson were barn doors. Berkey-Colortran showed a slimline soft light that folded up. Colortran also got a lot of attention from its high efficiency rear projection system, the Lumiscope. Sylvania showed tungsten-halogen lamps and a rapid charge Sun Gun which would provide ten minutes of 150 watt illumination from a rechargeable energy pack. Suitable for news cameraman.

Lenses Focused Everywhere

Canon showed a series but appeared most proud of the P10x20B1 billed at the world's smallest among ten times zoom lens for Plumbicon camera. Rank also displayed a wide range—a lens for all reasons was their slogan—including the F-22 for the TK-4A, PC-70, and GE-350. Angenieux showed a TV camera lens and also a new automatic IHS zoom lens with view finder for 16 mm cameras. The manual-servo zoom Scheider system was demonstrated at the Tele-Cine booth.

Here and There

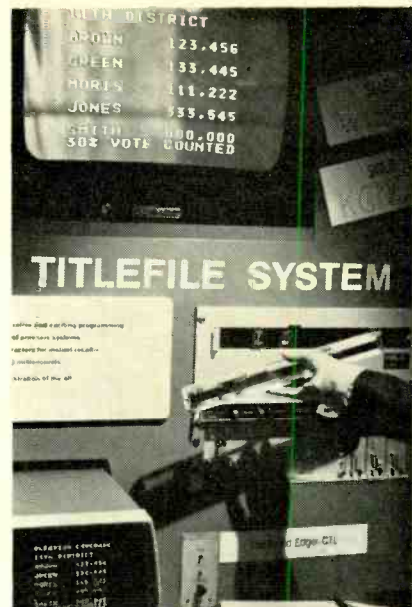
Conrac was strongly promoting its monitor modification plan which would give Conrac customers a revamped monitor with a new tube using controlled phosphors for only \$800. Conrac has put a large supply of phosphors in bond so that CRT variations will not pop up from year to year.

To locate that monitor where you want it, Kliegl was showing a new scissors-type mount that could be hung from the ceiling.

Experimental high energy video tape was demonstrated by 3M. A greater signal output was possible creating a crisper picture—S/N was 6 dB over Scotch Brand 400. The company was also discussing its efforts to do high speed tape duplication at roughly 30 times normal speed. 3M's effort is directed towards eliminating the need for a special mastering tape and the mirror-image master machine (used by Ampex in its new duplicator).

Memorex, which made an impact on NAB by flying in 119 foreign broadcast engineers and trade editors, showed its standard line of tapes on the floor but did talk about the future of chromium dioxide tape—it's coming.

Jamieson showed a new color processor, the Mark V, capable of developing Ektachrome at 65 ft/min.



New magnetic cartridge for Visual's titling systems (355).

For high speed inspection of film, Lipsner-Smith showed its new LSC Vedette system which gave a bright clear image in moderately lit rooms.

Both Bolex and Arriflex showed new 16mm cameras with automatic through-the-lens diaphragm controls.

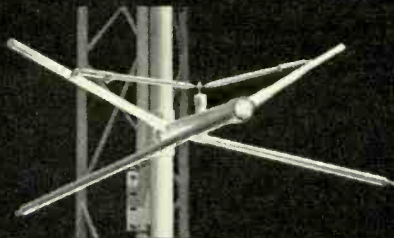
A novel method of store-casting by visual display was shown by TeleMation. Alphanumeric messages, made on TeleMation's TCG-1440 character generator, can be stored on normal audio cartridges for playback through a TV monitor. The material can be transmitted over SCA channels using an interface built by TeleMation.

If you happened to be there, you could have gotten a terrific buy on a low-cost color TV origination system. Visual, which bought a large inventory from Bell and Howell, offered for \$17,000: a color film playback system including 16 mm projector, carousel and multiplexer and the IVC vidicon color pick up camera, an IVC one-inch color VTR, a monitor, and a sync generator.

A new intercom system to satisfy a variety of needs was shown by Visual. It featured a programmable board containing two 7x7 balanced matrices. Visual also showed a new addition to its Rapid-Q cartridge equipment that could provide four-channel stereo. Switching is done by ICs rather than relays. It's called the RQ-RP-4T.

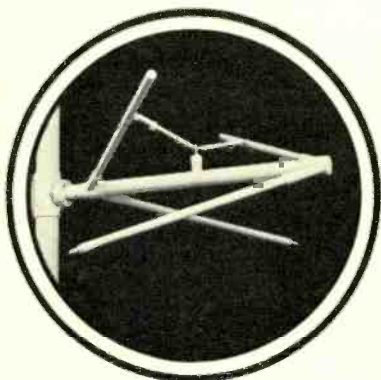
With surprisingly little fanfare, RCA introduced a replacement for Plumbicons. They're called Vistacons and the first units are interchangeable with lead-oxide types 55875 and XQ1020. **BM/E**

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**CROSS-
TALK**

Ed. note: Here are three letters responding to our March Editorial, "Serving the Public: U's plus Cable." The first is a parody of the Editorial; the second, a more conventional criticism. The third letter was solicited from Jefferson Standard, which operates a U with cable competition in one market and, in another market, operates a cable with U competition. We asked under what conditions U's and cable could coexist.

Dear BM/E:

To what degree, and how, should CATV (and for that matter cablecasting) be encouraged to the extent that the rights of the American public, willing to pay for extra signals, will not be denied?

A hard question if you are an FCC Commissioner trying to do the right thing. You know, you favor an outlet for local expression in every community. You know, broadcasting, today, is not performing this service and cannot function on this basis. (CATV can and is.) More program diversity; you know, single channel television stations cannot function on this basis. (CATV can and is.) Adequate free TV—a term that neither the broadcasters or the FCC Commissioners can define in numbers of channels. However, this problem is solved by the public as soon as the CATV systems come to their town. Therefore, cable has to be encouraged to expand and to originate in every community possible.

But must we control importation of distant signals? What would be the basis of such action? If a CATV operation can carry such signals by means of direct antenna reception (without microwave or other methods of reception), do I have the right to stop his carriage of these signals? If the operator wishes to import distant signals via microwave, I know it is already within my power to refuse such carriage by merely refusing to issue the microwave license. How about the various television markets where there is no capability of generating more than \$1.5 million annually, and there is not much profit especially if the stations are trying to cut it (usually less than 10% before taxes)? How much profit should these stations show, annually? And since I am an FCC Commissioner trying to do the right things, where does my allegiance lie—with the citizens of the United States, in trying to regulate in favor of all the people or with the broadcasters, to insure that their profits soar? Is there a

chance that these markets were too small to support the three stations at the outset? If this be the case, isn't this a case of poor business decision on the part of the broadcaster in that market? Is the Federal Government to be depended upon to regulate in such a manner to rectify this broadcaster's position in business and insure a profit in these markets?

"Preventing unfair competition becomes even a tougher problem when we consider the medium sized markets." It takes many hundred thousands of dollars a year to operate a cable system that is putting on something more than bland programming, counter-programming, plus lots of locally produced public affairs telecasting. This means that if CATV is going to reach its maturity soon, it deserves to be given a fair chance where good broadband communications is needed most. We're now talking the top 50.

The copyright proposal of three independent and one ETV station in addition to three networks (3&3&1) would cramp the CATV industry. The chance of CATV making it in markets 25 to 50 are slim unless they might supplement their services by adding distant signals. However, CATV as an industry, was willing to try operation in these markets with 3&3&1. This would only whet the appetite of the public for more television and would surely create demand from the public for maximum channel use. . . .

"The same holds true for two-station markets grossing less than \$.5 million each." But is it my duty as an FCC Commissioner to insure profits for private companies which operate broadcast stations as a private business? Which do I favor more—an outlet for local expression in every community with more program diversity or free TV? I know that conventional TV broadcasters cannot afford to act as these outlets for the communities since their stations cannot operate in this vein without bypassing potential network advertising. I know that conventional TV broadcasters can offer only one channel of service—no real diversity. But, more important is the fact that I know of no instance where a station in these markets has actually proved that a CATV system (even with distant signals) has driven local broadcasters off the air. Rather, according to my own commission's "TV Broadcast Financial Data," I find that the television broadcasting industry continues to register sharp increases in revenues. I do find some stations in some markets did not have sizable incomes, but isn't this true of any industry in our nation? Could it be that some of the stations failed to reach their public because they failed to realize their commitment to that public? And, could it be that some of these stations entered a market which they knew could not

easily support another station?

What of progress and the future? What if the modern, public-service minded CATV systems did finally halt the construction of more television stations in these various over-worked markets. What if these CATV systems handled their advertising and promoted their operation better than some small stations, as they were able to allow their public a full communications outlet, educate both the adults and school children and provide them modern services which the future holds? Do we hold back progress for a dollar or a million dollars? Do the broadcasters strive for excellence in their industry or do they strive for protection against competition so that they can continue to lose money, which they hope the government will regulate back their way?

We don't have to encourage broadcasters to get into the cable themselves—not since nearly half the systems constructed, last year, were constructed by broadcasters. Perhaps, we should go so far as to encourage the operation of cable systems in all communities. For, should this cause the demise of a few small mis-managed stations, or those which are not successful because they fail to see their commitment as broadcasters, then not only would the cable systems carry the better stations remaining on the air but they would still serve their community with multiple local outlets for local expression. But, perhaps this encouragement wouldn't lead to the demise of these stations. Rather, it might lead them into the field of competition. Perhaps, they would realize that no one is going to give them a license to use the public airways and then adopt regulations which insure a maximum profit for anything less than maximum service and hard work. With this realization might come improvement of programming, a greater feeling for their public and the beginning of a return to the basis of free enterprise and competition among all industries in communications.

Do we discriminate against the masses in urban areas and rural areas by permitting excuses as a substitute for public service? Since we are worried about the few stations who find it hard to operate in markets because of powerful vhf stations, rather than increase royalties, we might require all stations to share equally the profits for their efforts. Then, we could not only create a growth pattern for broadcasting, but could allow restrictive regulations to ease for a well-deserved growth rate of CATV, initiate studies and engineering for REA to promote the construction and limited CATV operations in the rural areas and build resources for the Corporation for Public Broadcasting as well. Then CATV systems specializing in futuristic approaches could get some grants and ethnic

groups could finally realize that the communications industry has stopped fighting more for the almighty dollar than for true service to the public—our reason for being involved.

"How's that for promising approaches?"

Rex Porter
9924 Antioch Road
Overland Park, Kansas
66212

Dear BM/E:

I have read your editorial of March, 1970, and I am amazed that an editor of your knowledge and vision would take the position you did in that article.

I thought by now everyone in the television business was willing to concede the obvious, that uhf stations will never be profitable in anything outside the top 25 to 30 markets without a network affiliation. Your editorial takes the stand that cable television is keeping uhf from making money, which simply is not true. The points that you have chosen to back up your statements are somewhat silly, and your arguments are contradictory on the face. For example, in paragraph 3 you say that small market U's must have networks, and then you say that we must encourage cable. Fine, but then you go on to say that we have to encourage cable only on a basis that would make it unprofitable since you bring in the limitations on imported signals in direct opposition to your statement that cable must be encouraged. . . .

Paragraph 6 calls for reducing competition from cable television in the top 25 to 50 markets to a point which is a little bit ridiculous. I don't know where you are going to find subscribers for the kind of service you purpose, so why bother?

Paragraph 8 discusses royalties available to the program originators and authors, and is another puzzle, because you first want to generate more programming by increasing royalties from the broadcaster or cable; you then say that uhf broadcasting will probably not provide the necessary funds and suggest that cable should do so. This is rather weird in view of your desire to limit cable importations to a point where the cable company won't make any money.

Paragraph 8 asks the consideration of discrimination against poor and rural areas by selecting cable service as a "substitute for uhf." Curiously, you find merit in the constant rerunning by uhf stations of old films of Gunsmoke, I Love Lucy, Howdy Doody, etc., because of the "option over viewing times" supplied thereby. Quite obviously, cable television can provide many more options for viewing times than can any broadcast operation—and would be the preferable medium for accomplishing that pur-

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WAFV AM FM
 METRO CITY, U.S.A.
PROGRAM LOG
 PAGE 1 DAY Wed DATE 12/3/69
 Eastern Standard Time Eastern Daylight Time
 SOURCE _____ Time On 6:30 AM Time Off 10:00 AM
 Scheduled work note _____ Time On 10:00 AM Time Off _____
 Announcer or Operator *John H. [Signature]* Time On _____ Time Off _____
 Announcer or Operator *Barry Neil Dickson* Time On _____ Time Off _____
 (Full Name) _____
 (Full Name) _____
 PROGRAM TIME PROGRAM TITLE-SPONSOR SCHEDULED LENGTH
 COMMERCIAL NON-COM'L
 MIN. SEC. MIN. SEC.
 30 ON OFF
 6:30 6:59:30 WAKE-UP (PART 1) 1 30
 6:59:30 7:00 7:05 ~~Harewick Carpets~~ XMTR OFF 6:37:29
~~Cancer Spot~~
~~Deal Shoes~~
 XMTR ON 6:54:10
 7:01 7:02 NEWS 1

pose, assuming there is some benefit in so doing.

In your last paragraph you have reached 1984. Assuming that you were able to impose a \$1 per month tax on cable subscribers in addition to the service fees already charged, and then used these funds to provide "free" translators in the same communities, how in the world do you propose to continue a viable television operation generating these dollars by providing translator service? In addition you seem to feel there would be enough money left over to give public broadcasting a lift and allow the establishment of special and ethnic stations. Holy Mackerel!

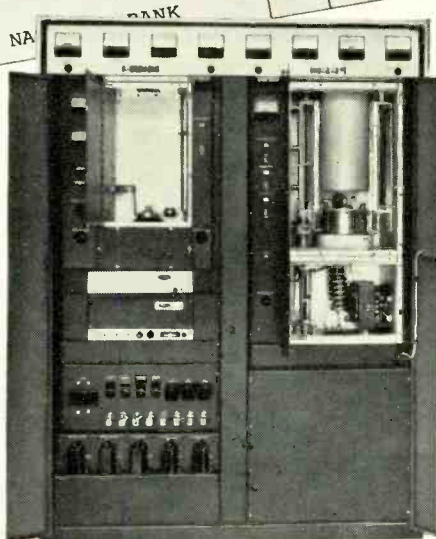
Your editorial reminds me of a statement made to me by a fellow in New York City several months ago when I asked why he did not subscribe to the cable service and he replied that he felt the broadcaster was obliged to provide him with a reasonably good signal so that he should not be required to pay any service fee or other charge to receive that broadcaster's picture. Suppose instead of taxing the cable subscriber we place a tax on all broadcast stations of 50 cents per viewer, based on their ARB reports, and use this money to build either cable systems, translators, or such other techniques as might be used to insure the reception of every viewer in a broadcaster's contour of at least a Grade B signal? This makes more sense to me than your proposal.

Assuming that the point of your editorial was the promotion of uhf broadcasting, a subject dear to the hearts of all FCC commissioners—past, present, and future—a tax on CATV won't cut the mustard. If you really want to see this goal accomplished, the proper way to go about it is to require that network affiliations in any market be given first to uhf stations and only if no uhf channel is available, to a vhf operator. Further, it should be required that if a uhf station comes on in a market formerly served by vhf, the networks must affiliate with the U and drop the V. In order to save arguments about which network should affiliate with a new uhf station in a multiple station market, the Commission could require that whichever station was most profitable at the time of inception of uhf service should drop its affiliation and give it to the newcomer.

The next problem, of course, with uhf is of "tuner parity." To solve this problem every uhf broadcaster should be required to provide a uhf antenna and converter to all viewers in his service area so that no additional cost to the viewer is incurred to watch his signal. This would be expensive, and so all the proceeds of vhf stations in the area should be taken to buy the antennas and converters.

Of course, if one is sincerely interested in the development of uhf,

the end of unscheduled sign-offs!



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he would recognize that the closest solution is CATV since cable services give uhf instant access to all television receivers, by a process of conversion which carries the U signal on a V channel, gives tuner parity immediately to the U operator, and doesn't require a lot of explanation of tuner procedures, outside antennas, etc. I am sure that this is a more preferable method of helping uhf reception than those you described; and, frankly, I don't think you really meant what you said in your editorial.

William F. Karnes
President
National Trans-Video,
Inc.

Dear BM/E:

The effect of CATV competition on new uhf stations remains to be seen, of course, although it is logical to believe that community antenna television will become an increasingly more vigorous competitor to both uhf and vhf station in the very near future. As the CATV systems grow, and as they increase their programming output, they almost certainly will claim increasingly larger audience shares.

This is not bad, though. To the contrary, it is good. It is still another example of our free enterprise system at work. With this increased competition from CATV, all stations—including the new uhf stations in the Top 50 markets—will have to provide an even better service than they now provide, or else they will find it financially impossible to continue operations.

I think the history of entertainment and advertising in this century bears out this contention. Newspapers thought the field was getting crowded when radio came along, and radio thought that it faced an almost insurmountable problem when television appeared. Some television executives believed their medium would begin to go downhill when CATV emerged. Yet, all of us are still here and—by and large—are prospering. In brief, then, it seems to me that independent uhf's in good markets can prosper if they pinpoint the needs of their target audience, program to meet those needs, and are well-operated and well-managed.

Charles H. Crutchfield,
President
Jefferson Standard
Broadcasting Company
WBT-AM-FM, WBTW, Jefferson Productions,
Charlotte;
WWBT (TV) Richmond,
Va.

Dear BM/E:

A belated thank you from the

May, 1970—BM/E

If you want a tube distributor who knows your business, give it to him.



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Engineering service. He has a "hot line" to RCA's Field Engineers. Call him any time you need their services. Call even if you need help in servicing our competitor's equipment!

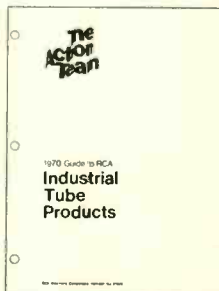
Quality. You know the story. He stocks the finest.

In power tubes, for example, brand preference studies by leading electronic publications have listed RCA as the first choice of professional designers year after year!

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P.S. Your RCA Broadcast Tube Distributor is also the man to call for RCA Starmaker Microphones.



RCA

management, staff and panel of "Suggested Solutions" for the excellent article, "New Talk Show Hits Problems Head-on" in the January *BM/E*.

We have been snowed under by letters, phone calls and telegrams from your radio station readership. At this writing we have placed "Suggested Solutions" on 126 radio stations that requested direct service and have 90 audition tapes out with many of these already ordering the series.

Response to the *BM/E* story arrived from almost every state plus Canada, Alaska, Puerto Rico, Australia and Europe. Somehow in moving to our new New York studios we

lost requests from about 38 stations so those whom we have not serviced thru loss please write again.

At this writing, "Suggested Solutions," which started on WPIX-FM at 10:30 p.m. last August 3rd is now being broadcast by 433 stations including The Mutual Broadcasting System (Sundays 3:05 p.m. NYT) which has just renewed for its third 13-week cycle.

Bill Bertenshaw
Radio & TV Roundup
Productions
111 Maplewood Avenue
Maplewood, N.J., 07040

Dear *BM/E*:

As a former chief engineer who has left the broadcasting field, I feel qualified to comment on your editorial "The Engineer as Executive," (*BM/E*, December, 1969.)

Many station managers consider their technical staff a necessary evil with status only slightly higher than the janitor. They quite often do not pay a salary competitive with what a truly qualified man can make somewhere else. Most small stations do not even have a fulltime engineer, so the station's interests may be secondary in the engineer's mind.

It is true that "no station stays on the air long without input," but it is also true that few stations are commercial successes for long without quality output. It is very disillusioning when the chief engineer has to fight a battle in order to get the money to buy needed supplies and equipment. It is even worse when the station manager buys a totally unsuitable piece of equipment without consulting the engineer and then complains to the engineer when its performance does not live up to the salesman's glowing promises. After a few such encounters, the engineer is less motivated toward economy and toward advancement within the broadcasting industry. As for attending engineering conventions, a lot of stations wouldn't finance their engineers to attend a \$2 luncheon across town, much less a real convention.

Few engineers are ignorant with respect to the free enterprise system. In fact the heads of a disproportionately large number of major companies have a technical background. It appears to be only the broadcast industry where the manager with engineering background is a rarity.

All of what you say may be true in some cases and some may be true in most cases, but let's not put all the blame on the engineer.

Jack Buchanan, Jr.

University of Kentucky

We forgot something. Our January cover asked whether or not today's transmitters were stable enough for unattended operation—but we forgot that monitoring might be more than just watching dials. So Charles A. Siebold, chief engineer at Baltimore's WCAO-WCAO-FM, sent us a news clipping and pointed out "I think you will agree that the event described might not have happened if there had been a technician (slumbering or not) at KOLA." Here's the story: "WASHINGTON—A SAN BERNARDINO, CALIF., RADIO STATION WENT OFF THE AIR AT 11:15 PM EST MONDAY UNTIL FURTHER NOTICE. THE REASON: ALL ITS TRANSMITTING EQUIPMENT WAS CARTED OFF BY THIEVES.

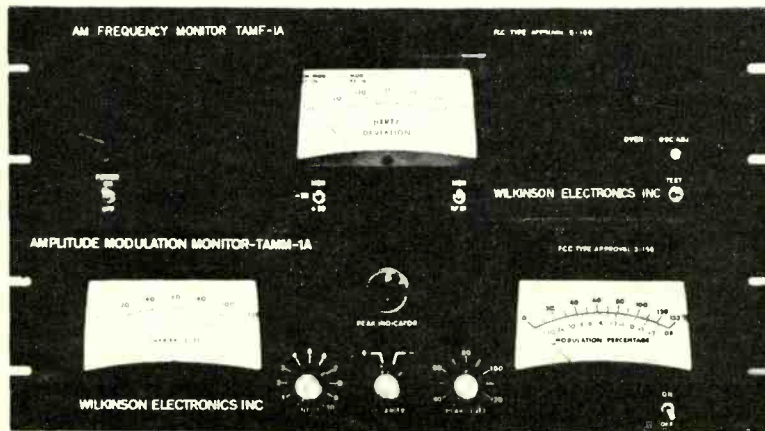
ABOUT 1000 POUNDS OF EQUIPMENT WORTH AN ESTIMATED \$20,000 WAS RANSACKED FROM THE TRANSMITTER BUILDING OF FM STATION KOLA WHILE THE OWNER, FREDERICK R. COTE, WAS BROADCASTING FROM ITS RIVERSIDE STUDIO. . . ."

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Circle 129 on Reader Service Card

NAB Conference

Continued from page 25

broadcasters to resolve, as they go back to their communities, to lead the battle for life's survival.

There's a satellite in your future.

"Satellites open up the possibility of space channels being so cheap that all kinds of diverse programming can become popular," said Arthur Clarke, noted space prophet. Demographic data of the future will define not the mass market but individual differences and needs, and program materials will be matched against interest profiles. It's conceivable that no two viewers in the future will receive the identical facsimile or video newspaper, Clarke said.

Every profession will have its own channels for continuing education, Clarke continued. He envisions broadcasts from space and ground distribution via cable.

"We are still in the Paleotechnic area of electronics," Clarke said. The arrival of solid state electronics is giving us a glimpse of what electron-

ics really can be like. He predicted electronic products so reliable that they would be guaranteed for the life of the purchaser. The future will also see reusable space craft.

Some of the consequences of the new era, in Clarke's view, will be dispersal of business since anyone can live and work anywhere. The slogan will be "Don't commute, communicate." Data channels will not be charged on a time or message base but will go for a flat yearly rental, Clarke predicted.

Education via satellite is essential to eradicate illiteracy and ignorance in some parts of the world. India and Indonesia were two nations cited by Clarke as urgently requiring satellites. The scientist saw education as essential to reducing poverty. "We can't live in a world that is half poor," he said. He proposed that the U.S. put up a television satellite network and make it available to the entire world. For \$1 billion annually (one twelfth of the U.S. defense budget) we could reach one billion children, Clarke ventured.

The long-range implication of satellite TV will be the passing of the nation-state. Clarke foresaw children of the future having a dual alle-

giance: to the planet and to their particular tribe.

Speaking of the near future, Dr. Joseph Charyk, president of Comsat, said that satellites, in two years, could be capable of transmitting 1.5 billion bits per second (meaning the text of one million books could be transmitted in an hour). In terms of TV, the costs would be about \$1.5 million per channel annually.

NBC has been paying in excess of \$23 million for AT&T services and the new rate structure increases this to \$30 million, said Allen R. Cooper, vice-president for planning, NBC. Cooper said NBC hoped for FCC authorization to go ahead on satellites and was disappointed in the FCC's action that it will give only "consideration of applications."

It is probably not feasible for direct satellite-to-home transmission, said Dr. Doleman Raphael, but he envisioned a \$10,000 receiver being tied to cable for further distribution.

There is a most urgent need for international standards for satellites, said Dr. Edward C. Welch, formerly of the National Aeronautics and Space Council. A satellite system, he concluded, is urgently needed for world peace and education. **BM/E**

2x2 slide projectors for the television film chain

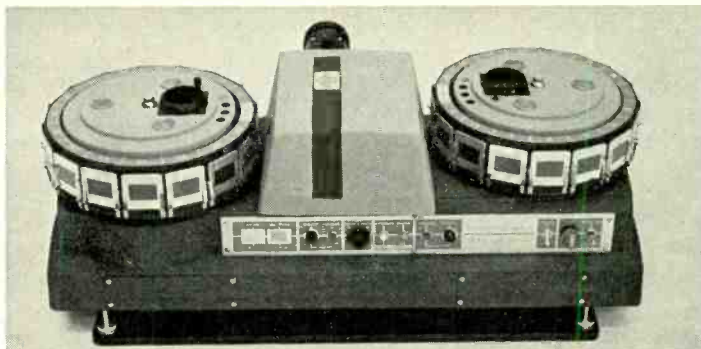
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Circle 130 on Reader Service Card

NEW LIT

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

Solid-state TV microwave relay links, MRS-2A and MRS-7A from RHG Electronics described in 8-page product bulletin, containing diagrams, specs. **200**

BNC series of rf coaxial connectors described in Catalog 36-698, covering construction and cable group data for 658 items—adaptors, jacks, etc.—from Kings Electronics Co. To get the 47-pager, send request on company letterhead to Technical Services Department, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York, 10707.

All-day TV automation switching control system, the CRT STEP, displays upcoming events on standard TV monitor; described in 4-page color bulletin from Chrono-log Corp. **201**



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82-channel coax cable for uhf/vhf home color TV described in data sheet from Columbia Electronic Cables. **202**

Antenna fabricating techniques described in Polyflon bulletin. **203**

Plug-to-plug adaptor, subminiature, for Slide-on mating jacks described in ConheX product bulletin from RF Components Div. of Scalecro. **204**

“Pressure Dams in Communications Cable,” paper delivered at 18th International Wire and Cable Symposium by J. B. Masterson of General Cable Corp., describes reasons for pressure damming, dam acceptability criteria; also surveys materials used for building cable dams; test results, tables, illustrations and bibliography included. **205**

Wire, cable and electronics catalog featured in 63-pager from Vikoa—pictorial depiction, thumb-thru index included in this IDS/MATV equipment catalog. **206**

System expansion bulletin, 24-page booklet outlining progression from a single camera VTR TV facility to multicamera, full-color system, designed to help CATV and ETV operators; details for nine systems in TeleMation pamphlet. **207**

Stumble-free, over-the-floor extension cords—Electroduct flat rubber duct in 2- or 3-wire units, 4, 5, 6 and 10 ft lengths—described with installation tips in 8-page catalog, also covering components and fittings. **208**

Record player and accessories for educational use described in 61-pager from Audiotronics. **209**

Patching and switching, connectors, plugs, jacks, accessories used in TV in all forms in 44-page Trompeter catalog including technical discussion “Noise in Cable Systems.” **210**

Color cameras for under \$10,000 (for CCTV) reviewed, along with videotape recorders, color film and TV systems, in RCA 12-pager. **211**

Pressurization equipment manual, 32-pager from Dielectric Communications, covers full line of DRY-PAK pressurization equipment and accessories for rf transmission lines—includes engineering data and application information. **212**

Rf assemblies, narrow and broadband, cavities, flat lines and lumped constants, in Polyflon catalog. **213**

PA catalog covering commercial sound speakers, speaker products and PA electronics, available from University Sound. **214**

Bench-type rf generator, 20 millisecond response, described in Lindberg Hevi-Duty bulletin, including dimensional data, ratings and spec chart. **215**

1970 equivalents index lists 2000 special electronic tubes and devices for which the English Electric Valve Co. has an equivalent—plus list of distributors in more than 50 countries. **216**

Parabolic and ITFS antennas described, specs and other information (radomes, mounting, adaptors and cable, connector accessories) included for Prodelin’s line of transmitting and receiving antennas covering freq from 450 MHz to 13.2 GHz, in 40-page catalog. **217**

Vhf/uhf radio test set A412 described in 4-page brochure with details of capabilities, freq ranges, operating conditions, applications and schematic circuits; from Amalgamated Wireless (Australasia) Ltd. **218**

“High Performance CATV,” 10-page paper by George P. Dixon, chief engineer of C-COR Electronics, presented at 1968 IEEE Broadcast Symposium; discusses the engineering advantages and differences found in using trunk amplifier spacings of 34 and 40 dB; also includes analysis of high-level distribution on feeder cables. **219**

“Infinity Revisited,” 6-page illustrated engineering essay from Bird Electronic Corp., covers development of coax transmission system termination technology, as it attempts to reach the reflection-free termination ideal. **220**

Composition and magnetic properties of Ampex ferrites for microwave applications described in data sheets; lithium, nickel, magnesium and garnets discussed; ferrites designed for use in circulators, isolators, phase shifters and switches for low and high power requirements. **221**

Underground excavating equipment from Davis, described in 20-page color brochure; covers 11 trenchers, plus accessories. **222**

FCC’s 35th Annual Report, recounting major Commission activities during 1969, includes statistical data, financial figures and field engineering functions for the broadcasting industry, plus special articles, appendix and more; 228 pages. Order for \$1.75 from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Underwater TV brochure from Cohu, 8 pages, 2 color, contains original painting on depths of various undersea vehicles and TV cameras, photos of several submarines, and oceanographic information. **223**

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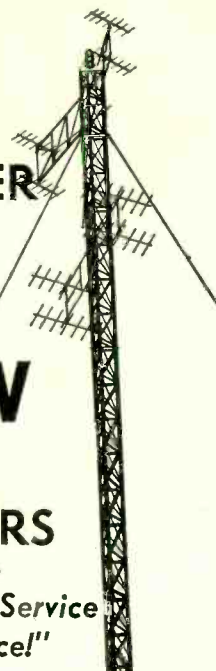
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May, 1970—BM/E

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FROM THE EDITOR

Mother Nature Needs You

Our environment has suddenly become a major issue in the United States—broadcasting has been a major force in making it so.

That we cannot continue ravishing nature as we have is now clear as a result of the April teach-ins. What we do as individual citizens and as broadcasters is less clear.

Pollution is a byproduct of efficiency and productivity that never gets on the profit and loss balance sheets, according to Dr. Harry Commoner at the NAB Convention. If we are to stem pollution we need new accounting methods. The new accountability and trade offs involved will come hard.

We might agree to pay more for our electric bill so that the utilities will pour fewer contaminants into the air, but as consumers will we buy steel-conserving, lower-powered automobiles, detergents that wash less well, apples with worms, or beverages in returnable bottles?

Much of our affluence, or good living, is based on an ever increasing productivity and a growing gross national product. Now some ecologists are suggesting that we must halt consumerism and slow the rate of growth of the GNP simply because we can't tolerate the compound growth rate of tin cans, smoke and auto exhaust. This means more unemployment or, to spread jobs around, a shorter work year and less pay. It also means that advertising which creates demand for more hard goods is not the positive good that we all now say it is.

It is by no means a certainty that the GNP has to be slowed but many of us are going to find our profits and style of living threatened and hurt by pollution controls. There will be strong lobbying by various vested interests to constrain the other guy. The Federal Power Commission, the Federal Trade Commission, the Interstate Commerce Commission, congressmen and local governments everywhere will be under great pressure to protect this industry or that against the brunt of the decisions that have to be made.

Dr. Commoner has said the public has to know the technical aspects of the problem so that the public can exercise its political rights to do something. He sees broadcasters and journalists playing a most vital role in informing the public of the facts.

Willard Walbridge says this calls for responsible reporting and digging into the matter "so we can act, rather than react." We agree. It's a matter of survival.

James A. Lippke,
Editor

PRODUCT INDEX

A quick reference to products mentioned editorially or in advertisements. Page number is listed first (light face type) followed by reader service number (bold face.)

For products shown at NAB, see recap beginning on page 25.

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- 54/123 Audio equipment/Sparta
- 62/131 Cartridge machine/Tapecaster
- 53/121 Cartridge machine/Tapecaster
- C3/137 Cartridge tape products/Broadcast Electronics
- 47/117 Consoles/Philips
- 46/291 Headset, cordless (for classrooms)/Sharpe Audio Div. of Scintrex
- 53/289 Microphones, cardioid condenser/Sony
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- 60/129 Monitors, a-m/Wilkinson
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- 53/122 Reverberation unit/Gotham Audio
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- 53/290 Tape recorder-reproducer systems/Vega Electronics
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- C2/100 B&W-to-color film process/ABTO
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CATV (See also: COMPONENTS, WIRE & CABLE)

- 9/104 Modulators/Anaconda Electronics

CCTV

- 37/115 Cable terminal assembly/Comm/Scope
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- 57/126 Lenses, zoom/Cosmicar

TEST EQUIPMENT

- 3/101 Video signal monitor/Tektronix

PHOTOGRAPHIC & LIGHTING EQUIPMENT

- 19/113 Color film processors/Filmline

COMPONENTS

- 64/133 Silicon rectifiers/Wilkinson
- 46/275 Uhf/vhf tapoffs/JFD

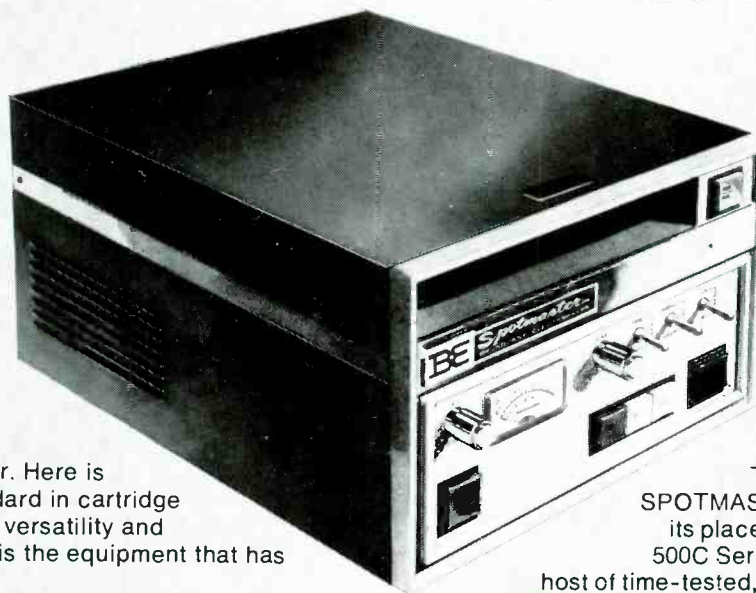
MISCELLANEOUS

- 18/111 Books/TAB
- 64/134 Graduate placement/Career Academy

Spotmaster

Introduces the incomparable

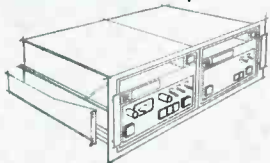
Ten/70



Your search is over. Here is the bold new standard in cartridge tape performance, versatility and ruggedness. Here is the equipment that has everything.

Five models of the magnificent Ten/70 are offered: mono record-play, mono play, mono delayed programming, stereo record-play, stereo play. All have identical dimensions. Any combination of two will fit in our sleek 19-inch roll-out rack panel, just 7 inches high.

And look at the "Human Engineered" versatility. Features and options include manual high-speed advance, exclusive Auto-Cue with automatic fast-forward, automatic self-cancelling record pre-set, front panel test of cue and bias

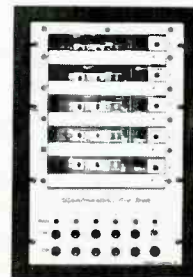


levels, built-in mike and line level mixer, automatic pressure roller engagement and electrical cartridge release, color-coded design for easiest possible operation.

No-nonsense SPOTMASTER engineering dictates the inside story: a massive U.S.-made hysteresis synchronous "Direct Drive" motor, solid state logic switching, modular construction throughout, premium components, separate heads allowing A-B monitoring, full bias cue recording, transformer input and output, flip-top access to heads and capstan.

This new generation of SPOTMASTER equipment takes its place alongside our classic 500C Series, still offered. With a host of time-tested, field-proven features, the 500C record-play and playback models meet or exceed all NAB specifications. Performance is second only to the Ten/70.

MULTIPLE CARTRIDGE MODELS—SPOTMASTER Five • Spot and Ten • Spot (holding five and ten cartridges respectively) may be operated manually or incorporated into programmed automation systems. And now there are stereo models, a Remote Control Sequencer, and a Five • Spot with full recording capability.



The versatile Five • Spot

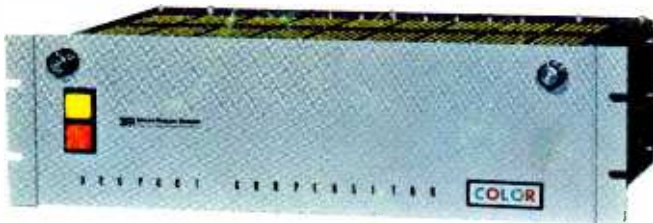
Call or write today for information about the new Ten/70 and other SPOTMASTER cartridge tape products and accessories. Remember, Broadcast Electronics is the No. 1 designer/producer of broadcast quality cartridge tape equipment—worldwide!

BROADCAST ELECTRONICS, INC.

A Filmways Company

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IF YOU'RE GETTING A PICTURE OF ANOTHER COLOR, YOU NEED 3M's COLOR DROPOUT COMPENSATOR



FOR TRUE COLOR.

The DOC replaces color dropout on your VTR reproduction with correct color video — all within the video signal itself. In fact, as the dropouts occur, it detects and replaces the “lost” signal with stored information from the previous scan line of the same field.

Best yet, the DOC's self-balancing video switch prevents white flashes. It provides precise color match with exact chroma fidelity as well

as complete freedom from switching transients. Proc amp and servo are stabilized to allow tape to play in full intersync or pixloc mode.

No wonder no other system can match the 3M Color Dropout Compensator. It's the only system available that can provide proper color and luminance replacement. For details write for the booklet, “Compensating for Dropouts in Color Television Recording”, today.

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Circle 138 on Reader Service Card

