

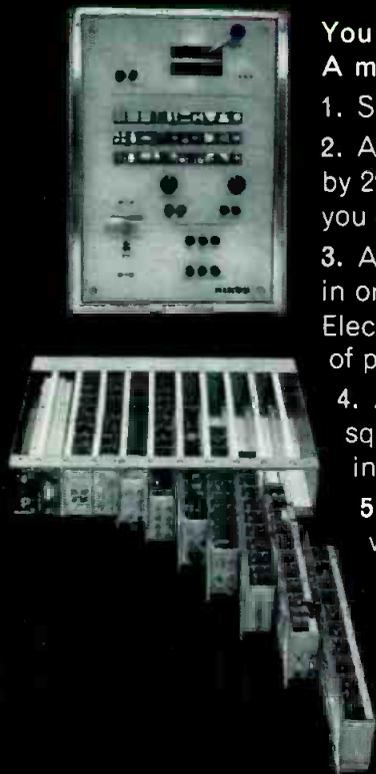
BMME

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 GEN FOR
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how to build a versatile special effects system on a not-so-versatile budget.



You build it the Riker way. Inexpensively. Cleverly.
A module at a time. Like so . . .

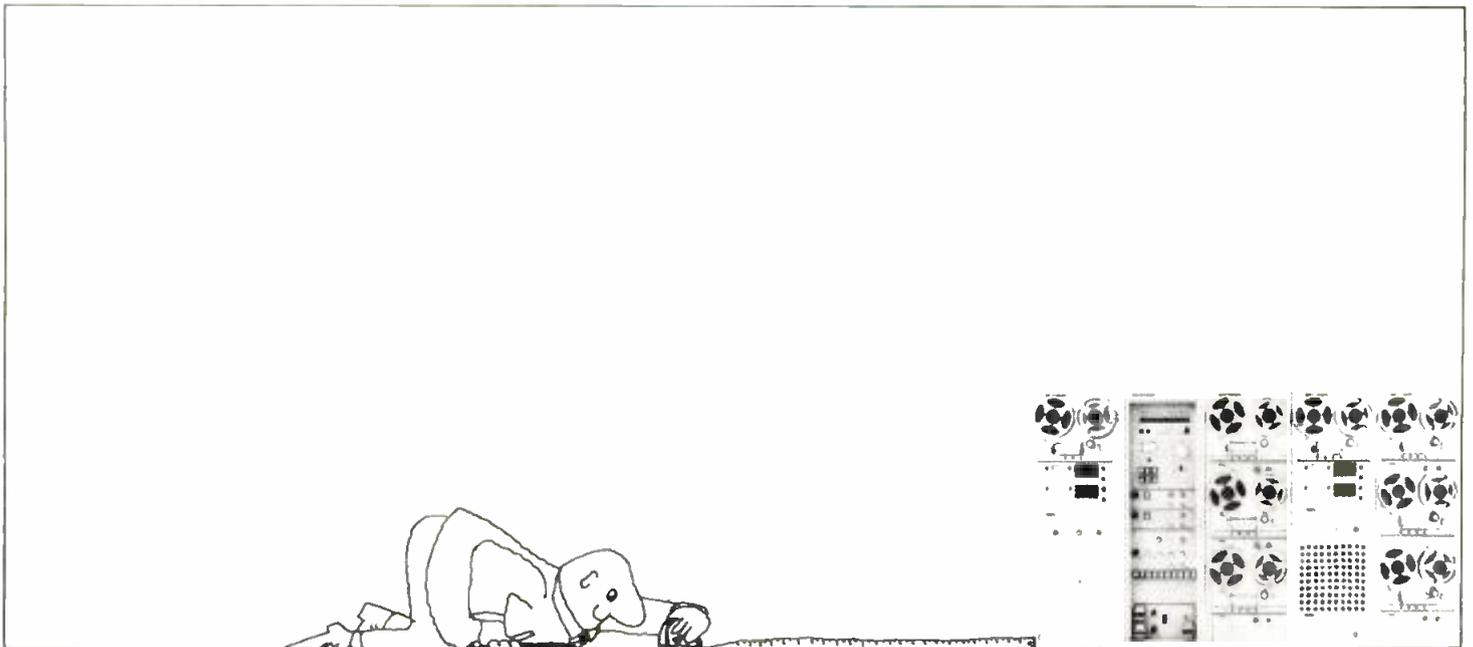
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4. Add a "Joy Stick" positioner. Now you're able to set circles, squares, diamonds and other wipe patterns to move or appear in any portion of the picture area.
5. Add a mixer-fader and you now have the world's most versatile special effects system.

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3



BROADCAST MANAGEMENT/ ENGINEERING

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This month's cover: In discussing this automation issue with illustrator Sudduth, we suggested satirizing machines in cartoon fashion (being impressed with some of this type coming from East Europe).

But S. being a pop art devotee saw only a great chance to do his own adaptation of that Mona Lisa of pop art: the Campbell Soup can. Like it?

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For years we've been offering a 30-day free trial, a full year's warranty on parts and labor, an increase in effective coverage, a guarantee of protection against overmodulation without distortion—but there are still a few of you who haven't tried AUDIMAX and VOLUMAX.

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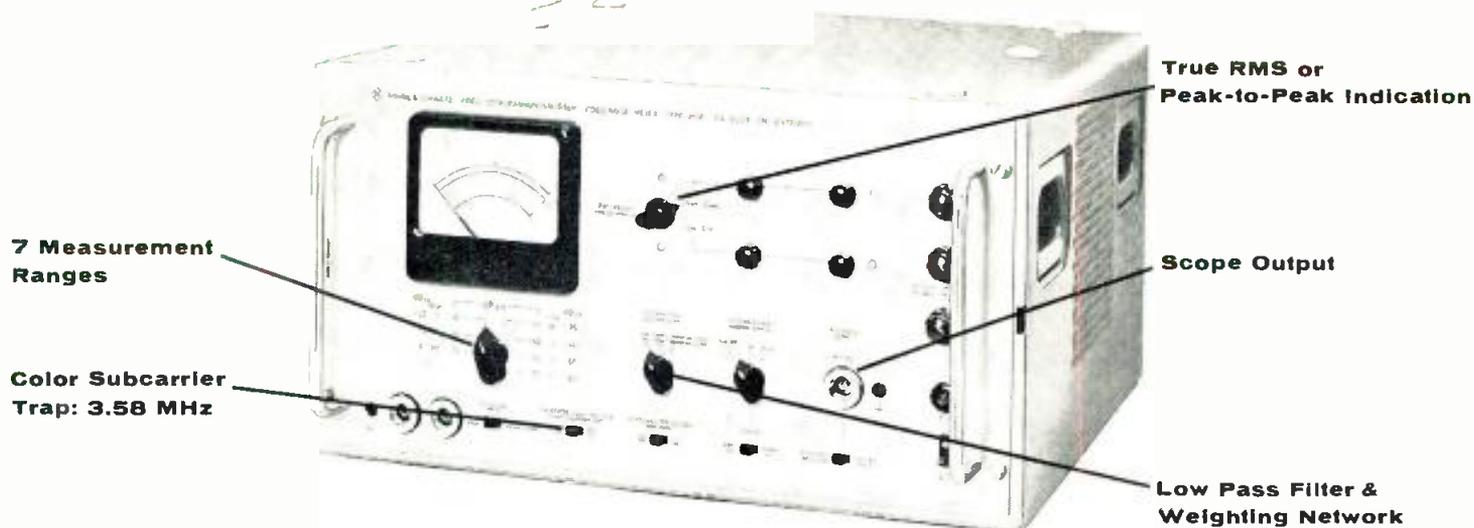
Audimax reacts to any given program situation in exactly the same way as your best audio man would — only a lot faster and more efficiently. It eliminates distortion, thumping, pumping, audio "holes", and bridges through program pauses to eliminate the "swish-up" of background noise. It even returns the gain to normal during standby conditions. Big claims? You bet. But we're willing to back them up with a 30-day free trial in your own studio. After that, send us \$665 if you like it. If not, send it back — freight charges collect. What can you lose? By keeping average modulation up, everybody wins. Volumax for AM broadcasters costs the same as Aud-

imax and limits peaks without side effects. Its action may be gentle or microsecond fast. That depends on the program waveform but the end result of the Audimax-Volumax team is **always a more even and pleasant sounding program that may be transmitted safely at much higher effective power levels.** That's another big claim we'll back up with a free trial. We've even got a claim for FM and TV broadcasters. FM Volumax is absolutely guaranteed to prevent FM overmodulation and SCA crosstalk without distortion. This one costs \$695. Write and let us back these claims with a 30-day free trial. Or better yet—call us collect at (203) 327-2000.

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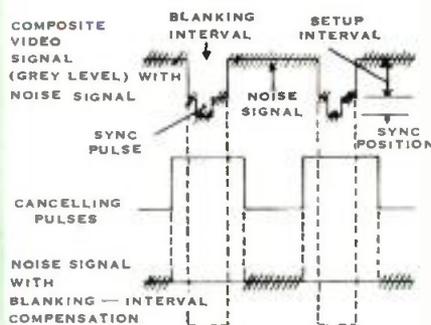
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NEWS

Two Cable Type Networks

Two separate companies, International Artists, 4433 Bissonnet, Houston, Texas, and Cable Television Network, Palm Springs, Calif., have been formed to provide regular programming services for CATV operators.

Felix Girard, president of I.A., offers motion pictures on videotape (for playback on Sony Videocorder) under a leasing agreement worked out expressly for CATV operators. (The fee is based on the number of subscribers and is indirectly related to fees charged by theaters based on seating capacity.)

Dick Lubic, president of the Cable Television Network, plans to provide 14 hr of programming per week to CATV operators. A feature movie will be provided once a week plus other videotapes made at studios at Palm Springs for CATV use. Tapes of two hours per day will be offered.

International Artists claims

twenty operators have applied for its license; Cable Television Network says over one hundred have signed for its service to begin November 15.

ACTS Acts

The All Channel Television Society officially formed in late May is now undertaking a membership drive to line up all uhf broadcasters.

The trade association will devote itself to the full development of uhf broadcasting, described by Membership Chairman Sterling (Red) Quinlan, WFID-TV, Chicago, as the area of greatest expansion in the television industry. Quinlan sees a potential of 1000 uhf broadcasters split equally between commercial and noncommercial stations. He reports the initial response was gratifying and that seeking associate membership from program and equipment suppliers was the next target.

Under the chairmanship of

William L. Putnam, WWLP-TV, Springfield, Mass., ACTS has seventeen projects underway. Chief among them are the membership drive, regulating CATV, and improvement of rating research.

Petitions have been filed with the FCC calling for the licensing of CATV operators, adoption and enforcement of quality standards of signals carried on CATV and opposition to all proposals permitting CATV stations to extend TV signals beyond their Grade B contours.

The association opposes the FCC proposal presumed to help uhf which would permit CATV operators within the Grade B contours of any TV station of an ARB defined market to carry other stations in that market. ACTS feels that the rationalization back of the rule would be used in the future to extend distant signals of others into the U's market. The group urges the use of translators.

ACTS opposed the diary method of gathering research since this

Covering The News With Remote Pickup TV . . .



Whether it's a world crisis or a golf tournament, TV viewers are becoming more and more accustomed to seeing on-the-spot action on their living room screens. ABC-TV got a bird's eye view of the recent U.S. Open Golf Tournament with the aid of "Columbia"—a Goodyear Tire & Rubber blimp, and a GE PE-250 (a recent Goodyear acquisition) perched in the gondola doorway (photo left).



Back in June, networks and TV stations throughout the country devoted 155 hr to coverage of the Mideast crisis, the war that followed, and the visit of Russian Premier Aleksei Kosygin. Our photo (right) shows a Jefferson Productions Norelco PC-70 hired by ABC for pool coverage at UN headquarters in New York. Jefferson later provided exclusive NBC coverage.

tends to favor high-rated shows. It points out that electronic rating methods used in New York only showed independent stations to be very strong—50 percent of the audience between 5 and 7:30 P.M. and 23 percent in prime time. Diary ratings do not show independents to be so strong.

ACTS is seeking the services of a full-time executive director. Headquarters are located at 485 Madison Ave., New York, N.Y.

Small Market Broadcasters Seek Help

The Secondary Market Television Committee of the NAB has asked the NAB Research Department to find out how audience measurement services can do a better job for smaller stations.

The Committee also voted to continue NAB's efforts to get the FCC to extend its rules against the importation of distant television signals by CATV systems to all television markets. Currently, the rule against distant signal importation applies only to the top 100 markets.

A report on secondary market television station manpower needs and suggestions on recruiting and training will soon be distributed.

Chairman of the committee is Hamilton Shea, Gilmore Broadcasting Group, Harrisonburg, Va.

Instant Color at WNCT

General Manager Hank Tribbley of WNCT, Greenville, N.C., can tell you how you can get on the air in color in four days, and he has the evidence to prove it. He placed an order with Visual Electronics Corp. for two Noreleo PC-70 color cameras on Thursday, June 29, and Chief Engineer Heber Adams sent out his first live program at 6 P.M., Monday, July 3rd.

All Against CATV Ownership Limits

Broadcasters and CATV operators finally agreed on one thing: limitation of ownership of CATV is not needed at this time.

The NAB told the FCC any rules affecting ownership at this time would be premature since CATV has not yet been fully evaluated in terms of national telecommunications objectives.

The NAB cited unsettled issues:

emergence of CATV in large metropolitan markets, the extent of CATV local origination, the disposition of the many applications for interconnected microwave links serving CATV and the entry of common carriers into CATV.

The NCTA stated its membership is not opposed to CATV ownership by broadcasters or newspapers, but felt rules regulating ownership were unnecessary and inappropriate. NCTA reminded the FCC that it lacks the authority to apply rules since it doesn't have licensing authority over CATV operators.

World Trade Center New Antenna Park for NY

FCC hearings on TV interference problems anticipated in the construction of the World Trade Center by the Port Authority in N.Y.C. showed that there would be interference. There were no solutions to overcome the problem short of relying on cable transmission as proposed by Irving Kahn of Tele-Prompter. Local broadcasters have agreed to move their transmitters from the Empire State Building to the WTC after construction is completed sometime in 1971.

The TV Broadcasters All Industry Committee favored the move after conducting their own studies made by Alford Manufacturing and Janskey and Bailey. The construction of the towering World Trade Center would interfere with transmission from the Empire State Building and the Empire State will obstruct signals transmitted from the World Trade Center. Interference was judged by the broadcasters to be less from the WTC. The WTC will reimburse broadcasters for their Empire State rent until leases expire.

Moseley Gets Patent

A U.S. patent covering accurate indications of remote fm transmitter meter readings at the control point has been awarded to John A. Moseley, president of Moseley Associates, Inc., manufacturer of aural STLs and remote control equipment, Santa Barbara, Calif.

BC Engineers Named To Conference Committee

Vincent T. Wasilewski recently announced the members of NAB's 1968 Broadcast Engineering Con-

ference Committee.

Appointed chairman is Albert H. Chismark, director of engineering for the Meredith Broadcasting Co., Syracuse, N.Y.

Other committee members are LeRoy Bellwood, chief engineer, KOGO-TV, San Diego; William S. Duttera, director, allocations engineering, NBC, New York; George Jacobs, engineering director, Corinthian Broadcasting Corp., New York; Leslie S. Learned, vice president for engineering, MBS, New York.

Clure H. Owen, manager of allocations, ABC, New York; James D. Parker, director, transmission engineering, CBS Television Network, New York; Robert J. Sinnett, vice president in charge of engineering, The Hearst Corp., Baltimore; and Benjamin Wolfe, vice president for engineering, Group W, New York.

Free Color Film On Education Now Available

"Ode to Tomorrow"—a color film—now is available to groups interested in education, without charge. The documentary shows why many young adults who are trained to become teachers, enter the profession briefly, then leave it. The motion picture notes that most of those who change professions accept less challenging roles.

Seven months in the making, the 30-min film was produced by the Georgia Department of Education Television Services.

A print may be borrowed upon written request to: Georgia ETN Network, 1733 Clifton Road, N.E., Atlanta, Ga. 30329.

Fm Gains Continue

An April-May ARB survey of 50 markets shows fm listener gains of about 11 percent continuing the trend found in eight markets in January and February. The fm share peaks in prime television hours, William Greene, director, CBS-fm, told the Florida Association of Broadcasters.

Greene also painted a qualitative picture of the fm audience profile. Age group—18 to 49; family unit—large; income and education—above average but listeners are being gained from all educational groups; time devoted to fm listening—1 to 2 hours and four or more; enthusiasm—strong for favorite stations and interested

ARE YOU SURE your stereo signal will meet FCC requirements?

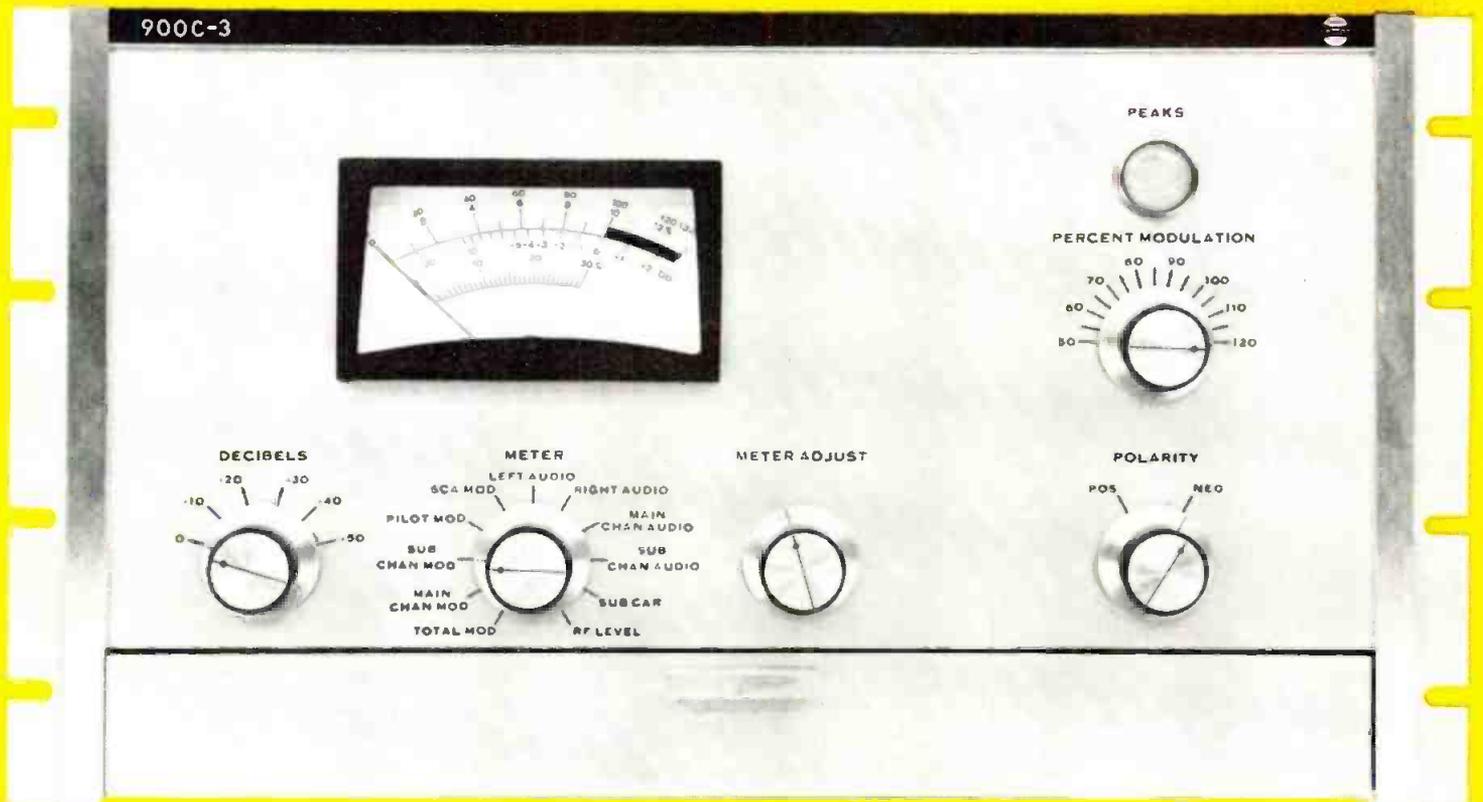
with Collins' 900C-3 Modulation Monitor, there's no question.

Collins' new FCC-Type Approved 900C-3 Modulation Monitor eliminates all uncertainty about your stereo signal. The 900C-3 continuously monitors and measures FM stereo emissions with a precision that leaves no doubt about whether you're meeting FCC requirements.

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For more information about Collins' FCC-Type Approved 900C-3 (FCC Type Approval No. 3-143) contact Broadcast Marketing, Collins Radio Company, Dallas, Texas 75207. Phone: (214) AD 5-9511.



COMMUNICATION/COMPUTATION/CONTROL

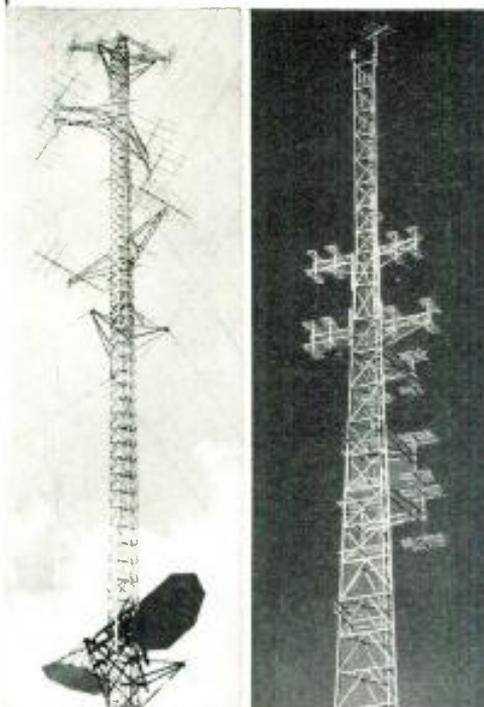


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in fine sound quality.

Greene cited a letter from a college-bound student, who before enrolling, wanted to find out if CBS-fm could be heard at Fairleigh Dickinson University. The speaker summed up the fm listener as young, affluent, responsive and loyal. "Who could ask for anything more?" he asked.

Kaiser Offers Youth Jobs

Six young people have joined Kaiser Broadcasting television and radio station in six different cities in the nation in response to Vice-President Hubert H. Humphrey's Summer Youth Opportunity program. The youths range in age from 17 to 21. Broadcasting is a new business to five of the new hires. One has never held a job before. The jobs were created in production, engineering, film makeup, news, accounting-traffic and general office. Station sought out applicants from local churches, equal employment councils, urban leagues and state employment offices. The Summer Youth Opportunity program is a phase of Kaiser Broadcasting Corp.'s participation in Plans for Progress and Equal Opportunity employment.

AWC Acquires Controlling Interest In A-A

Anaconda Wire and Cable Co. has entered into an agreement to acquire the 51 percent interest of Astrodata, Inc. in the Anaconda Astrodata Co. of Anaheim.

"This move was made," Anaconda said, "to further strengthen its position in the CATV and telephone industries."

Anaconda Astrodata will function as a wholly-owned subsidiary of the Anaconda Wire and Cable Co.

Ex Parte Contacts Proper

The protest by CATV companies, MultiVision Northwest Inc. and GenCoE Inc., to the FCC that the AMST officials meeting with certain FCC Commissioners was improper was denied by the FCC.

The FCC rejected the notion that no person associated with the industry, regardless of interest, could discuss any matter of policy if that policy is being applied in a particular case.

TeleVue System's request that the views of AMST official, who protested TeleVue System's waiv-

ers be dismissed was called unwarranted by the commission, but it granted the company redress. Fifteen days were granted in which to respond to arguments AMST had presented.

NAB President Favors Uniform Poll Closing

Vincent T. Wasilewski said recently that a uniform closing of the polls would be preferable to any attempt to delay radio and television broadcasts of election returns.

He also said there should be no restriction on the projection of possible winners on the basis of early returns.

Mr. Wasilewski said suspension of the section during the 1960 presidential campaign made it possible for the networks to donate 43 hours of radio time and 39 hours of TV time to the Kennedy-Nixon debates.

WCCN Goes W(CHEZ)

The Wisconsin pavilion of the New York Worlds' Fair is now the home of Central Wisconsin Broadcasting, Inc., Neillsville, Wis. The main floor of the three-floor building houses the broadcast studios for WCCN-AM-FM, a news machine receptionist, information desk and 89 varieties of cheese, all offered for sale. The cheese label? You guessed it, "The World's Fairest Cheese."



• WISCONSIN PAVILION OF NEW YORK WORLDS' FAIR
• NEW HOME OF WCCN & WORLD'S FAIREST CHEESE

A mezzanine above the broadcast studios houses three administrative offices. Visitors are encouraged to go up on the balcony above the pavillion floor for a panoramic view of the main floor and outside rock gardens. Howie Sturtz, II, president, says the transmitter building is limed oak. For aging the cheese, we presume.

Visual Electronics first quarter report. Visual Electronics Corp., in a report for the first quarter ended June 30, 1967, showed net sales of \$5,766,095, compared with \$3,-215,463 in the like 1966 period,

Circle 7 on Reader Service Card →

James B. Tarpe, president, announced recently.

Net income for the quarter amounted to \$306,176, compared with \$204,603 for the same period in the prior year. Earnings per common share after preferred dividends amounted to 30 cents on 1,030,400 shares outstanding, against 24 cents per common share on 850,000 shares outstanding in the like 1966 period.

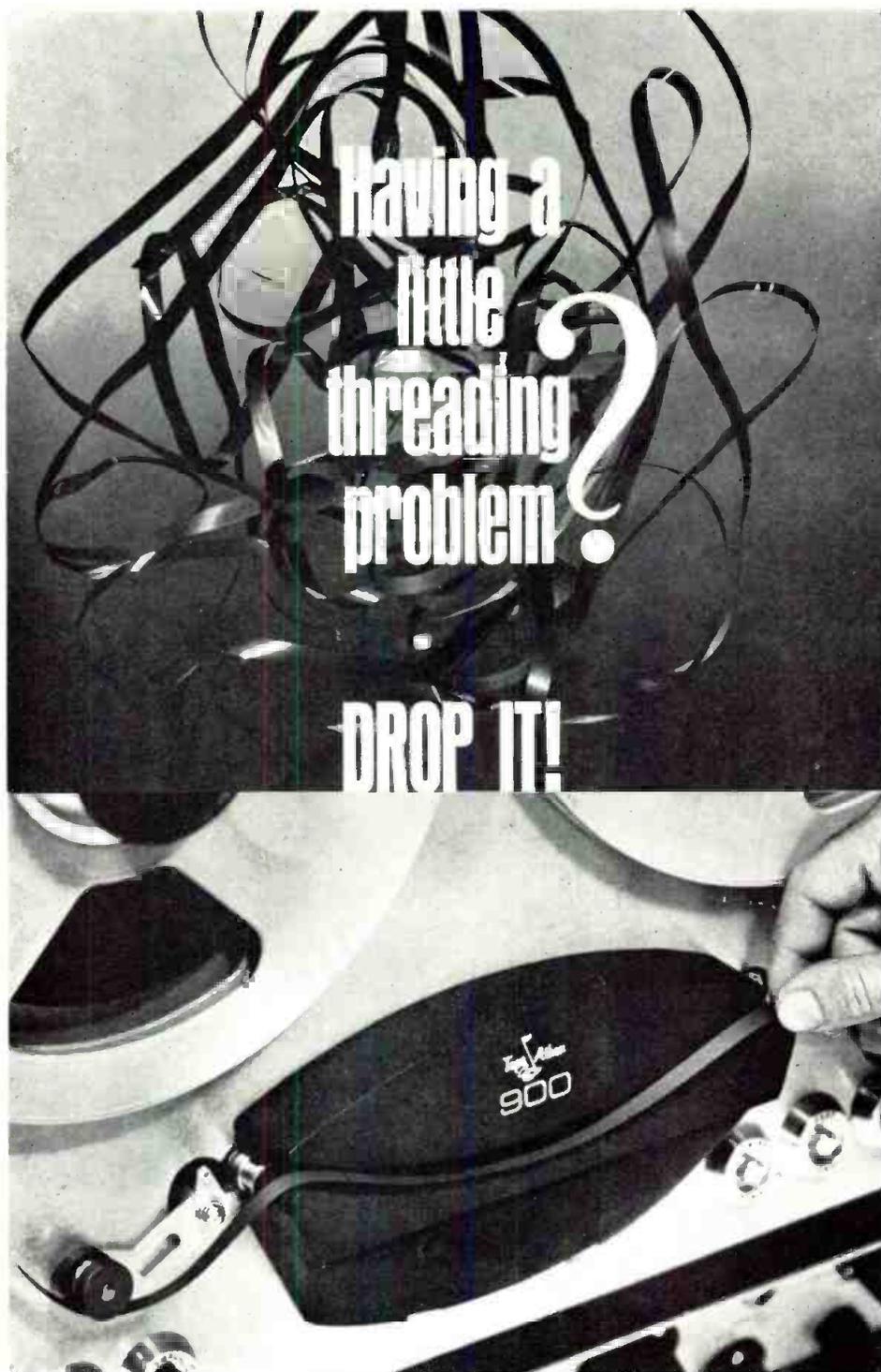
Greece and Thailand order TV cameras and transmitters. An order placed recently with PYE TVT Ltd. for 4½-in. I.O. cameras will be the first professional television equipment to be imported by the Hellenic National Broadcasting Institute for use in their TV station in Athens.

In the case of Thailand, a recent order for transmitters represents a further phase in the development of its TV network and follows the recent installation for the Public Relations Department of a complete television station at Haadyai in the southern part of the country.

ColorTran gets Hong Kong contract. Mr. Milton Forman, president of ColorTran Industries, Inc., has announced that his firm has been selected as principal contractor in the outfitting of three large new television stages, as well as a film production unit, belonging to Television Broadcast Ltd., Hong Kong.

Webster Engineering completes move. Webster Engineering Co.—factory representatives for Bauer Electronic Corp.; Moseley Associates, Inc.; Sparta Electronic Corp.; Standard Electronics Corp.; Riker Industries, Inc.; Kahn Research Labs.; Chrono-Log Corp.; and Sony Corp.—has completed the move of their main offices to new and larger facilities at 1136 Gail Lane, Sleepy Hollow, Dundee, Ill. 60118. The firm believes that partial stocking of some of the most popular broadcast equipment lines will make faster deliveries possible in cases of emergency.

Fischbach and Moore Div. to develop uhf TV facility. The F&M Systems Co., a division of Fischbach and Moore, Inc., has been awarded a contract to design and install a complete uhf TV studio equipment system in Dallas for Doubleday Broadcasting Co., Inc., a subsidiary of Doubleday and Co., Inc., of New York.



Tape threading on a Tape-Athon 900 Recorder/Reproducer has been reduced to a split second job. You just drop the tape—and there it is—right in position beneath the heads.

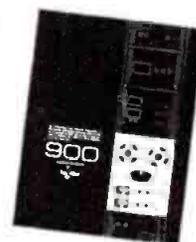
Now, no one buys a professional recorder because it's easy to thread—but that's a start. Look at the other advanced engineering features that Tape-Athon has incorporated into the 900. Like DUAL CAPSTANS for instant starting and stopping; all SOLID STATE electronics for maximum service and low heat generation; VERSATILITY unlimited with variable reel size, variable speed control, and optional editing mode.

Details in the 900 Catalog; or see it at your local Tape-Athon distributor.

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8673	electronic conducting glass	RCA Bi-Alkali	Close-spaced target-mesh, long-life tube for studio use
8673/S	electronic conducting glass	RCA Bi-Alkali	Same as 8673, except 8673/S designates one of a matched trio of tubes for use in color cameras
8674	electronic conducting glass	RCA Bi-Alkali	Wide-spaced target-mesh, long-life tube for remote service
8674/S	electronic conducting glass	RCA Bi-Alkali	Same as 8674, except 8674/S designates one of a matched trio of tubes for use in color cameras



4492	glass	S-10	Wide-spaced target-mesh for use in RCA TK-42 and TK-43 cameras at a target potential of 2.3 volts above cut-off
4536	electronic conducting glass	S-10	Close-spaced target-mesh for use in RCA TK-42 and TK-43 cameras at a target potential of 3 volts above cut-off
7389C	electronic conducting glass	S-10	Close-spaced target-mesh, for monochrome cameras
8748	electronic conducting glass	RCA Bi-Alkali	Close-spaced target-mesh, for long life in monochrome cameras
8749	electronic conducting glass	RCA Bi-Alkali	Wide-spaced target-mesh, for long life and high sensitivity in monochrome cameras

For TK-42 and TK-43 cameras

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Touring Exhibits at 16th NCTA Convention

A few still shots don't properly convey the action that took place in the exhibit halls of the 16th NCTA Annual Convention. In terms of sheer size, Jerrold, followed by Vikoa, dominated the area but other systems producers including Anaconda Astrodata Co., Ameco, Entron and Kaiser had elaborate multi-booth displays. Theta Communications took the entire end of the smaller Red Lacquer room to show its all-channel short-haul microwave system concept ideal for metropolitan signal distribution.

In terms of equipment-per-floor space, Telemation's booth was the busiest as it showed a new video control center, automated news channel system, switches and other production equipment.

Cameras and tape recorders for live origination were in ample evidence as Sylvania, Packard Bell, Shibaden, Sony and distributors such

- 1—Jerrold's twenty-channel capability set tone.
- 2—Head-end gear by International Telemeter set for 25 channels.
- 3—Winsome Miss captured lens causing near miss of Raytheon's microwave equipment.
- 4—With no girl distractions, BM/E focused with no trouble Lenkurt microwave.
- 5—Placard says Tape-Athon equipment dropped by shipper but still works.
- 6—Entron's new suitcase-packaged amplifier.
- 7—H-P test equipment to check gear bought elsewhere.
- 8—Anaconda cable is best.
- 9—Sex and equipment at Vikoa.
- 10—SKL boasted about its color-burst line.
- 11—ITT cable is best.



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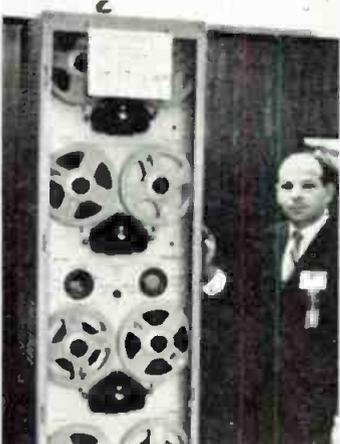
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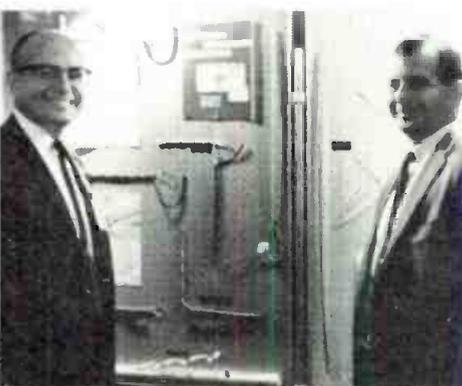
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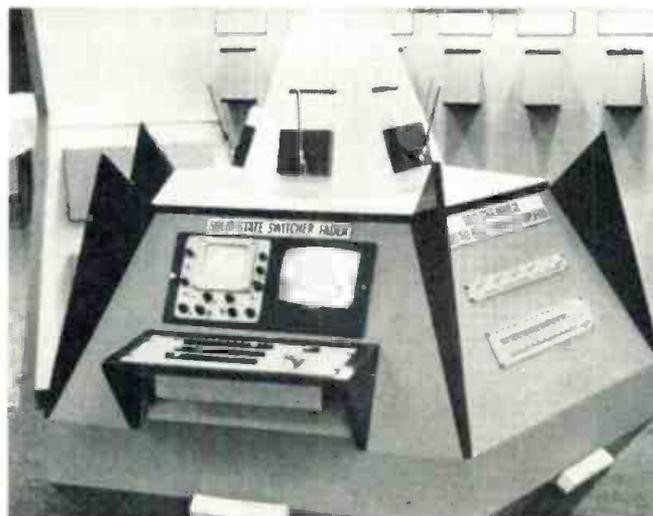


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as Telemation, Television Utilities Corp. and Transitube, Inc. showed cameras, monitors, switches and other cablecasting accessories. Dynair showed studio control equipment as well as solid-state head-end equipment.

Much new solid-state head-end equipment was also on display at other booths including Ameco, Benco, CAS, Entron, International Telemeter and Jerrold. Entron featured a low-noise, tower-mounted unit.

The cable manufacturers, tower construction people, and microwave relay suppliers were out in force. New test equipment was evidence at booths of Anaconda Astrodata, Blonder-Tongue, Dynair, H-P, Jerrold and Vikoa.

AEL gained distinction by showing hybrid microcircuits in a new bridging amplifier.

12—Cameras and viewfinder for local origination (TUC).

13—Emergency alert systems at Asteroid booth.

14—Transitube Inc has a camera for sale behind blonde.

15—Shibaden people promoting local origination equipment.

16—C-Cor amplifier ready to go.

17—Blonder-Tongue forces and guest pose.

18—Practical Pruzan tools.

19—Polarizer on lens of Sylvania camera add motion to weather map.

20—Solid-state switches and other local origination equipment at Dynair booth.

21—R. H. Tyler's weather scan camera.

22—Stock prices at Trans Lux booth.

23—Telesis points out ease of programming nonduplication switcher.

24—All transistorized equipment at CAS.

25—Times Wire and Cable is best.

26—Kaiser CATV amplifier lineup.

27—Sony videotape recorder for local origination.

28—Collins microwave equipment.

29—Theme is ColorVue at AEL.

30—Superior cable is best.

31—Packard Bell camera for local origination.

32—Ampex says why not local color origination.

33—Phelps Dodge cable is best.

34—AMP connectors for that cable.

35—Ameco shows solid-state head ends.



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INTERPRETING THE FCC RULES & REGULATIONS

Section 315 (Political Broadcast) Revisited

SECTION 315 of the Communications Act, as amended, and the pertinent Commission Rules [Section 3.119 and 3.120 (a-m), 3.289 and 3.290 (fm), and 3.654 and 3.657 (TV), which are, with negligible variances, identical] have stimulated as much controversy and confusion as any matter in the broad field of communications law. To attempt an exhaustive treatment of this subject matter in the space limitations of this article would be impossible. Therefore, this article is designed to refresh your recollection as to the fundamental obligations of the broadcaster under Section 315 and discuss major changes in case precedent and FCC policy during recent years.

In brief, Section 315 provides that any broadcaster who allows the "use" of his facilities by any legally qualified candidate must provide "equal opportunities," without censorship, to all other such candidates with comparable times, rates, and treatment. The problem, as usual, is one of semantics. To understand the Act and the rules, the broadcaster must be able to define the pertinent terms. The following definitions emanate from FCC memos, letters, public notices, numerous cases, and comments by the Commission's staff.

(1) A *legally qualified candidate* is one for whom the electorate can vote. See *Socialist Labor Party of America*, FCC Report No. 1934. This may or may not include those unlisted on the ballot. If under your state or local law "write-ins" are permissible, then any *bona fide* candidate may qualify. "*Bona fide* candidate," a term often bandied about by the Commission although never really defined thereby, refers to one who has made, or is making, a conscientious effort to obtain election; this may be evidenced by his promotional material, speaking engagements, and other proof or effort. (Naturally, any party nominee is a qualified candidate.) In the last analysis, the definition of a "legally qualified" or "bona fide" candidate is *determined by State law*. [See Section 3.120(f), 3.290(f), and 3.657(f) of the Rules.] However, the FCC may interpret State law.

(2) "*Any public office*" would include federal, state, municipal, and other elections in which the local citizenry may vote.

(3) "*Use*" of the broadcasters' facilities by a candidate has been broadly defined as *any and all appearances by a candidate* other than for a bona fide newscast, news interview, news documentary, or on-the-spot coverage of a news event. [See *WMCA, Inc.*, 7 RR 1132 (1952); *KNGS*, 7 RR 1130 (1952); and *Use of Broadcast Facilities by Candidates for Public Office*, FCC 62-1019, 31 Fed. Reg. 6660 (1966).]

(4) "*Equal Opportunities*" means *comparable time, rates, and treatment*. Comparable *time* does not necessarily mean the exact day, hour, and show, but rather approximately the same amount of time in a time segment of equal commercial value. Comparable *rates* would indicate that any rate discounts given one candidate must be afforded to all. (Of course, no candidate may be charged more than the rate charged regular commercial advertisers.) Comparable *treatment* implies that the broadcaster will not discriminate against any candidate in its practices, regulations, facilities, or services rendered. (See FCC 62-1019 as cited above.)

(5) The provision that the broadcaster shall have "*no power of censorship*" has been repeatedly held to *preclude all censorship* except as to deletion of obscene language or materials concerning lotteries. In the absence of a state law that exempts broadcasters from liability for libel by a political candidate using its facilities, the only sure protection rests in libel and slander insurance. [The Commission has vehemently asserted that broadcasters are protected from libel suits in such cases. See *Port Huron Broadcasting Company (WHLS)*, 4 RR 1 (1948), and *WDSU Broadcasting Company*, 7 RR 769 (1951).] However, several state courts have disagreed, and prior to 1959 the United States Supreme Court had not ruled on point. See *Daniell v. Radio Voice of New Hampshire, Inc.*, 10 RR 2045 (1954). The controversy of a broadcaster's libel liability has been resolved, at least temporarily by the Supreme Court's decision in *Farmer's Educational and Cooperative Union of America v. WDAY, Inc.*, 360 U.S. 252 (1959). That case follows the earlier FCC rulings that Congress could not have intended to compel sta-

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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tions and/or broadcast stations to carry political speeches without censorship and, at the same time, subject the broadcaster to the risk of a libel suit. See Branscomb's "Should Political Broadcasting Be Fair or Equal? A Reappraisal of Section 315," 30 Geo. Wash. L. Rev., 63, 65 (1961).

Observations Concerning Section 315

With the above definitions in mind, the simple statements in Section 315 and the pertinent Commission rules should be more meaningful. Perhaps the most important thing to remember is that *a station need not carry any political broadcast*, but if it permits the use of its facilities by one candidate, it must afford equal opportunities to all candidates for *that office during that campaign*.

While the broadcaster cannot censor candidates, he can and should censor noncandidates. See *Felix v. Westinghouse Radio Corporation*, 6 RR 2086 (1950). It is vitally important that licensees understand that the Section 315 prohibition of censorship applies *only* to candidates. In all other instances, the licensee has complete authority over and responsibility for the content of its programs.

In accordance with the Commission's rules, *the licensee must maintain and permit public inspection of a complete record of all requests for broadcast time made by or on behalf of candidates for public office and information concerning the licensee's disposition of such requests for at least two years*.

Section 3.120(e) of the Rules provides that "A request for equal opportunities must be submitted to the licensee within one week of the day on which the prior use occurred." On April 23, 1964, the Commission addressed a letter to Senator Yarborough, concerning the alleged failure of various stations owned by one licensee to honor Yarborough's *untimely* request for "equal time at no charge," which broadened "the seven-day rule." The owner-licensee of the various stations, also a candidate for the democratic nomination for U.S. Senator, utilized time on his stations without charge. By letter, the owner-licensee offered Senator Yarborough comparable time without charge, and the latter replied that he would utilize this opportunity but failed to state precisely when. Subsequently, when the latter requested specific time periods, the owner-licensee refused and advanced the so-called "seven-day rule" in defense. The Commission held that ". . . where the licensee, or a principal of the licensee, is also the candidate, there is a special obligation upon the licensee to insure fair dealing in such circumstances. The licensee is therefore estopped from relying upon the seven-day rule . . ." (Emphasis supplied.)

Fairness Doctrine and Section 315 Compared

There is an unavoidable overlap of the "Fairness Doctrine" and Section 315 of the Act. Previously distinguished, the latter pertains *only* to political candidates while the former concerns broadcast licensees' broad obligation to afford reasonable opportunity for the discussion of conflicting views on matters of public importance. Obviously, any hotly contested campaign for public office might well constitute a "matter of public importance" and thus appear to fall within the domain of the "Fairness Doctrine" and obligate a "fair" coverage of all sides of the controversial matter. Conversely,

cannot the "equal opportunities" provision of Section 315 be attached to matters of public importance? Exactly where is the line to be drawn?

Section 315 is readily distinguishable from the Fairness Doctrine in that it applies *only* to political candidates, and, therefore, no provision of Section 315 is applicable to the broader issues, controversies, and matters encompassed by the Fairness Doctrine. While Section 315 does not encroach upon the Fairness concept, the basic element of fairness would seem to include Section 315. A simple formula, to aid the broadcaster in making the distinction, follows: "*Political candidates require application of Section 315 of the Act; and political issues and broad matters of public interest and importance require application of the Fairness Doctrine.*"

Unhappily, while the above may serve as some small assistance, the question arises. "In view of the fact that the Commission has repeatedly asserted that *noncandidates* are not subject to the provision of Section 315, are their utterances not then subject to the Fairness dicta?" Or, "Are station editorials attacking a particular candidate subject to the Fairness Doctrine?"

The prevalent attitude seems to be that where noncandidates (including spokesmen, station announcers, and program participants) comment upon candidates for public office, the Fairness Doctrine applied. Therefore, if the licensee should editorialize on behalf of a political candidate, it should furnish the opposing candidate with a copy of the editorial and permit a *spokesman* for the other candidate, *but not the candidate himself*, to answer the editorial in a comparable time period. Similarly, if one of the station's staff members, or a participant on a show, should support or attack any candidate, the licensee should offer a *spokesman* of the agreed candidate approximately the same quality and quantity of broadcast time. If you allow a candidate, rather than his spokesman to reply to the comments of a noncandidate, Section 315 will apply immediately. A chain reaction of "equal opportunities" requirements might result and throw your program schedule into a "cocked hat." (Next month's article, analyzing the Fairness Doctrine, will delve more thoroughly into the problems inherent in personal attacks and political editorializing.)

Remember, *the requirements of the Fairness Doctrine are greater as to political candidates* than they are as to controversial issues. On the plus side is the fact that while the broadcaster may not censor candidates under Section 315, *he may censor noncandidates* under the Fairness Doctrine. In short, the licensee may require the noncandidate to confine his remarks to the subject matter which gave rise to his appearance. The licensee should endeavor to maintain tapes of programs dealing with, or touching upon, political elections. Thus, in the event a brief comment is made by a noncandidate over the licensee's station, the station's obligation under the Fairness Doctrine would be negligible. However, if the station had no record of the nature and length and comments made, a dispute might arise concerning the amount of "free" time required and result in complaints to the Commission. If the station's policy to give away as little time as possible, the licensee must be able to *prove* that controversial matters aired have been provided approximately equal coverage.

continued on page 22

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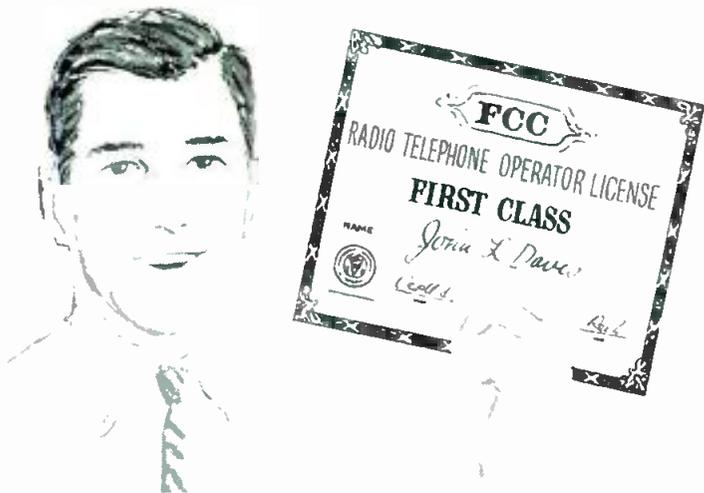
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Summary

In light of the above, the broadcast licensee's obligation under Section 315 of the Communications Act, as amended, might be summarized as follows:

(1) A station need not carry any political broadcast, but if it permits the "use" of its facilities by one "legally qualified candidate" it must afford "equal opportunity" to all candidates for that office during that campaign. (Of course, licensees are expected to devote some time to broadcasting matters of a political and controversial nature and thus do their part to keep the public informed.)

(2) *Section 315* of the Act applies *only* to political candidates and its provisions should be reviewed whenever dealing with the candidates themselves.

(3) The requirements of Section 315 apply, *regardless of the nature of the broadcast*, whenever a legally qualified candidate is permitted to "use" the facilities.

(4) *The Fairness Doctrine applies to noncandidates*, this includes all spokesmen for candidates, comments made by all noncandidates participating in the licensee's programs, and broadcast editorials. The overlap of Fairness and Section 315 is evidenced by the fact that the requirements of the Fairness Doctrine are greater as to political candidates than they are as to controversial issues. (The Fairness Doctrine now appears in Section 315(a) (4) of the Act.)

(5) Each contest for each office is separate, and a primary campaign is distinct from a general election campaign. The licensee may choose only one, or none, of the several campaigns for "use" by candidates.

(6) The "equal opportunities" requirement of Section 315 applies as soon as a station permits the "use" of its facilities by a "legally qualified candidate," even though such use be only as a guest on another program. There is no "use" when the station allows a candidate to participate in a *bona fide* news event, news documentary, news interview, or "on-the-spot" news coverage broadcast.

(7) The "equal opportunities" requirement necessitates an offer of comparable time, rates, and treatment.

(8) Equal opportunities need be afforded only to candidates themselves, and not to supporters of candidates or to political parties.

(9) Section 315 precludes censorship of candidates' slanderous comments and all other matters, except for permissible deletion of obscene language or matter pertaining to lotteries. The Supreme Court decision in *Farmer's Educational, supra*, notwithstanding, slander and libel insurance is advisable. Section 315 does *not* preclude full censorship and direction of all matter aired by *non*-candidates. The licensee can and should censor and direct comments by *non*candidates.

(10) Exactly the same *rates* must be charged and discounts allowed candidates as are charged and allowed commercial advertisers. Rate discounts and policies made available to one candidate must be made available to all others. (This does not preclude the station from offering candidate A a lower rate, per spot, for package buying, than it offers candidate B for the purchase of less spots. It does, however, require that the station offer the "package plan" to all candidates.)

(11) The licensee should not permit a candi-



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date to reply to a comment made by a noncandidate or a noncandidate to reply to a candidate. If this is done, both Section 315 and the Fairness Doctrine will apply, thus compounding the licensee's responsibilities.

(12) The licensee can *require* all candidates to submit advance scripts of their talks, *provided* that the licensee requires this of all candidates and makes no attempt to censor the material. The licensee may and should impose the same requirement upon noncandidates.

In summary, the licensee is urged to require appropriate members of its staff to review Section 315 of the Act, and Sections 3.119, 3.120, 3.289, 3.290, 3.654, and 3.657 of the Commission's Rules and Regulations. The latter two rules pertain to a-m, but identical rules apply to fm and TV. A thorough knowledge and familiarity with the pertinent rules and Section 315, coupled with the distinctions and overlap illustrated above, should enable the broadcaster successfully to comprehend his responsibilities as to "fairness" and the "equal opportunities" requirement of Section 315. Since the licensee's responsibilities under each are different, it is essential that the broadcaster know which set of standards applies to a given situation.

Of course, this article (and next month's article on Fairness), cannot possibly constitute complete coverage of these broad and complex subjects. However, when read *together*, they should enable you to reduce the problems to an acceptable size.

Recommendations

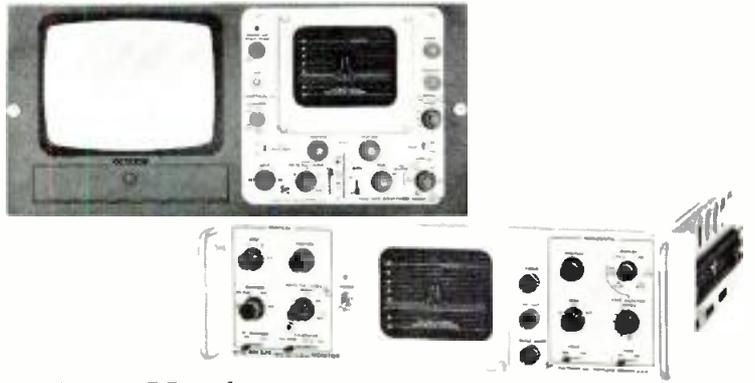
It is most desirable that those responsible for policy decisions adopt, well in advance of each election, a comprehensive policy for use of the stations for political broadcasts, including spot announcements.

The policy should spell out precisely what campaigns will be covered and in what manner. For example: (1) Candidates for the Presidency, United States Senate, and United States House of Representatives, and their authorized spokesmen, will be required to purchase time and spots; (2) candidates for all State offices, and their spokesmen, will be required to purchase time and spots; (3) each candidate for a major city office, but not his spokesman, will be given two five-minute periods in evening hours in the two weeks before the election, and will be required to purchase any additional time and spots; (4) candidates for minor offices, such as dog catcher, garbage collector, etc., will not be afforded the opportunity to use the station. The policy should be fair, taking into consideration anticipated network orders, and the design should avoid the possibility that the station will be unable to carry out its statutory responsibilities by heavy purchases of time and spots on the last two or three days before the elections. The policies should also include the manner of handling programs and spots concerning bond issues, referendums, and the other local and state issues on the ballot.

By virtue of establishing clearly defined policies, in advance of the campaigns, the licensee will be able to anticipate responsibilities under Section 315 and the Fairness Doctrine and facilitate the appropriate adjustments in programming.

In any event, the licensee should continue to make conservative decisions, proceed with caution and vigilance, and consult with communications attorneys whenever any questions arise.

measuring picture quality in terms of K-factor



... with a Tektronix Type 529 or RM529 Waveform Monitor

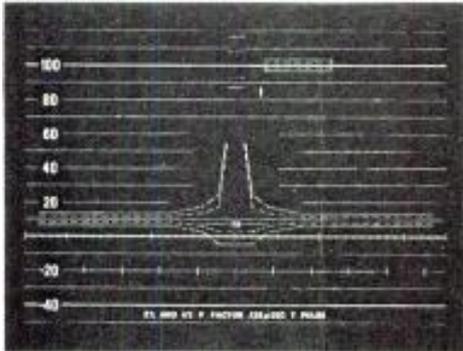


Fig. 1. The Tektronix sine² K-factor graticule. Two sweep speeds are provided on these waveform monitors so that this graticule can be used for 0.125 μ s T-pulse testing on such applications as studio and network transmission lines, and for 0.250 μ s 2T-pulse testing on such applications as video tape recorders and transmitters.

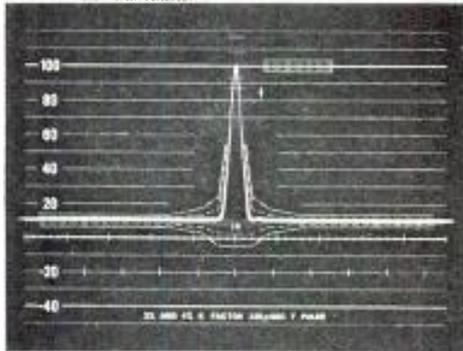


Fig. 3. Display of an undistorted 0.125 μ s sine² pulse at 0.125 H/cm magnified 25X. A T-pulse with its base on the -10 IEEE unit line will reach the +100 IEEE unit line if the video system has 6.7 MHz equivalent bandwidth. At 4 MHz, pulse height will be reduced by 18%.

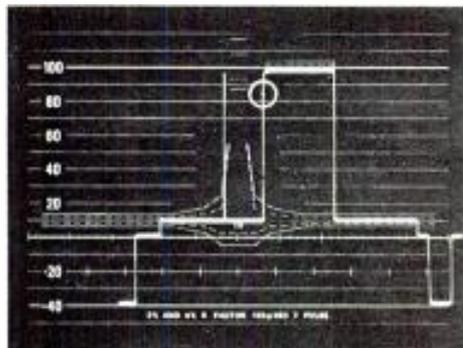


Fig. 5. Display of a bar signal at 0.125 H/cm with the base on the -10 IEEE unit line and the rising edge aligned with the arrow (circled). The top of the bar signal should be at the +100 IEEE unit line. The inner and outer lines of the box at this point show the 2% and 4% K-factor limits.

Measurements of TV picture quality in terms of K-factor can be made simply and precisely using the sine² graticule of a Tektronix Waveform Monitor. These measurements can be made when a sine² pulse and bar is transmitted during the vertical blanking interval of normal broadcast operation.

Figure 1 shows the sine² graticule — marked in percent of K-factor for signal-distortion measurements when using a sine² pulse and bar and also marked in standard IEEE units for normal signal-level measurements. Figure 2 shows an undistorted sine² pulse and bar.

T-pulse measurements. The phase response of a video system can be determined by observing the leading and trailing edges of the sine² pulse. Figure 3 shows an undistorted pulse. Phase distortion causes asymmetrical aberrations, such as shown in Figure 4. Any display of symmetrical ringing on both the leading and trailing edges of the pulse indicates bandpass degradation without phase distortion.

Bar Measurements. The critical mid-band frequency and phase response of a video system can be determined by observing the amount of tilt in the flat-topped portion of the bar. If the video system has ideal response, the bar will be transmitted as shown in Figure 5. Impaired response in the system will cause tilt or sag, such as that shown in Figure 6, with streaking or smear in the picture.

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 (8 1/4" high, 8 1/2" wide, 19" deep, weighs 24 lb.)
 Rack Mount Type RM529 \$1135
 (5 1/4" high, 19" wide, 20" deep, weighs 27 lb.)
 Power consumption of each model is ~ 80 watts — no fan used.

Let's Call It Bob Hewerton, Director

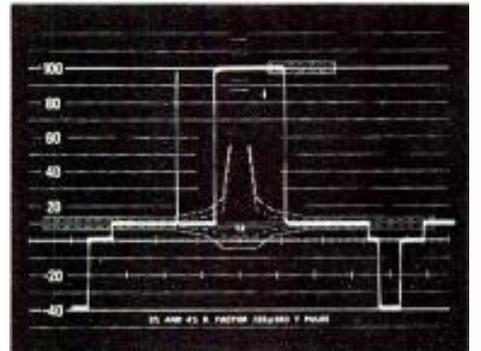


Fig. 2. Display of a sine² T-pulse and bar. Waveform shows the following: the horizontal sync pulse on the -40 IEEE unit line, the backporch on the 0-level line, the 10% offset or base for the pulse and bar, and the sine² or T-pulse on the -10 IEEE unit line, and the bar on the +100 IEEE unit line.

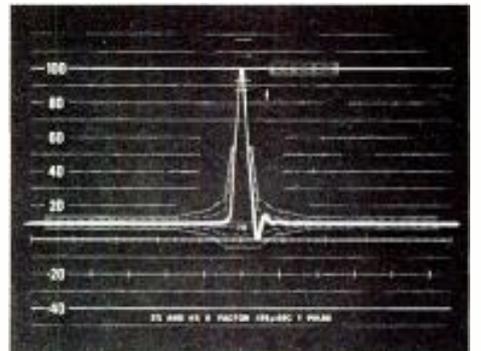


Fig. 4. Display of a sine² T-pulse showing some phase distortion. Phase distortion will appear as aberrations on the leading or trailing edges of the T or 2T-pulse. The K-factor system relates the amplitude of ringing vs the displacement of the ring from the transient in terms of picture degradation.

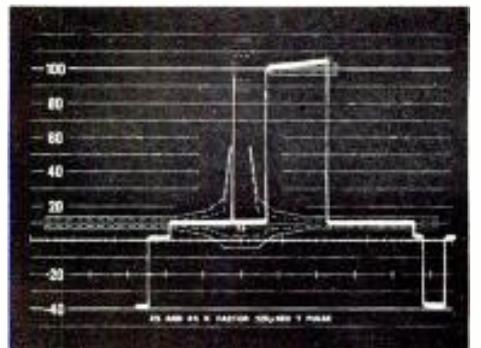


Fig. 6. Display of a bar signal at 0.125 H/cm, showing tilt which exceeds the 2% to 4% K-factor tilt limits.

For a demonstration, contact your nearby Tektronix field engineer or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.



Exacting standards of component manufacture



... part of the Tektronix commitment to technical excellence

Circle 14 on Reader Service Card

The city
with the
tallest
antenna
in the
world
still
needs
CATV

Both systems under construction use Alumifoam[®]

You'd think New York could get ample TV signal coverage from the top of the Empire State building—or the new and higher Trade Tower coming up. But a lot of apartment dwellers lodged in canyons between steel and aluminum skyscrapers wouldn't agree.

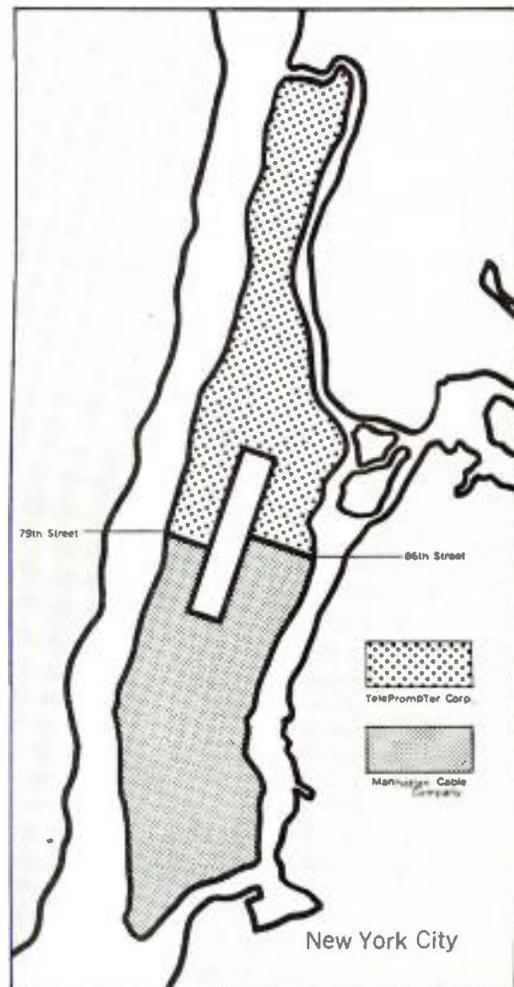
That's why TelePrompTer and Manhattan Cable TV are tunneling their cable under city streets and avenues, installing the CATV systems that will bring ghost-free, non-fading, clear-channel color and black and white reception to families that want it.

We'd like to point out that both of these franchise owners are using Alumifoam[®] Cable—the trade name for our seamless aluminum tube sheathed coaxial cable. And they give us potent reasons for their choice. The performance of Alumifoam is unsurpassed. A consistent 30db return loss is guaranteed, and it averages better than that. The aluminum sheath eliminates outside interference. Long life is assured because of seamless tube construction. There is no internal ridge to create a path for the longitudinal transmission of water or water vapor. Color signals are carried without degradation. Manhattan Cable has attested to the quality of the cable, based on shipments to them of up to 60,000 feet per week.

Another thing, as TelePrompTer points out—the cable is not limited in its usage to merely 12 channels, but is capable of many additional channels that they plan eventually to carry.

It's this kind of performance that's convincing more and more CATV companies to maintain the quality of their signal from reception to home set—with Times Alumifoam CATV cable.

Even in New York.




**TIMES
WIRE & CABLE**
DIVISION OF THE INTERNATIONAL SILVER CO.
Wallingford, Connecticut

Circle 15 on Reader Service Card



ALUMIFOAM[®]—New low loss trunkline

Focus on Automation

THE HUMAN use of human beings calls for more broadcast automation. Although people have learned to spin a platter well, to coordinate a video switch sequence precisely, to read a meter accurately and to type logs and invoices without mistakes, there is no need for people to do these tasks. Machines can do them as well or better. People should do the nonroutine, the creative, and let the rest to the machine.

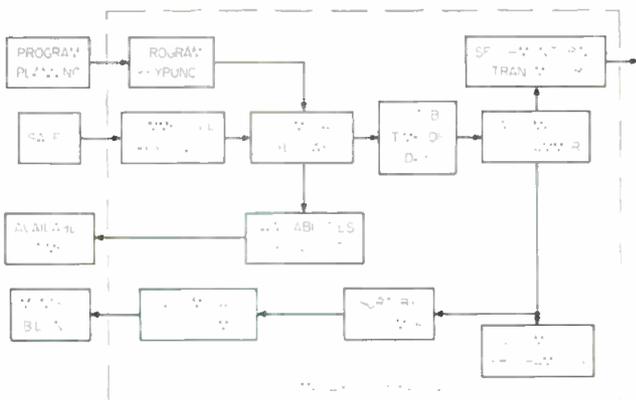
Machines can't talk (except to other machines in machine language). Broadcast people can not only talk, they can relate—so they should spend their time selling, promoting and producing — not standing by to push or turn a switch. In this report on automation in 1967, we will explore exactly what machines can do and how they are being used by broadcasters.

Automation is being used in three separate phases of broadcasting: programming, technical operations and business operations. See diagram. We shall look at these three phases. Details will cover:

- Automated radio programming (equipment and programs)
- Automated video switching
- Preprogramming remotely controlled cameras
- Automated transmitter control and logging
- Automated daily scheduling, program logging, general accounting and research
- Automatic nonduplication switching for CATV

Many of these topics have been covered previously in *BM/E* and particularly in our Focus on Automation issues of September 1965 and 1966. In this third annual look at automation, we examine, again, broadcasters' experiences with radio programming, transmitter control and CATV nonduplication switching. Covered extensively for the first time are *automated video switching* (at commercial and ETV stations) and *data processing* in broadcast work.

Although automation has created more problems than solutions for some stations, more and more automation is the trend. We asked several experts to predict the future in radio programming, video switching and one area that needs automation — automatic camera check out. So clear the cobwebs and stereotyped thinking and read what these trend makers think.



WHAT THE EXPERTS PREDICT

Unite Man and Machine

The greatest advancements in American industry have been accomplished only after a union of man and machine has directed its combined characteristics to the task at hand.

The capability for automation in the broadcast industry now exists to a degree far in excess of its present use. It is only necessary to put to work the capabilities we now have . . . Broadcast automation is not a utopia which relieves all the burden from the broadcaster. We can not expect to get something for nothing, but we can expect that broadcast automation will help us to do a better job with equal or less effort.

J. L. Smith, manager
Broadcast Systems Engineering
Collins Radio Company

Radio programming: on-line with a computer

As new generations of systems have been developed, they invariably are more sophisticated and at the same time simpler. I think we will always use switches as memories for many systems but our latest generation this year introduces systems which will operate in conjunction with punch card, punch tape, and magnetic memory. Indeed some systems will be able to communicate directly with on-line computers. General computer technology is making and will continue to make great strides, and the shape of business itself will change much in the next ten years. In ten years I would predict that most stations will wind up on line with a computer.

The operation of a broadcast station will change much in the next ten years. The FCC rules will change to allow the operation of automatic transmitters and for the first time radio stations will be able to operate as a business. Men will not be hired merely to "watch" a transmitter operate, but engineering as well as production talent will be used in a much more efficient manner. The production department will create material to go into the system. The program format will be controlled at management level, and the scheduling of commercials will be a simple traffic function.

A computer type system will allow individual input information to come from several sources, yet there will be no sacrifice of complete flexibility. At least 80 percent of the radio stations will be totally automatic and many of them completely unattended for at least a part of the broadcast day. Radio will sound much better than it does today and will be much bigger business, both in annual gross and more important in net profits. When I speak of radio, I speak of a-m and fm, although within ten years fm will be the predominant media. I suspect many of us will be alive to see the day when there will be no a-m radio in the United States.

Paul Schafer
President
Schafer Electronics

TV programming: on-line with a computer

If I can be bold enough to look into the future, it is probable that the trend in technological development that I have just outlined will progress in much the same fashion as has the automation of other industries. [Carey's system displays 20 events of memory on a CRT, automatically entering new data from punched cards as memory locations become available. Errors are corrected by moving an elec-

tronic cursor to appropriate characters and making change on a keyboard.] Thus the latest system which I have described presents a fully programmable on-line control system enabling the process to be controlled for most of the time without operator participation.

It appears to be uneconomic to expect development to advance to the point of eliminating the operator altogether. It is reasonable to expect that on-line systems will gain more and more acceptance in the industry as operators overcome their initial fears and as management and employees accept the fact that the automation is beneficial to both.

This will inevitably lead to off-line utilization of the equipment to perform other tasks in the station. Notably this could include the computation required for the program planning operation. This would yield a more expedient response to the commercial presentation. In addition, the machine could be extended to perform certain accounting routines, particularly in the billing operation. Thus the cards that were used to load the control data into the memory could also contain the necessary accounting information and, as each event is transmitted, the appropriate data can be added to the cards for the preparation of invoices.

Peter M. Carey, p. eng.
director of corporate planning
Central Dynamics Ltd.

Cameras: automatic check-out

The color explosion of 1966-67 posed a host of problems both technical and financial to the broadcaster. One problem which involves both categories is the amount of maintenance technician time necessary to completely set up and align color cameras.

While modern circuitry is stable, permitting turn-out procedures to be completed in less than five min., it is necessary to check out the complete system periodically to ensure consistent optimum performance over the life of the equipment.

This complete system check is considerably more complex for color than for monochrome cameras. Not only must the equivalent of three or four monochrome cameras be aligned, but each channel must be precisely aligned with all others to maintain the tracking alignment of controls operated under changing scenic conditions—especially the constantly varying light levels and zooming operations. The time consumed for this operation can range from thirty min. to more than an hour, and generally requires two men.

The first obvious approach to this problem is to develop automatic checkout and alignment equipment similar to that used by military electronic systems. But deeper probing into the approach reveals that a color camera is not a "go, no-go" system. It requires judgment and a certain amount of guided artistic talent on the part of the operator since the final camera performance is basically qualitative. Thus a totally automated system becomes impractical if not impossible. Even if we could assume feasibility, the cost and complexity of such a device would make its use prohibitive.

In an attempt to provide a practical solution to the problem of color camera checkout, a two phase study was initiated by Philips Broadcast Equipment Corp. several months ago. The first phase was to analyze the camera system carefully, the goal being to improve the inherent stability in the solid-state electronics, and thus to reduce the frequency of main-

tenance checks. The second phase, carried on concurrently, was to determine a technically and economically feasible system for removing the drudgery from the setup procedure.

At the present time most broadcasters have setup procedures whereby most controls are adjusted in an attempt to "peak up" the camera. Due to the inherent stability of most of the circuits, this procedure is generally unnecessary. In fact, depending upon such subjective elements as the mood, taste and individual proficiency of the operator, it may improve—or it may degrade—performance.

At Philips, we have developed certain working concepts for semiautomatic checkout equipment. One concept under investigation involves the use of tape storage. The system would operate as follows:

1. Manually set up and align the color camera.
2. As a sampling process, record on tape all the key voltages and test waveforms to provide a standard for the particular camera.
3. During checkout, electronically compare the camera performance against the standard. Only variations from the standard would be flagged. Thus, only those circuits which are out of tolerance require readjustment.
4. At the time major replacement parts are installed in the system a new standard would be made for future comparisons.

Our investigation indicates that this type of system could materially reduce the normal maintenance and alignment time of the camera, since only circuits out of tolerance need to be adjusted, and also provide more consistent picture quality. A similar system could be used for checking out the performance of the multitude of circuits in the larger studio complexes (i.e., video lines, audio lines, control circuits, signal processing and distribution equipment, etc.).

The appropriate hardware is not commercially available today, and we are still studying various alternatives to determine the optimum semiautomated equipment in terms of technical performance and economic acceptability.

At the moment, the tape storage technique appears to be one of the most promising means whereby we can assist the broadcaster in providing better service to his clients and to the public.

Eric Herud, product planning manager
Philips Broadcast Equipment Corp.

A computer controlled world

We believe it necessary that the broadcasting industry, along with so many other industries, move towards the use of computers in all areas of the business as rapidly as management can understand and absorb the need and the benefits that are to be realized. At the same time great care must be exercised in not assigning functions to the computer that are either unnecessary or can be accomplished just as easily by a less expensive method.

The most logical computer applications in broadcasting lie in the sales, research and traffic areas. Secondary applications include billing and accounting and to a limited extent stations operations. Beyond those present applications, we look forward to the day when a group broadcaster can adopt a complete "management control system" with the use of computers.

Clifford M. Kirtland, Jr.
Vice President, Secretary
and Treasurer
Cox Broadcasting Corp.

Automation Users: Happy Customers

In a recent continent-spanning telephone survey, *BM/E* gathered user opinions and comments from broadcasters about their automation gear. Independent broadcasters in New York, Las Vegas, Dallas and Portland are unanimously pleased with the performance and capabilities of their automation equipment. The only report of a significant amount of difficulty with automated equipment came from a New York-based official at the flagship station of a midwest fm network. He reported that his network presently is considering disposing of its automation gear and changing format despite the fact that most of the technical difficulties recently have been cleared up.

Experience with automation equipment in the group *BM/E* sampled ranged from a few months to about a year; the degree of automation ranged from total programming down to 2 hr/week.

Difficult as it may seem, *BM/E* learned that stations with completely automated formats manage to accomplish necessary maintenance during relatively brief shutdown and live-programming periods. Maintenance schedules ranged from daily checks and cleaning of heads, up through 1 hr daily checks, to 6-hr shutdown periods each week for cleaning and checking.

Most of the stations *BM/E* canvassed used program services. All who did were on the whole pleased with program selection and unanimously enthusiastic about the technical and aesthetic quality of the services which were provided for about \$200 to \$215/month, depending upon the amount of tape involved. Vice President and General Manager Miller Gardner at WRFM, New York, reveals that his station maintains a 10-in. reel of tape which is used for recording hot, new releases that might take a bit longer to reach them through their programming service.

Insertion of 25-Hz cue tones—the factor controlling interval between selections—varied as a matter of program format from a specified period *before* the end of the selection, through insertion *precisely at the end* of the selection, to a specified period of time *after* the selection ends. Some systems relied exclusively on cue tones for activation of the ensuing sequence, others used cue tones backed up with silence sensing.

A problem or limitation involving silence sensing which came to *BM/E's* attention is the instance when a tape becomes hung up in its transport. In many cases, this condition generates enough noise to prevent silence sensing from activating the ensuing sequence.

Some rather humorous problems were reported in the preparation of tapes. Stations preparing their own program tapes sometimes omit the usual sharp cutoff from 40-Hz to dc to prevent inadvertent cueing by program audio. As you might have guessed, *BM/E* learned that a station located in Cleveland, which shall be call-letterless, experienced an unscheduled id which was repeated six times through the courtesy of a double bass player in an orchestra that was playing a funeral dirge.

Another Cleveland station might still be identifying continuously were it not for a kindly cleaning man who telephoned the station engineer after the 28th repetition!

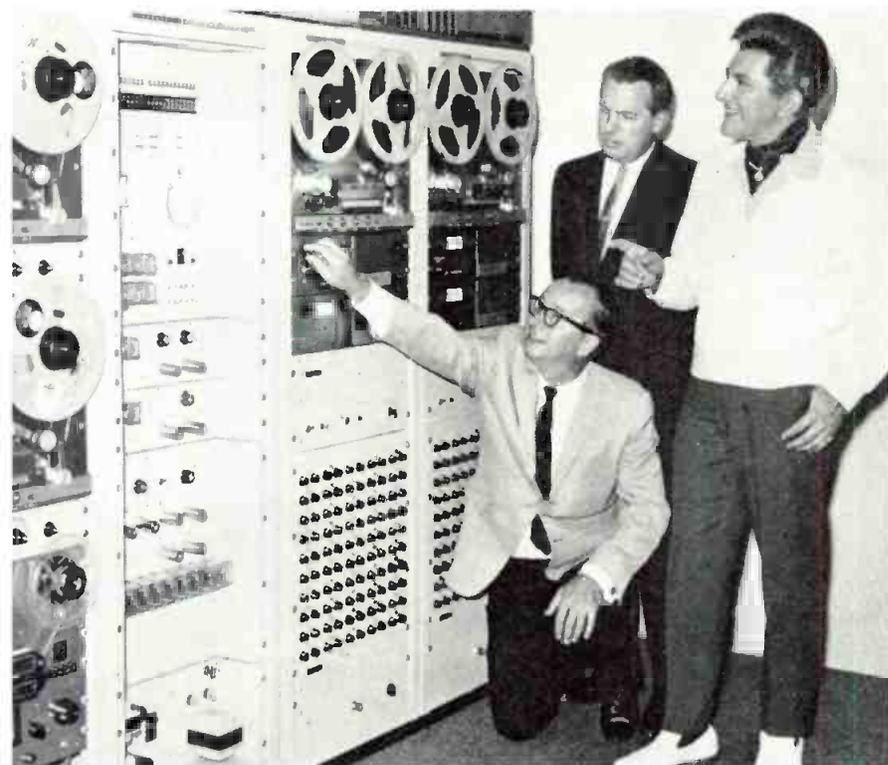
When asked what the significant advantages of automation were, our sample group of broadcasters responded with these characterizations: more control, dependability and versatility, better quality, and time, labor and money saving in the long run.

Station manager Harry Gift, KUDU-FM, Ventura, Calif., says the main advantage is that it "leaves our personnel free to record their announcements and news spots, and gives us all more time to talk to, and evaluate the requirements of, our listeners." KUDU operates with completely automatic programming for the station's entire 18-hr broadcast day, seven days a week. Two reels of tape, on Tape-Athon's Model 5000 system, provide up to 16 hr of unrepeatd music selections and four hr of announcements and news are handled with a 24-cartridge message unit. Control of the KUDU system is accomplished through a remote program console which may be situated as far as 200 ft from the rack. Pre-program is entered by selector switches for an entire day or week.

Ordering and installation posed few problems for our sample group. Waiting time for delivery was noticeably weighted at about 2 weeks, though it did range as high as 2 months. After the equipment arrived, installation was accomplished between 48 hr and 2 weeks.* The number of people directly concerned with the operation of the automated equipment and the amount of retraining they required varied considerably. KLIF, Dallas, went so far as to

*Things don't always go so smoothly: one station which will use some of the very latest equipment available didn't have bugs worked out at press time and we were prevented from describing the installation. Interface problems between an IBM typewriter, card readers and switching relays developed.

Stephen Grayson, operations director, WRFM (stereo), New York, sets up the sequential order for another day of automated programming. (Equipment is Schafer designed.)



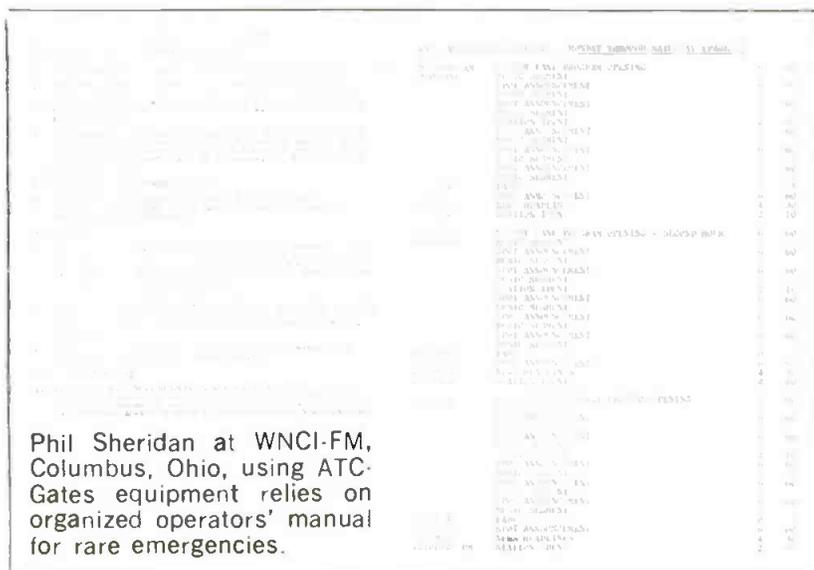
Manager Mel Ryan, KORK-FM, Las Vegas, tells vp and general manager Joseph McMurray and pianist Liberace that if system is kept clean it is almost 100-percent reliable.



Bill Faber, KUDU's chief engineer changes the tape cartridge on the station's Tape-A-thon equipment while Traffic Manager Betty Brown checks separate programming console.



Automation cold and not alive? Not at KMET-FM, Las Vegas where all girl announcers (Kathy Harron, above, June Kenny, left) are mixed with Continental automated equipment.



Phil Sheridan at WNCI-FM, Columbus, Ohio, using ATC-Gates equipment relies on organized operators' manual for rare emergencies.

CASH IN ON CANNED SOUND

Broadcasters who worry about whether going to automated programming will kill that live sound should ponder WRKO-FM, Boston's solution. WRKO is probably the nation's only top-40 disk-jockeyless station. All intros are by jingles and promos have a robot-like voice quality achieved by having the announcer speak into a "Sono-vox." There is no dead time as the station's ATC-Gates programming equipment was modified to overlap selections.

What happened to its ratings? It's going into orbit. Harry Ury, general manager, reports the latest ARB showed the station 7th in overall cume including a-m's.

PROGRAM SERVICES

Complete tape program services are available from several automation equipment manufacturers, such as International Good Music and Perfection Music, Inc.

Others who are big in a complete tapes service are Alto-Fonic Programmers, Inc., and Triangle Program Sales (a division of Triangle Publications). CBS/fm is also coming on strong by syndicating the Young Sound.

Services are generally available on a library, bicycle or purchase basis. The bicycle basis, in which fresh music arrives weekly or more frequently, simplifies storage and scheduling problems (you play what you get and then ship it on) is convenient but it may cause unexpected problems—the user ahead of you may have fouled up the tape. In the library plan, new tapes are generally shipped monthly from the programming service with the station returning an equivalent number. If you subscribe to a pop service, you usually get supplemental tapes of new releases during the month.

Triangle's Audio Program Service has a wide variety of 53-56 min program units which can be ordered in a variety of ways. Units are mailed weekly.

Reels supplied by the services are generally 14 in. for 7½ in./s. tape and 10½ in. for 3¾ in./s. Mono and stereo are available. Half-track tapes have metallic foil on the tapes for automatic reversing. A 25 Hz switching tone is generally mixed at the end of the program audio, followed by 1 s of silence. All services state special orders may be placed.

Obviously, various formats are necessary and the services try to package these to meet the broadcasters' needs. The larger services offer five, six,

or seven formats ranging from contemporary, traditional pop, conservative good music, to light classic and classical. There are variations, within the grouping such as instrumental or vocal for the pops, tempo on the contemporary, etc.

Triangle's services goes beyond music to include interview and commentary shorts. A brand new service is Capital Reading, a weekly service hosted by Anne Blair especially for fm syndication. Miss Blair will have Capitol Hill celebrities review important new books.

The packaged formats are winning audiences. Alto-Fonics claims three of its formats have achieved top ratings in the Los Angeles market. KMET-FM at least once hit the number one spot in fm (and eighth overall, ARB), and in the same period KPOL-FM another Alto-Fonic customer was number two. KPOL-AM which also uses Alto-Fonic generally runs third, fourth or fifth.

CBS-fm claims top ratings for its Young Sound. WKRX-FM, Louisville, is the leading fm station in terms of weekly cume; KMOX-FM, St. Louis, is leading during the periods it features the Young Sound; ARB reports also show the audience in New York and Los Angeles for the Young Sound has doubled.

What does all of this "success" cost? Less than a good announcer, is the popular expression for a "full service." Some units can be furnished for a dollar an hour but a minimum unit order is required. Over 500 stations are using program services. IGM claims to be the largest and has over 200 customers; Alto-Fonic and Triangle claim over 100 stations each, both a-m and fm.

If these success stories sell you but you are against tape, check the Seeburg Corp. They promoted at the last NAB convention, "music automation without a costly tape service."

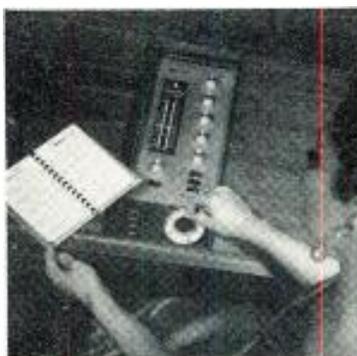
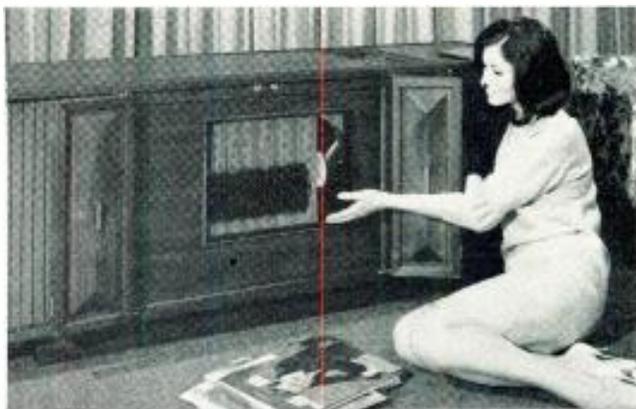
THREAT TO AUTOMATED RADIO PROGRAMMING?

Those music lovers who aren't crazy about your brand of programming but who are too lazy to stack the record player don't have to put up with you any longer. They can now buy the new Seeburg Automated Home Music Center. A stereo record mechanism that vertically stores and plays both sides of 50 twelve-in. records has been introduced by Seeburg. The mechanism will play all 100 sides at one playing (40 hours) or the home listener can dial any selection through a dialable memory system.

Although a varied sequence of more than one record cannot be preset, dials can be located in various parts of the home.

A program book provides dialing instruction for specific records. Once records are placed in the magazine, they are never touched and need not be removed for years.

Options available with the Home Music Center include a built-in tape cartridge player and a-m/fm radio. The console shown sells for \$1500.



have its chief engineer give the whole slate of announcers a 12-week course to qualify them for the First-Class Radiotelephone license examination. Other stations in our sample group managed to get by with a minimum number of personnel—usually an announcer and an engineer—and a 5-min briefing. KORK, Las Vegas, sent an announcer and an engineer to the Schafer factory for a day for their training. WRFM has as many as 7 to 10 people operating various portions of the automation system and found that their people were able to work with the system after they were given a briefing which emphasized what the system could *not* do.

Despite the apparent ease with which station personnel take to newly-installed automation equipment, WNCT, Columbus-Worthington, has found that a well-written operator's manual as well as written maintenance and operating instructions make it possible even for inexperienced staff members to perform routine chores with little or no difficulty. Though most station personnel tend to memorize their routine duties, an operations manual serves as an authoritative source of information for clearing up procedures which may become incorrectly remembered, and for training new personnel.

Though broadcasters long have been concerned about losing the immediacy and spontaneity of their *live* sound when automation equipment is installed, the impression *BM/E* gained during the survey was that automation does not betray itself to the listener. On the contrary, if properly operated, automated systems can make announcers and performers sound somehow more live, particularly when program services are used. IGM's Rogan Jones relates responses of broadcasters indicating that they are accepting the idea that production goofs now can be left in the production room and that automation makes stations sound better than live ones. This indication was backed up by the cross sampling of opinion *BM/E* received while conducting its telephonic survey. Mel Bailey at KXL, Portland, reports that audience ratings are up since the installation of automation equipment. Advertisers, too, have indicated favorable acceptance. KORK, Las Vegas reported that automation has permitted them to beat their competition and that advertisers were on the whole favorable in their reactions to automation.

Though *BM/E* received only one report of format being the controlling factor in the selection of a particular make of automation equipment, the one instance serves to point up the fact that a broadcaster prior to purchasing should: 1, plan his programming and commercial policies; 2, inspect all available equipment to make sure he gets the system best suited to his stations needs; 3, visit other stations with automated equipment in operation and; 4, provide for enough equipment to do the job decided upon.

Automated Programming Equipment

To the equipments and descriptions in last year's report, September 1966, p. 22-27, which included Automatic Tape Control (Gates Radio), Continental Electronics, International Good Music, MaCarTa, Inc., Perfection Music, Inc., Schafer Electronics, Tape-Athon and Visual Electronics should be added Metrotech, Inc., 670 National Avenue, Mountain View, Calif. 94040. Metrotech has announced a 3000 series which has an Interspersion Control Unit that permits the user to set the time between selections. Unit with two transports starts at \$2865.

Automated Video Switching

No topic is of more interest to chief engineers of television stations than is programmed video switching. Those who have been using some form of preset switching for several years are now thinking of second generation automatic switchers.

Generally what's wanted is more events to be stored and particularly more display of upcoming events. Buyers also want solid-state design that does not consume a lot of precious master control room space.

Some customers also want their automatic switchers to be able to handle special effects. It goes without saying that switchers must handle a large variety of input sources. Commercials come in on 16 and 35mm film and videotape. More videotape is being used; more and clustered spots are a trend.

Whereas equipment is readily available for automatic radio programming, the same can not be said for automatic switchers.

No company has an established position. "The switcher business is up for grabs," according to one *BM/E* reader. This same chief engineer wants his entire station switching system to be redone—the means of delegating equipment to studios as well as automatically programming the sources, and he wants it redone with minimal disturbance of his daily activities. In effect, he wants a turnkey job.

Others are not so anxious to jump to automatic switchers. They don't trust the networks time predictions hence they feel they must ride the manual control. If or when the networks decide to send a standardized pulse to kick off the automatic sequence, these hold-outs will jump aboard.

Cutting in a local preprogramming sequence, even on the unpredictable Johnny Carson Show, does not dismay Jim Wulliman, chief engineer of WTMJ-TV, Milwaukee. Using the Sarkes Tarzian automatic switcher, WTMJ has a choice of three modes of operation: manual, marked clock, or duration.

With this choice, the engineer can use his own good judgement in initiating a sequence of events by operating a cue take or manual take button at the right time. Example of how WTMJ-TV uses the Sarkes Tarzian APT-1000 will show the flexibility of this computer switcher, but first, as orientation for card input programming, let's look at WFIL-TV's system which uses the Visual Electronic 6000 switcher.

WFIL-TV Automatic Switching

WFIL-TV's complete daily video programming is automatically switched with the exceptions of live shows and special film and tape shows requiring elaborate special sound effects. This is accomplished by a Visual 6000 Automation System and an IBM Card Reader. The automatic switching system, including an IBM punch card system for source material, costs from \$60,000 to \$90,000.

Data for automatically switching TV commercial spots and station breaks (including film, videotape, slide, live or remote) is punched onto IBM cards. This data will include, in sequence, duration of spot, video source and audio source. The video sources are: film projector, videotape machine, live or remote. (Pre-roll time for film and videotape is included.) The audio sources are: reel-to-reel tape

WHAT'S IN THE CARDS?

Code Used

M — Minutes. (Precedes duration time. If duration time is not preceded by M, it denotes time in seconds.)

R — Remote.

L — Live studio.

C — Indicates a true time for start of sequence.

P — Film projector. (Two projectors handle both b/w & color. P9 & P0 denote color.)

V — Videotape machine.

S — Slide Chain.

N — Network.

O — Audio source same as video.

1 — Announce booth is audio source.

2 — Network is audio source.

3 — Cartridge is audio source.

4 — Audio tape recorder (reel-to-reel) is audio source.

96 — No elapsed time given for the particular program. The conditions remain indefinitely until switched either by True Time from upcoming card or manually from Master Control panel.)

R3 — Special indirect source. (Time, temperature and promo of upcoming event.)

Card No. 1 — C095917 20P30

C — True time. (Start of a sequence.)

095917 — Air time. (Numerals 1 thru 9 are preceded by zero since digits cannot be eliminated. Time is 9:59:17.)

20P3 — :20 duration film on Projector No. 3.

0 — Audio same source as video.

Card No. 2 — 20P40

:20 Film.

P4 — Projector No. 4.

0 — Audio same source as video.

Card No. 3 — 04R31

:04 Film.

R3 — Special identification source. (Time, temperature and promo of up-coming event.)

1 — Announce booth.

Card No. 4 — 96N10

96 — No elapsed time given. Stays until switched by a true time or manually.

N1 — Network source No. 1.

0 — Audio same source as video.

Card No. 5 — 03N10

:03 Film. (Since previous card did not include elapsed time, and this card does not include true time, operator must punch a direct take.)

N1 — Network source No. 1.

0 — Audio same source as video.

Card No. 6 — 20P90

:20 Film.

P9 — Projector No. 9 (color)

0 — Audio same source as video.

Card No. 7 — 08P30

:08 Film

P3 — Projector No. 3

0 — Audio same source as video

Card No. 8 — 05S51

:05 Slide

S5 — Slide chain No. 5

1 — Announce booth.

Card No. 9 — 96N10

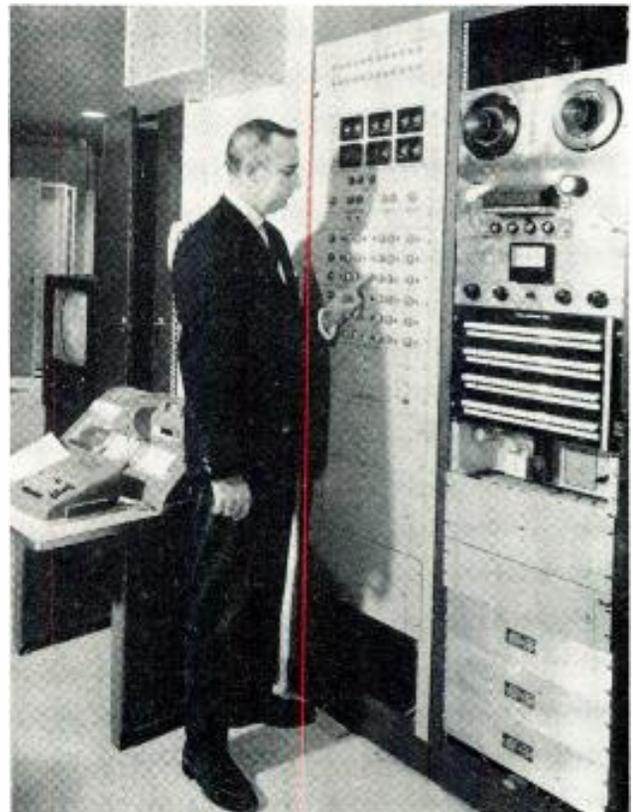
96 — No elapsed time

N1 — Network source No. 1

0 — Audio same source as video.



Actual cards for sequence, left



Visual 6000 equipment at WFIL

machines, audio cartridges or announce booth. Also included on cards is true time or starting sequences (actual air time).

This data is compiled and coded into the day's program log by traffic clerks and the equipment is assigned using guidelines furnished by engineer. The log is sent to a keypunch operator who copies coded data and punches it onto cards for insertion into the IBM Reader. Double check is always made by Operations in Master Control just before air.

The Visual 6000 Automation System stores six upcoming events; as each is used, the Reader supplies the next in line. Last minute changes can be controlled manually from a panel in Master Control,

or certain changes can be made directly on the Visual 6000. The translation of an entire day's logging can be accomplished in approximately one hour.

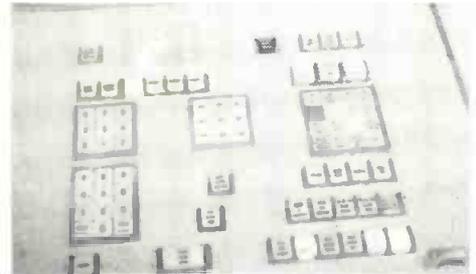
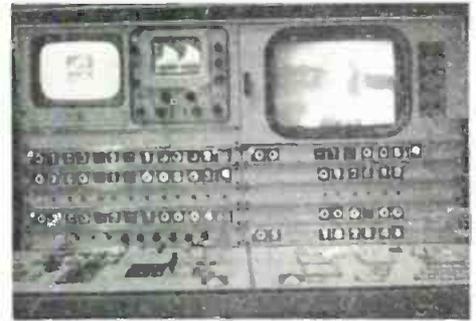
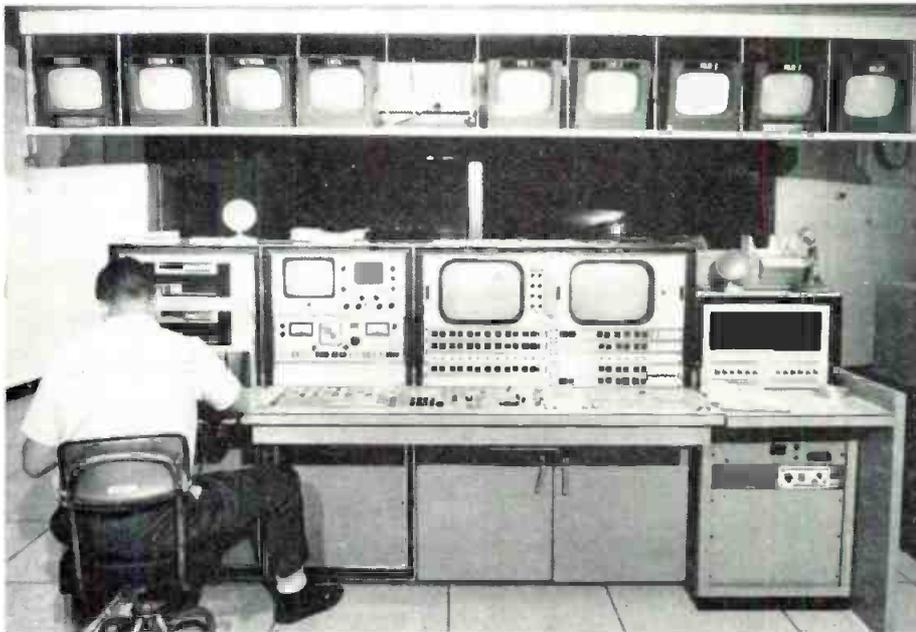
The cards are assembled into the IBM Reader and simultaneously the data of each succeeding six is flashed visually on the Visual 6000. The visual display consists of Nixie tubes. This machine contains the following data:

True Time

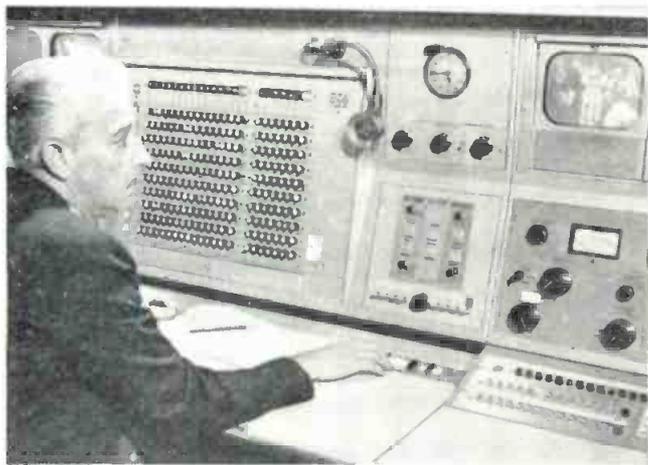
Next True Time Event

Duration — Video — Audio

A one-hour breakdown sequence and decoding is shown in the accompanying box. The actual deck of cards from the IBM Reader for this sequence is

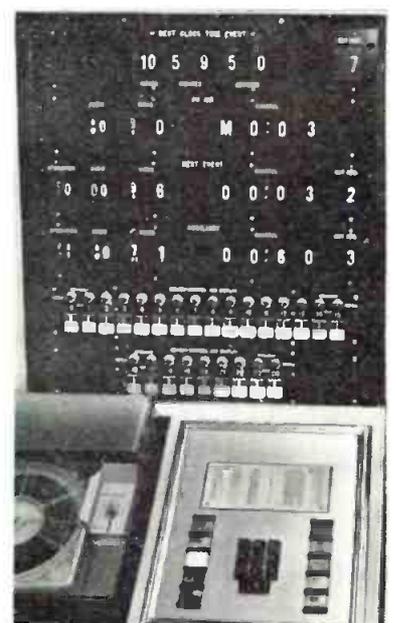
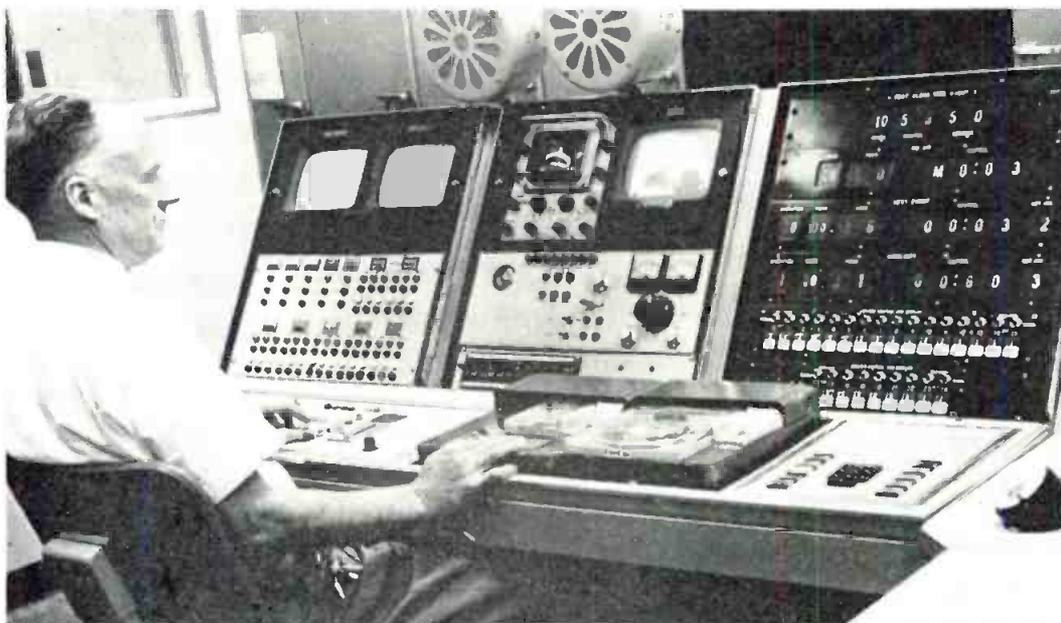
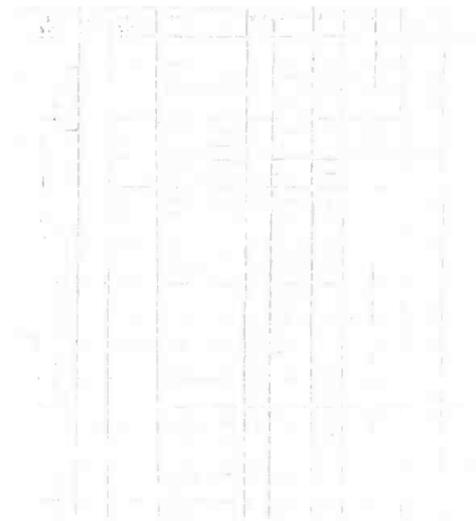


WTMJ-TV uses Sarkes Tarzian APT-1000 system as integral part of master control. Details of Next Event, On-Air and Control panel shown at right.



Bruce Flemming, video engineer at WSJS-TV, Winston-Salem, prepares for station break using the RCA TSA-3 TV pre-set switcher. By November TSA-3 will be modified so that only nine source-selection buttons instead of 18 are needed to select any projector or camera from three film islands.

Typical sequence sheet WTMJ-TV



Installation at WTOP, Washington, D.C. (CBS affiliate) uses Tele-control Corp.'s Unicon event switcher. Magnetic core memory is capable of controlling 100 video events but current model handles 32 pre-programmed events. WCAU-TV, Philadelphia, has similar unit.

illustrated.

This system does not replace an engineer, says Irwin L. Ross, manager of Studio Engineering and Operations. The advantages over manual operation are: Less chance of error; complex breaks are handled more efficiently to the split second; engineer is able to devote more time to riding levels for better air quality.

Automation Programming at WTMJ-TV

The Sarkes Tarzian APT-1000 can be fed by cards or the sequence of events can be programmed directly by using the 12 button numeric keyboard.

Each event word has its own address in the computer's magnetostrictive delay line memory. Twenty-five events can be stored in the computer memory.

The APT-1000 also can be programmed to use operational transitions of cut, fade, dissolve and super between events.

Sixteen options for entering the audio source are possible. (To simplify switching, an Audio Lock button causes the audio of the event on-the-air to hold and carry over into the next event if that is the proper source.)

Two methods of timing are possible — duration time or clock time. The digital clock allows switching

APPROACH TO AUTOMATION AND CONTROL IN ETV

By William A. Woods

The educational broadcaster, no less than the commercial broadcaster, must design his technical facilities to be more and more efficient to help reduce ever-increasing operating costs. Not only must many functions be performed economically, they must be performed simultaneously. This calls for automatic switching.

In September of 1965, the Chicago Educational Television Association (channel 11 and channel 20) completed the design, installation and checkout of a semiautomated studio control system. This system was designed by Mr. Duane Weise, now director of engineering for General Electric Broadcasting Company, in cooperation with Central Dynamics, Limited. The primary objective was to attain minimum operating costs with least amount of capital expenditure. Conditions called for a need to perform as many as four different functions simultaneously throughout the studio complex. In addition, high quality had to be maintained with a minimum of personnel. Consequently, the Central Dynamics, Limited switching system was chosen for its up-to-date design and solid-state reliability. The Chrono-Log S.T.E.P. unit was chosen for the same reasons and because it could be easily integrated into our operation.

Very basically, the operation of channels 11 and 20 is broken down into the following categories: master control area, videotape area, live studio production, station breaks.

Master Control Area. The master control area was designed and built to enable one person to control audio and video levels to the transmitter on both channels, and act as operator for anywhere up to five 4½ in. image orthicon cameras and up to three vidicon film cameras. In addition, he is able to act as video man for the videotape machine that may be feeding either channel on the air at that time. In addition, he can delegate any video and audio source to any one of three studios. He can switch station breaks either automatically or manually on channel 11 or channel 20. It is the operator's job to load audio tape cartridges on the master control console to be used in conjunction with the station break. (Each one of these cartridges roll at the predetermined time according to how the Chrono-Log 16-event template is pinned.)

Mr. Woods is director of engineering, WTTW/WXXW-TV, Chicago.

Videotape Area. When the videotape operator receives the tape from the audio visual library (traffic), he loads the tape on the tape machine so there is the proper amount of "pre-roll" and ascertains that the machine is on remote control so that the Chrono-Log unit has control of the start-stop functions in the master control area, for operation at the proper sequence of time. The videotape operator loads all slides and films and makes certain that they are on remote control to the master control area so their start-stop function can also be controlled by the Chrono-Log unit.

Live Studio Production. As mentioned, the master control operator monitors channels 11 and 20 video-audio feeds to the transmitter. He also sets up the I.O. cameras at the camera control units which are located next to the master control console. After the cameras are set up, he acts as video operator on them during the studio production time on-air or tape. He also acts as video man as necessary on the film camera or videotape machines that are in operation to either feed studio production or the on-the-air function. These things are normally done simultaneously. We are able to do this because of the close physical proximity of all the control equipment and because the Marconi Mark V 4½-in. I.O. cameras are characteristically stable and easy to operate.

Station Breaks. Station breaks are normally handled automatically by the Chrono-Log S.T.E.P. system, but can be done manually also. When the master control operator is busy with camera set up, etc., the automatic station break system is a necessity. Essentially, an automatic station break, from start to finish, is roughly done as follows:

1. The Program Department determines when the station break will be made, how long each promo or id will run, and in conjunction with the Engineering Department, determines what source the video and audio will come from (film, tape, etc.).

2. This information is then passed to the Audio Visual Library, where specific numbers of the audio cartridges and slides are assigned for that break on the station program log and also on the cartridges and slides. The station break information is also put on a template pinning order by the Audio-Visual Library. This template pinning order is given to a technician and it tells him exactly how to pin the 16-event template in order to achieve the proper timing for video and audio sources during each station break. After the template is pinned, it is then stored in a rack until called into use as indicated on one of the daily program logs. The log is sent to the master control area twice daily for

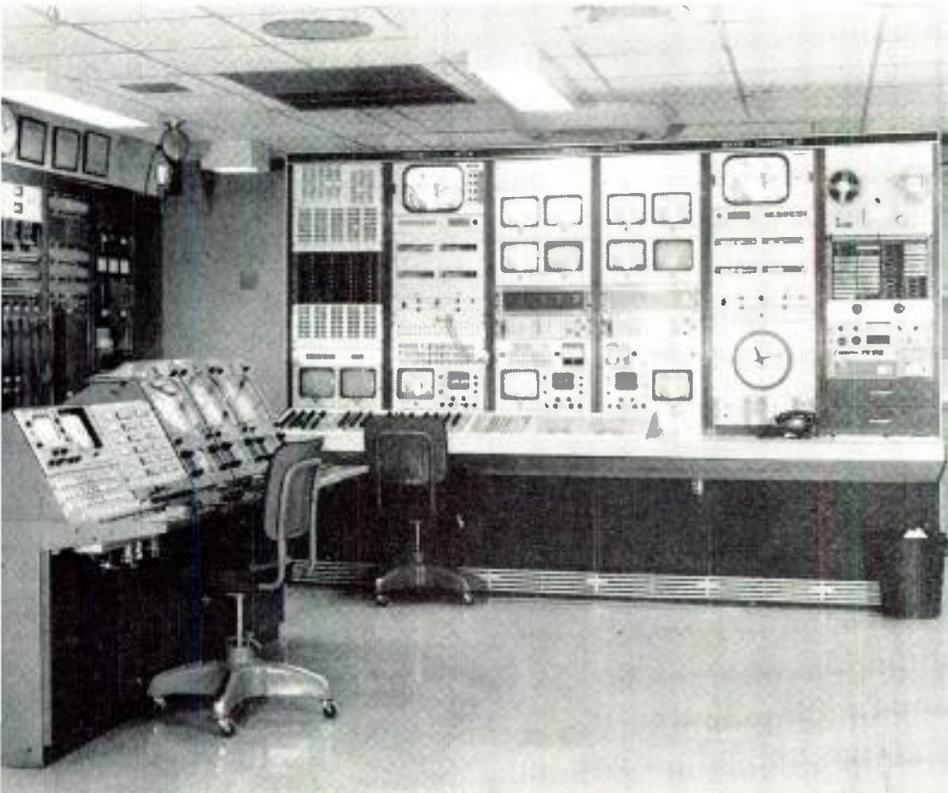
on a real time basis or the elapsed time on an event by event basis. Intermixture of these time methods can be used.

One of five occurrences controls the time at which an event goes on the air: 1. the duration count reaches zero from some initial elapsed time setting, 2. real time relationship to clock time stored in a particular word, 3. depression of MANUAL TAKE switch, 4. depression of CUE TAKE switch, and 5. occurrence of external cue signal. In all cases, except Manual Take and elapsed time conditions, the duration counter begins its countdown from ten seconds, and when the count reaches zero the event is switched on-air.

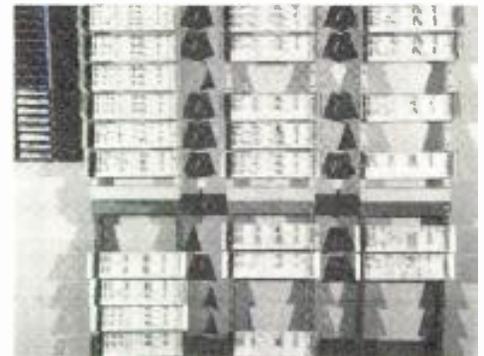
Pre-roll of videotape recorders begins at 7 seconds and film projectors at 2 seconds as the duration counter is counting down.

If the CUE TAKE button is operated again before countdown reaches zero, the duration counter will snap back to 10 seconds. If the MANUAL TAKE button is depressed, the next event goes on air at a time coinciding with the next one second pulse. Such possibilities permit the engineer to switch in on the Johnny Carson show fairly precisely, even when the first cues for breaks are misleading as guest talks on.

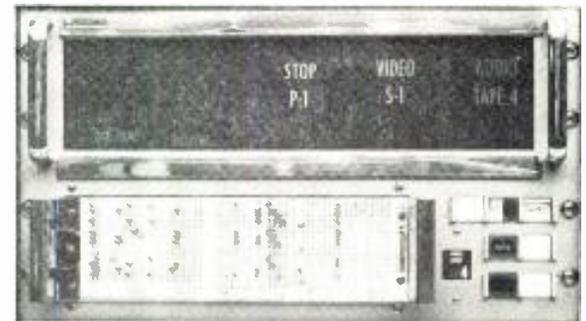
WTMJ has written up in an operations instruction book some typical switching problems. See Typical



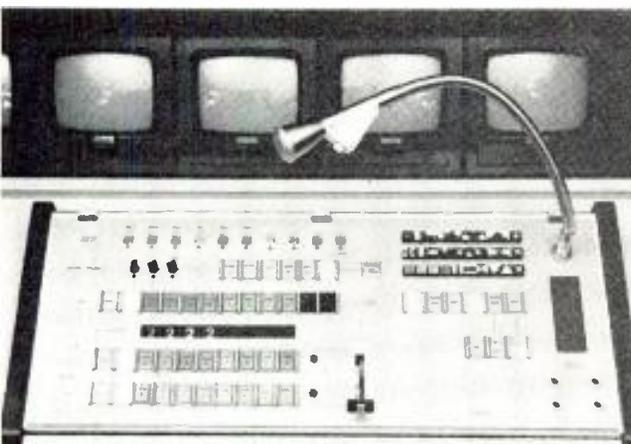
Two channels are controlled at WTTW/WXXW-TV master control area. Station break switchers are in center. Camera control units in foreground.



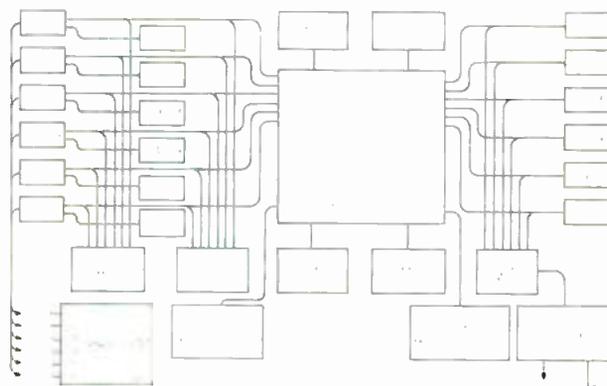
Various event sequences are stored on pre-set pinned templates. Audio cartidge rack shown, upper left.



Chrono-Log S.T.E.P. control & display unit.



Typical studio control room panel. Buttons indicate cameras, VTRs delegated.



Block diagram of switching possibilities at WTTW/WXXW-TV.

Sequence Sheet.

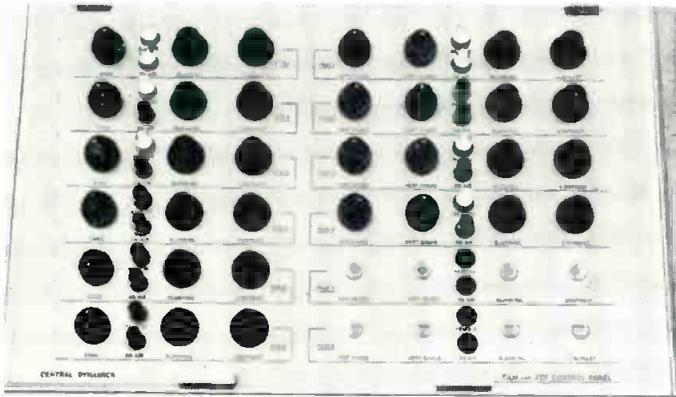
Example No. 1 shows the Manual mode operation for a simple id insertion during a network show. Notice that Manual mode is indicated for event No. 01 in the special code column indicating that the switch to the id slide will have to be initiated manually by depressing the MANUAL TAKE button when net throws the cue. The id will then be cut on the air and the duration counter will count down from 10 seconds and automatically switch back to network when the duration count reaches zero. Note that event No. 03, which is network, also has a Manual mode bit.

Example No. 2 has, within the net show, a film,

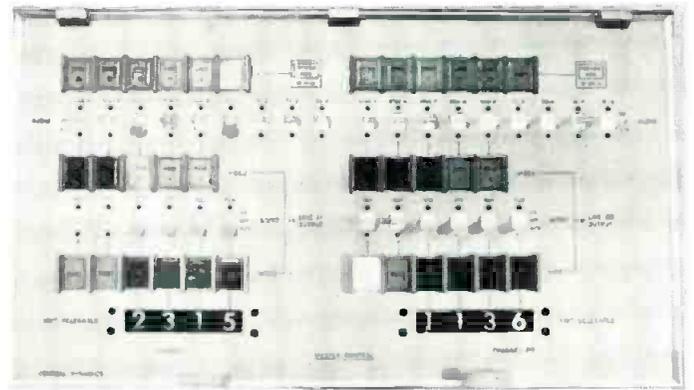
id, videotape and back to net sequence (events 4 through 7). Note that the duration time in event No. 03 is 003 seconds. When event No. 03 goes on the air, the Manual mode bit will hold the duration counter at 003 seconds and will not count down until the CUE TAKE button is operated. This 003 second duration time is entered in this event because the next event involves a film which has a 2 second pre-roll time. When net throws the cue for the break under discussion, the CUE TAKE button should be depressed manually. The duration counter will start counting down from 003 seconds. When it hits 002 seconds, it will pre-roll the projector No. 3 and cut it on the air

Switching and Control panels in Master Control Room

(Monitoring selector and intercom panel not shown.)

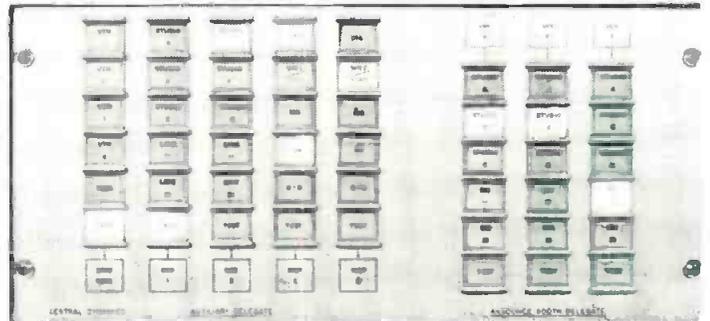
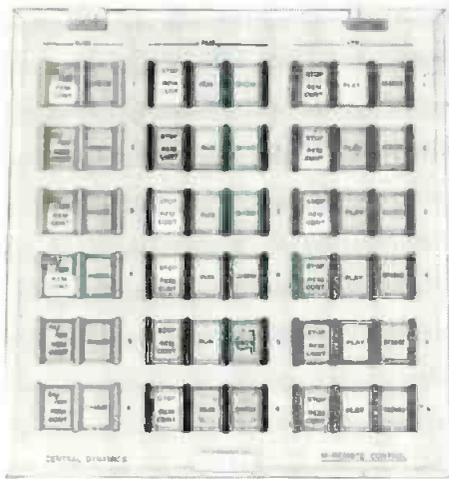


Film and VTR control panel (camera control panels similar).

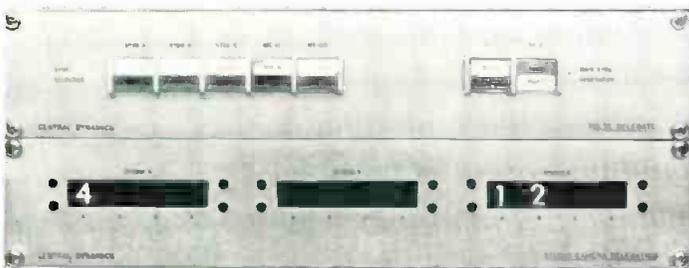


Main display panel showing ON-AIR and delegating plan.

Remote control operation panel for slides, film, VTR.



Announce booth delegate panel.



Studio camera delegating display.



Film delegate display panel.

when the duration count reaches zero. Since the film duration is one minute, the duration counter will count down and when it reaches zero the APT will switch to the color id slide and start counting down from 010 seconds. When it reaches 007 seconds, it will pre-roll VTR No. 2 and cut it on the air when the duration counter reaches zero. When the count-down on the VTR reaches zero, the APT will switch back to network with the duration counter holding because of the Manual mode bit in event No. 07.

Example No. 3 shows a videotape spot, id and back to net sequence. This example is quite conventional except that in event No. 07 a duration time of

channel 11 and channel 20 separately and it indicates program times, titles, station breaks, promos and video-audio sources for all events.

3. The information on the program log is sent simultaneously to the videotape/projection operator who loads the slides; film and videotape, according to the video and audio sources indicated on the log. The log reflects the manner in which the template is pinned to accomplish each event. The master control operator has four tape cartridge play-back machines available in the master control console for each channel. He loads tape cartridges of various lengths and content in these machines for play-back at the proper time with the proper slide or film as has been determined by the pinned template.

4. When the station break occurs, the Chrono-Log unit, through a custom-built interface panel, automatically rotates a slide drum, switches this video on to the air and rolls one of the tape cartridge machines with the accompanying audio for that slide simultaneously. This event is then "counted down" in seconds by the Chrono-Log unit and at zero seconds switches to the next event which may be another slide with accompanying audio tape cartridge. This again counts down to zero seconds and switches on a videotape machine that may be delegated for air use containing the next program material. There is automatic "pre-roll" built into the interface panel for all videotape machines. If the master control operator desires, he may over-ride the automatic switching system by pressing the "manual" button and proceed to switch the station break manually from the master control switcher. In this way, we are able to handle two station breaks simultaneously even if the master control operator is occupied operating video on three studio cameras.

Our facilities contain three studios each with identical control and switching functions for consistency. The studio switchers are Central Dynamics, Limited custom-built units with the Riker 30-effects generator. Any video source can be delegated to this switcher for use by the director who does the switching. Each control room also has full audio facilities for tape cartridge, 1/4-in. tape, turntable and nine input audio console. In addition, patching is available so that any control room can control audio from any other studio.

With the design and facilities we now have available, we are able to operate two channels on the air and videotape a full production program with six technicians. Also, due to the proper choice of equipment, a crew of four technicians is able to perform a more than adequate routine and preventive maintenance program.

008 seconds has been entered. This is because event No. 08 is a videotape with a pre-roll time of 7 seconds. When the CUE TAKE button is depressed, the duration counter will count down from 008. When it hits 007, the APT will send out a pre-roll pulse to VTR No. 1 which will start, lock-up and switch on the air when the duration counter reaches zero. Event No. 09 is a color id. Note the "color" mode bit in this event which tells the APT to switch to the color crosspoint rather than the monochrome crosspoint. (If a monochrome slide were called for here, the "color" mode bit is merely omitted. The APT will always pick the monochrome crosspoint unless the "color" mode bit is included in the event.)

Since network timings are not dependable, the "Manual" mode bit is used quite extensively where there are cut-ins. The duration time for the network event usually contains a time of 003 or 008 depending upon whether the cut-in is a film or videotape. As shown in the first example, the duration time of event No. 01 is 000 since this event is followed by a slide which does not require a pre-roll. In passing, it should be said that if the exact pre-roll times are programmed, such as 002 seconds for a film and 007 seconds for a videotape, no pre-roll pulse will be sent out and the film or VTR will be put on the air, but the machines will not be running.

Example No. 4 utilizes the clock time switching facilities of the APT. In other words, the APT will switch an event on the air at a given clock time as read on the digital clock and regular IBM clocks. We come out of net in event No. 10 and hit a Sentry film in event No. 11 for one minute, then to a station id for 012 seconds event No. 12 and into net on event No. 13 at 17:30:00 to catch the Huntley-Brinkley open. Previous to this switch, the "next clock time event" display would have read "13"—"173000" indicating that a switch to event No. 13 would occur at 17:30. This switch will take place when the digital clock matches up with the digits in the "next clock time event" display.

Example No. 5 shows clock time to switch out of network to a local break and then into a local studio show coming from "A." Here we come out of Huntley-Brinkley at 175830 and switch to event No. 14, a Clark film. Note that in event No. 13 the duration time is 010 seconds with a "Manual" mode bit. The actual "clock time" in event No. 14 is programmed to read 175820 which is 17:58:30 minus the 010 second duration time mentioned above. When the digital clock advances to 175820 it will match the time in the "next clock time event" register and start the duration counter on its way to zero from 010 seconds. When the duration count reaches 002 it will start up PRJ No. 3 and cut to the Clark film in event No. 14 when the duration count reaches zero. The exact clock time will then be 175820 plus 10 seconds which is exactly 175830—our desired switching time.

The visual displays below the on-air monitor, right, as shown on the photographs are, reading down, on-air display, true time digital clock, clock time characters for the inputs being entered into the memory and next clock time event. Below the next-event monitor, left, are the next two upcoming events. The third display line shows either the input being introduced during programming or any upcoming event called for.

Aussies for Automation

One of the more elaborate fully automatic video switching systems went into operation in Australia over two years ago. The installation was made by

Central Dynamic, Ltd. The automatic program controller conceived for the station was based upon entering the data into the machine by means of the regular control panels and then assigned it to the AUTO mode. Thereafter the machine searches the memory under control of a real-time clock and automatically switches the program content at the right times including pre-rolling the respective machines. The system has a storage capacity of 20 events although it can be extended in excess of 100. (It is not necessary however to have a memory capacity much greater than the number of machines possessed by the station.)

Three events could be displayed alphanumerically on projection readouts, namely the on-air event, the preview event and the third event. The third event display can be assigned to read any other memory location for check-out and editing purposes. Any event in the memory thus selected can be changed up to 10 seconds before air time by the operator. He can also, at any instant, override the automation to restore manual control. The Australian operation, according to Peter Carey of CDL was able to handle its switching operations with one man other than three. Further, there was far less program drop-out due to human error.

The present generation of systems being designed by CDL represent relatively little philosophical change from the first one but have different operating features. The current approach is based on the provision of a cathode ray tube type of display on which all 20 events in the memory are displayed alphanumerically and move up the tube as the sequence progresses. CDL reports that operators asked to be able to view the entire switching sequence planned for the forthcoming period—not previously possible. The data is entered into the memory by means of a deck of pre-punched tab cards (one card per event) which thus renders the memory capacity of the machine virtually infinite.

In operation, therefore, the traffic department, for example, will plan the program content ending up with delivery of a stack of cards to the operator. He merely loads these into the card reader and the machine automatically enters the data from the cards into memory as locations become available throughout the sequence. The operator may monitor the program as it runs through on the tube face and, should there be any errors, he can change the data by moving an electronic cursor to the appropriate character and then correcting it by means of a numeric key board. In addition, he can manually override the automation at any time. The displays for this system are arranged on conventional standard station monitors driven by a regular video signal specifying display data. Any number of displays can thus be provided.

Sources for Automatic Video Switchers

Irv Moskowitz, director of R&D, Riker Video Industries, makes a distinction between internal and external video switchers.

He sees the internal switcher-computer (of Sarkes Tarzian, for example) playing a role in large facilities tied to networks for precisely timed cutaways to local stations, and the smaller external computer (such as the Chrono-Log, for example) for breaks at id time. The latter offers desirable flexibility without a large investment.

Because of new interest being shown in automatic video switching, we are not sure our list is complete. Companies known by us to be producing in this

market include American Pamecor, Inc., Box 1776, Valley Forge, Pa.; Central Dynamics, Ltd., 147 Hymas Blvd., Point Claire, Montreal, Canada; Chrono-Log, 2583 West Chester Pike, Broomall, Pa.; IGM, Bellingham, Wash.; RCA, Camden, N.J.; Sarkes Tarzian, Bloomington, Ind.; Telecontrol Inc., 143 Sound Beach Ave., Old Greenwich, Conn.; Visual Electronics, 356 West 40th St., New York, N.Y.; Ward Electronic Industries, 142 Central Ave., Clark, N.J.

Remote and Automatic

REMOTE AND AUTOMATIC go together. If you're operating remote you have long lines set up for monitoring and control; it's a small step to add automatic logging equipment. And if you're doing something by automatic control it can be near or distant.

The basic reason for doing something remotely or automatically is to make better use of some person's time. Don't assign a man to a camera if camera maneuvering is simple. Don't keep a man at the transmitter if you don't have to. And don't watch and record meter readings if a chart recorder can do it. Alarms will sound if parameters drift out of tolerance. There are economic benefits to be gained by remote or automatic control and if you are not now enjoying them, it's time to re-evaluate. You can now buy some models of automatic logging equipment for well under \$1000.

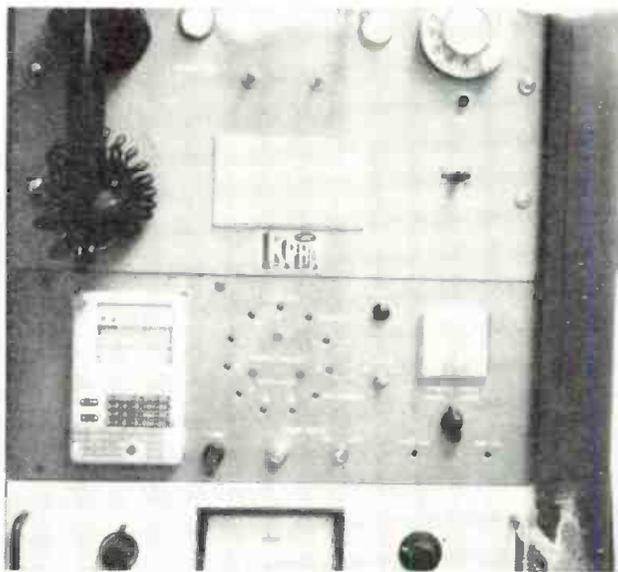
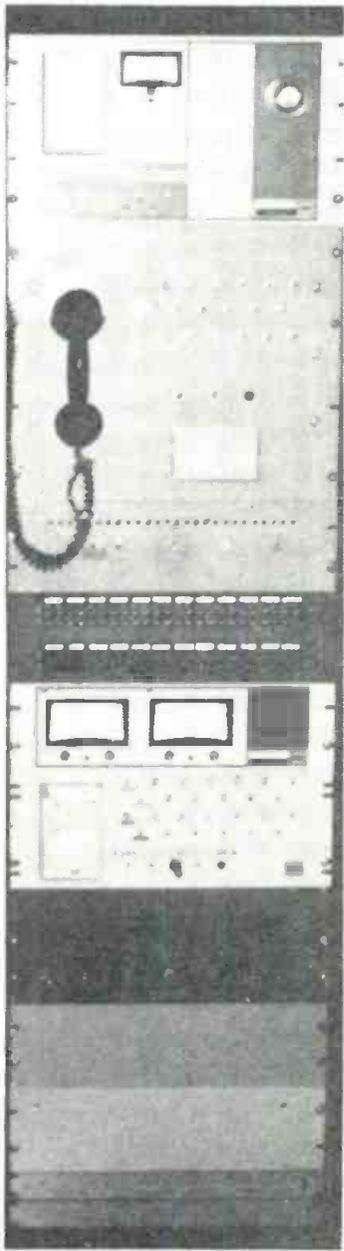
It's probably safe to say anyone who uses automatic logging equipment is a satisfied customer. *BM/E* didn't find it necessary to survey users' reactions—if they were satisfied in 1965 they will be satisfied in 1967. We did, however, look for a few examples of unusual use of logging equipment.

At *KPHO*, Phoenix, operations switch between the studio and the transmitter. All programming is done from the studio. Since the station operates on remote control during the day, a chart recorder is located in the studio. The announcer has an FCC license and no engineer is on duty. At night, for directional operation, a first class engineer is on duty at the transmitter. A chart recorder at the transmitter records the extra common point current and the three other towers' lights. One Rust unit is used for sampling and calibration and its output is switched to either the studio or the transmitter. The unit is located in the studio.

But because the stepper is an inherently noisy thing, it could not remain in the studio with the announcer. *KPHO* Engineer Howard Zile solved this problem by putting the stepper in the storeroom. A new panel was made up to hold the chart recorder, calibration pots and eleven lights. It is mounted in the studio just under the remote control unit.

Zile also made a number of other interesting modifications for this mode of operation. His basic Rust unit has 10 master calibration pots. Twenty-six additional calibration pots have been added to the chart recorder panel located at the transmitter plus five 4-pdt relays for studio-transmitter switching. What are all of the additional calibration pots used for?

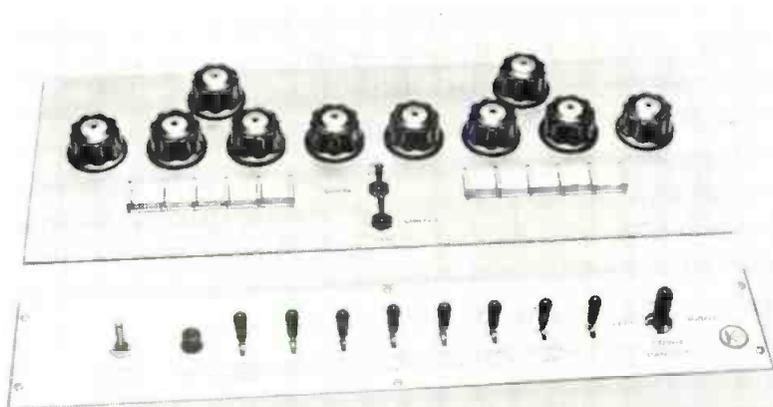
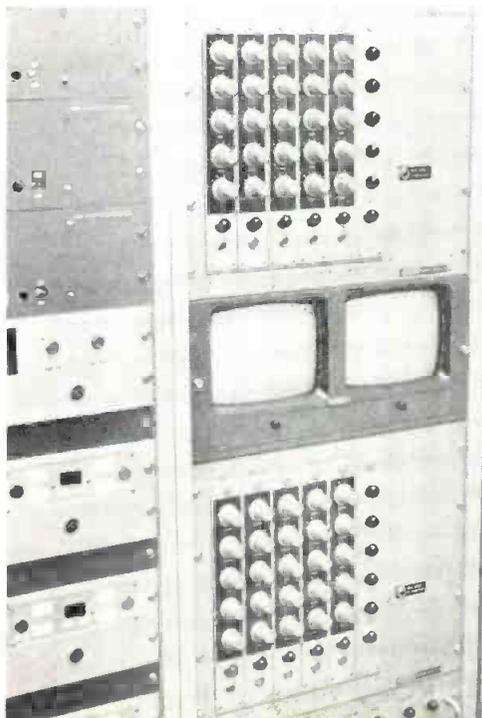
The first chart recorder reading is frequency, but since the zero is different for night and day, both must be calibrated. The second is plate voltage which require four calibrations. Third is plate current and again four pots are needed. Fourth is antenna $\neq 1$ with another four pots needed. Fifth is the night common



Modified automatic logging at KPHO. In transmitter, left, panel below handset shows expanded scale alarm / power meter and alarm frequency meter plus 26 calibration pots added. Studio panel, right, shows Rust recorder and indicating light panel. Actual stepper is in store-room.



Bill Kusack, WFLD chief engineer, remotely controls a camera which will perform according to pre-set conditions. Immediately in front of Kusack is program assembly switcher. The switches on the sloped panel control the film islands. (In master control room is Ward Industries event switcher).



Above, close-up view of Evershed remote camera control panel (top) and remote control switches for camera located in the city room of affiliated newspaper. Left, view of two camera setting, presetting control units used at WFLD.

point requiring two calibrations. Sixth, seventh and eighth are the other three towers with two calibrations each.

The expanded-scale, percent power meter has four calibrations—two for antenna #1, day and two for C.P., night.

In the transmitter chart recorder panel, the remote-local switch has been rewired so the chart could be used during the day while on remote operation. Zile has used the transmitter chart recorder for various things during the day. For a while, he sampled the ac line voltage, but now records the modulation monitor. A switchable alarm buzzer was also installed in the studio with the chart alarm light.

Zile finds that a continuous record of his transmitter operations has been of considerable help to both engineering and programming personnel.

At KCBS-AM, San Francisco, a CBS owned and operated station, they are automatically logging antenna phase and current ratios as well as transmitter operations.

The study program is under the direction of Ogden Prestholt, director of engineering, CBS radio. He reports that measurements using Rust and Nems Clarke

equipment are being recorded with greater resolution and accuracy than is possible by visually reading the meters of the Nems Clarke Model 112 phase monitor. Both phase and current are being recorded with an accuracy of 0.4 of a degree and 0.4 of a percent respectively, but the chart recording can be resolved to spot 0.2 of a degree variations.

The continuous monitoring is giving Prestholt a good feel of what happened as a result of rain, and hot and cold temperatures, day and night operations. Prestholt does not adjust or tinker with coupling and load circuits if he spots variations since he doesn't believe in changing settings. The information he is gathering may some day be useful in determining the practicality of automated a-m transmitter operation.

Remote Control of Camera

The new studio of WFLD, Chicago, reveals effective use of remote camera control. The overall photograph shows Bill Kusak, chief engineer, operating the Ever-shed Power-Optics camera control panel. The photograph of a rack of equipment shows the set up controls used to preset five different camera shots possible for a given program. Variables are zoom, focus, iris, pan, and tilt. Two such camera pre-set units are shown.

SELF-MONITORING OF AUTOMATIC FM TRANSMITTERS By J.L. Smith

The automatic fm transmitter is entirely feasible. The FCC has been petitioned to change the rules to permit operation such as that described below. A Notice of Proposed Rule Making will shortly be sent out by the FCC. It is possible that the rules can be rewritten to authorize automatic fm transmitters by early 1968. The prospects for automatic a-m and TV transmitters is more distant. There are now such things as automatic directional antenna changers (directional antennas are widely used by a-m stations). Further, the industry is no where near producing an automatic monitor and controller of picture quality — although the principles suggested by Eric Herud for automatic camera check out, page 29, may work (i.e., if certain voltage, currents and waveforms exist at critical monitor points, good pictures quality is assured).

At the beginning of the broadcast day, the transmitter is turned on automatically by a time clock or other mechanism. From that point to sign-off no further attention to the transmitter is required unless a fault develops or it is desired to switch from stereo to mono, etc. At the end of the broadcast day, the transmitter is turned off, either manually via the remote operation link or automatically.

If a parameter begins to vary toward a tolerance limit, it will first reach the alarm condition. This alarm may be transmitted to any other location, i.e., the headquarters of the contract maintenance engineer, the home of the chief engineer or any location which is required. The maintenance personnel then proceed immediately to the transmitter site and note the cause of the alarm from the fault indicator panel and perform the necessary corrective actions. In the event that the parameter reaches the tolerance limit before the maintenance personnel arrive, the transmitter automatically removes the carrier from the air and holds the fault information on the fault indicator panel. When the transmitter is shutdown due to a fault, an automatic attempt is made to return the transmitter to the air as a determination of whether or not the fault was transient. Three such attempts are made after suitable waiting periods and, if the fault persists, the transmitter is shut down permanently and can be returned to the air only from the transmitter location.

Only those parameters which affect emissions

are capable of transmitter shutdown, i.e., power output, center frequency deviations, control line failure, etc. Parameters such as tower light failure, program loss, etc. sound the alarm for proper action but do not remove the carrier from the air.

Once each week it will be the responsibility of the broadcaster to check the calibration of the sensors and level detectors and verify the integrity of the self-monitor circuits. This is accomplished by switching to a manual monitor mode which disables the control function of the self-monitor circuits but still allows them to function into visual indicators to display when the alarm level is exceeded and when the shutdown level is exceeded. To preclude the possibility that the transmitter may be inadvertently left in the manual mode, switching is accomplished with a clock-actuated switch with a maximum run time of 15 min. At the end of this preset time period the transmitter is automatically switched back to self-monitor mode. While in the manual mode, the alarm at the remote operation point signals continuously.

To verify the calibration of the power output monitor, the power is increased 5 percent manually and it is verified that the alarm and shutdown circuits operate at the required points. The same procedure is followed for low power variations.

Similarly, the frequency monitor service is verified by manually offsetting the frequency through the assigned limits and noting the operation of the alarm indicator and shutdown indicator.

FCC inspections of the station are carried out in a manner similar to the calibration procedure with the exception that, if requested by the inspector, a parameter may be varied to momentarily shutdown the transmitters and thus verify the full circuitry.

— Extracted from a paper given at the 1967 NAB Convention by J.L. Smith, manager Broadcast Systems Engineering, Collins Radio Company.

The lower panel in the close-up photo of the remote camera control panel shows the controls for a camera located in an entirely different building—the city room of the *Chicago Daily News*, where news reporters can be switched in for commentary and interpretation of the day's stories.

A duplicate control panel is also located on the master control unit console. The camera in the city room can be turned on at the TV studio, the on-camera light controlled and zoom, focus, iris, and pan/tilt controlled. WFED reports that the authenticity provided by newspaper men adds greatly to the impact of televised news.



Data Processing

CLEVER PROMOTION by IBM to the radio and television industry uses the following headline: "Dave Morris, broadcaster, used to think he was too small for an IBM system."

Dave Morris is a real person, as is also Joe Levitt, Dick Wheeler and others pictured in the ad promotions. The copy proceeds to point out that even for broadcasters with as few as four salesmen, or a total staff of 25 persons, a \$380 a month IBM system pays off.

A simple IBM system consisting of a card puncher, a card sorter, a duplicating machine and an accounting machine, can do many tasks including showing daily time availabilities, scheduling commercials (without product conflicts) and programs, printing out program logs and preparing invoices.

The system simplifies invoice preparation. (Joe Levitt, KSRS, San Jose, Calif. has 273 different rates and his system gets out 300 invoices by the 2nd of the month.) It can also prepare FCC reports. KSRS also uses the system to keep track of the station's record library.

The Columbus Broadcasting Company, Inc., licensee of WRBL and WRBL-TV, has automated its logging and accounting operations with the installation of an IBM data processing system.

The daily program logs are developed in their entirety by IBM equipment beginning with the 029 Card Punch Machine. Source documents, including start orders, change orders, program changes, promotional and public service announcements, are supplied to the key-punch operator. For each account, a color-coded master card is key-punched with account name and category number, salesman's identification, time, length, commercial spot or program classification, audio and video source, day of week, as well as time and production cost and contract begin and end date.

These master cards are returned to the Traffic Department and inserted into a visible line display in the exact sequence of the daily log and are available as ready references for program adjacencies and availabilities.

After the master cards are sequenced each day they are given to the Data Processing Department and the 514 Duplicate Machine punches duplicate cards from which that day's log is actually printed on the 402 Accounting Machine. These duplicate cards are retained by the DP Department for other uses. The master cards are redisplayed in that day's line to be used on a continuing basis throughout the term of the contract.

By sorting on the 082 Sorter either alphabetically



IBM data processing equipment at WRBL and WRBL-TV. Master cards punched on 029 card puncher are put in visible line display holder. Sorter (082) shown in center photo and accounting machine 402 is shown in background of bottom photo. Duplicator 514 is in foreground.

or numerically they can then be fed into the Accounting Machine to print such reports as revenue distribution, sales commissions, public service reports, etc. The most complicated applications of the new data processing installation involve coupling of the 402 Accounting Machine with the 514 Duplicating Machine to print itemized statements and age trial balance reports while summary punching on the 514 tabulated information from the 402 into total or new balance cards.

The DP system was first installed in early 1966 and was then employed to accomplish the programming and accounting functions of the company's radio division. The system was expanded in early 1967 to handle the more complex DP requirements of TV.

Company executives feel the speed and accuracy of the system made it possible to absorb a much increased work load due to growth with the addition of only 1 person.

Electronic Data Processing all the way

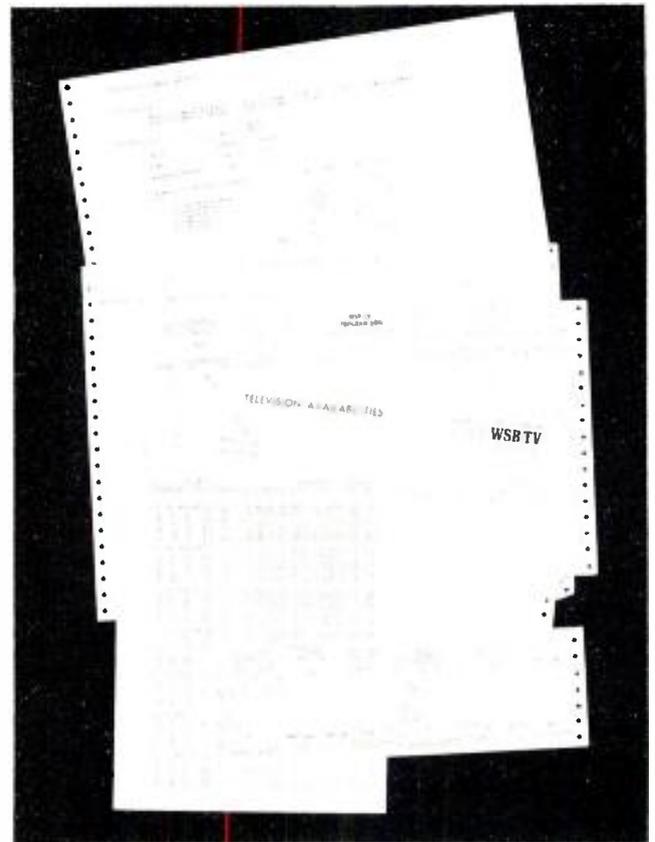
To the best of our knowledge, Cox Broadcasting makes the maximum use of data processing equipment.



Honeywell 200 at Cox Broadcasting, White Columns Center, is relatively large installation for broadcaster. Several outputs produced are shown at right.



View of card punch and sorter room at Cox.



Cox views computers used for sales, research and traffic operations as more important than billing and accounting. Some of the applications to which Cox puts its Honeywell 200 computer include:

- Log Preparations
- Sales Availability
- Weekly Sales Projection
- Sales Analyses
- CPM Analyses
- Public Opinion Poll
- Cume Studies
- Billing
- Personnel Reports
- Film Inventory
- FCC Analyses

Eighteen descriptions of how Cox uses the computer were provided by Dan Clay, data processing director.

Daily Log Preparation for WSB-TV. All time orders, program orders, format orders and miscellaneous production orders are entered into the computer daily. This becomes in a traffic master file three days before air time, a "rough log" is printed and sent to the traffic department. Public service and promotional announcements are entered into computer-indicated available positions, along with film numbers for all spots. This additional information is entered into the computer, and a final completed TV schedule is printed at 3:00 P.M. on the day before air time. This daily information is stored on magnetic tape and serves as input to many other data processing applications.

WSB-TV Daily Sales Availability Report. The traffic master file (magnetic tape) updated daily as described in the previous application, is printed out, showing the daily status of the TV time inventory. It shows all in-house business and the availability status of every formatted spot on the schedule. A unique feature is a graph (using printed x's) projecting the next 13 weeks activity on every spot on the schedule.

WSB-TV Major Advertiser Frequency Report. Each week the traffic master file is sorted by advertiser, and a print-out is made of all major advertisers showing the number of spots they have scheduled for the next 13 weeks on each of their products. This aids in determining the proper frequency rate to use on each new schedule.

WSB-TV Weekly Sales Projection. The traffic master file is scanned and compared against a calendar in the computer memory. In-house sales are projected for the current month and the next 2 months.

WSB-TV-AM-FM Billing. The output tapes from the daily logs are accumulated and used to produce the monthly invoices, open-item statements, and aged trial balance.

WSB-TV-AM-FM Sales Analyses. The output tape from WSB-TV-AM-FM billing is used to prepare various sales analyses: by product, by agency, by salesman, by branch office, by daypart, by revenue accounts, etc.

WSB-TV FCC Analyses. All the information contained on the daily logs is accumulated for each month and summarized showing the amount of time actually broadcast for each FCC program type and source.

WSB Accounts Payable and Financial Reports. Expense vouchers serve as input to write the accounts payable checks. Journal entries are key punched and the voucher register, trial balance, general ledger, detail-and-summary profit-and-loss statements are run.

CATV Billing System. The bi-monthly billing, accounts receivable control, and revenue accounting is processed on 14 CATV systems, either owned or partially owned by Cox. The basic input documents are: 1. a cash receipt stub, which is a part of the post card bill sent to the subscriber, 2. a work order that contains the original billing information on all new accounts, in addition to all billing changes to existing accounts, and all one time charges.

Cox Cablevision Corporation Accounts Payable and Financial Reports. This system is very similar to

the wsb system, except that the reporting is done separately and then consolidated for 8 CATV systems.

WSB-TV Film Inventory. The information on all feature films, syndicated films and cartoons that run each month is key punched and used to update the film inventory master file. A run is then made showing: film package type, distributor, series, number of film titles, number of usable film titles, number of allowable runs, projected number of usable runs, number of runs used to date, number of usable runs remaining, amount charged off per run, license period, payment period, total cost of package, unpaid balance, and amount to be expensed.

Personnel Reports. A quarterly report is run showing pertinent data, such as salary rate, date of employment, etc. on every employee of Cox Broadcasting Corporation.

Capital Expenditure Budget. This is a report showing the yearly amount budgeted to pay for each piece of capital equipment, the amount paid to date, and the amount over or under budget.

Public Opinion Poll. Any Cox station can take a public opinion poll on any subject and have the results cross-tabulated with demographic breakdowns by the computer.

CPM Analyses. Each time a local market report comes out from Nielsen or ARB on any of the Cox markets, we get a magnetic tape with that information contained on it. This is combined with a station schedule file and a rate file (also on tape) to produce a complete CPM analysis on every station in these markets. It shows the audience demographics and CPM's for up to 10 rate plans on every spot on the schedule.

WSB-TV Local Sales Availability Submissions. Any wsb-tv salesman can fill out a simple request form and have the computer printout an availability submission for his client. He can be very selective in what he wants to appear on the printout. He can select rate plan, any combination of demographics and CPM's. He can also specify whether or not he wants the schedule totaled, showing total audience figures and average CPM's. He can get NSI or ARB figures.

Rating Analysis Report. This is basically the same report as the previous one, except that it enables the research department to analyze any schedule on any station in any of the Cox markets with the same type of selectivity.

Cume Studies. Instant cume special computer tapes can be made up as either ARB or Nielsen ratings are received. Printouts give the client the opportunity to put together his own reach and frequency data for selected TV schedules.

The potency of the last four research items is easy to imagine. Cox has before it the complete break down of the strengths and weaknesses of its own as well as its competitors stations. These analyses are of course helpful to existing and prospective advertisers in ascertaining logical buys.

Cox executives see the role of the computer expanding. Some uses may be dropped, others added. The operation described here have been going on since November of last year when the installation was complete (the uses, however, were being designed three years earlier when Cox first began to study what data processing can do for broadcasters). In the not too distant future, data processing communications lines between the various Cox properties and the Atlanta installation will be made. The cost of performing the above function runs about \$4000 per month.

Nonduplication CATV Switchers

A SPATE OF DENIALS from the FCC for nonduplication waivers should mean good business for the nonduplication switcher manufacturers.

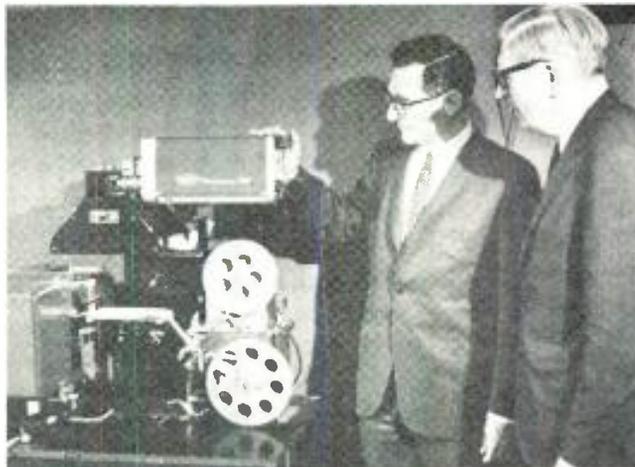
However, one should not place an order for a switcher without evaluating for a moment just what is needed. It may be that the equipment you order will not conform to the specific requirements of the Second Order and Report.

CATV operator Donald W. Levenson, P.E., and president of Wheeler Antenna Co., Inc. of Wheeling, W.Va., has observed that many operators program with a five-minute "override." In other words, to be sure of not cutting off the end of a program that may end at 10:30, they program their switching gear to switch at 10:35. This not only does not comply with the Second Order and Report, but is in abuse of the viewer who gets five minutes into the new program only suddenly to find his screen blank.

Cutting out early hurts the commercial sponsor who paid for the program and its transmission, but did not get his ad message viewed. In some cases these advertisers are in the local region.

To eliminate the problem, Levenson feels that nonduplication switching must be done in less than one second to not abuse either the viewers or the advertisers.

This may call for synchronizing switchers with



Trans-Lux automation stock quotation service. User S. W. Peterson, right, (Manhattan Cable TV) gets demonstration from Robert Weisberg of Trans-Lux Distributing Corp.



Automatic A-P news display service. (Tele-Mation equipment.)

www. An alternative to this, Levenson feels, is to get broadcasters to transmit a switching signal. Switching signals could be placed in the vertical interval of TV picture or possibly in a subaudio tone on the audio transmitter.

Certainly some of the standard clock-activated devices are not accurate enough to do a clean job of switching and certainly some of the home-made timers suggested in magazine articles in the past are not satisfactory.



Simple automatic card display cyclor by Vikoa.

There are a host of nonduplication switchers on the market. Products from CATV manufacturers described in the automation report, *BM/E*, September 1966 included equipment from Jerrold, IGM, Vikoa, Ameco, TeleMation and Electronic Systems Development.

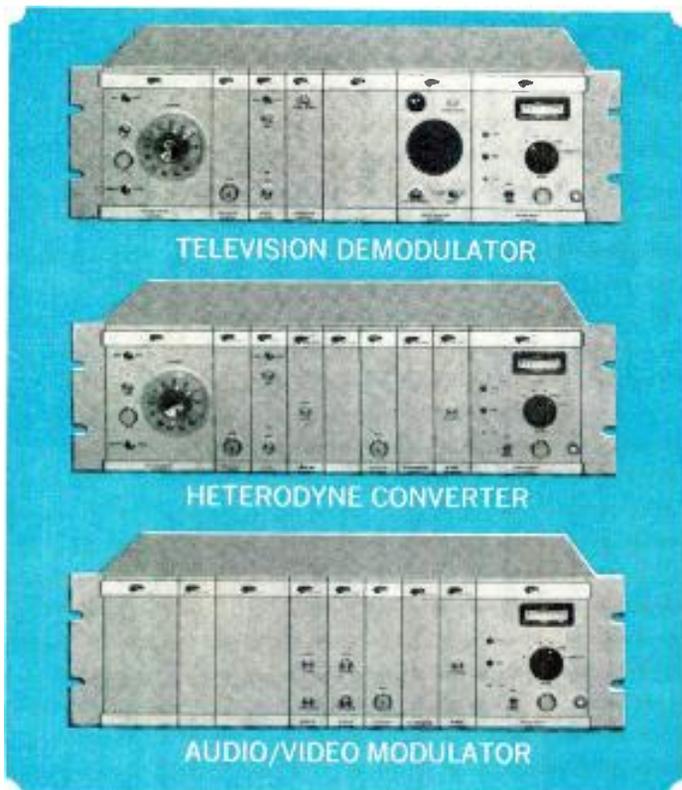
A new entry is available from Telesis Corp. It offers interesting features in that you buy only as many program boards as there are stations which you must protect. This reduces the switcher's cost. Further, to reduce cost (and programming time), switching options of boards was cut to ½-hr intervals since between show switching is rarely called for. Boards accommodating five-minute interval switching are available if needed. Timing is done by a NASA-standardized Bulova Accutron cycle timer. Fail safe operation is claimed since standby power in the form of a battery will keep the timer functioning should ac power be interrupted. This switcher is also suited to broadcasters operating in single station markets who want to automatically switch between networks.

While Telesis is promoting the fact that small interval programming is not necessary, TeleMation is taking the opposite course. In its Model TMP-205 literature, it boasts of split-minute programming which permits carriage or deletion of local station break intervals. The unit can be made to switch 30, 43 or 73 seconds prior to the start of the next program to coincide with network practice. A program channel must be given up to get this split-minute timing feature.

Recent examples of other new automation equipment for CATV include automatic stock quotation program sources, an AP news service and new card display cyclers.

WHEN IT COMES TO HEAD-ENDS

...can you afford anything but the very best?



The most critical part of any CATV system is the head-end and, so far, not even the best has been good enough. But now, DYN AIR can supply a completely solid-state head-end package — to your specifications — that will perform with broadcast precision.

DYN AIR head-end equipment includes all three basic signal-processing units, with interchangeable modules used to minimize maintenance problems. Sophisticated military-type RF shielding on each module eliminates interference common to equipment using standard commercial packaging. Precise frequency control and AGC circuitry assures interference-free full-color pictures.

Not just another head-end, but truly professional equipment designed by a company with years of experience with broadcast television transmission and solid-state CATV head-end equipment.

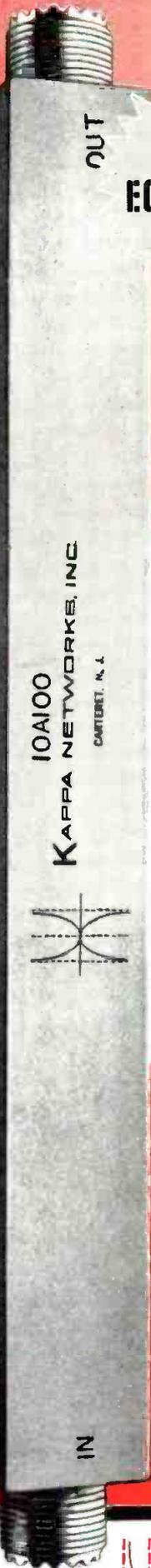
WE DIDN'T CUT CORNERS . . . SHOULD YOU?

6360 FEDERAL BOULEVARD
SAN DIEGO, CALIF. 92114
TELEPHONE (714) 582-9211

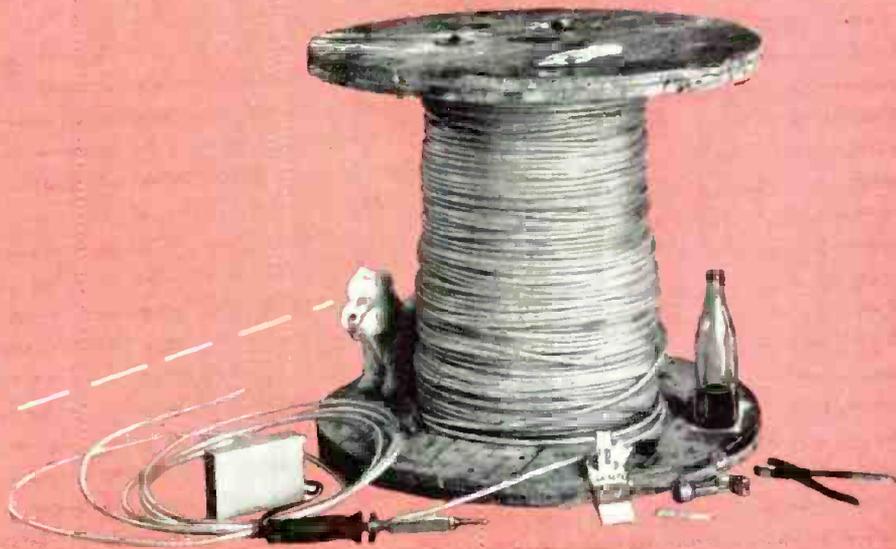


The experienced manufacturer of solid-state head-end equipment.

Circle 16 on Reader Service Card



**FULLY
EQUALIZED**



HOW KAPPA GETS VIDEO CABLE PERFORMANCE...WITHOUT CABLE!

We replace it! ... with Kappa Super- η Delay Lines. As a result we can help you avoid large coils of video cable, storage compartments, and separate equalizers. Kappa Super- η Delay Lines outperform conventional (m-derived) lines because they are more efficient ... they yield inherently greater delay-bandwidth from fewer components. The performance of Kappa Super- η more nearly approaches constant delay at all transmitted frequencies ... an essential characteristic of the ideal low pass, dispersionless delay line.

Unit-to-unit uniformity and excellent temperature stability are also marked features of Kappa Super- η Video Delay Lines.

Where you need equalized cable performance without physical length in your video systems, do the job efficiently and economically ... use Kappa Super- η Delay Lines!

KAPPA SUPER- η VIDEO CABLE SIMULATOR GUIDE

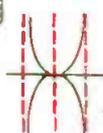
Model No.	Length of Cable Simulated* (in feet)	Package Length (x 7/8" square)	Approx. Delay Range (nsec.)	Max. Insertion Loss (db)	Price**
10A50	50	5"	78	0.5	\$52.75
10A100	100	8"	157	1.0	\$69.50
10A150	150	11"	235	1.5	\$86.25
10A200	200	14"	314	2.0	\$103.00
10A250	250	16"	392	2.5	\$119.75

**ACTUAL
SIZE**

* ± 2 ft. or 2%, whichever is greater. ** Additional discounts available for quantity orders.

SPECIFICATIONS OF KAPPA SERIES 10A SUPER- η DELAY LINES

Impedance: 75 ohms $\pm 2\%$ Size: 7/8" square x length required
 K factor: less than 0.25% for sin² T Pulse Case material: Electro-tinned brass
 Cross talk: less than 46 db Finish: Mil-spec gray lacquer



For prompt engineering assistance call us collect at (201) 541-4226.
KAPPA NETWORKS, INC.
 Delay Line Specialists Manufacturing Engineers
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 World's largest manufacturer of broadcast quality delay lines.

Circle 17 on Reader Service Card



The fastest replay on record:
Keyboard... to Converter... to Screen — Instantly!

The VIDEOGRAPH® Display Control Unit model 990

A new pacesetter that meets today's challenge for instantaneous, economical TV broadcasting of News... Titles... Election Reports... Sport Scores... Weather Bulletins... and a myriad of other messages requiring no additional Camera Chains or artwork preparation!

The A. B. Dick Videograph® Model 990 Display Control Unit is unique in its low-cost sophistication. It offers digital-to-video character conversion from 64 different alphanumeric or special symbols, directly and instantly onto the TV screen—unerringly. Input to the unit can be from any 8-bit data input source such as a keyboard, punched paper tape, magnetic tape, or Dataphone line input. And, the Videograph® can store and display one complete frame of pre-selected information.

Its video output is compatible with standard TV signals, and information may be erased and corrected electronically. "Error-free" information composed in the Videograph® may be fed as data output to be stored for future use in a punched paper tape or magnetic tape device.

The A. B. Dick Videograph® is ideally designed for the standard TV system, producing single or multiple line display in crisp, easily legible characters. It can even achieve vertical or horizontal crawl effects, and slow-rate "blinking" of words is also possible. For the complete story, contact your area Visual Electronics representative—or write for brochure.

VISUAL ELECTRONICS CORPORATION

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® Registered Trade Mark of A.B. Dick Co.

Circle 18 on Reader Service Card



ENGINEERING CASEBOOK

Packaging Portable TV Equipment

In cross-country and world-wide shipment of valuable network portable television equipment, damage often results that makes it unusable upon arrival. Here's how a major network and an equipment-case manufacturer tackled the problem.

IN NETWORK TELEVISION, the Columbia Broadcasting System actively provides comprehensive coverage of such diverse events as political conventions, Miss Teenage America pageants and NFL football games. This necessitates transporting valuable television optical and electronic equipment from one end of the country to the other, and around the world.

CBS employs some of the world's most expensive and advanced equipment to bring these first-hand television reports of special events from remote points around the world within the reach of every television receiver in the country. Among the types of equipment frequently shipped to remote locations are Mark III, IV and V color and monochrome camera lenses, rf systems designed for remote use at the NFL football games, parabolic antennas, rf camera systems, video and pulse distribution systems and audio amplifiers. The network's two 12 × 50 Angenieux close-up zoom color

lenses are valued at \$26,000 each. CBS also transports several disc recorders, used to provide instant playbacks of football plays and the network's Eidophor rear projection systems.

With this valuable equipment constantly in transit by plane and truck, CBS began a search for protective enclosures that ended four years ago in the selection of Skydyne fiberglass cases. Shipping handlers in trucking companies and the commercial airlines gave no special consideration to the valuable equipment. In some locations, the cases and equipment are actually dropped 15 ft from the loading hatch of commercial airliners.

The cases selected by CBS are of fiberglass construction and are equipped with special metal corner pieces to provide further protection against breakage, drops, and environmental hazards. Until they began phasing them out, CBS had been using fiberboard footlockers for transporting this equipment.

The fiberboard footlockers, and frequently the equipment, deteriorated in transit and required continual replacement. Moreover, their construction prevented the use of permanent interior protective compartments that would further reduce the effects of shock and vibration inside the case.

When CBS turned to color transmissions from remote locations, they decided to seek the best possible protection for this valuable equipment. The first cases built by Skydyne for CBS were equipped with interior compartments and linings of polyurethane. It was soon discovered that the equipment CBS was transporting was subjected to more shock than anticipated. Further, it was found that this equipment could stand

less shock and vibration than originally allowed for. It became obvious that additional protection for valuable lenses, optical and electronic equipment was needed.

Polyethylene Lining

The solution was a switch of materials used in the cases to separate and surround the inner compartments. Polyethylene was substituted for polyurethane in this case because it provided the additional protection and was more suitable for protecting the expensive optical equipment.

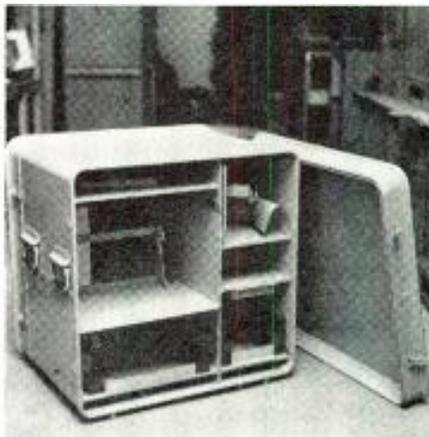
For special news and public affairs situations, CBS goes airborne transmitting portions of its telecasts live from helicopters in flight. When New York City suffered its crippling transportation strike early in 1966, CBS helicopters televised traffic situation reports from roving helicopters. Pope Paul's history-making visit to New York and the World's Fair at Flushing Meadows was covered completely by CBS from the moment of arrival until the door closed on the departing Papal airplane. Presidential motorcades are frequently covered by live television from helicopters in flight.

To meet the requirement for greater flexibility and durability, mobile equipment is housed in sandwich panel cases that open at either end. Sandwich panel is a strong material consisting of two layers of metal or alloy with an inner core of wood to add strength. Entry to the cases is through both top and bottom.

As operating cases, electronic equipment to support CBS's portable Ikegami television cameras is built into the cases. An audio amplifier to be flown aboard CBS helicopters, for example, would be mounted in a sandwich panel op-



Lens and fittings are cradled in polyethylene-lined compartments.



Sandwich-panel case for Ikegami camera opens front and rear.



Service bench carries power supply and drawers of tools and spares.

Model AA-200



SOLID STATE AUDIO AMPLIFIER

Frequency Response:

±1db, 20 to 20,000 cycles at 100MW

±2db, 20 to 35,000 cycles at 100MW

Harmonic Distortion:

Less than 1%, 20 to 20,000 cycles at 100MW

Less than 2%, 20 to 20,000 cycles at 200MW

Input:

50 to 150 ohms balanced (mu metal shielded, permalloy core transformer)

2,000 or 100,000 ohms unbalanced

Gain:

70db, 50 ohm input, 8 ohm load

65db, 2,000 ohm input, 8 ohm load

Output: 500 and 8 ohms

(grain oriented transformer)

Circuit: 7 transistors, 1 thermistor

Controls: Locking volume control

Connections: Barrier strip

Power Supply: 9 volts DC, 100 MA

(accessory power supply available —

Round Hill Model PS-200)

Construction: Brown enameled steel case

Size: 9"L x 2 3/4"W x 3 1/4"H

Weight: 28 ounces

Price: **\$34⁵⁰** Including complete Technical Data and Schematic
Send check or money order — we pay postage.

ROUND HILL ASSOCIATES INC.

A MILO ELECTRONICS SUBSIDIARY

434 Avenue of the Americas, New York, N. Y. 10011

Model PS-200



SOLID STATE POWER SUPPLY

An all-transistor general purpose power supply, the Round Hill Model PS-200 is particularly suited for use in applications requiring a stable, well-filtered DC source. It employs Zener referenced voltage regulation, and delivers 9 volts DC at loads up to 200 MA with complete dead short protection. A locking screwdriver-adjusted programming potentiometer permits the output voltage to be adjusted over a one-volt range.

Input Voltage: 105-125 volts AC,
60 cycles, 5 watts

Regulation: Line + load 5 MV

Ripple: Under full load 10 MV, peak to peak

Output Voltage: 9 volts DC

(adjustable over 1 volt)

Maximum Load Current: 200 MA

Controls: Locking programming control

Connections: Barrier strip

Construction: Brown enameled steel case

Size: 9"L x 2 3/4"W x 3 1/4"H

Weight: 44 ounces

Price: **\$24⁵⁰** Including complete Technical Data and Schematic
Send check or money order — we pay postage.

ROUND HILL ASSOCIATES INC.

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434 Avenue of the Americas, New York, N. Y. 10011

erating case before flight. In operation, one side of the case is exposed to provide access to the instrument's controls. The other side might contain spare lengths of cable and provide access to the equipment for servicing. Following the telecast, the lids are secured to protect the equipment against potential hazards.

Like their ground-based counterparts, the CBS equipment flight containers have also been equipped with polyethylene compartments and lining where needed. When the containers are employed as operating cases, the electronic equipment is secured to the case itself with more permanent hardware.

Mobile Service Bench

To meet the specialized needs of political conventions, CBS and Skydvne developed a mobile service bench which the network transports to all events requiring a large number of camera systems operating at peak efficiency. The units saw their first service at the 1964 Presidential convention in San Francisco.

Each maintenance bench is a large sandwich panel case containing four large drawers. The drawers contain all the spare parts and tools to make replacements or repairs as needed at the site. Each drawer is compartmented to hold the parts and tools required. The top of the large case lifts to expose a work bench area over the drawers, and additional storage space is on the inside of the lid itself. Filled with its parts and tools, this unique case serves as a complete transportable service station is television broadcast equipment. When it is not in use, a steel bar is passed through the front of the unit from the work bench area and secured at the bottom with a padlock. In this condition, the drawers may not be opened and the spare parts removed by unauthorized personnel.

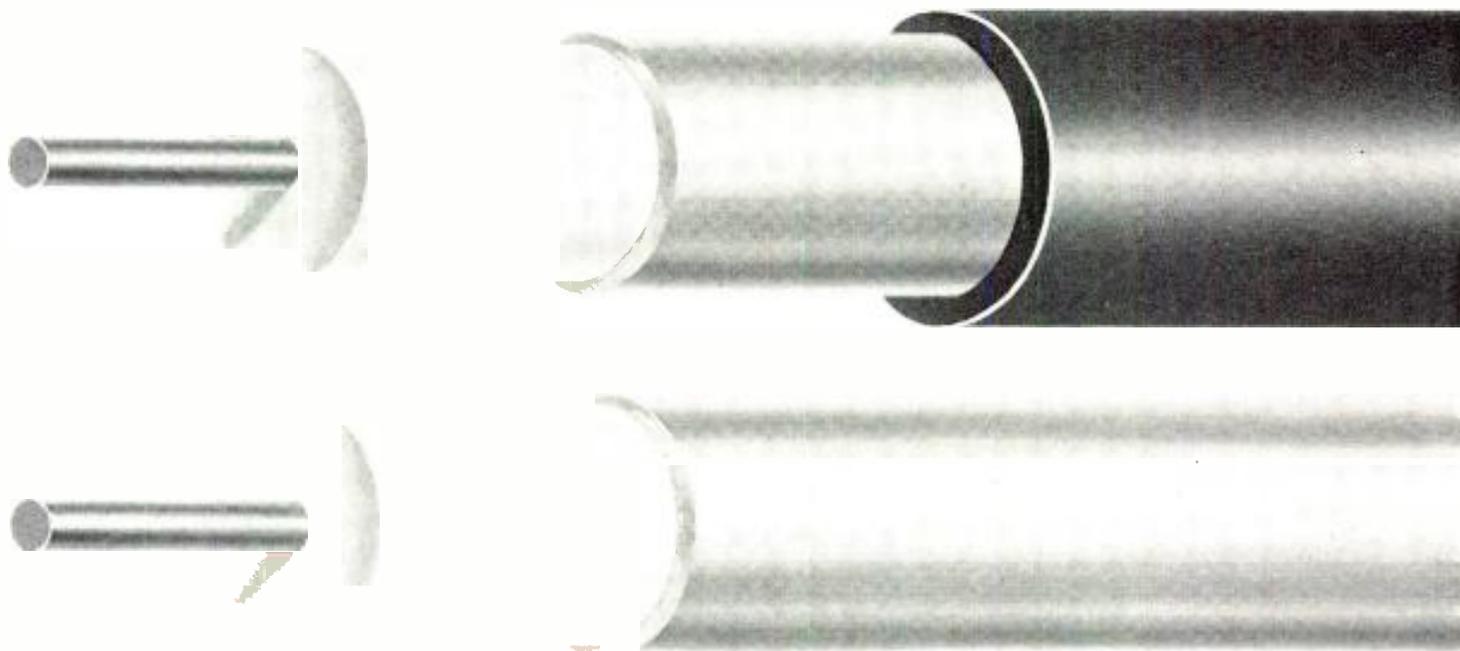
Other types of transportation enclosures produced by manufacturers other than Skydvne are also used for certain specialized applications at CBS. Steel cases are used for certain types of equipment. Combination wood and plywood cases, built by CBS in its own maintenance shop, are used occasionally for transporting equipment moved only once. CBS also employs small cardboard cases for pieces of equipment that are not moved by commercial carriers, or for storage purposes. ●

Superior E-X-T-E-N-D-E-D Spectrum Coaxials go all the way to 300 MHz...and beyond!

Now ... a new 84 MHz segment available!

Controlled impedance uniformity over the extended range provides sufficient band width for up to 14 additional 6 MHz TV channels. You get 26 db minimum return loss (measured at a fixed 75 OHM termination) at any frequency. Both Coppergard and Alumagard feature Cell-O-Air[®] expanded polyethylene dielectric in aerial types. Coppergard features solid polyethylene dielectric in direct burial construction.

- CATV Systems
- ETV and ITV Programs
- CCTV for Business and Industry
- Data Transmission
- Remote Control Telemetry
- Alert and Alarm Systems
- Traffic and Highway Control Systems



Alumagard (seamless aluminum sheath)



Coppergard (corrugated copper shield)

Superior's Full Spectrum Coaxials — through 219 MHz — are also available in both aerial and direct burial types.

For detailed information and prices, write
SUPERIOR CABLE
SUPERIOR CABLE CORPORATION HICKORY, NORTH CAROLINA 28541

Circle 19 on Reader Service Card

BROADCAST EQUIPMENT

High-Intensity Lamp Has No Lens

Model LQF10-50 Super-Beam "1000," made by Colortran Industries of Burbank, Calif., permits smooth and accurate focusing from spot to flood with a ratio of 11:1. Using the new lensless 1000-W tungsten-halogen "quartz" single-ended frosted lamp, the LQF10-50 operates directly from 120 V ac or dc, without boosting. The Super-



Beam "1000" produces 50 to 560 fc at 20 ft from the flood to spot focus positions and is available in motion picture and TV models. TV version (LQF10-50/TV) weighs 11 lb and is supplied with steel loop focusing control and yoke incorporating a C-clamp for mounting. Both versions are priced at \$125.

Circle 100 on Reader Service Card

Videotape Recorder

Craig 6401 videotape recorder, made by Craig Panorama of Los Angeles, Calif., features mechanical simplicity in its operation. Helical-scan, full field, two-head frequency-modulated system utilizing 1/2-in. tape at 9 1/2 in./s. accepts 7- or 8 1/2-in. reels. Records and plays back 50 or 63 min, depending on choice of reels. Easy-maintenance features include all-electronic rotary transformer head assembly, eliminating hard to clean mechanical brushes and slip



rings. Dimensions are 21 3/4 X 13 3/4 X 17 3/4; weight, 65 lb. VTR list price is \$1035.00.

Circle 101 on Reader Service Card

TV Color Film Processor

Recently announced by Treise Engineering of San Fernando, Calif., Model MTV-30 color processor is especially designed to meet television needs. The compact, self-contained unit occupies 17 X 9 ft of floor space and requires just 20 min to achieve operating temperature of



100-110° from ambient temperature of 70°. All tanks are fully insulated and all solution pumps are magnetically coupled. Unit operates at 40 ft/min and has drying system that combines conventional and impingement methods.

Circle 105 on Reader Service Card

One-Man Training Studio

Comprised of several components housed in a caster-mounted cabinet, the WAVE/Trainer System, made by Commercial-Institutional Products Div. of Westinghouse, Metuchen, N.J., can be used for sales training, industrial production and safety courses, information distribution to the field, taped demonstrations, etc. Among the individual items in the WAVE/Trainer System are: solid-state monochrome vidicon camera; exclusive Westinghouse audio-visual recorder, used for recording and playback of video sources and up to five different audio tracks simultaneously; audio pickup; 19-in. solid-state monochrome TV receiver; and a 9-in. monitor for

simultaneous viewing while taping or for off-air or camera playback. Rounding equipment lineup is Westinghouse Audio-Visual recorder which accommodates five different audio tracks simultaneously, allow-

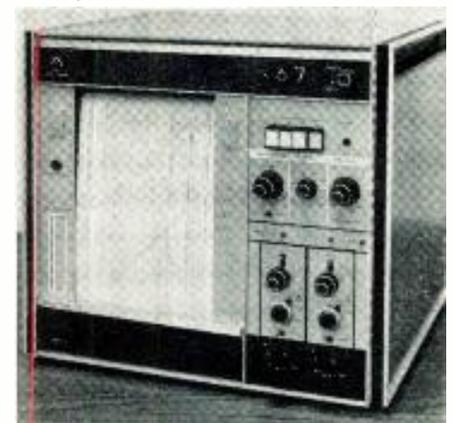


ing common video integrated with five audio messages.

Circle 103 on Reader Service Card

Electrostatic Recorder

The Statos I recorder, made by Varian Associates of Palo Alto, Calif., prints data in direct writing form with a frequency response of 3 kHz with no moving parts, ink arcing, or heat in the recording process. The fixed head of the Statos I simultaneously records two analog signals (from presently used sources) and one digital signal across 100mm full scale. Accuracy at dc to 1.5 kHz (full scale, 100mm resolution) is within 1 percent; or dc to 3 kHz (50mm resolution) is within 2 percent. The paper transport system — statos' only link with conventional recorders — has 6000:1 speed range with 14 calibrated chart speeds from 0.2 cm/min to 20 cm/min, electronically selectable and continuously variable. Measuring less





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**Advanced Circuit Techniques Achieve Increased
Reliability and Improved Picture Quality**

MAINTENANCE FREE OPERATION

All Solid State Circuitry • No periodic alignment or adjustment required • Highest quality components and workmanship.

EASE OF OPERATION

Display linearity independent of size adjustment • Unique deflection circuits have feedback active over entire raster • No sync controls — synchronization is automatic on both North American and CCIR Standards.

IMAGE QUALITY

Displays sine² T/2 pulse without distortion (62.5nsec) • Feedback active over full video band • Unity interlace results from novel sync circuitry • Keyed back porch clamp assures less than 1% black level shift for 100% video amplitude change • Less than 1.5% geometric distortion overall.

OTHER IMPORTANT FEATURES

Fully regulated high voltage and low voltage power supplies • Balanced input with loop-through facility • 46 db input common mode rejection.

Model 6946A—Price \$950.

Contact your nearest Hewlett-Packard Sales Office
for full specifications.



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100 Locust Ave., Berkeley Heights, New Jersey 07922
Telephone 201-464-1234 TWX 710-984-7972

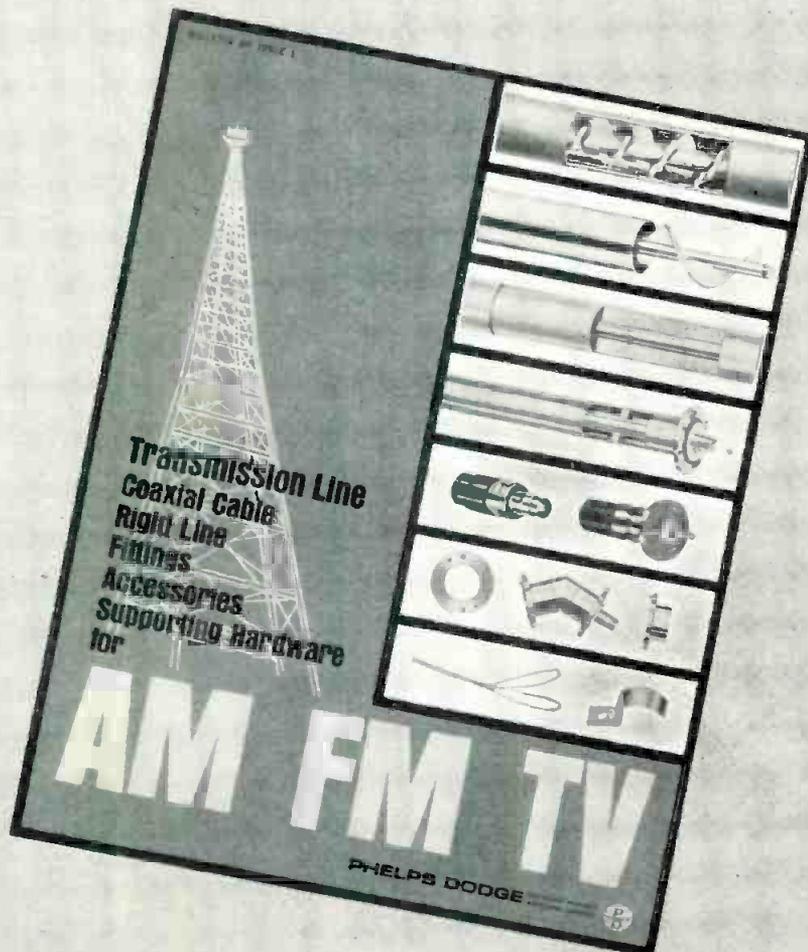


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Coaxial Cable Air dielectric and foam dielectric types offer reliability and lower loss characteristics.

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Coaxial Cable Accessories Off-the-shelf delivery of cable grips, grounding kits, tubing cutters, two-stage regulators, automatic dehydrators.

Rigid Line Available in four diameters. Meets or exceeds EIA RS225 specifications.

Rigid Line Accessories Miter elbows, gas barriers, reducers, tee assemblies, adapters, flanges are available.

Supporting Hardware Anchor fittings, hangers, braces, supports, clamps, bulkhead fittings.

PHELPS DODGE ELECTRONIC PRODUCTS
NORTH HAVEN, CONNECTICUT



Circle 21 on Reader Service Card

than 2 ft³ and weighing 95 lb, the Statos I is available in portable or standard rack mount configurations and operates on 105-125 V ac, 50 or 60 Hz, 150 W (230 V available). Basic price is \$7100.

Circle 104 on Reader Service Card

Fm Stereo Signal Generator

Type SMSF 87-to-108 MHz fm stereo signal generator, made by Rohde & Schwarz of Passaic, N.J., has frequency stability within 1 kHz and accuracy of output within 200 kHz. The 50-ohm SMSF solid-state signal generator, BN 41410/50, also provides an i-f output of 10.7 MHz

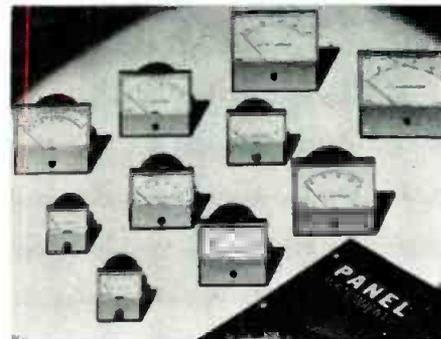


variable over ± 500 kHz. A precision attenuator and fixed pad permit continuously variable output power of 0.3 mV to 0.3 V (rf) and 1 mV to 1 V (i-f). Frequency response is better than ± 1 dB. Distortion typically is less than 0.2 dB and spurious deviations are less than 15 Hz. Price is \$995.

Circle 106 on Reader Service Card

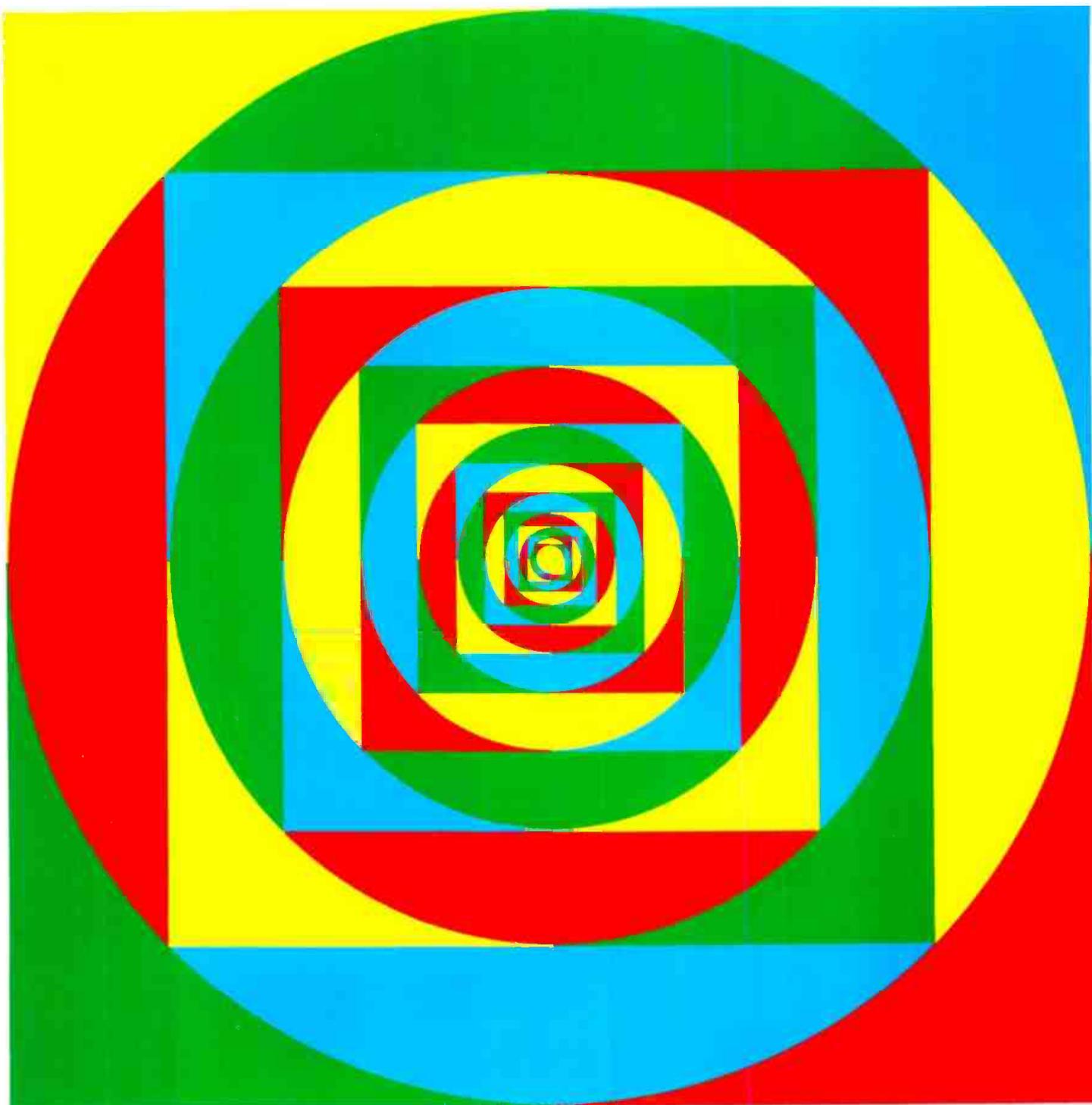
Panel Meters

Series G panel instrument series, made by Triplett Electrical Instrument Co. of Bluffton, Ohio, is available in five sizes from miniature 4-oz. 1½ in. (120-G), ranging through the 2½ in. (220-G), 3½ in. (320-G), 4½ in. (420-G) and the 5½ in. (520-G) units. Each meter can be provided with a special flat insert for the masked portion of the panel meter front. Insert can be customized and painted any color the electrical manufacturer desires and even imprinted with the company's trade-



mark or logotype, instructions or specific industry levels being tested. For all specific panel meters in the G Series, standard panel calibration is either magnetic or nonmagnetic. The standard G Series accuracy is 2 percent for all types except the ac rectifier type which is 3 percent. On

Circle 22 on Reader Service Card →



**78V was meant to be
your master.**



78V is the tape to use if you're after excellent masters and great copies.

Here's why:

We designed 78V for the new generation of high-band recorders.

It reproduces colors no other tape can match.

It offers quality video without sacrificing quality sound. (Its signal-to-noise ratio is consistently high. And it has better frequency response, more stable reference signals, and more uniform audio signals than any other video tape.)

It's consistently low in abrasion from reel to reel.

And it's durable. 78V will perform with a minimum of dropouts long after other tapes have failed.

Of course, the best test of a great tape is how well it performs on your recorder.

We'd like you to make that test.

Contact us, and we'll dispatch our man with a reel. We'll also send you more information—including specs—on 78V if you'll write us at

700 Memorex Park, Santa Clara, California 95050 .

**78V begins
where other color video tapes
leave off.**

MEMOREX

special order. 4½ and 5½-in. dc types may be obtained with best accuracy of ½ percent, 1 percent for ac (iron vane), 2 percent for rf thermocouple and 3 percent for ac rectifier type.

Circle 110 on Reader Service Card

Remote Volume Control Unit

Specifically designed by Altec Lansing of Anaheim, Calif., for systems utilizing solid-state preamplifiers, and power amplifiers, Revocon II, when installed in or between these units, physically replaces their volume controls. Revocon II can be installed in the sound reinforcement system, in only minutes, with up to a thousand or more feet of low-cost, unshielded, bell-type wir-

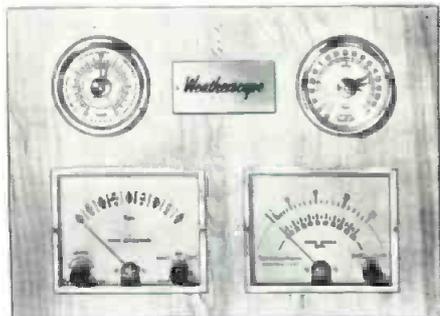


ing to remote unit location. The 1521A slave network, the heart of the Revocon II, will not change any of the performance characteristics of the original amplifiers. Up to six 1522A remote volume control units may be ganged from a single 1583A power supply, and the units may be bolted together to form a console of individual units for table or wall mounting, or portable operation.

Circle 107 on Reader Service Card

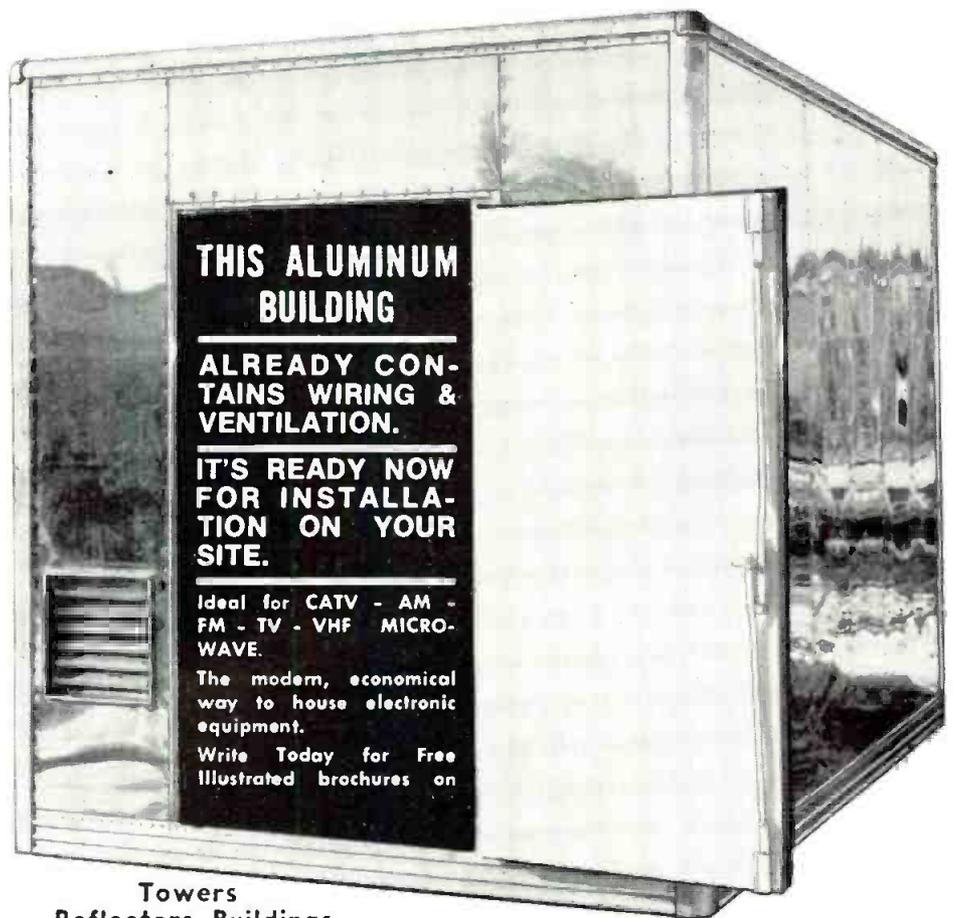
Weather Instruments

Weatherscope Panel, made by W.W. Boerst, Jamestown, N.Y., incorporates remote reading maximum-minimum thermometer, barometer, and meters indicating wind speed and direction. Panel measures 17 X 12 in. and is finished in either maple, walnut, or mahogany. All outdoor parts are made of noncor-



roding aluminum. Transmitter assembly may be installed on roof at a maximum height of 2000 ft. Sixty ft of weatherproof, plastic-covered cable is supplied. Weatherscope Panel

← Circle 22 on Reader Service Card



Towers
Reflectors Buildings

Advance Industries

Dept. BM 967

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Circle 23 on Reader Service Card

Operating remote control? Be safe and sure with the



NEW! ALL SOLID-STATE RF AMPLIFIER FROM WILKINSON!

Features of the Model TRF 1A:

- VERY LOW DISTORTION AND CARRIER SHIFT
- BROAD GAIN CHARACTERISTICS
- EXTREME STABILITY • EXCELLENT SELECTIVITY
- ULTRA LINEARITY

PRICE: **\$395**

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WOODLYN, PA. 19094

PHONE (215) 874-5236 874-5237

Circle 24 on Reader Service Card

SUPER SOUNDS FAIRCHILD

start
with



New FAIRCHILD 42 input TV Network Mixer.

Pictured above is one of several complex 42-input consoles constructed for a major TV network in New York. Each of the 42 input positions also has a reverb fader parallel with the input system to allow mixing of a separate reverb balance from each of the 42 inputs. Each of these 42 systems are then assigned and switched to one of five submaster channels, and then assigned to one of two outgoing channels. Therefore there is a possibility of over 420 switching and mixing combinations to be implemented in this console, and yet with all this complexity there is no audio in the console with the exception of the 20 audio lines assigned to peripheral effects equipment. All audio is located in one rack, remotely located and controlled with FAIRCHILD INTEGRA II REMOTE CONTROL AUDIO COMPONENTS.

Included in the INTEGRA II design is a complete system of plug-in cards that encompass the amplification, attenuation and switching functions required in audio console design. By combining several functions on one card, a savings in space and cost is possible, while simultaneously allowing the design of simple or complex consoles and implementing their fabrication in short periods of time. The console pictured above was completed in 60 days and was delivered, ready to go and on the air in less than five days.

Send for tech bulletin on INTEGRA II.



FAIRCHILD CONAX

The world-accepted standard to control high frequency spillovers due to pre-emphasis. Maintain high levels even with brass and crashing cymbals in FM and recording.

THE REVERBERTRON

The new compact reverberation system which gives your station that real big voice. With the Reverbertron you can have that Carnegie Hall effect as close as the gain control on the Reverbertron. And there's the added plus of an increase in apparent loudness of your station sound due to reverberation, as originally described by Dr. Maxfield.



FAIRCHILD COMPACT COMPRESSOR MODEL 663

Allows creation of those up tight levels that contribute materially to presence and loudness combined with overload protection. The FAIRCHILD Model 663 Compact Compressor produces no distortion despite the amount of compression used... no thumps, no noise. The 663 provides adjustable release time and up to 20 db of compression. Model 663NL comes with unity gain and additional gain if needed with +18 dbm output.



FAIRCHILD PROGRAM EQUALIZER MODEL 664NL



An ideal no loss equalizer for broadcast and recording. The FAIRCHILD Model 664NL allows the production of the "hot, solid commercial" sound standard with major recording studios; transforms any conventional console into 'Big Board sound'. 1½" x 5¼" high unit provides equalization up to 10 db at 4, 6, 8, 10, or 15 KHZ and low end equalization up to 10 db. Rolloffs also provided. The Model 664NLB has equalization at 2, 3, 4, 5, and 7.5 KHZ for motion picture demands. The FAIRCHILD Program Equalizer contains equalization plus 18 dbm amplifier output. Put life into your sound with the FAIRCHILD Equalizer.

FAIRCHILD LIMITER MODEL 670

Fast attack Stereo Limiter (50 microseconds) with low distortion and absence of thumps. Sum and difference limiting position eliminates floating stereo image. Includes regular channel A and B limiting. Dual controls, dual meters provided. Used throughout the world. Flexible release times make it indispensable in stereo recording and broadcasting.



(with twenty ft of thermometer capillary tubing) is priced at \$225.
Circle 108 on Reader Service Card

Power Supply Has Dual Outputs, Ranges

Model DL40-1 silicon dual lab power supply, made by Trygon Electronics of Roosevelt, N.Y., has calibrated adjustable current limiting controls and two independent outputs with dual ranges on each output. Independent range switches permit



selection of 0.75 or 1 A for the 0-20 V range or 0.50, 0.1, 0.25, or 0.5 A for the 0-40 V range. Other features include input range of 100-125/200-250 V ac, 47-420 Hz. 0.01-percent regulation, 2 mV peak to peak ripple, and remote voltage programming and sensing. Price is \$249.

Circle 109 on Reader Service Card

Split-Second Motorized Antenna Switch Matrix

The SLS-1M motorized switching matrix, made by Delta Electronics of Alexandria, Va., has switching time of ½ s and binary control circuitry which permits remote switching via pulse-code telegraph and microwave links. Switching concept used in SLS-1M involves a plunger-type mechanism which completely removes all residual stubs from active circuits; matrix connections are strip-line. Included is an interlock system which prevents accidental feeding of one transmitter



Write to FAIRCHILD — the pacemaker in professional audio products — for complete details.

FAIRCHILD

RECORDING EQUIPMENT CORPORATION
1040 45th Ave., Long Island City 1, N. Y.

Circle 25 on Reader Service Card

You only get out of a thing



what you put into it.

Our new Criterion series tape cartridge system is the certain, for-sure way to get the best sound into your cartridges, then get it out of them at air time. Here's why:

- Improved tape drive – exclusive 450-rpm 4-pound Hysteresis synchronous positive-speed motor.
- Speed accuracy of 0.2% – direct Capstan drive comparable to finest reel-to-reel machines.
- No tape skewing – exclusive triple tape guide assembly with precision-machined cast aluminum head mounting.
- Positive alignment of tape cartridges and other components – heavy duty machined cast aluminum base.
- Low signal to noise ratios – space-age alloy motor shielding.
- Superb fidelity – solid-state plug-in electronics and fully regulated power supply.

We'll be happy to send you all the technical details on this newest and finest tape cartridge system. Just jot down your name, station and address on this ad and mail it to us.



Basic Criterion series solid-state playback unit and recording amplifier. Available in slide-out rack panel mounting or trimline desk console. Mono or stereo. 1-, 2-, or 3-tone.

AUTOMATIC TAPE CONTROL DIVISION
1107 East Croxton Avenue
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GATES

Gates Radio Company,
Quincy, Illinois



Circle 26 on Reader Service Card

NEVER BEFORE



TEAC Series R-310 Professional Tape Recorder

NEVER BEFORE . . . so many quality features for the professional Broadcaster!
NEVER BEFORE . . . at such a low price!

Series R-310 Record & Playback models are available for half or full track monophonic, and two or four track stereo. Rack, portable case or console cabinet mounting.

LIMITED INTRODUCTORY OFFER

Be among the first to place your order and take advantage of our special **NEVER BEFORE — NEVER AGAIN** offer!

Call or write Sparta for full specifications and information.

SPARTA
ELECTRONIC CORPORATION

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Circle 27 on Reader Service Card

into another, or two transmitters into one antenna. Switches are motor-driven and have average power handling capacity of 50 kW at frequencies of 0 to 30 MHz. Peak power rating is 200 kW. Characteristic impedance is 50 ohms with a vswr or 1.15 or less. Cross-channel isolation is 65 dB or better.

Circle 111 on Reader Service Card

Expanded Line of Equipment Cases

An expanded line of standard equipment transportation cases manufactured of A.B.S. light, strong, and highly-ductile thermoplastic now is being made by Skydyne of Port Jervis, N.Y. The line includes units measuring from approximately 8 X

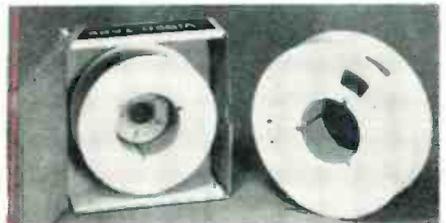


6 in. to 47 X 18.5 in. and are available immediately. Cases are designed to meet military specifications and are available with shock absorbing interior equipment mounting facilities and in a wide selection of colors and optional hardware.

Circle 112 on Reader Service Card

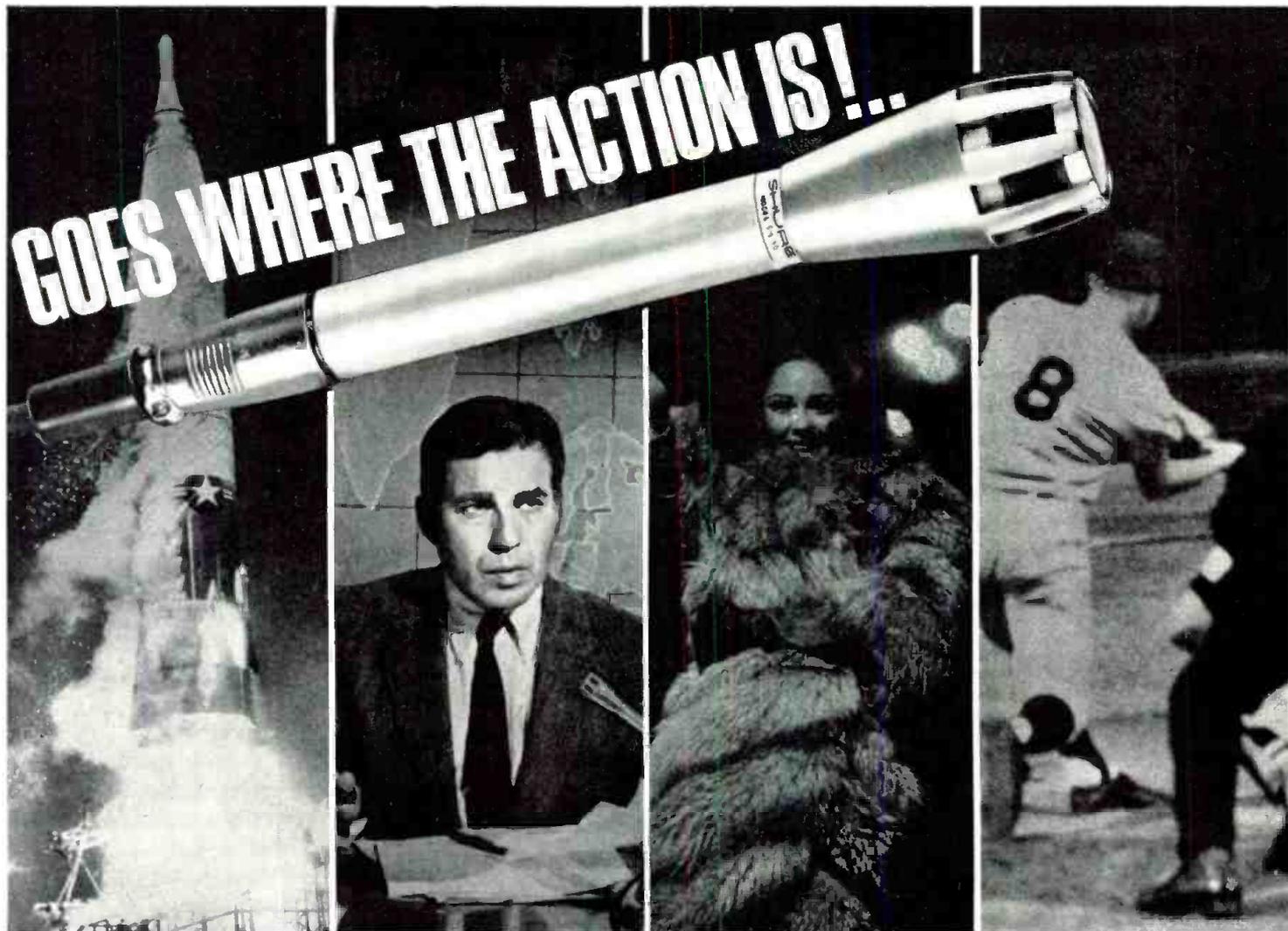
Videotape Reels

Plio-Magic 2-in. videotape reels, recently introduced by Plastic Reel Corp. of America, Carlstadt, N.J., are available in 6½- and 8-in.-dia



sizes. Reel is made of a high-impact formulation and comes with a rubber pickup band and hub. Retainer pivot holds reels in special shipping carton.

Circle 122 on Reader Service Card



The SM60 cannot be stereotyped—is equally at home in the studio or in the field—stand-mounted or hand-held—in uses as diverse as outdoor sporting events and elaborate variety shows. Small wonder that audio engineers have called it one of the most versatile omnidirectional dynamics they've ever encountered, for the SM60 is a unique combination of good-looks, strength, performance and economy.

The smooth, wide-range response provides cleanest, natural reproduction of both speech and music. A very effective built-in wind and "pop" filter protects against undesirable effects of close-talking.

Lustrous, non-glare metallic finish and tailored-to-the-

hand dimensions provide striking on-camera appearance and superior handability. Specially reinforced machined-steel case front is designed to take abuse that would ruin other microphones—you can drop it on its nose without damage to the internal structure! Efficient windscreen and front end are *quickly* and *easily* removable for cleaning.

Best of all, it is priced competitively with conventional "workhorse" microphones. Why not check out an SM60 now? See your Shure Professional Products Distributor, or contact Mr. Robert Carr, Manager of Professional Products Division, Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill. 60204—Phone 312 - 328-9000.

SHURE SM60

VERSATILE OMNIDIRECTIONAL DYNAMIC MICROPHONE

THE LAST WORD IN WEARABLE LAVALIER MICROPHONES . . . BY SHURE



Specifically designed for radio, TV, motion pictures . . . matches well in sound with stand or desk mounted units. Smoothly-contoured, machined-steel case and recessed grille for minimum clothing noise. Exclusive snap-in mounting of microphone for greater convenience, security. "Positive Lock" lavalier goes on in an instant—provides simple, noiseless position adjustment. Extra-flexible, kink-free rubber cable is easily replaceable.

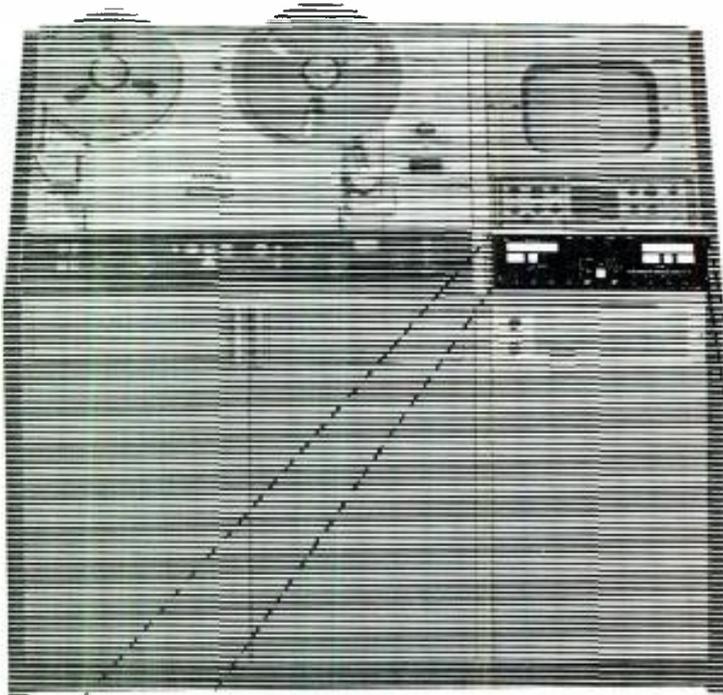
MODEL SM51 DYNAMIC LAVALIER



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Circle 28 on Reader Service Card

THIS NEW CHANGE IN YOUR TV RECORDER OFFERS FANTASTIC IMPROVEMENT IN TAPE EDITING AND CONTROL



ON TIME

Editing and Control Equipment for TV Tape Recorders



EECO's **ON TIME** SYSTEM records a time code on the cue track. With this precise control . . .

-  SCENES are QUICKLY LOCATED.
-  "ELECTRONIC" SPLICING is FAST and ACCURATE.
-  The transport can be stopped and started AUTOMATICALLY

. . . at PRECISE, PRESET TIMES.

For more information or a DEMONSTRATION on your recorder, contact . . .



Electronic Engineering Company

of California
1601 East Chestnut Avenue (Box 58)
Santa Ana, California 92702

Circle 29 on Reader Service Card

MMIES IN THE NEWS

Frank Gaither, vice president, Cox Broadcasting, has been reappointed chairman of the National Association of Broadcaster's Public Relations Committee. NAB also announces the promotion of **Thomas R. Winkler** to the position of manager, Radio Code.

Steve Fayer has joined WKBG-TV, Boston, as special assistant to the general manager, a newly-created position.



Rupert F. Goodspeed David A. Diver

The appointment of **Rupert F. Goodspeed** as product manager, broadcast equipment, at Philips Broadcast Equipment Corp., has been announced by Robert L. Diamond, marketing manager.

ColorTran Industries, Inc., announces the appointment of **David A. Diver** as technical sales representative.

Joseph Dembo has been named vice president of the CBS Radio Division and general manager of WCBS, the CBS-owned radio station in New York. The announcement was made by Fred Ruegg, CBS Radio vice president, station administration. Dembo succeeds Thomas J. Swafford who has been assigned to the staff of the CBS Broadcast Group.

Melville K. Weill, chairman of the Board of Skydyne, Inc., and its founder recently announced the appointment of a new slate of officers: **Robert L. Weill** is the new president; **William F. Maccallum**, vice president and director of sales; **George B. Parsons**, vice president and director of engineering; and **Walter H. Bloomer, Jr.**, secretary and treasurer.

WOOD-AM-FM-TV News Director Dick Cheverton has announced the appointment of **Don MacKinnon** to the post of special projects director for WOOD news.

The Board of Directors of the American Research Bureau, Inc., has appointed **Dr. Mark D. Munn**, formerly



COMPARE THE FEATURES OF TOWNSEND ASSOCIATES U.H.F. TRANSMITTERS WITH OTHER MANUFACTURER'S TRANSMITTERS



1. Video and audio modulators
2. Emergency amplifier operation at all power levels
3. Number of beam power supplies normally supplied with transmitter
4. Year first transmitter with new type klystrons was placed into commercial operation
5. Sideband filtering
6. Driver R.F. circuits
7. Heat exchangers
8. Control of amplifier beam power
9. Built in test and monitoring equipment
10. Amplifier coolant operating temperature

	T.A.	G.E.	R.C.A.
1.	Transistorized	Tube	Tube
2.	Multiplex-aural or visual	No	No
3.	2	1	1
4.	1962	1963	1964
5.	Low Level	Low Level	High level
6.	Transistorized	Tube	Tube
7.	Unitized	Random Arrangement	Random Arrangement
8.	Vacuum switch	Mechanical Adjustment	Mechanical Adjustment
9.	Frequency monitor, sideband analyzer, picture monitor, oscilloscope, demodulator, audio oscillator	None	None
10.	130°	130°	212°

While some manufacturers have some of the features found in T.A. transmitters, no manufacturer has all the features which make T.A. transmitters the only truly modern U.H.F. transmitters.

Townsend Associates transmitters are F.C.C. type accepted at all common power levels.

**For more information
write today to:**

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(413) 733-2284

LOS ANGELES OFFICE
8846 Delco Avenue
Canoga Park, California 91306
(213) 882-0732

Circle 30 on Reader Service Card

Care-free way to transmit 5 Kw AM

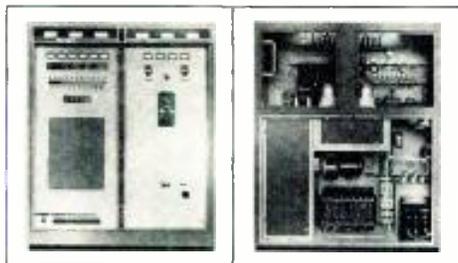
Use the all-new leader: Bauer

No other AM transmitter matches the reliability, performance and clean, well-engineered mechanical layout of the new Bauer Model FB-5V. Totally up-to-date, this transmitter combines simple, straight-forward circuitry and design with a host of broadcaster benefits.

A space-saver (60" wide, 29" deep), it is on-the-air ready in 30 seconds with 6000-watt, power-plus capability. Has full metering—all functions clearly displayed simultaneously.

Tally light system indicates any fault or momentary overload, permits fast reset to back-on-the-air status, and 'remembers' the cause, pinpointing it for later correction.

All components are modern, of highest quality, and excellently arranged for quick accessibility. Every part is within easy reach for inspection or service.



Bauer also offers Model FB-10J, a 10 Kw AM transmitter (12-Kw capability) with the same clean design features of Model FB-5V, which itself can be increased to 10 Kw with a simple field conversion kit.

Send for full data and learn how Bauer has made these new AM transmitters better and more care-free for you.

Bauer

ELECTRONICS CORPORATION

1601 California Ave.
Palo Alto, California 94304

A  COMPANY

Circle 31 on Reader Service Card

manager of media and program analysis for the Leo Burnett Co., Chicago, as vice president of AFA Services.

Donald P. Dickerson, time salesman for KRLD-TV, Dallas, for the past nine years, has been appointed general manager of KMEC-TV, channel 33, Dallas. It was recently announced by Carroll Maxwell, KMEC-TV general manager.



Donald P. Dickerson



Charles E. Maki

Ameco announces the appointments of **Wayne E. Calhoun** as personnel director, **Charles E. Maki** as senior vice president in charge of the CATV Products Division, and **Donald J. Lanzinger** as senior engineer.



Donald J. Lanzinger



Duane W. Crist

Anaconda Astrodata Co. has appointed **Duane W. Crist** to the newly-created position of sales manager, CATV Products.

Glenn Lahman has been appointed engineering manager of KDKA-TV-AM-FM, Group W stations in Pittsburgh, replacing **George Hagerty**, who has been named engineering manager of Group W's Central Licensing Bureau in Washington, D.C.

WTOW-AM-FM announces the appointments of **Harry L. Putnam** as program director and **Nic Howard** as program director.

Robert L. Rooney, faculty member at the State University College at Oswego, N.Y., leaves his position in ITV to become station manager at WOSC-AM-FM, Oswego-Fulton, N.Y.

The Society of Motion Picture and Television Engineers has selected **Gordon A. Chambers**, director of Engineering Services, Eastman Kodak Co., Rochester, N.Y., as the recipient of the Society's 1967 Progress Medal Award.

SPOTMASTER

RS-25



Tape Cartridge Racks

RM-100



... from industry's most comprehensive line of cartridge tape equipment.

Enjoy finger-tip convenience with RM-100 wall-mount wood racks. Store 100 cartridges in minimum space (modular construction permits table-top mounting as well); \$40.00 per rack. SPOTMASTER Lazy Susan revolving cartridge wire rack holds 200 cartridges. Price \$145.50. Extra rack sections available at \$12.90.

Write or wire for complete details.


BROADCAST ELECTRONICS, INC.
8800 Brookville Road
Silver Spring, Maryland

Circle 32 on Reader Service Card

VFH TRANSISTORISED TRANSLATOR ONE WATT OUTPUT



F.C.C. TYPE ACCEPTED

also available:

100 WATT OUTPUT

- VHF and UHF TRANSLATORS

10 WATT OUTPUT

- VHF TRANSISTORIZED TRANSLATOR

MULTIPLE OUTPUT AMPLIFIERS

- (FOUR ONE WATT OUTPUTS)

TWO YEAR GUARANTEE
on all our superior
designed units

RODELCO

127 RIDGE ROAD, WYANDANCH, N.Y. 11798
Phone-516 643.5110

Circle 33 on Reader Service Card

September, 1967 — BM/E



Paint the town Red, Blue, Green. Color your station successful.

If you're already transmitting network color, the logical next step is a full spectrum of local color news coverage. Watch how color enhances your importance to the community and your usefulness to advertisers! Kodak makes your move to color feasible with the versatile ME-4 System: high-speed *Kodak Ektachrome* EF Films, a virtually foolproof process, and quality-tested chemistry. The ME-4 System assures color video images of high resolution, low noise and excellent color saturation. Processing service is available in many areas, or you can easily process the film yourself. Naturally, we'll help you set up the process and keep ourselves available for continued service thereafter. Want more information? Call your nearest Eastman Kodak motion picture engineer.

Eastman Kodak Company

Atlanta: 404/GL 7-5211 Chicago: 312/654-0200
Dallas: 214/FL 1-3221 Hollywood: 213/464-6131
New York: 212/MU 7-7080 San Francisco: 415/PR 6-6055

Kodak
TRADEMARK

BROADCASTERS SPEAK

Sirs:

Some time ago, perhaps as long ago as 1964 you published an article concerning the conversion of Citizens band equipment for use on frequencies allocated for remote pick-up stations. Our copy of the issue, which had been snatched from a friend in the business has been misplaced. Would it be possible to obtain a copy of the issue or at any rate to put me in touch with the station engineer who wrote the article.

We look forward to each issue of *BM/E*, so keep up the good work.

Ron E. Pierce
General Manager
WCAI
Fort Meyer, Fla.

Anything to get a station manager off the hook. R.P. We're sending a copy of the May/65 BM/E.

Sirs:

I would to take this opportunity to say "thank you" for a fine magazine. Every one we receive is read from front to back by everyone from General Manager down to the announcers. We really appreciate what you are doing to make broadcasting what it is today.

Our copy of *BM/E*, Volume 3 Number 7 for July came to us in such bad condition it is unreadable.

Could you possibly send us a couple more? Thank you very much.

Bill Averitt
Program Director
KDLA
DeRidder, La.

July/67 BM/E's on the way, B.A.

Sirs:

The excerpt on "The Basics of Radio News." (July Edition, *BM/E*) without a doubt, is one of the most complete extracts to cross my desk.

Mr. Dary is to be commended for his excellent approach on how to organize a News Operation, and once this is accomplished, how to keep it organized and operating smoothly and efficiently.

Most publications, dealing in one's professional field, have a tendency to end up on that dirty old bookcase in the corner of the room. However, I feel that Mr. Dary has published a guide for professional and amateur alike which will be used so often as a frequent reference, so as not to have a chance of gathering Newsroom dust.

At least TAB books has my order, thanks to *BM/E*'s staff, who thru their article, brought this new publication to my attention.

Kyle V. Ridgway
Radio-TV News Director
Information Office
Fort Knox, Kentucky

Glad you managed to find this fine piece, K.R., despite the fact that we forgot to list it on the contents page.

Sirs:

I was interested in a writeup on page 6 of your July issue describing a new video tape to film process done by Acme Film and Videotape Laboratories.

Could you please tell me where I might reach this organization?

George D. Margolin
Vice President and
General Manager
Front Projection Corp.
New York, N.Y.

We've a number of inquires about this. G.M. The address is: Newell Associates, Inc. 155 San Lazaro Ave., Sunnyvale, Calif.

Sirs:

I would like to pass this bit of information along to the readers of *Engineering Casebook* who use General Radio frequency meters models 1181A, 1181B, 1301A and 1302A.

This equipment employs a 6B4, which is now expensive to replace. General Radio informed me that a 6W6GT will replace 6B4 with only slight modifications to the tube or its socket. By joining pin 2 to 8 and pin 3 to 4, the 6W6GT will replace the 6B4. However, if any of the pins of the tube socket are employed as tie points, these tie points should be relocated prior to employing the 6W6GT.

Clyde Chaffin
Chief Engineer
KVMA
Magnolia, Ark.

VIDEO SALES ENGINEER

Memorex Corporation, a leader in the development, manufacture and sale of precision magnetic tape, has openings for qualified individuals throughout the country.

You must be an already successful salesman with an extensive background in and thorough knowledge of the video broadcast engineering field. You must be looking for more challenge to your abilities and greater earning potential. To customers in the video recording industry you will be offering professional sales service in the form of

precision magnetic video tape products of guaranteed quality.

Our compensation and benefit package will include salary plus incentive commission, new car, expenses, profit sharing, insurance, and paid vacation.

Please send your résumé to our Professional Employment Office, 1180 Shulman Avenue, Santa Clara, California. An equal opportunity employer.

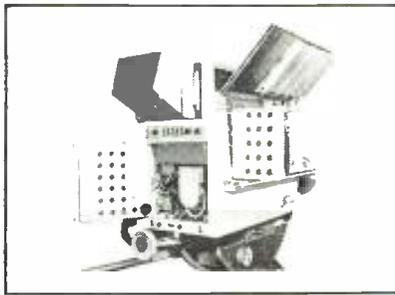
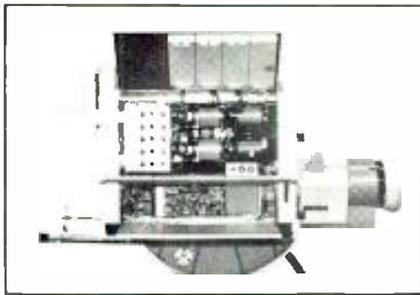
MEMOREX
CORPORATION

Circle 34 on Reader Service Card

CAMERA HEAD:

12" X 23" X 18 1/2" — 110 lbs

Hard to believe a commercial TV color camera can be so compact?



Not hard at all . . . when it is Toshiba TV broadcast equipment! Besides being compact, the Model IK-37 camera chain provides improved compatibility and sharper pictures with wider grayscale on both types of receiver, color and black-and-white. A 3" Toshiba image-

orthicon tube for Y signal and three Toshiba SENSICON tubes for C signal, arranged for easy servicing in this camera head, give signals that are ideal for colorplexing and equal in quality to any straight monochrome signals.

- All solid-state circuits with high-grade Toshiba semiconductor elements throughout the chain.
- Lightweight and easy-to-pan camera.
- Plug-in units for simplified maintenance.
- SENSICON tubes with nearly 100% conversion efficiency and twice as high sensitivity as that of ordinary vidicons.
- Optical system and coil assemblies fixed rigidly and reliably in an anti-shock arrangement.
- No need of adjusting the picture in view finder as its input is fed back from the controller.
- Provisions for mounting servo-operated zoom lens and for d-c remote control (up to 40 yards) of the zoom.

Tokyo Shibaura Electric Co., Ltd.

Producer Goods Export Division, Uchisaiwaicho, Tokyo, Japan

Toshiba America Inc.,

530 Ave. New York, NY 10036 Phone MU7-5471

Circle 35 on Reader Service Card



LITERATURE of INTEREST

For additional data, circle No. shown on Reader Service Card.

Tone Signalling equipment is the topic of 12-page brochure from Datatone. Brochure gives technical descriptions, specifications and application data on all elements of system, including transmitter, receiver, power supply and terminal equipment. **150**

"Skydyne Design Manual for Mil Spec Cases" is the title of an 18-page brochure from Skydyne, Inc. Brochure contains graphic, verbal and tabular analysis of sandwich-panel

structures and materials used in Skydyne cases. **151**

"Proceeding of the 1967 National Association of Broadcasters Engineering Conference," held April 3-5, now is available in bound format from Tab Books. Price is \$7.95 through September 30; \$10.00 thereafter. **152**

Filters for wire, cable and microwave applications are tabulated with operating characteristics and price in 19-page listing from Lynch Communication Systems, Inc. **153**

Helicopter video pickup techniques used by KTLA are described and illustrated in Application Bulletin (8-82) from Cohu Electronics. **154**

"Handbook of Noise Measurement" includes a detailed discussion of noise and vibration, including definitions, characteristics, measuring units, and psychological and physiological effects of noise on humans and their activities. A new section describes-measuring instruments and accessories. Handbook is available from General Radio for \$1.00. **155**

"Power Output Ratings of Packaged Audio Equipment for Home Use"—RS 234-B—from EIA defines standard test conditions and procedures and music power output. Price is \$5.50. **156**

Subminiature rf connectors made by Sealectro Corp. are presented with dimensional drawings in 6-page Catalog 171. **157**

Electronic Engineers Master (EEM) 67-68 edition now has a catalog section with 2133 pages divided into 35 product categories. For subscription information, circle: **158**

A case history describing the use of broadcast and closed circuit videotape recording equipment by the Nebraska Educational TV network is available from Ampex. **159**

Causes of voltage variation in an apparently normal power service are explained in Catalog 09 from Acme Electric Corp. **160**

"How Marketing Data Are Wasted" is title of a paper presented in the June issue of the *Journal of Advertising Research*. The paper explains how to determine "good" or "bad" data on "Intentions-to-buy" and what cumulative purchasing patterns for a new product indicate about its possible success or failure. Other articles of interest in June issue include one which describes the measurement and control of commercials on a modified CATV system. Single copies are available for \$2.50; reprints, \$1.00. **161**

Antenna rotor system, including rotor adaptor for added structural strength and thrust bearing are illustrated and described in brochure from Cornell Dubilier Electronics. **162**

Application Data sheets 67-1 through

67-4 present features and specifications of the Newell Associates low-, medium- and high-speed tape recorders, and an automatic tape changer. An accompanying brochure explains the principle by which the Newell tape transport operates. **163**

Videotape duplication facilities of Ampex Corp. and cost of services are presented in Brochure V66-280 (A). **164**

Communications instruments and components are illustrated with accompanying specifications in 8-page catalog from Barker and Williamson. Catalog contains capsuled information on distribution and grid-dip meters, coaxial switches, inductors, etc. **165**

Solid-state i-f amplifiers from Electronics Laboratory are presented in 4-page Bulletin IFA-103. **166**

CCTV master directory from GBC America Corp. supplies information on various types of system connections, camera block diagrams, monitor diagrams and camera lenses. **167**

"Evaluating Performance of Digital Magnetic Tape" is the title of Memorex monograph number 5. Booklet is 5th in a series dealing with problems associated with magnetic recording tape. **168**

High-speed silicon diode characteristics (Series 100) from Isofilm International are presented in data-sheet format. **169**

Books on all phases of radio-TV-CATV, many unavailable from other sources, fully described and illustrated in 18-page literature package from TAB Books. **170**

Bundled conductor spacing lessons learned from construction of Michigan's Mackinac Bridge are included in 4-page bulletin from Preformed Line Products. **171**

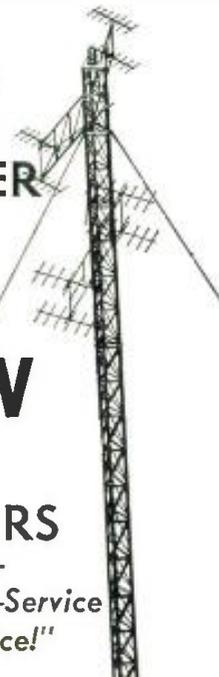
Quality assurance systems evaluation standards for equipment and system manufacturers have been published by EIA. Document is available for \$1.00. **172**

Automatic transfer switch Brochure 797 from Automatic Switch Co. presents features, specifications and dimensional drawings of transfer switches handling up to 125 A. **173**

Electrolytic Capacitors replacement guide from Cornell Dubilier has 32-page cross reference, including capacitors of 32 color chassis manufacturers. **174**

Standby power booklet from Onan Div. provides answers to 7 key questions for those considering the purchase of auxiliary power equipment. **175**

Interesting results of research carried out by Advertising Research Foundation including "TV Set Count Set" and "CATV Ad-Lab Progress" is included in June-July issue of *Verb Item*. **177**



THE
LEADER
IN
CATV
TOWERS

"Quality—Service
and Price!"

Yes, quality, service and price on CATV systems are the reasons for Fort Worth Tower's position as the industry's leading supplier. Experience gained as a pioneer supplier of CATV enables Fort Worth Tower to provide you with a quality product at a price that is reasonable and attractive.

Take advantage of our experience. For assistance in systems planning, engineering and complete systems quotations . . .

CALL OR WRITE TODAY

Fort Worth Tower

COMPANY, INCORPORATED

P. O. Box 8597, Fort Worth, Texas
(817) JE 6-5676

— Associated Companies —
Tommy Moore, Inc.
Big State Engineering, Inc.
Tower Construction Finance, Inc.

Circle 36 on Reader Service Card

First Dave. Then, Bill.

When are you going to use me in an Audiopak ad?

Name _____

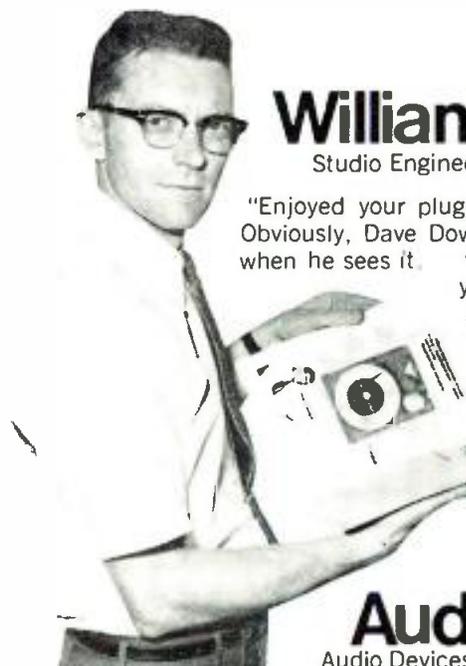
Title _____ Station _____

Address _____

City _____ State _____ Zip _____

Here's what I think of Audiopak tape cartridges:

P.S. Don't you think I should try a sample of Audiopak before you print what I say about it?



William Chapman

Studio Engineer, KEST, Boise, Idaho

"Enjoyed your plug in BM/E this month (May) Obviously, Dave Downing knows a good thing when he sees it.

"But, if it's testimonials you want, KEST is 100% Audiopak equipped. We are automated a fair part of the day, and soon discovered that automation without dependability is *hardly* automation; hence a full changeover to Audiopak cartridges.

Know anyone who wants a few dozen 'Brand X' carts?"

Audiopak™

Audio Devices, Inc. 235 E. 42 St., N.Y. 10017

Circle 37 on Reader Service Card

Your Sylvania distributor is up-to-date on your business. Use him: it's like adding an electronic consultant to your staff...free.

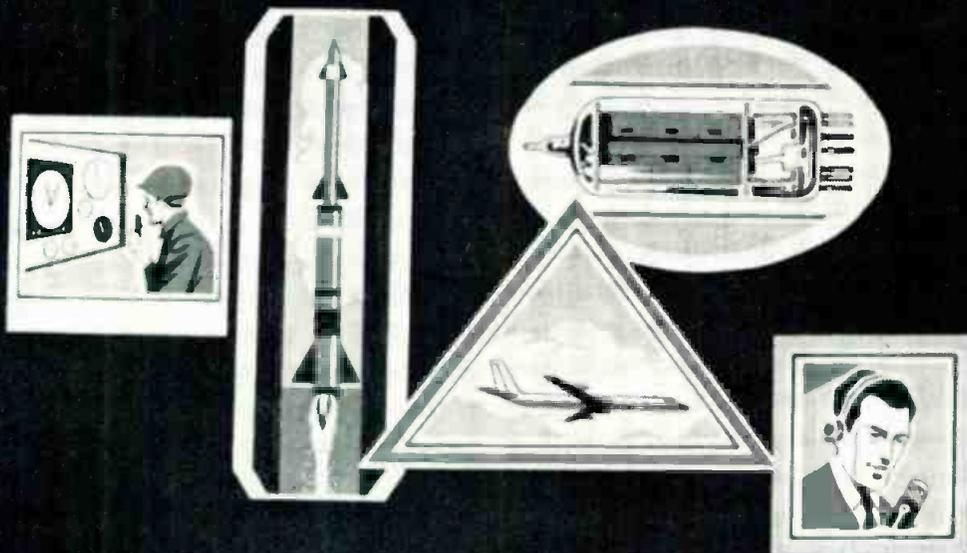
We keep him up-to-date with frequent reports and analyses of your maintenance and design needs. We give him plant tours and technical training. And ready access to Sylvania product and applications engineering staffs.

He knows the features of each and every tube we make. And he knows how *you* use them. He's up on the latest developments. He knows our competitors' tubes inside out, too.

Get a free analysis, by your Sylvania distributor, of your tube and semiconductor replacement needs. He can prevent emergencies, prepare an inventory—and save you money. He's an expert. Depend on him for service and for fast delivery—in any quantity.

Sylvania Electronic Tube Division, Electronic Components Group, Seneca Falls, New York 13148.

SYLVANIA
SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS **GTE**



BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

SITUATIONS WANTED: 15¢ per word; \$2.00 minimum
HELP WANTED: 20¢ per word; \$2.00 minimum.
ALL OTHER ADVERTISING: 25¢ per word; \$3.00 minimum.
BLIND BOX NUMBERS: No extra charge. Send replies to address below.

DISPLAY CLASSIFIED ADVERTISING: \$21.50 per inch 1x; \$20.00 per inch 6x; \$18.50 per inch 12x. Professional Cards \$15.00 12x.
CASH DISCOUNT: 2% cash discount if remittance accompanies order.
CLOSING DATE: 5th of the second month preceding issue date.

BM/E, Monterey and Pinola Avenues, Blue Ridge Summit, Pa. 17214 Phone 717/794-2191

BUSINESS OPPORTUNITIES

WANTED TO BUY

Small Market Radio Station in Southeast. Qualified buyers invite immediate inquiries.

Box 967-1, c/o BM/E,
Blue Ridge Summit,
Pa. 17214.

POSITIONS WANTED

Available Now! Mature newsmen, ending association with network-affiliate in major midwestern market after six years. 20 year broadcasting background, college-trained journalist thoroughly versed all phases newsgathering and reporting. Exceptional ability as editor-in-chief, writer or analyst. Has covered three national political conventions and directed both radio and TV news operations. Good voice, appearance and lively personality. Family man, 41, with both newspaper and teaching experience at university level. Key contacts in every field from politics to sports. Prefer metropolitan area but will go anywhere for appealing opportunity. Present employer is best reference. Box 967-2 c/o BM/E, Blue Ridge Summit, Pa. 17214.

LOOKING FOR A MATURE, EXPERIENCED SPORTSCASTER WHO WANTS TO JOIN A LIVELY, REPUTABLE TV-RADIO STATION? I have these credentials: (1) Extensive experience in sports broadcasting (plus other phases of broadcasting). Play-by-play TV & Radio. (2) Eagerness to be permanent part of your station and advance in organization. (3) Sincere desire to re-locate in good market and community. Will supply all information requested. Have top references plus full background summary. Prefer US midwest, northwest, or west coast. Box 967-14, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Need a tough manager? Small to medium market. Falltime. Texas, Oklahoma, Colorado, Kansas, Missouri. No dogs, but can help troubled station. Family man degree. 31, 13 yrs. experience. Top sales, low expenses. Must have full responsibility. Automation, Foreign Language Experience. Box 967-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Attention California—Mature, dependable manager experienced all phases—sales, programming, even have 1st Class License. Career has run from small market manager to network executive. Want management connection in radio, TV, CATV or allied field. What's your proposition? Box 967-4, c/o BM/E, Blue Ridge Summit, Pa. 17214.

"Let's Talk" Have profitable idea for talk show. Need station with eye for talent ideas, profit to air show. Have talent, know how, ambition, ideas to put show over for a mutual profit. 1-302-475-4825 or Box 967-5, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Program Director who developed one of New York State's most successful operations with music and news, would like to relocate as program director or manager. Stable, reliable. Box 967-19, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Detroit broadcasting school graduate. Negro DJ announcer 22, draft exempt. 3rd endorsement, ambitious with desire to learn. Will relocate. Gerald Dailey, 1701-Ford, Detroit, Michigan. (313) TO-5-7577.

Broadcast engineer with control room, Special events, remotes and motion picture projection, recording total of 20 years experience. What have you got to offer me? Box 967-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Writer, producer, director, in Peabody winning documentary series available immediately due to cutback. Experienced cameraman, creative editor. James Culp, 246 Manor Drive, Mill Valley, California 94941.

POSITIONS WANTED (cont'd.)

Mature 3rd endorsed wants nite or extra staff. Los Angeles or vicinity. Grad-Don Martins Hollywood. 16 years city L.A.. 3 yrs. broadcast mobile units. Box 967-7, c/o BM/E, Blue Ridge Summit, Pa. 17214.

ATTENTION TEXAS C&W STATIONS: Besides being an experienced 3rd class announcer, I know, sing, write and love country music. \$500 a month gets me. Box 967-18, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Present TV asst. chief. Desire Chief, asst. chief, or equivalent in industry. 16 years experience all phases. Minimum salary \$10,000. Box 967-8, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Director, 32, first phone, experienced on full hour news, sports, remotes. VTR spots, switching, TD background. Now on west coast, will relocate. Box 967-20, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Country DJ and announcer country music only. 3rd endorsed. Family man. Also plays several string instruments. Joe Reeves, 923 Lindell Avenue, Hannibal, Mo. AC 1-3908 or AC 1-0752.

Zany personality rocker graduating from #1 rated college station. Two years pro experience 3rd endorsed, strong board and production. Box 967-21, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Radio and TV sales Executive is interested in becoming active investor in radio station where capable salesmanship can contribute to growth. Box 967-22, c/o BM/E, Blue Ridge Summit, Pa. 17214.

One of the finest on-camera news directors in the nation seeks change. Associated Press award winner. Box 967-23, c/o BM/E, Blue Ridge Summit, Pa. 17214.

DJ-newscaster, authoritative, artistic, 3rd ticket, military complete. Will relocate. Box 967-24, c/o BM/E, Blue Ridge Summit, Pa. 17214.

DJ, announcer, newscaster, experienced unmarried, willing to relocate. Box 967-25, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Announcer-DJ, 26, 8 years experience, college B.S. and M.A. degrees, veteran officer, 3rd endorsed. Box 967-9, c/o BM/E, Blue Ridge Summit, Pa. 17214.

12 years Radio-TV, experienced general and sales manager. Dynamic, age 37, civic-minded family man. Mel Lisman, 4809 24th, Lubbock, Texas 79407.

Young Negro Disc Jockey available immediately. Very good newscaster. Box 967-10, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Announcer DJ Negro, female 3rd beginner. Any locality. 606 Head St., San Francisco, Calif. 94132.

HELP WANTED

VTR TECHNICIAN—Rapidly expanding CCTV campus network needs technician to design, install, and maintain campus wide television installation. Applicants must be experienced in maintenance of RCA and GE vidicon camera chains, and RCA and Ampex VTRs. Excellent pay and benefits. Work with a major state university located near the Great Smoky Mountains and TVA lakes. Contact Mr. Frank Lester, department of Television Services, The University of Tennessee, Knoxville, Tennessee 37916. An equal opportunity employer.

DESIGN ENGINEER

A leading manufacturer of television equipment has an immediate opening for an experienced video-audio design engineer. B.S.E.E. and a minimum of five years experience in the design of television terminal, broadcasting and audio equipment is required. Send resume to INTERNATIONAL NUCLEAR CORPORATION, 608 Norris Avenue, Nashville, Tennessee 37204. Attention Mr. Raymond L. Weiland, President.

IMMEDIATE OPENINGS — Qualify for any of the following positions: Technicians for RCA closed Circuit Television equipment — Camera men — Maintenance men — Video Tape men — Video Engineers. RCA Rep. 143-08 94th Ave., Jamaica, New York, or (212) 297-3344.

HELP WANTED (continued)

HELP WANTED: Announcers, Newsman, engineers, combomem, Salesmen, etc. There is a shortage of qualified help throughout most of Kentucky. Anyone interested in locating in Kentucky need only mail their full qualifications, address and phone number to J. T. Whitlock, Box 680, Lebanon, Ky. 40033 for a free listing in our Ky. Broadcasters Newsletter issued the 15th of each month. No tapes or phone calls please.

ENGINEERS—TV—Sunny California. Discover job security, and a new way of life in California. Have top openings for qualified Maintenance Engineers, especially Video Tape and Live Color Video. Send resume or letter to The AMPS Agency—3924 Wilshire Boulevard, Los Angeles, California 90005. 388-3116
By Broadcasters — for Broadcasters

Chief engineer for unusual television originating and translator complex in rural area in northern New York. Great opportunity for the right man. Contact Dr. Frank W. Cyr, Rural Supplementary Educational Center, Stamford, New York 12167.

WANTED: News Director for progressive 500 Watter in Michigan's resort belt. Single station market, who plans to stay. Must be able to report, write and deliver news, write editorials and produce documentaries. No sensationalism, just good journalism. Good career in fine community for young family man in expanding business. Box 967-11, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted 1st ticket engineer to handle transmitter watch. Interesting job offering the chance to learn a 6 tower DA system, microwave, SCA, and FM. A beginner with the right potential will be considered. Reply to Mr. Art Silver, Dir. of Eng., WHWH, Box 1350, Princeton, N.J. 609-924-3600.

Are you tired of working on old, beat-up equipment? We need an engineer who can maintain two new transmitters, stand by, and automation system and complete audio equipment. The pay isn't the best but the conditions are good. Contact Bob Thorburn, Radio Station WLBB, Carrollton, Ga.

LEADING 5 KW (directional night) has opening for alert young transmitter engineer. The man we are seeking should have fundamental knowledge transmitter operation and maintenance and capability to learn and advance to chief transmitter engineer under guidance of our technical director. Private apartment available if desired. WSAV Radio and Television, Savannah, Georgia.

First Class engineers, maintenance background, no board work. Immediate openings. Excellent growth opportunity with independent group. Rush reply by letter to C. Dingmen, WCTC, 385 George St., New Brunswick, N.J.

Assistant Engineer Needed for unusual television originating and translator complex in rural area, in Northern New York. Contact Dr. Frank W. Cyr, Rural Supplementary Educational Center, Stamford, New York 12167.

Bright-sounding morning man, midwest market! Number one station for eight years. Growth and opportunity with an expanding chain. Good starting pay. Send tape and short resume to Box 967-12, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Opportunity in south Texas for qualified chief engineer. Must be qualified in VTR, studio maintenance, microwave and full power, tall tower operation. Send resume and salary requirements to Personnel, P.O. Box 1359, Ft. Smith, Arkansas.

If you have a First Class license, experience and ability, and are worth \$150 per week to start, a well-run east coast station would like to hear from you. Box 967-26, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Needed—Experienced combination salesman & announcer. Good future, security, living conditions, hours & pay. Excellent recreation. South-eastern location. Box 967-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted—1st class engineer-announcer, Radio Station WNKY, Box 248, Neon, Ky.

SALES

CATV

AEL is rapidly expanding its activities in the CATV industry and is seeking top level individuals to augment its Sales Staff.

Recent CATV Sales background required. Sales will cover all areas of the CATV field, and will primarily involve distribution equipment.

To obtain additional information or to arrange an interview, send resume to Mr. L. Peetoom.



AMERICAN ELECTRONIC LABORATORIES, INC.
P.O. BOX 552, LANSDALE, PA. 19446 • (215) 822-2929

COLORVUE

An Equal Opportunity Employer

WGH Radio needs an experienced 1st phone engineer, no announcing, permanent position. Send resume and references to Chief Engineer, WGH Radio, P. O. Box 98, Newport News, Virginia 23607.

Immediate opening for engineer-first phone Television Station, operation—no announcing. Location—Northern Lower Michigan, Box 967-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

"Need Assistant Chief with first or second FCC license. Good company, good pay and good opportunity to advance." Box 967-16, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Rapid advancement for management potential announcer-salesman with growing company. Send tape and resume to Boyce Hanna, Box 199, Shelby, N.C. 28150.

1st class engineer—Music-news station, AM-FM, Southeastern Massachusetts. No board work. Excellent salary. Send details, experience. Box 967-27, c/o BM/E, Blue Ridge Summit, Pa. 17214.

New 1st needed to work into seven station group. Excellent training, fringe benefits and challenge. Send resume to WITL, Lansing, Michigan.

Wanted! Broadcast technicians to enter aircraft electronics. Numerous jobs everywhere. Write: Avionics, Reno/Stead Airport, Reno, Nevada 89506.

Sports director for Midwest television station, a fulltime position for an experienced personality. Air Video tapes. SOF and resume to Box 967-28, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Chief Engineer — AM — Send resume to Box 389, Williamsport, Pennsylvania or call 717 322-4676. You'll like our city.

Experienced fulltime announcer needed immediately. Pay commensurate with ability. Radio Station WKSC, Kershaw, S.C. 475-8585

Need 1st Phone for maintenance and studio work, no announcing. Michigan AM-FM. Box 967-17 c/o BM/E, Blue Ridge Summit, Pa. 17214.

SALES REPS WANTED

Sales Representatives wanted for CATV Products—Log Periodic antennas, components. John Thomas, Lindsay Electronics Lindsay Ontario, Canada. Phone 705-324-2196.

EQUIPMENT FOR SALE

For Sale: Used Channel 5 Transmitter
Dynair — 100 W.
Abe Reiter, International Telemeter Corp.
2000 Stoner Avenue
Los Angeles, California 90025
Phone: Area Code 213, GRanite 8-7751

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee.

EQUIPMENT FOR SALE (cont'd.)

Raytheon 5kw transmitter, Model RA-5, with spare tubes and parts. Best offer takes. New rig now being installed. Contact Bob Smith, WIXK Radio, New Richmond, Wis. 715-246-2254.

Moseley Studio Transmitter Link Model PCL-2B with crystals for 946 megacycles. Complete unit less antennas in AI operating condition. Write Irv Laing WQTE Radio, P. O. Box 306, Monroe, Michigan. 48161.

COMPLETE UHF TELEVISION STATION setup. Cameras, Transmitters, projectors, etc. Everything needed to put station on air except tower. \$55,000.00. Contact: The Maze Corporation, Box 6636, Birmingham, Alabama.

Schafer automation 1-C-U-9 control unit, 1-PBR rack with 3 Ampex-350 playbacks. 1-MU-3-R preparation unit, all accessories. Like new, cost \$12,800.00, sell \$7,500.00, KXA, Inc., 320-2nd W, Seattle 98119, Phone 206-284-8600.

Ampex 300, 350, 352, 400, 450 users, for greater S/N ratio, replace first playback stage 12SJ7 with our plug-in transistor preamp. For specifications write VIF INTERNATIONAL, PO Box 1555, Min. View, Ca. 94040.

Decays! 6000 classified gag lines, \$5.00! Comedy catalog free. E. Orrin, Box 679 Boyer Road, Mariposa, Calif. 95338.

CARTS, CARTS, CARTS, CARTS, CARTS. LIK-NU Cart Corp. re-builds your cart tapes lik-nu. New pads, tape for as low as 90¢ for 7 1/2 sec. 5-day service. Box 2608, Fort Wayne, Ind.

EQUIPMENT SALE: Gates Producer \$495.00, Ampex 350 recorder \$950.00, Viking 36 Cart-ridge Units 125.00, plus many other items. The Maze Corporation, Box 6636, Birmingham, Alabama.

1 RCA BF A-4B FM antenna tuned to 99.3 MHz. Deicers, mounting hardware, heater harness etc. In use two years. Crated, best offer. Chief Engineer, WLPO-FM, LaSalle, Illinois.

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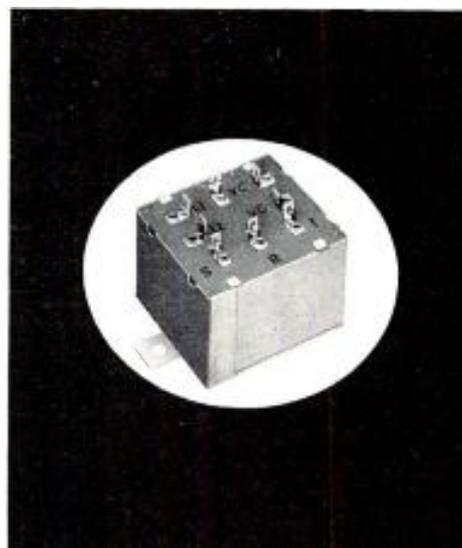
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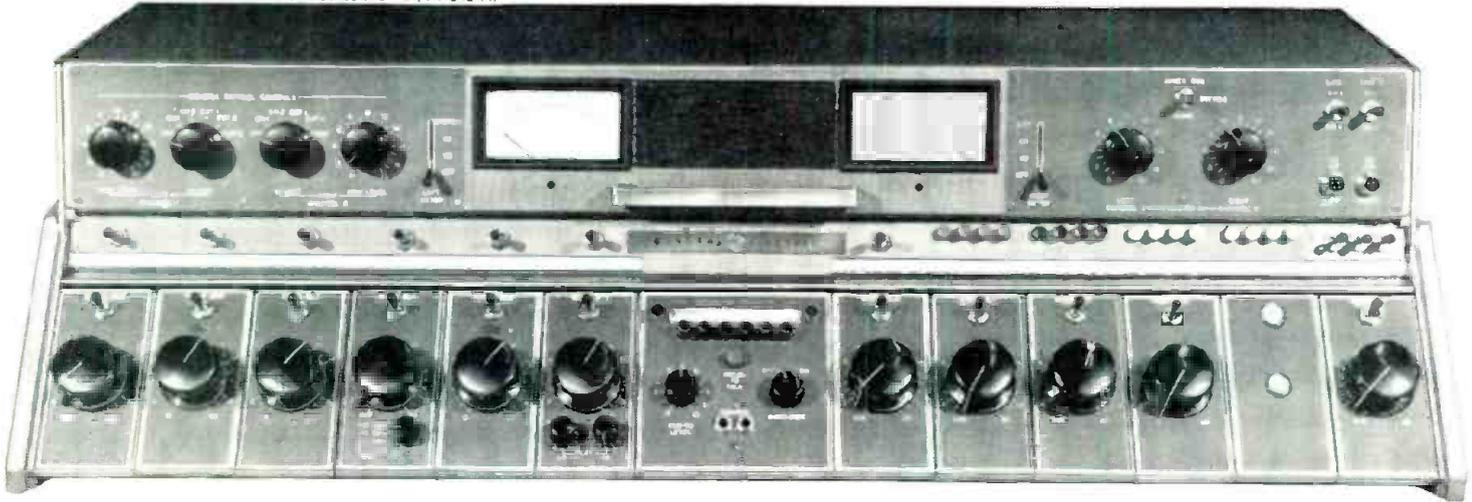


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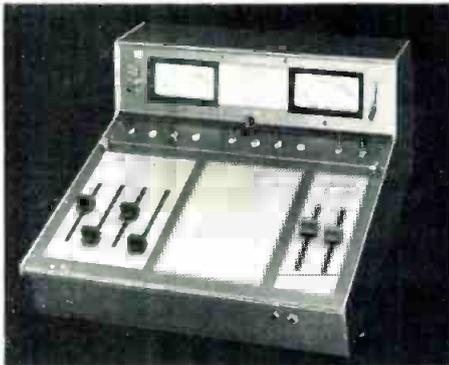
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FROM THE
EDITOR

The President's Communication Panel

Although the President stressed the international aspects of a need for a national communications policy, he also charged the 16-man communications panel to answer the domestic question "Are we making the best use of the electromagnetic frequency spectrum?" He also asked "How soon a domestic satellite system, should it be general purpose or specialized, and how many systems?"

If the panel should become convinced that the technical experts that have said the nation is misusing the spectrum are correct, new legislation may ensue. This could alter drastically the business of broadcasting.

Technology has advanced so that new answers to communications are possible. At the same time, population growth and changes in community and business needs have created conflicts in the existing system and new solutions are called for. New pressures for spectrum usage are coming from crime control agencies, federal, state and local governments, and computer users, for example.

Donald G. Fink, communications expert and general manager of the Institute of Electrical and Electronic Engineers, advised those attending the Engineering Conference at the last NAB Convention to prepare for an orderly transition in these areas: relocation of television broadcasting to uhf only (within 10 years); new programming from sources such as CATV; direct broadcast from satellites to home; and more channel availability when redundant scanning of TV is perfected.

Conceivably, the technology of the latter two would remove channel scarcity and almost anyone could go into broadcasting. But program sources and distribution systems are likely to become separate and distinct specialties. Redundant scanning schemes pose expensive storage problems. Fink envisions, as a possibility, CATV systems doing the conversion and piping wide band signals to conventional TV sets (and at the same time providing local program services).

J.R. Pierce of Bell Telephone Labs, speaker at the last NCTA Convention, foresaw private instruction, newspaper transmission and private computer usage in the home (along with phonovision). In the "distant future" Pierce foresaw the bulk of communications being done by guided means and the electromagnetic spectrum being used chiefly for unique services such as communications with moving vehicles and people.

An IEEE/EIA Joint Technical Advisory Committee member, R.P. Gifford, has proposed that spectrum space be rented, the dollar value being based on a unit called the PODAF, (*PO*wer *D*ensity over an *A*rea and *F*requency band). Assuming a dollar per year rental per PODAF, an average land mobile system uses space with a rental value of \$24 per year; microwave station, \$96; TV station, \$96,000 per year.

The President's own Director of Telecommunications Management, James D. O'Connell, and v.p. of the new 16-man panel, is well aware of these technical trends and social and political pressures, and is a strong advocate of a clarifying national policy.

The panel will be hard pressed to predict with any accuracy the timing of technical accomplishments such as practical transmission above 10 GHz. Nevertheless, we expect the panel will recommend policies that will alter today's perspective. To the extent that change can be made gradually, no one should get hurt except those intractable private interest at odds with an intelligent national policy.

James A. Lippke

Now... Listen to this.

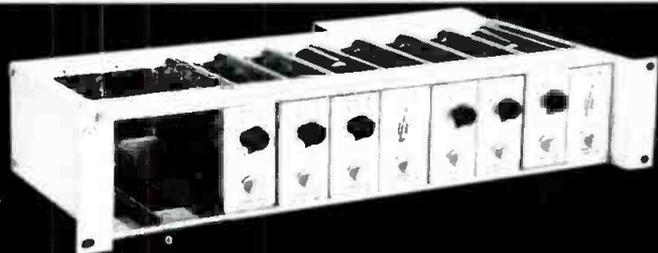
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What do you think?

