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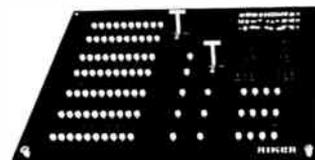
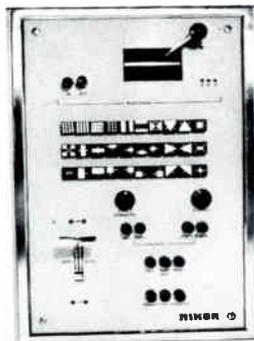
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Profits up . . . problems down. This station owner knows his reliable Schafer System is operating smoothly day in-day out.

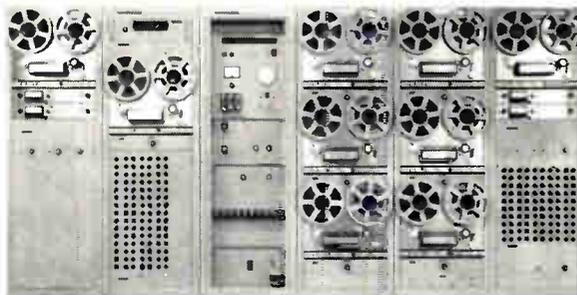
His people are free to be more creative . . . They have more selling time, too.

And Schafer gives any station owner more time for fun, relaxation, his family, and the community.

That's the magic of Schafer-land.

Meanwhile Back at the Station

The Live Sound of Schafer Goes On . . . And on . . . And on . . . And on . . .



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Exploiting Machines

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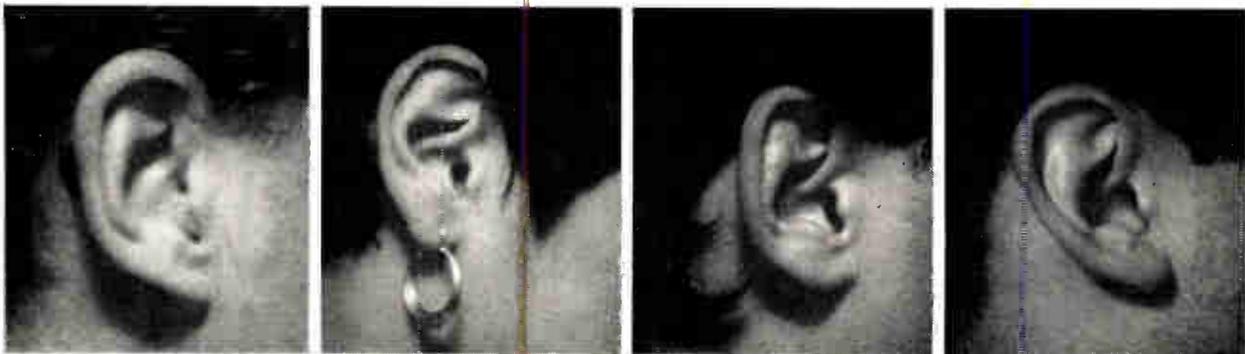
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This month's cover: generated by computer! Our electronic brain missed the whimsical touch that usually typifies BM/E's cover but it does symbolize September's theme of automation. Computers now handle broadcast operations, and generate music. Is visual art next? As programmed by L.D. Harmon and Dr. K.C. Knowlton of Bell Labs, the computer converted a scanned line (of a photo) into 132 fragments. It then computed the brightness level of each fragment and encoded it into numbers 0 to 15 covering the gray scale. Artistic rendering is produced on microfilm using any of 196 micropatterns (transistor symbol, wheel, heart, etc.). The computer makes a random choice among the micropatterns that will reproduce the requisite brightness level.

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No doubt about it. Other devices can control volume and modulation levels. That's what they're for.

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Circle 3 on Reader Service Card

BROADCAST INDUSTRY NEWS

FCC To Study A-m Radio Policy

The FCC imposed a ban on all applications for a-m radio stations effective July 19, 1968 in order that future a-m radio policy could be studied. Exceptions are requests to change transmitter sites, due to storm damage or property condemnation. Also excepted are a group of Class IV stations near the Mexican border which have been prohibited from increasing daytime power under the U.S.-Mexico Standard Broadcast Agreement. If this agreement, now being renegotiated, is ratified and a power increase is permitted, applications from these stations will be processed by the Commission.

During the freeze, the Commission plans to explore the question of whether there is a "significant national need" for new a-m stations or major power increases in existing stations. The FCC is also considering whether available frequency space should be saved for future use "in developing areas" and the subsequent eradication of remaining "white" areas. Under discussion also is the possibility of combining a-m and fm into one

aural service in a future allocation system and the efficiency of allocating valuable frequency space to a-m operations on a demand basis.

The Commission halted acceptance of a-m applications once before—in 1964. At that time officials were concerned that despite the growth of a-m radio service, there had been little reduction in "white areas." The new rules that evolved from the 1964 FCC study were only moderately successful.

FCC Extends Stay of CATV Authorization

The FCC has extended its stay of an Order authorizing Vumore Video, Corp. of Colorado, Inc., to operate a CATV system at Colorado Springs, Colo. A joint-brief had been filed by four opposing broadcast organizations protesting the authorization of Vumore's operations. Vumore, in turn, had requested additional time to file responsive pleadings before the court. The stay was granted by the FCC provided the parties filed with the Court by Aug. 10.

The joint brief was filed by the National Association of Broadcasters, the All-Channel TV Society

and the National TV and Colorado Translator Associations as intervenors on behalf of KRDO-TV and KOAA-TV. They claim that FCC authorization of CATV operations without hearings in an area outside the top 100 markets is an abandonment of the small television markets to unrestricted CATV development. Also criticized was rejection of the stay's possible effect on translator stations and the use of translators as an alternative solution.

Spectrum Assignment Changes Proposed

Results of a comprehensive four-year study by the Joint Technical Advisory Committee were published recently.

The paramount recommendation of the report was a radical change of the technical procedures relating to radio spectrum allocation and assignment. This is to be accomplished through adoption of a spectrum engineering philosophy and system design concept which will lead to the establishment of the "next generation" spectrum engineering system. This will involve creating many new sources of technical information concerning ways in which the spectrum can be used. These sources, in turn, will be incorporated in a highly sophisticated data processing system ultimately permitting flexibility of frequency assignment unattainable using present techniques.

As a step toward establishing the "next generation" spectrum system, JTAC recommended formation of a "Pilot Project" to put the recommended frequency concept into experimental operation. Also, the Committee felt that improved spectrum engineering analytical capabilities should be developed and maintained at the national level in the field, and in the "Pilot Project."

Other JTAC suggestions include improved spectrum monitoring capability, improved information basis capability and improved standards for receiver susceptibility. In addition, JTAC urged an in-

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CBS Minicam to Be Philips-Produced

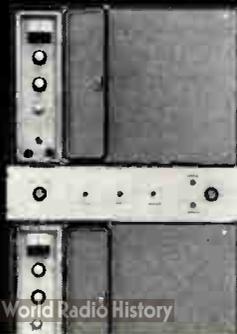


New digitally controlled rf color camera developed at CBS Laboratories will be manufactured under license by Philips Broadcast Equipment Corp. The Camera, shown here zeroing in on Senator Charles H. Percy (R.-Ill.) at Miami GOP Convention, has already had its baptism of fire.

A new color camera will be unveiled by Visual Electronics at this November's NAB. Sections of the three-pickup-tube camera will come from a variety of countries, making it a truly "international" system. Watch *BM/E* for details.

"Now a word from our customers"

Losing money on interrupted programming? Don't! Switch to the ultra-reliability of dual STL microwave TV systems . . . total solid-state B-Line fixed links from Microwave Associates. Performance like nothing you've seen or heard before. Superb color, sharp images, audiophile sound, unbeatable reliability. Plus double protection . . . from solid-state circuitry and highly dependable hot standbys. Other bonuses too. Solid-state RF sources instead of klystrons . . . no tube replacement costs, no bulky power supplies, no heating problems, no harmful voltages. Interested? B-Line dual STL's (and TSL's) are in volume production for 2, 7 and 13 GHz auxiliary broadcast bands. With options like multiple-channel audio, automatic hot-standby switching, accessories, and complete RF system engineering assistance. Write or phone for details. (617) 272-3000. Have the last word!



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crease of knowledge of man-made radio noise and its effects.

The suggested pilot project would require millions of dollars and would eventually answer many questions that presently puzzle radio engineers.

Sec. 315 Suspension Postponed by House

One issue bandied about recently in the House Commerce Committee concerns suspension of Sec. 315. Despite pressure by NAB, CBS and NBC to pass suspension, the House Committee has postponed any action until Sept. 11.

Opponents of suspension claim that it would just be the first step in a coordinated TV campaign to gain outright repeal of Sec. 315.

Also an issue in the House is treatment that would be accorded substantial third and fourth party presidential candidates.

Pickup Tube Progress

There has been much work going on recently in the development of television camera tubes.

The General Electric Co. has produced the first U.S.-designed lead oxide vidicon TV camera tube in a one-inch format to have been used in actual broadcast operation. The tube, Type Z-7946, is a development unit which is being supplied in limited quantities to CBS-TV for the Minicam IV color camera.

The Z-7946 has a lead-oxide photoconductive layer for high sensitivity, low lag and low dark current. It employs electrostatic focusing and magnetic deflection to meet portable camera requisites of light weight and low power consumption.

EMI Electronics has also come out with a 1-inch vidicon camera tube. It uses an unusual form of electrostatic focusing combined with deflection based on a system of crossed planar lenses.

The new tube eliminates the bulky coils and power supply of conventional electromagnetic systems, offers improved resolution over existing electrostatic tubes and excellent geometrical fidelity.

A 3-inch Image Orthicon TV camera tube capable of giving quality pictures like those of a standard 4½-inch tube has been produced by English Electric Valve Co. Ltd. It is available in two versions: the P874 and the P875.

The new tubes combine the basic features of an ordinary 3-inch

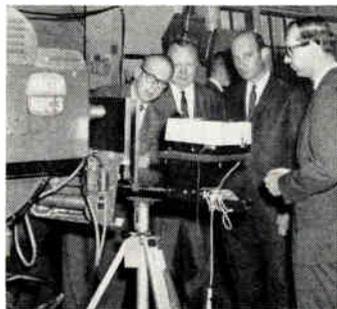
Elcon image orthicon with an electron-optical design which reduces noise in the output signal and eliminates the dynode effect. These tubes boast several advantages over other models: (1) the scanning beam is smaller and better focused, (2) most of the scattered electrons are eliminated from the system, (3) the dynode background is eliminated.

FCC Explores Radio Land Mobile Congestion

The FCC has been busy in recent weeks trying to alleviate the problem of land mobile congestion. In a report issued by the Commission recently factors involved in use of multiplex communications in land mobile radio services were explored. The report deals with frequency-division multiplex systems. Evaluation indicates that some forms of multiplexing may increase efficiency of spectrum use by land mobile services, but nothing definite can be said until multiplex techniques are fully explored.

The FCC is also currently running tests in Lancaster, Pa. to determine if it is possible to share the use of vhf-TV channels with mobile radio facilities of police, fire, industrial and other services.

As a step to relieve the congestion the Commission has proposed



KMTV, Omaha, recently played host to 60 representatives of Omaha's leading advertising agencies at the station's production seminars designed to familiarize the advertising media and station personnel with the potential of various production tools and techniques. Using special videotape presentations, the station's Production Manager Jack Parris demonstrated the best use of such machines as the Chrona Key, Front Projection, Editec, and high-band videotape machines.

At KMTV's production seminar (l-r) Robert Gillan, vice president of Bozell and Jacobs, KMTV's Local/Regional Sales Manager Joe Baker, Ron Kaplan, and Jack Parris examine the station's front projection equipment.

an increase of spectrum space for land mobile use by 115 MHz. This high capacity common-carrier service would replace "one-circuit" transmission with wider-band transmitters having several subcarriers, each carrying separate communications circuits.

Section 214 Certificates Needed

The FCC has granted a stay in the effectiveness of a previous decision requiring certificates of convenience and necessity from telephone companies installing CATV channel facilities. The stay will last until ten days after disposition by the Court of the companies' motion pending resolution of the appeal on the merits.

The stay was contingent upon the filing by the companies of the motion for stay with the court by July 15. The stay action also requires that no new construction of channel facilities be started and all construction in progress as of June 26 be discontinued pending disposition of the court appeal.

TV Aural Monitor Range Cut Proposed

The FCC has proposed a reduction in the minimum indicating range required for TV broadcast aural frequency monitors eligible for type approval.

The rule, as it reads now, requires that a type approved aural frequency monitor for TV stations have an indicating range of at least ± 3000 Hz. This is 50 percent greater than the maximum permissible frequency deviation for the aural center frequency.

Collins Radio Co. requested an amendment of the rule to allow type approval of monitors having an indicating range of ± 2000 Hz. Such a range reduction, Collins claims, would facilitate the design of monitors at lower cost and complexity.

FCC officials believe that the extreme reduction proposed by Collins is not desirable.

WNYW Provides World-Wide Election Coverage

"Election, USA," a series of programs exploring the candidates and issues in the upcoming American election, is presently being broadcast by WNYW.

This station is the only privately

Continued on page 10

Light in Weight, Heavy in Quality...

TYPE HUZ VHF FIELD STRENGTH INDICATOR



FEATURES

- **COVERS FM, TV, AIRCRAFT, POLICE, MOBILE BANDS**
- **47 TO 225 MHz**
1 μ V - 100 mV
- **AM/FM DETECTION**
- **PORTABLE - ONLY 9 LBS.**
- **BATTERY OPERATED**
- **SELF CALIBRATING**
- **SELECTIVE VOLTMETER**

APPLICATIONS

Type HUZ VHF Field Strength Meter being completely portable and light weight is an excellent instrument for both field and laboratory. Make survey measurements to determine propagation conditions, polarization, and radiation patterns. Find the most effective location for receiving antennas. The HUZ also is a selective voltmeter. Measure antenna voltage, and compare to the field strength, computing the effective height and gain of the antenna. Measure antenna cables for attenuation. Thus determine the overall efficiency of the receiving system. Make measurements under various weather conditions to determine effects of icing, humidity, etc. With the directional capabilities of the HUZ, it is used in the field or laboratory for locating and measuring interference or surveillance. Use of the special ignition probe permits measurements of automotive noise.

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Greater Reliability, and
Longer Useful Life Of . . .



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Circle 5 on Reader Service Card

owned and commercially sponsored shortwave station in the U.S.

"Election, USA" is only part of the extensive coverage already provided for WNYW's listeners in Europe, Africa and Latin America. The station currently airs newscasts with the election news seven days a week on the hour and half hour from the American Broadcasting Radio Networks.

FCC: Uhf Channels For Land Mobile Use

The FCC has proposed sharing the use of lower uhf-TV channels with land mobile radio services in 25 major urban areas. It is hoped that this action will help relieve the increasing congestion in Public Safety and other important land mobile radio services in the large cities of the United States.

The Commission suggested reallocation of uhf-TV channels 14 through 20. The land mobile services would use the TV channels in geographic areas where they're not assigned for broadcasting. Existing equipment designs could be modified to permit use of the lowest uhf-TV channels within about six months and new equipment could be expected for the

remaining channels within one to two years.

NBC Uses Visual File In Election Coverage

An electronic titling system was used by NBC in their coverage of the recent political conventions. This Visual Masterfile supplied by Visual Electronics Corp., N.Y., instantly produces titles and candidates' names directly on the TV screen.

Information that has been stored on a magnetic disc is recalled in milliseconds and converted instantly into video similar to a TV camera signal. In addition, words and figures can be instantly updated on-air from a typewriterlike keyboard.

NBC claims that this system will enhance reporting by providing great flexibility in producing instant access to titles.

FCC Contracts For Land Mobile Studies

The FCC awarded a \$500,000 contract to the Stanford Research Institute, Menlo Park, California for research-policy studies of communications between land mobile

radios and computers.

The land mobile project, to be completed within a year, is to explore interservice sharing of land mobile radio channels and to study frequency assignment principles.

The computer study, to be completed within six months, is to consider regulation and policy problems created by the interdependence of computers and communication services and facilities.

TV-Radio-Chief Link to the Ghetto

At a recent meeting in Buffalo, N.Y. NAB president Vincent T. Wasilewski defended the broadcasting industry against the many onslaughts it has received.

Wasilewski said radio and TV, by revealing the affluent society, act as an inspiration for the underprivileged to demand a better life. He continued, stating that while only a minority of ghetto residents read newspapers, broadcasting reaches some 90 percent.

Defending the industry against charges of airing excessive violence, the NAB president replied that because this medium has such universal appeal, it is an easy target for everybody's frustrations. To let the major tragedies of our time

The company that pioneered SCA monitoring takes another giant step with two FCC

TYPE-APPROVED MONITORS

Back in the early days of FM broadcasting, McMartin was first out with an FCC Type-Approved monitor. Since that time our company has been the leading producer of monitoring equipment for *all* types of FM broadcasting — monaural, stereo and SCA. Only McMartin makes monitors for *every* type of FM transmission.

And now we're ready to deliver our two newest FM monitors—both Type-Approved under the new rules. Under the new FCC rules stations engaged in SCA broadcasting must have a Type-Approved monitor in and installed by January 1, 1969.

McMartin®

McMartin Industries, Inc.
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Omaha, Nebraska 68131

go underreported would be nothing more than hiding one's head in the sand. It is the broadcaster's duty to combine reporting and restraint—in suitable proportions.

Sales Up: Color TV, Phonos, Car Radio

During the month of May, a strong advance of sales to dealers has been reported in the color TV, auto radio and console phonograph categories.

Color television sales to dealers during the month advanced 16.1 percent over sales in May 1967. Console phonograph sales were up 6.1 percent in May over the previous year also. Sales of auto radios increased 2.3 percent over the same period.

Five Antennas Placed Atop Hancock Center

RCA recently announced a \$1,300,000 project to supply and install the broadcast antennas of five Chicago television stations atop the 1100-foot high John Hancock Center.

The antennas will rise to a height of about 1450 feet and will weigh more than 140 tons. They will be

mounted vertically, one above the other in two stacked arrays, atop 12-foot-diameter towers on the buildings roof. Two of the five antennas are of the "Polygon" type weighing about 10 tons each.

The broadcasters include WBBM-TV, channel 2; WMAO-TV, channel 5; WGN-TV, channel 9; WFLD-TV, channel 32; and WSNS-TV, channel 44.

The Hancock Building installation will give Chicago viewers improved reception and other advantages resulting from multiple-transmitting antennas at a single location and at a substantially increased height.

College Net Goes International

The American-based Intercollegiate Broadcasting System and the European International Broadcasters Society have agreed on a plan to broaden services internationally.

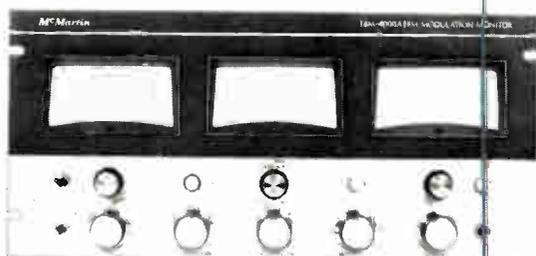
The Intercollegiate System, founded in Rhode Island in 1939, is the nationwide organization of college radio. The International Broadcasters, founded in 1961, is the global professional association of TV-radio in 103 lands. This society will aid the collegiate sys-

tem by securing quality radio programming for U.S. radio stations subscribing to the IBS Service. It's expected that a good start can be made in time for the coming academic year in October.

Wired System's Success Doubtful in NAB Report

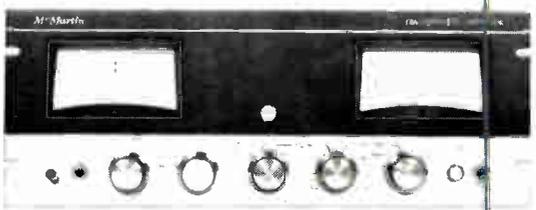
A research report prepared recently for the NAB concluded that substitution of a nationwide wired system for on-air TV might provide a small increase in national entertainment but could eliminate entirely "a considerable portion" of all types of local programming. The best solution is to be found in a total commercial and educational TV system supplying full entertainment and information services using tower transmission and electronic storage and playback.

The report stated that there is no statistical correlation between the number of channels provided and a diversity in programming. The "most significant" increase occurs when a second channel is added, but the rate slows down with succeeding additions. Rather than a resultant increase in total audience, there is a shift to competing programs.



New TBM-4000A FM/SCA Modulation Monitor Type-Approval No. 3-153

The transistorized TBM-4000A offers instantaneous monitoring of the critical functions of FM SCA broadcasting. Total and main channel modulation, sub-channel modulation and sub-channel frequency may be monitored simultaneously. It will also monitor either of two sub-channels. This unit has no tuned circuits and uses plug-in modular design for quick servicing.



New TBM-2000A SCA Monitor Type-Approval No. 3-154

The transistorized McMartin TBM-2000A is designed to detect and monitor SCA multiplex channels. The modulation meter is calibrated to accurately monitor percentage of injection and SCA modulation percentage. The unit includes a frequency meter, a peak flasher indicator for SCA and features no tuned circuits and plug-in modular construction. The unit is designed to work with the TBM-4500A Stereo monitor, and will also monitor either of two sub-channels.

Circle 6 on Reader Service Card

CENTRAL DYNAMICS TV PROGRAM CONTROL SYSTEMS

have made the panic button obsolete in 13 stations around the world!

Four years ago, Central Dynamics designed and manufactured a revolutionary television program control system for a station in Adelaide, Australia. Today, thirteen stations are enjoying panic-free, ulcer-free operation. In these stations, directors are *creative* directors—not traffic cops! The work load is smoothed out. The haunting possibility of human error has been eliminated. And station operation has become a genuine art.

HOW DOES IT WORK?

The system incorporates a "memory", loaded either by magnetic tape, by punched cards, or manually from control panel push buttons. The memory, in turn, activates the control logic which provides the machine control output for film projection, slide projection, VTR and cartridge tape, causing all functions of these machines (start, stop, change, etc.) to proceed automatically. Included in the system is a dynamic alpha-numeric display of the program schedule on conventional TV monitors, enabling operators to check or change the program at will.

Control room at WVNY-TV, Burlington, Vermont, showing the APC 210 installation.

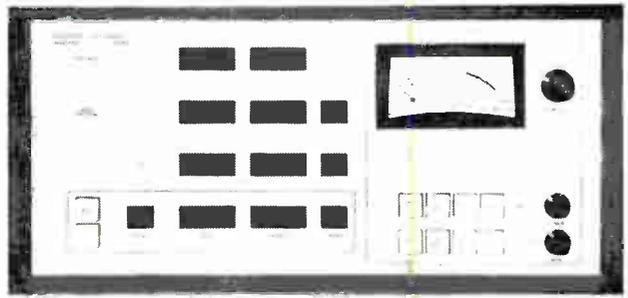


what will it do for your station?

- allows the work load to be smoothed out. Eliminates the panic in commercial and station breaks, because sequences are pre-set and run automatically.
- takes the burden of mechanical direction from the director.
- eliminates the possibility of human error.
- improves station operation. The capital cost is soon offset by reduced make-goods and more effective use of creative engineering personnel.

two systems available

1. APC 310: a comprehensive program control system. Allows complex process control routines to be pre-planned, checked visually, and executed without error.
2. APC 210: semi-automatic TV master control. Permits advance selection of program sequences during quiescent periods.



Detail of read-out panel

CENTRAL DYNAMICS EQUIPMENT OF THIS TYPE IS INSTALLED IN THESE STATIONS.

SAS 10	Adelaide, Australia	WVNY-TV	Burlington, Vt.
HK-TV	Hong Kong	WLAC-TV	Nashville, Tenn.
KMBC-TV	Kansas City, Mo.	WRGB-TV	Schenectady, N.Y.
KMOX-TV	St. Louis, Mo.	CFRW-TV	Edmonton, Alberta
WBNS-TV	Columbus, Ohio	CHCH-TV	North Bay, Ontario
WMAL-TV	Washington, D.C.	CKLW-TV	Windsor, Ontario
WOR-TV	New York, N.Y.		

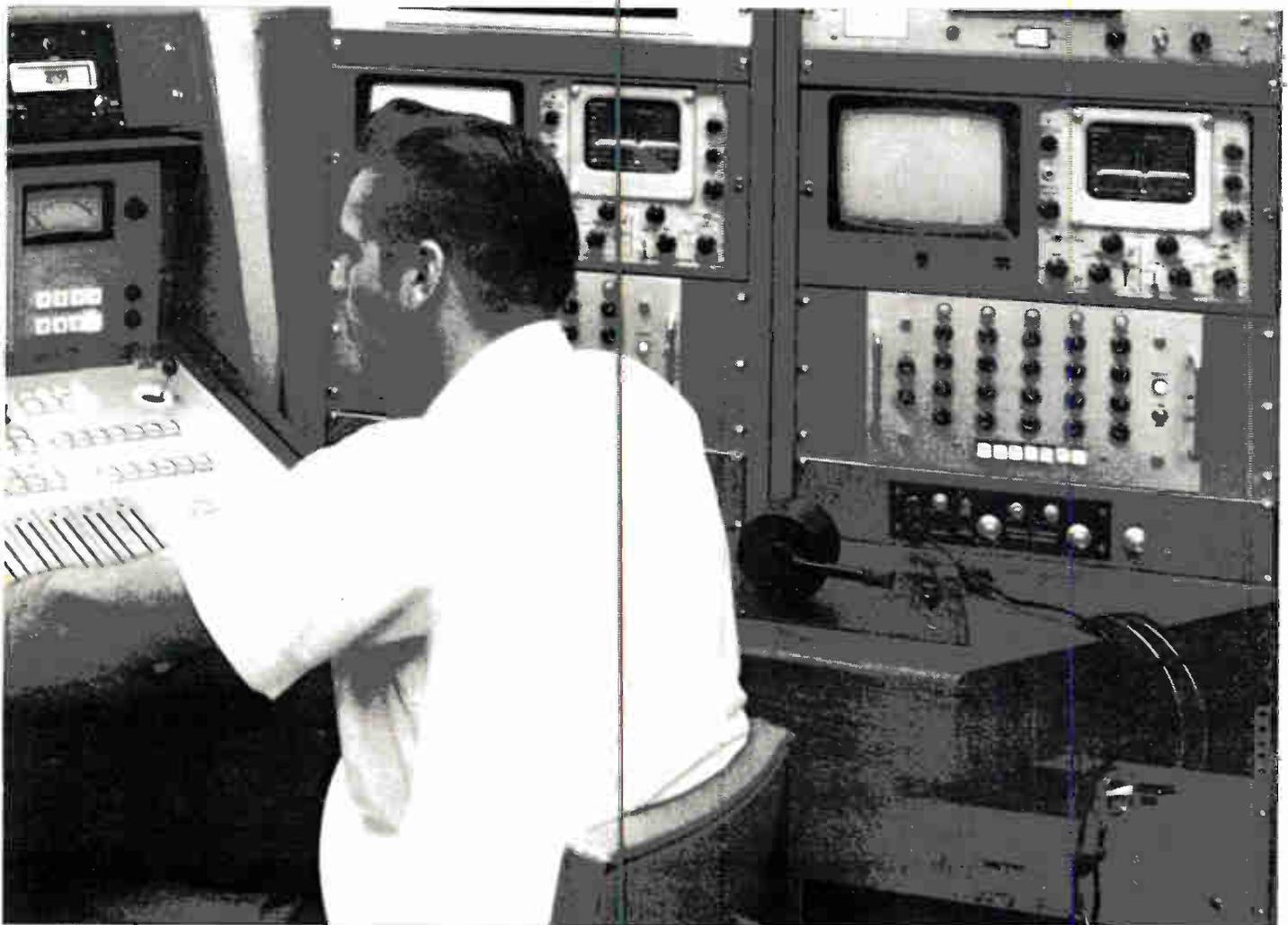
MAY WE HELP YOU?



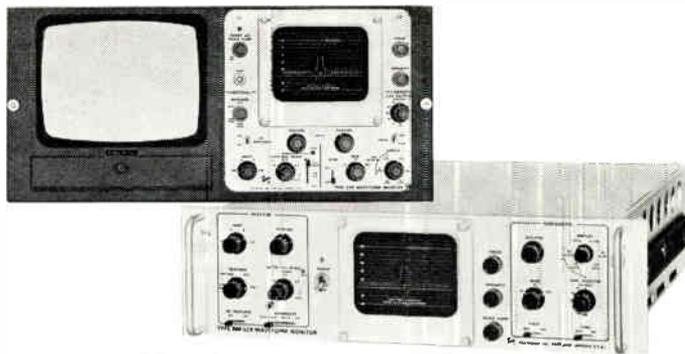
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Cherry Hill Industrial Park, Cherry Hill, New Jersey 08034. Phone (609) 424-3900



measuring picture quality in terms of K-factor



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

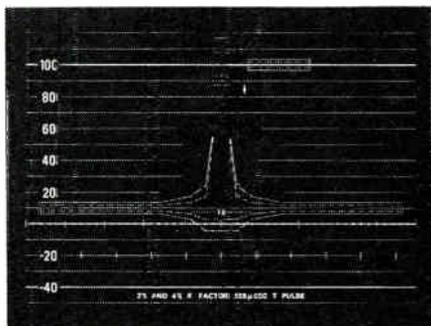


Fig. 1. The Tektronix sine² K-factor graticule. Two sweep speeds are provided on these waveform monitors so that this graticule can be used for 0.125 μ s T-pulse testing on such applications as studio and network transmission lines, and for 0.250 μ s 2T-pulse testing on such applications as video tape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

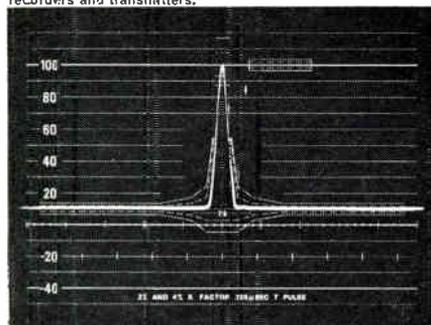


Fig. 3. Display of an undistorted 0.125 μ s sine² pulse at 0.125 H/cm magnified 25X. A T-pulse with its base on the +10 IEEE unit line will reach the -100 IEEE unit line if the video system has 6.7 MHz equivalent bandwidth. At 4 MHz, pulse height will be reduced by 18%.

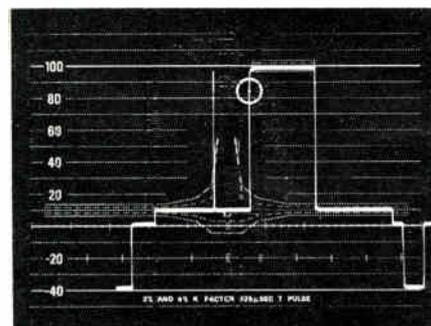


Fig. 5. Display of a bar signal at 0.125 H/cm with the base on the +10 IEEE unit line and the rising edge aligned with the arrow (encircled). The top of the bar signal should be at the +100 IEEE unit line. The inner and outer lines of the box at this point show the 2% and 4% K-factor limits.

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.

Type 529 Waveform Monitor \$1085
(8 $\frac{1}{4}$ " high, 8 $\frac{1}{2}$ " wide, 19" deep, weighs 24 lb.)
Rack Mount Type RM529 \$1135
(5 $\frac{1}{4}$ " high, 19" wide, 20" deep, weighs 27 lb.)
Power consumption of each model is ~80 watts — no fan used.

U.S. Sales Prices f.o.b. Beaverton, Oregon

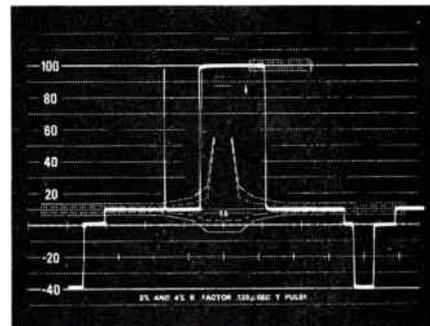


Fig. 2. Display of a sine² T-pulse and bar. Waveform shows the following: the horizontal sync pulse on the -40 IEEE unit line, the back porch on the 0-level line, the 10% offset or base for the pulse and bar, and the sine² or T-pulse on the +10 IEEE unit line, and the bar on the -100 IEEE unit line.

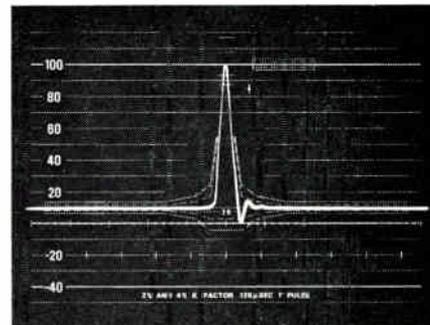


Fig. 4. Display of a sine² T-pulse showing some phase distortion. Phase distortion will appear as aberrations on the leading or trailing edges of the T or 2T-pulse. The K-factor system relates the amplitude of ringing vs the displacement of the ring from the transient in terms of picture degradation.

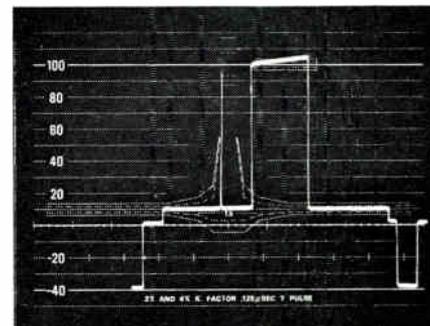


Fig. 6. Display of a bar signal at 0.125 H/cm, showing tilt which exceeds the 2% to 4% K-factor tilt limits.

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



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to technical excellence

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CONVENTION

LOG

NCTA '68:

Multi-channel Systems Emphasized

On the Convention floor, the amplifier suppliers emphasized 12-channel-plus systems. A prevalent trend toward the systems approach was in the wind, as opposed to previous years' emphasis on individual equipment items.

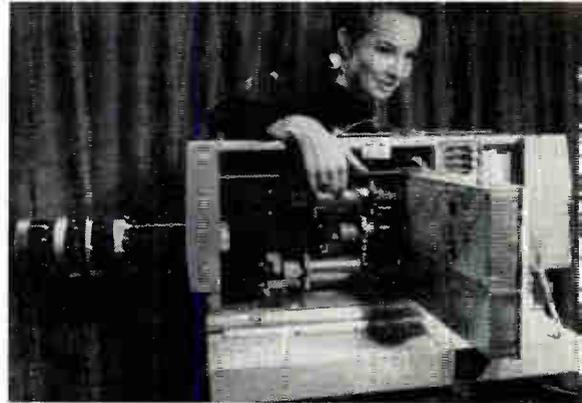
Noticeably absent were converters. The usual sources were not exhibitors. Vikoa garnered attention as an exception; the company showed a block unit that could convert midband frequencies directly to uhf. The TV viewer need operate only his receiver's tuner.

New on the scene will be split amplifiers, linearized single-stage amplifiers and push-pull amplifiers to reduce second-order and harmonic distortion. All of these equipment types will be rigorously field-tested by CATV operators

and suppliers over the next year or so. There's no clear-cut picture now of just which approach will ultimately be the best one.

The theme of this year's NCTA Convention was a general striving for technical improvement and perfection, in sharp contrast to previous shows where the emphasis has been on new devices. Many CATV operators now have high-quality measuring and test equipment fully as good as the commercial broadcasters do. Using gear of this caliber automatically makes them a more sophisticated group of buyers, putting pressure on suppliers to meet or exceed their published specs on head-end and origination equipment.

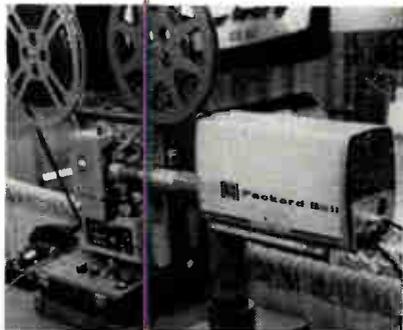
Another big change: enormous new interest in local origination.



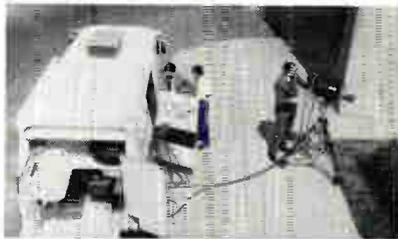
Color for local origination was started by International Video Corp. in its new broadcast color camera (above) and a film/slide chain (below) with optical multiplexer. The broadcast color camera—tagged at \$18,500, appeared in many locations on the show floor as various exhibitors eagerly tried it out with their own equipment.

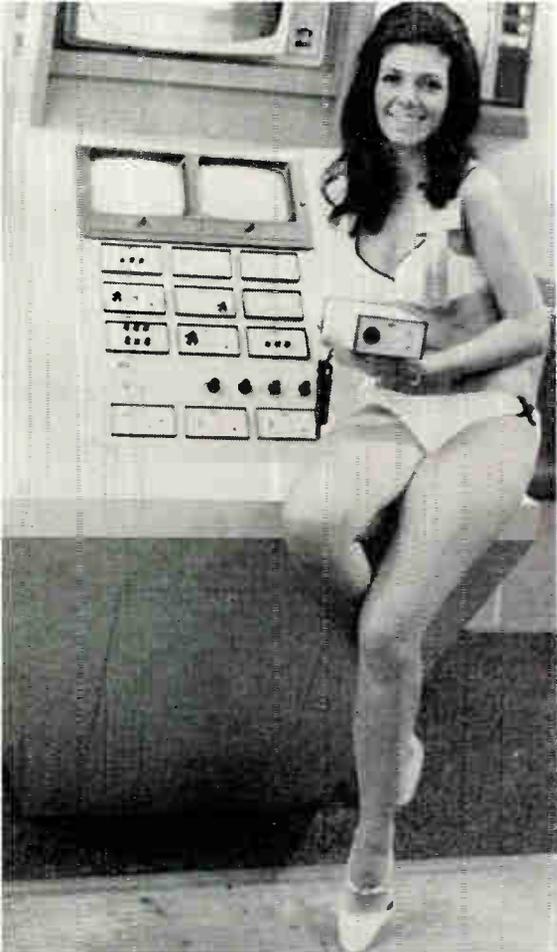


Touring the NCTA Convention Floor



Color-compatible helical recorder was shown by Ampex (left) along with a line of local origination gear. New mono film chain was featured by Packard Bell (above), with slow-motion and single-framing capability. The gal from Sony (above, right) was everywhere in the hotel with her battery portable VTR dutifully recording show doings for later viewing in the booth. Bird's-eye view from Telsta lift bucket shows Sylvania compact van (right) outdoors.





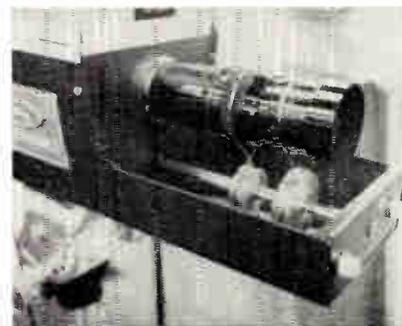
Part of Dynair's Mini Series (left) the Mini-Seq switcher is lovingly caressed by model. Other Minis are mounted in panel. Complete local origination system by TeleMation (right) includes new high-resolution camera, console filled with switching and processing gear.



This was represented at the show by an incredible array of studio equipment, ranging from quality mono cameras to appropriate color gear.

Simple items as tapoffs and drop cords got a big play. Many exhibitors had new lines. Drop cords that are more resistant to local radiation were prominently displayed. Improvement in radiation resistance is indicative of one thing: CATV is getting closer to the big city and interference pickup is becoming a problem.

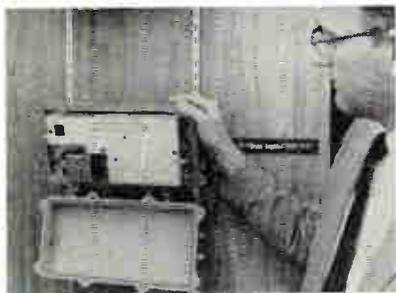
Although methods of going underground were stressed at technical sessions and guidelines for underground cable selection were profusely offered, underground accessory items seemed buried among the plethora of other devices.



Converted GBC camera (above) has had operator controls added for focus and zoom in AEL display. AEL also showed "Telemobile" (below) compact origination gear including VTR, film chain.

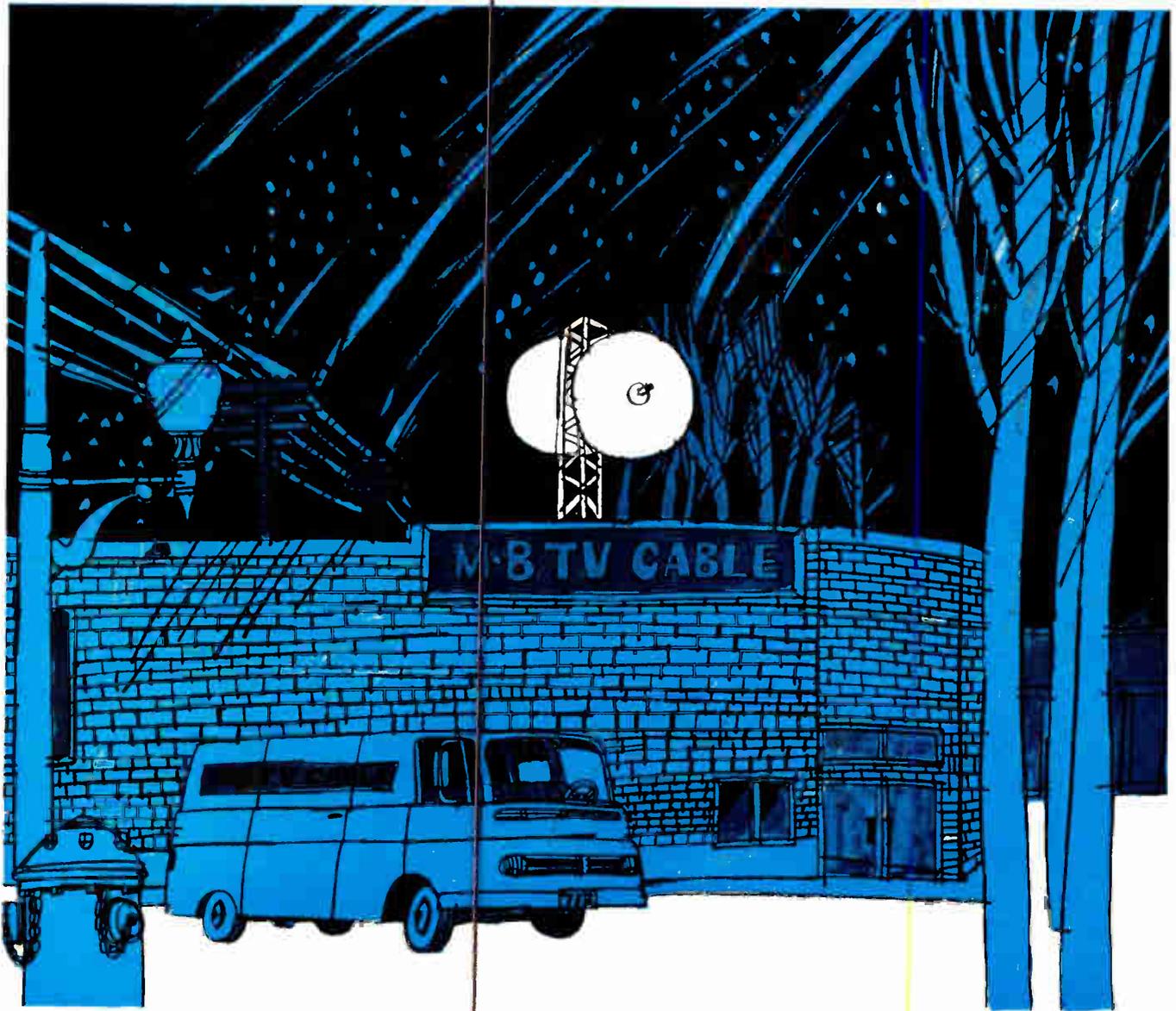


Local origination services and video inputs were offered by Television Presentations, Inc.



New entry (left) in the amplifier field is Conduction. (Above, left) Hot item from Vikoa is its 21-channel converter, one of many standout items in their display. (Above) Entron's booth included its pulsed pilot carrier generator, mounted directly above TV set. (Right) Push-pull amplifiers were standout feature in Jerrold's "Starline" series in huge exhibit area.





**The weather may be unpredictable
But that doesn't mean
your microwave has to be.**

With Lenkurt's 76E microwave radio system, you can always forecast reliable video transmission.

That's why major networks have used it for years for studio-to-transmitter links. And that's why you can rely on it to get the best video through to your CATV and ETV customers.

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So if you'd like predictable transmission for your customers, call or write Lenkurt Electric Co., Inc., San Carlos, California.



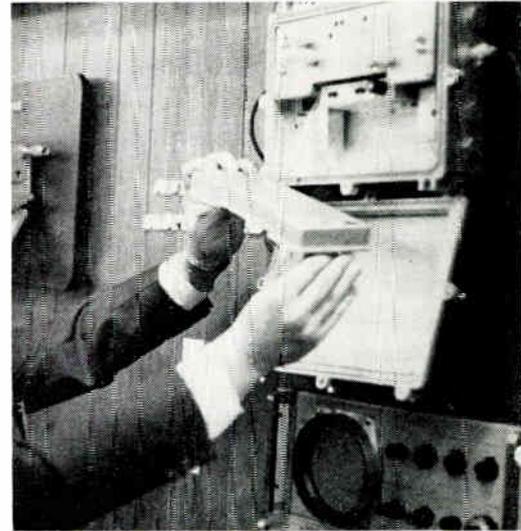
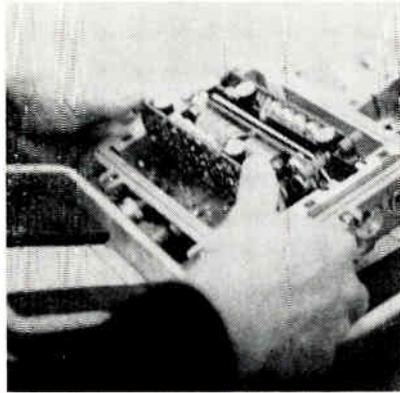
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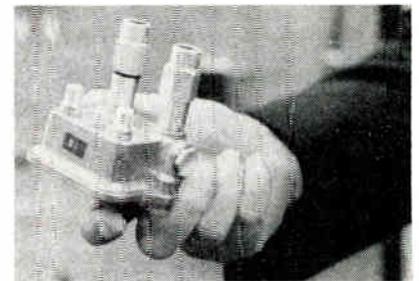
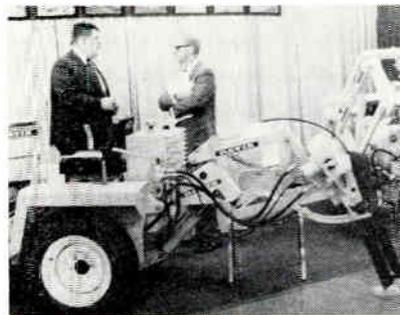
GENERAL TELEPHONE & ELECTRONICS



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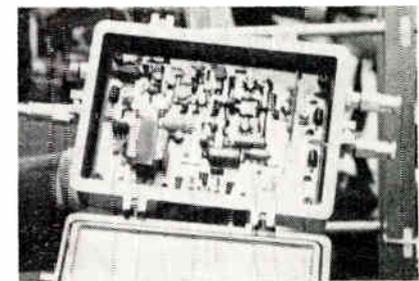
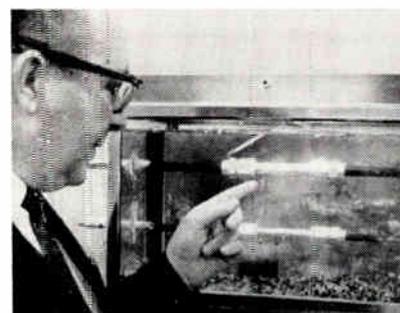
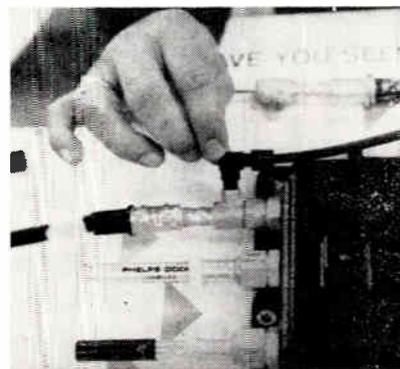
Combination trunk, bridging and agc amplifiers (above, left) by HTV Systems, are housed in a single enclosure. Plug-in modular circuits provide flexibility in Cascade amplifier (above, right). Ameco's line splitter/amplifier (right) provides separate high- and low-band equalization.



**DROP
CABLE**

at \$20⁰⁰

ask us about it



Several exhibiting companies featured new interference-resistant drop cables—especially good for cities. Preformed set the pace with entire drop package at \$20.

Trenching and cable burying equipment was shown by Davis (top photo) and Sod Master. AMP-Fit one-piece molded nylon fitting by AMP, Inc., (center photo) is rated at 300 lb/in², crimps onto metal or plastic tubing. (Bottom) Hermetic seal of Gilbert coax connectors is demonstrated by display in water-filled aquarium.

Directional tap for buried or aerial cable used by Pruzan (top photo) features low loss, high match, small size. Variable tap (middle) type 8500 from SKL, has continuously variable tap loss of 15 to 50 dB. Line extender by Lindsay (bottom) has single or dual outputs, with matched, built-in directional tap.

More photos on page 23

The Innovators will strike again. Soon.

First, it was the
Norelco® 3-Plumbicon*
tube color camera which
since 1965 has
become the world's
most-accepted,
most-imitated
camera.

At the 1968 NAB show,
it was this tiny
blockbuster, a
color camera
6½ pounds light.



New developments
on their way
to you from
Philips Broadcast
are even more
exciting. But
for now...

*Trade mark for television camera tubes.

Here's Total Station Capability from the Innovators at Norelco.

(The people who re-invented color television.)

Philips Broadcast Equipment Corp. now offers you complete, turnkey service in television broadcast and production facilities.

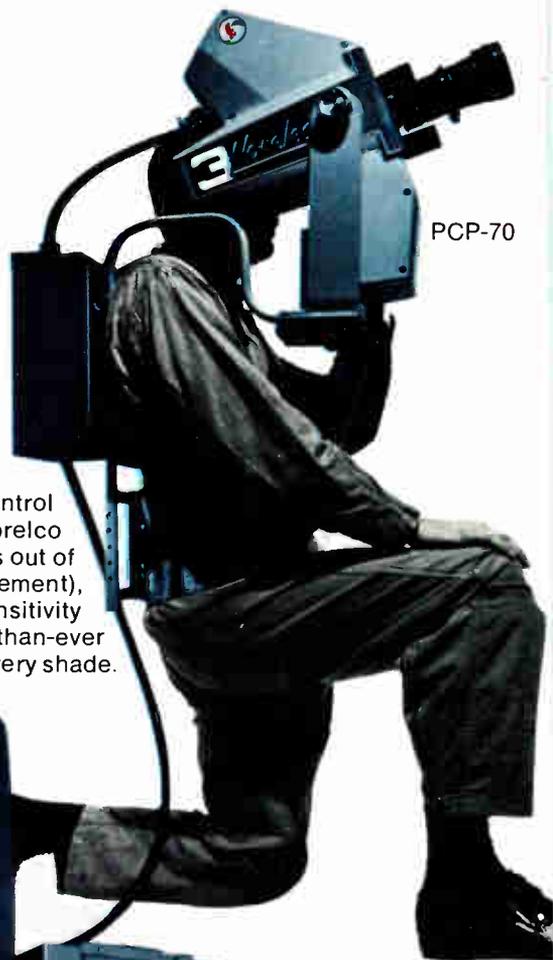
From systems engineering through installation, and including financing, the quality and reliability that have made our Norelco color equipment the industry's standard of excellence is available for full system development.

Color pictures of the highest attainable quality start with the Norelco family of Plumbicon cameras. First, the PC-70 studio and field camera. Now used by all three major networks, numerous groups and more than one hundred independents, it has become in less than four years the undisputed world's champion.

And for extra mobility: Choose the PCP-70 portable, the "Little Shaver." Its picture matches that of the PC-70 precisely.

Finally, there's the PCB-701 special purpose color camera—the "Robot." Put it anywhere. It can pan, tilt and focus by remote control.

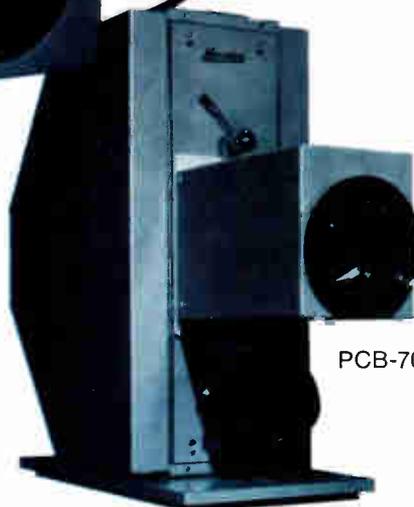
All are compatible with the PC-70 camera control unit. And the new-generation Norelco cameras, in addition to Contours out of green (electronic edge enhancement), have extended red sensitivity Plumbicon tubes for truer-than-ever reds of every shade.



PCP-70



PC-70



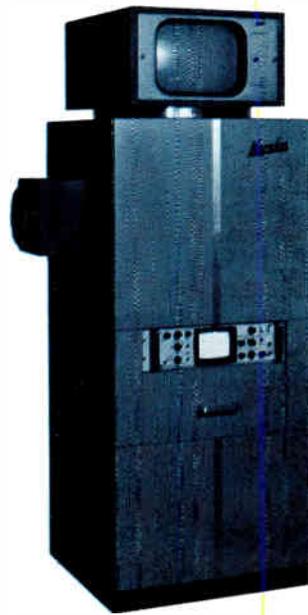
PCB-701

The heart of your film island—the Norelco PCF-701 film camera—provides for the first time, the advantages of the Plumbicon tube, establishing a new and heretofore impossible standard of color performance. Automatic light control is built into the camera's common light path. The eye-level monitor rotates for easy viewing, and side-mounted waveform monitor and drawer-mounted registration & operation panels facilitate signal checking and set-up. Norelco's PCM-800 multiplexer is designed specifically for the PCF-701 film camera. Slides can be supered over film on the same film island for the first time in color TV.

PCM-800



PCF-701



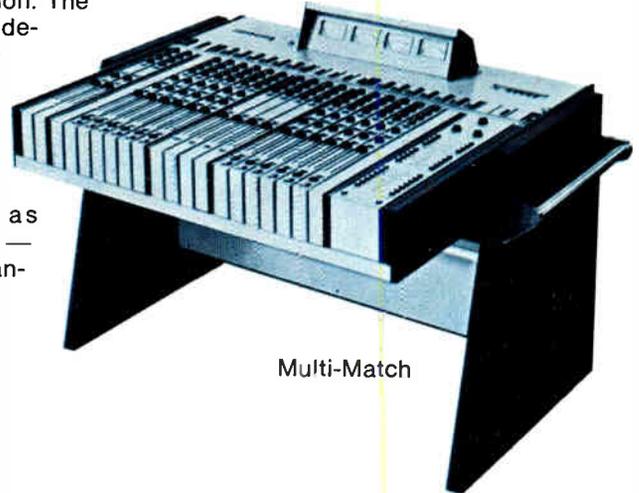
See your brilliant Plumbicon picture on 19" and 25" monitors fed by Norelco's new silicon solid-state distribution amplifier. Monitors work from either composite or non-composite video, with separate test signal input, and are easily switched from composite color signal to separate R-G-B inputs from front control panels. Bonded implosion-proof faceplates have anti-reflective coatings, and cabinet design allows close stacking without impairing ventilation.



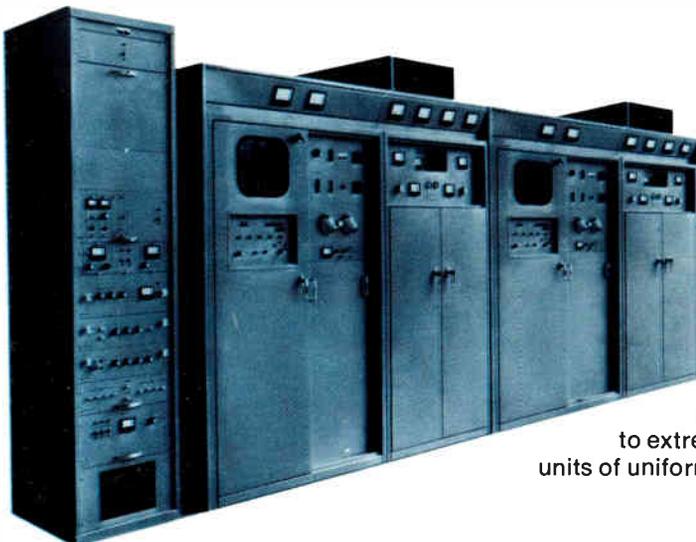
Distribution amplifier's modular plug-in printed circuit boards and other features allow connections on passive connector to determine performance for individual units. Eight amplifiers, each providing six outputs, are contained in a rack 5 1/4" high.

Norelco Multi-Match audio mixing desks provide superb performance and complete flexibility in units of modular, expandable construction. The Range 70 portable 12-channel system is designed for the 1970's and reflects the needs of the Sound Director. It is suitable for studio and field. For small studios, there's a Norelco 8-channel solid-state mixer, and — particularly for remotes and as auxiliary studio equipment — there's the light, compact 4-channel mixing unit that may be battery-operated.

Range 70



Multi-Match



Norelco UHF transmitters, with outputs of 10, 30 and 55 kW, feature high-reliability klystron visual and aural amplifiers, silicon solid-state circuits and power supply units, and provision for parallel operation of two transmitters with automatic phase control for visual and aural carriers. Minor component variations have little effect on overall performance, thanks to extreme stabilization of circuitry. Modular units of uniform styling are joined to form in-line arrangement.

Here's Norelco Total System Capability at Work:

Hollywood Video Center—a modern, turnkey studio and mobile facility by Philips Broadcast

The television studio and mobile van completed in the spring of 1968 for Hollywood Video Center, a division of Western Video Industries, Inc., Hollywood, California, represented the first turnkey facility designed, engineered, installed and furnished by Philips Broadcast Equipment Corp. As fast as the studios and mobile unit were finished—ahead of schedule—they went “on air.” The widely syndicated *Steve Allen Show* was first to utilize HVC's Norelco-equipped studio facilities, and the big 40-foot van started a continuous schedule of field trips with *Operation: Entertainment* tapings for ABC.

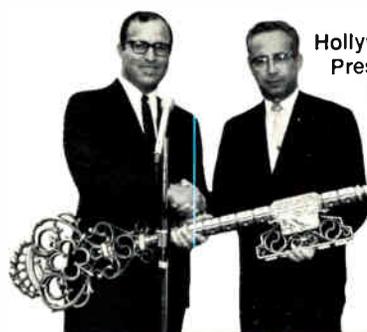


Hollywood Video Center studios have four Norelco color cameras, as does the mobile unit. All cameras and control units are interchangeable, and provide total flexibility of equipment.



Van has four cameras with provisions for six. CCU's are on wheels, allowing transfer between studio and van.

Custom video switching systems in studio and van are identical. Studio also has Norelco PCF-701 3-Plumbicon film camera.



Hollywood Video Center President Rounseville Schaum, left, and John S. Auld, vice president and general manager, Philips Broadcast Equipment Corp. Gold key symbolizes completion of HVC mobile unit and studios.

*Awarded to Philips
for Outstanding
Achievement in
Engineering for the
Development of the
Plumbicon Tube*



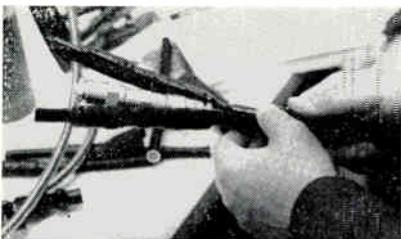
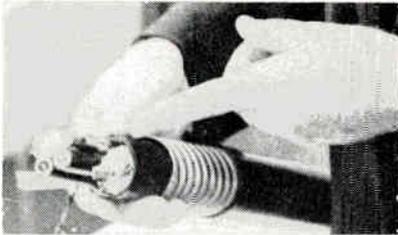
Emmy®

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Norelco

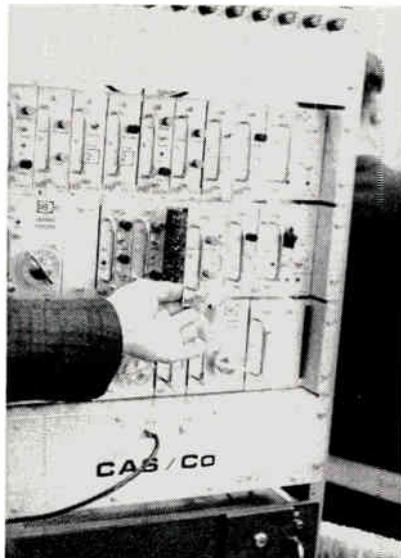
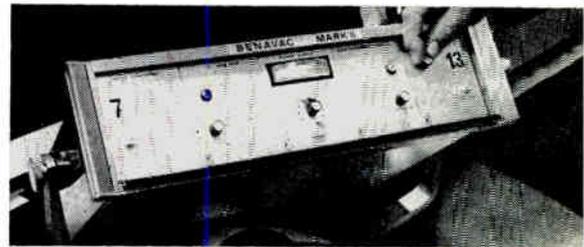
**PHILIPS BROADCAST
EQUIPMENT CORP.**

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(Top photo) Double trunk cable by General Cable has steel tape sheath for added protection. Easily stripped drop cable by Times Wire & Cable (middle). (Bottom) Heat-shrink packet for connectors by Sigma offers extra protection.

New sophisticated instrumentation, such as this Blonder-Tongue equipment, is becoming important to CATV operators, both for head-end and local origination.



(Top photo) Microwave relay gear from Collins added to head-end possibilities. Among others showing microwave equipment, Raytheon showed racks full of CATV oriented gear. (Bottom) Rack of signal processing modules by CAS provide heterodyne units, origination modulators, duplication channel processors and alerts.

(Top photo) Benevac Mark II headend channel processor by Benco features modular design. (Middle) Solid-state processors by Scientific-Atlanta with FET front end and plug-in modules entered the CATV market. Portable microwave com system from Microwave Associates accommodates all major color systems (bottom).

INTERPRETING THE FCC RULES & REGULATIONS

Multiple Ownership Rules As To Investment Entities Amended—Part I

BM/E's REVIEW (February 1968 issue) of the television multiple ownership rules discussed three main areas of concern to the Commission: (1) duopoly, (2) concentration of control and (3) the top-fifty markets. Since that time, the Commission has effected noteworthy revisions of those rules affecting the licensees' burdens in completing FCC Form 323—the Ownership Report.

By *its Report and Order*, released June 17, 1968, in Docket No. 15627 (FCC 68-627), the Commission revised Sections 73.35 (a-m), 73.240 (fm) and 73.636 (TV) of the Commission's Rules relating to multiple ownership of a-m, fm and TV broadcast stations. This action amended the rules so that all licensees could understand their responsibilities in determining whether they were violating (1) the duopoly and concentration of control portions of the multiple ownership rules and (2) the reporting requirements of Sections 1.613 and 1.615 of the Ownership Report (Form 323). This article discusses the very difficult problems encountered by licensees in determining the correct information to be reported as to several types of investment entities—mutual funds, stockbrokers, trusts, and record owners holding stock for beneficial owners. Next month's article explains the amendments to the rules so that licensees may determine whether any of their shareholders have placed them in a position of violating the duopoly and/or concentration of control rules. While these articles deal generally with changes in the multiple ownership rules that affect all broadcasters, the practical effect thereof has greatest bearing upon the information required by those broadcasters whose corporations contain 50 or more shareholders and the guidelines to be followed by these licensees in meeting their obligations towards the requirements of the (1) duopoly (2) concentration of control and (3) ownership report rules.

As has been stated on numerous occasions, the multiple ownership rules of the Commission have the twofold purpose of promoting (1) maximum competition and (2) diversity of programming sources and viewpoints. Sections 73.35, 73.240 and 73.636 of the Rules govern multiple

ownership of standard, fm, and television broadcast stations respectively. In these three sections, the language of the provisions is identical except for variations appropriate to each service. The pertinent provisions, with underscoring added, read as follows:

§73.34)
§73.240) Multiple Ownership
§73.636)

No license for a standard [fm or television] broadcast station shall be granted to any party (including all parties under common control) if:
[Duopoly Rule]

(a) Such party directly or indirectly owns, operates or controls one or more standard [fm or television] broadcast stations and the grant of such license will result in any *overlap* of (specified service contours) of the existing and proposed stations; or
[Concentration of Control Rule]

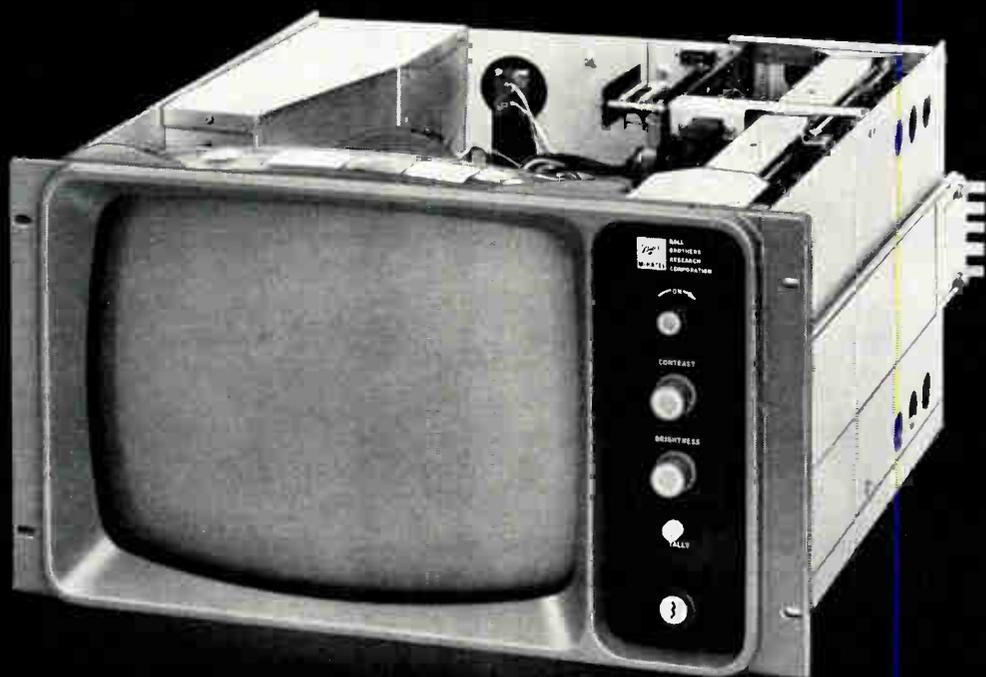
(b) Such party, or any stockholder, officer or director of such party, directly or indirectly owns, operates, controls or has any interests in, or is an officer or director of any other standard [fm or television] broadcast station if the grant of such license would result in broadcasting in a manner inconsistent with the public interest, convenience, or necessity. In determining whether there is such a *concentration of control*, consideration will be given to the facts of each case with particular reference to *such factors as the size, extent and location of areas served, the number of people served, classes of stations involved and the extent of other competitive service to the areas in question*. The Commission, however, will in any event consider that there would be such a concentration of control contrary to the public interest, convenience or necessity for any party or any of its stockholders, officers or directors to have a direct or indirect interest in, or be stockholders, officers, or directors of, *more than seven standard [fm or television] broadcast stations.* [No more than seven a-m's, seven fm's, five vhf and two uhf television stations.]
[One-Percent Rule]

The word control as used above is not limited to majority stock ownership, but includes actual working control in whatever manner exercised. Additionally, in applying the foregoing provisions to the stockholders of a corporation which has more than 50 voting stockholders, only those stockholders need be considered who are officers or directors or who directly or indirectly own 1 percent or more of the outstanding voting stock.
[Headings and emphasis supplied.]

Parts of the multiple ownership rule have come to have their own designations. Thus, paragraph (a), which prescribes cross-interests in stations in the same broadcast service serving

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.

BBRC's New TCB-14R Gives You *More Color Monitor In Less Space*



Ball Brothers Research Corporation has designed a color broadcast monitor to fit EIA rack space of 10½ inches high by 19 inches wide and 18 inches deep.

It has a 14-inch display. Its minimum vertical rack space greatly increases critical viewing and placement possibilities. Another thing you'll appreciate: all operating controls are front-accessible on an extendible PC card. More? Solid-state; high performance; I and Q demodulation. And more. Write for our data sheet on the TCB-14R. There's nothing else like it. Yet.



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substantially the same area, is the so-called "duopoly rule." Paragraph (b) is often referred to as the "concentration of control" rule. The seven-station aspect of that rule is sometimes known as the "seven station" rule. Note 2 is generally called the "one-percent" rule. In connection with the subsequent discussion, it may be noted that under the one-percent and seven-station rules, *stock holdings of less than 1 percent in each of more than seven broadcast stations in the same broadcast service are not considered excessive.*

I. The Problem of Investment Entities

Section 1.613 and 1.615 of the rules require that specified information concerning ownership or control of broadcast stations be filed with the Commission. The information required by Section 1.615 must be filed on FCC Form 323—the Ownership Report. One of the purposes of these sections is to supply the Commission with information concerning multiple ownership.

In recent years, the possibility that full achievement of the objectives of the multiple ownership rules was being thwarted was brought home to the Commission by information at hand which suggested the following:

- (a) Some investment entities, such as mutual funds, brokerage houses, and trusts had acquired stock in each of two or more large, publicly held, corporate broadcast licensees with the result that they had interest in stations in the same broadcast service serving substantially the same area—*acquisitions apparently inconsistent with the duopoly rule;*
- (b) Such entities had acquired one percent or more of the stock of each of two or more large, publicly held corporate broadcast licensees with

resulting interests in more than seven stations in the same broadcast service—*acquisitions apparently inconsistent with the seven-station rule;* (c) Apparently, because the Commission has not provided machinery necessary for obtaining it, large, publicly traded, corporate broadcast licensees were not submitting full and complete information about *beneficial and record ownership of their stock by investment entities* (and were thus not complying with Sections 1.613 and 1.615 of the rules and the instructions accompanying FCC Form 323). Consequently, the Commission has insufficient ownership information about stock acquisitions that might be inconsistent with the multiple ownership rules.

Before discussing the modifications of the rules as adopted, it is necessary to examine the way in which the various investment entities function so that licensees will understand the basis for establishment of the revised rules. Additionally, comprehension of the entities' functioning methods will also have a bearing on other questions such as ownership reporting requirements and enforcement of the rules.

Since the mutual funds may vote stock as beneficial owners, they may be presumed to be in a position to influence or control management of the corporations in which they are shareholders; and, under the provisions of the Investment Company Act of 1940, they could exercise control—if they so desired. However, the record indicates that, as a matter of general policy, they do not hold stock for the purpose of exercising or influencing such control. *More than 90 percent of the prospectuses of mutual funds state that the fund may not under any circumstances invest in securities for the purposes of management or exercise of control.*

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ELECTRONIC PRODUCTS

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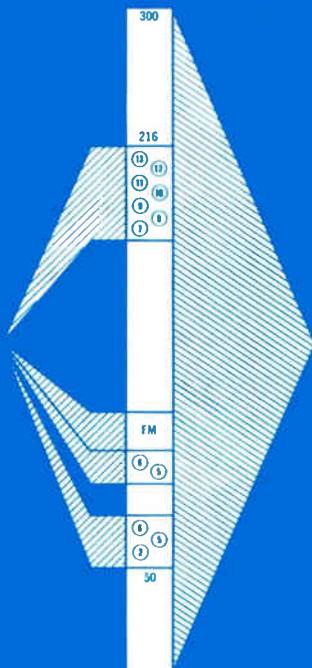
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**Close the gaps.
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Standard Coaxials
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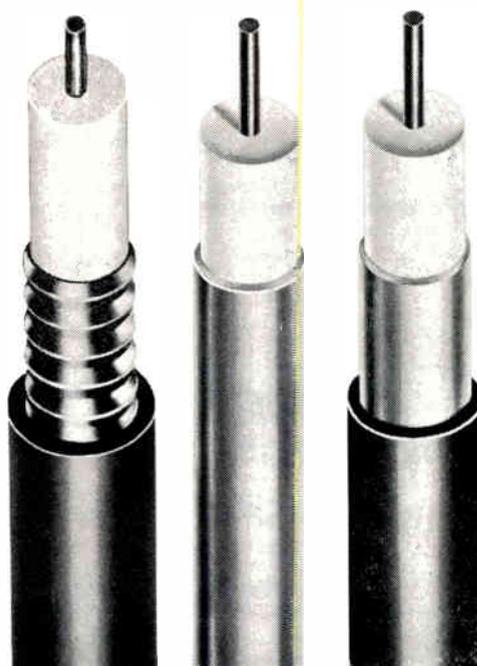
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Virtually all mutual funds vote at annual elections of portfolio companies by proxies given to the proxy committee of the portfolio company management committee. Generally, mutual funds are supporters of the management of portfolio companies. Their investments in such companies presuppose confidence in them, and any disaffection with management of such companies is usually indicated by selling some or all of the company's stock rather than by intervening in the company's affairs.

Finally, it is noted that the characterization of mutual funds as the beneficial owners of portfolio company stocks with the power to direct how the stocks should be voted, while correct, needs amplification. Under the provisions of the Investment Company Act of 1940, as many as 60 percent of the board of directors of a mutual fund may be managers of the fund or persons affiliated with managers. It is the practice of managers to have the full 60-percent representation on the fund board. Thus, although technically it is the mutual funds that are the beneficial owners of the portfolio stock held by bank nominees, *it is the managers who control how it should be voted.*

A. Stockbrokers

In accordance with rules and policies of the SEC, the recognized stock exchanges require that when brokers receive proxy material for stocks held in the "street name" for benefit of their customers, it must be forwarded to the customer without comment. The broker then votes the stock as instructed by the beneficial owner. If the customer does not respond, the broker may vote the stock if the question is routine, but not otherwise. These practices apply whether or not the stock involved is listed on the exchange of which the broker is a member.

B. Trusts

Unlike mutual funds and brokerage houses, trusts are of so many kinds and the duties and the voting powers conferred on trustees by trust investments are so varied that it is difficult to make generalizations in this area.

II. Conclusion as to Investment Entities Problem

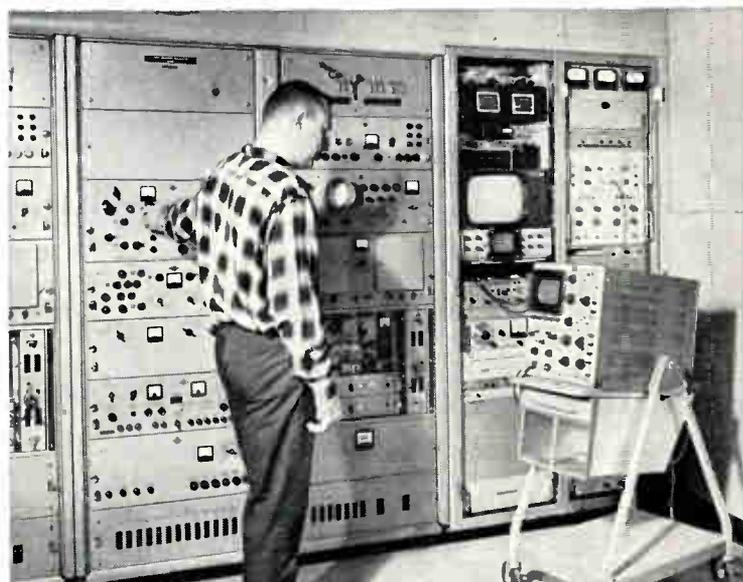
It is important to note that in describing the functioning of investment entities, the Commission used the terms "record owner" and "beneficial owner" to describe certain aspects of stock ownership with regard to the investment entities. Consequently, for purpose of administering the multiple ownership rules, the Commission decided that *ownership of stock in a corporate broadcast licensee should be attributed to the party or person who possesses the right to determine how the stock will be voted.*

Accordingly, the multiple ownership rules were amended to attribute ownership of corporate broadcast stock as follows:

(a) *Mutual funds: Ownership of stock held by a bank nominee for the benefit of a mutual fund will be attributed to the manager of the fund.*

Continued on page 66

**check
the stations
that . . .**



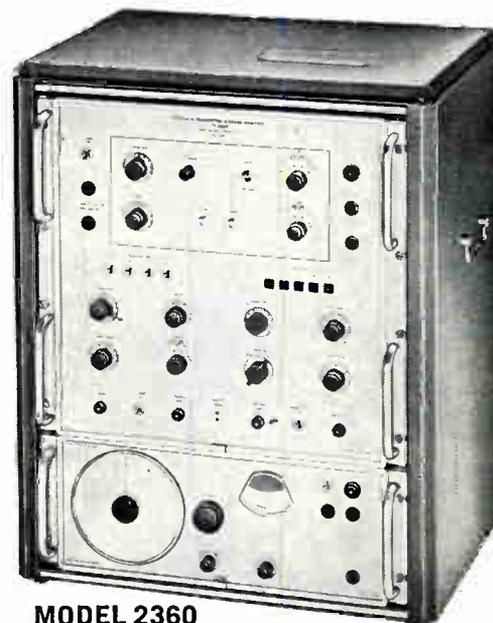
(Photo courtesy WFLD Chicago. Marconi 50KW UHF Tx)

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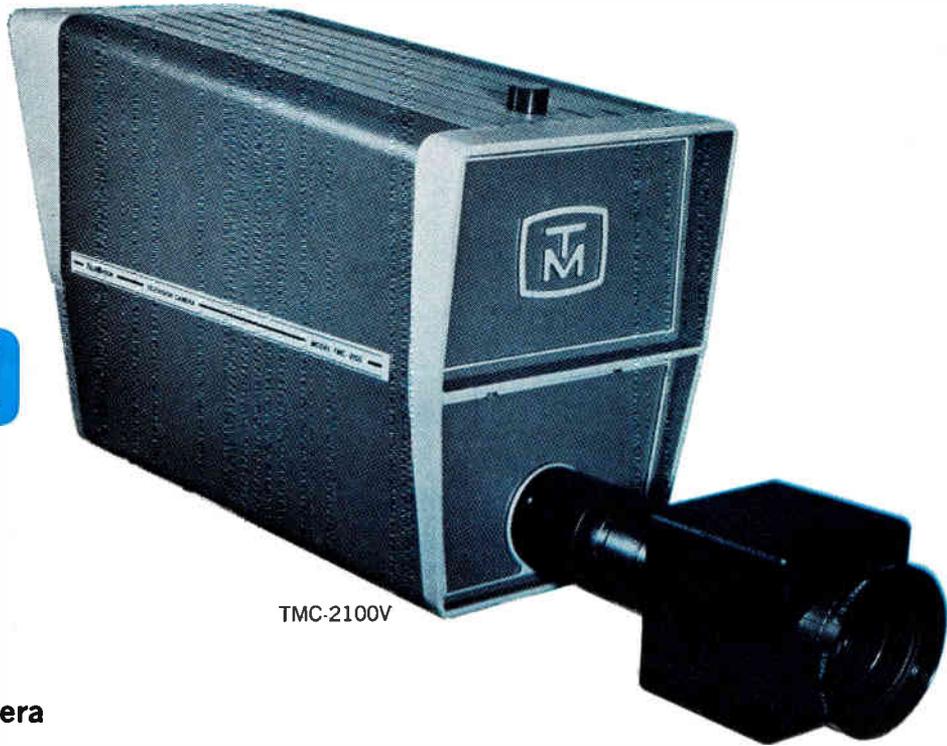
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TMC-2100V



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FEATURES:

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Packed for travel (above), van stores its three Packard Bell cameras above console. (Right) Van is compact, unobtrusive.



Compact Video Mobile Van on a Tight Budget

By Oliver Berliner

Shopping-center based Telsudio Center runs a multifaceted operation that includes an fm broadcast station, a merchandise distributorship, and a fully equipped mobile TV van that's strictly for rental.

A COMPLETE MOBILE STUDIO whose cost brings it within the price range of modest-budget CATV systems as well as local TV broadcasters has been designed by Telsudio Centre, Garden Grove, California.

At a cost of only \$40,000, Telsudio has equipped a Ford Vanette with complete audio and video facilities for on-site videotaping of such events as spot news, sports, television commercials and pilots, school productions, sales meetings and industrial manufacturing and processing. Telsudio calls the van "Video-Tape Mobile" (VTM) and rents it complete with crew to a wide range of customers, including broadcasters,

Oliver Berliner heads SounDesign Engineers, consultants in audio, video and theatrical lighting system design.

producers, agencies, industrial firms, schools and the military. It also serves as a mobile demonstration unit for the line of home, educational and commercial sound and video equipment sold by Telsudio.

The vehicle used, a standard Ford "Vanette," is the smallest such truck being produced. The particular van used was a *Filmobile* that had been rented previously to Ralph Edwards Productions and NBC for hidden-camera filming. NBC had placed two smoked plastic ports in each side of the truck and it was decided to keep them there. When cameras inside the truck shoot through these smoked plastic sheets, it's necessary to open the lens only one *f*-stop to accommodate light loss, yet it is almost impossible for anyone outside to see the camera that's inside the truck—even with the lens just inches away from the porthole.

Vidicon-type cameras were specified because of cost, size and power-consumption considerations. This is important, since the van will be used by budget-conscious rather than ultra-critical clients, even though tapes made by the VTM are of full broadcast quality. Overall specs though include total power consumption of less than one



Tripods, dollies and cameras unload quickly from rear of van and can be set up and operating in minutes.

kilowatt for all audio and video equipment. This permits the van to use power from virtually any common ac outlet, and further permits everything to be run from a battery-inverter system self-contained within the van and completely noise free. No bulky, noisy and expensive generators are ever required.

Video equipment includes three Packard-Bell type 9200 cameras, selected in spite of the fact that they're more expensive than most others in their class. First of all, they have a professional "studio equipment" appearance, in contrast to certain other good cameras that unfortunately look like expensive toys. The manufacturer's nearby location was another consideration. The cameras are furnished with electric zoom lenses with 10:1 ratio which can be extended further, and are designed so that zoom, pan and tilt may all be done with one hand. Included are zoom speed and electric iris controls. One of the nicest features for the cameraman's operational ease is that in tilting up to 60 degrees the camera (and its 9-inch Conrac solid-state viewfinder) does not move. Instead, just the lens and vidicon tube are tilted. The only problem raised by this choice of camera is that it has just one interphone jack, with no provision for the floor manager to plug in. This was remedied by wiring up some multiple jack adapters for the W-E 52-B headsets. This way, there's a minimum of three interphone outlets within the van and at least one at each camera.

Packard Bell supplied the complete video equipment: three Telecaster 9200 viewfinder cameras with rack-mounted remote controls, EIA broadcast sync generator, waveform monitor, camera line monitors, video switcher-fader and 2-inch Sony professional quality videotape recorder model PV-120. Even though this is a helical scan machine, the bandwidth is sufficient to provide broadcast quality tapes.

Packard Bell also did the video equipment installation, placing the control console directly over the van's rear axle. This placement not only provides best possible weight distribution, it also provides just enough space between the console and the van's rear doors for cable and camera storage. Camera stowage was solved by the in-

genius method of mounting them on a steel beam. This beam is anchored at both ends at the van's sides. A single bolt on each camera holds it securely in place. Even more operating flexibility is possible by taking the three cameras into the station's studio for interviews or other program origination.

Monitors are two of the latest solid-state Conrac duals. Each camera feeds a monitor and the fourth monitor reads the input to (or output of) the Sony video recorder. The Sony was selected because of its compactness, reliability and ease of rack mounting.

The video operator sits at the switcher at the right half of the console and he also operates the VTR and the director sits at his left. Behind them is the audio operator who can look between them or over their shoulders to see the monitors when necessary. One small and one large video monitor act as "spares" and can be placed anywhere inside the van or out, for cueing and tape playback purposes. The audio operator also has at his disposal a modified used RCA broadcast disc turntable and an Ampex AG-500 tape recorder, equipped for making simultaneous audio tape recordings along with the audio on the VTR. The Ampex can also play any tape into the audio mixing system.

In addition to the audio system, there is a paging amplifier for use by the director or control room crew for making announcements, calling for quiet on the set or reaching personnel who don't have interphone equipment. Naturally, this is not used during actual "takes." SoundDesign Engineers, in charge of the overall project, installed the audio system which was built around an Ultra Audio Products M-5 "Custom-mixer"—providing a sorely needed 5 inputs. The mixer will accept up to five microphones, but since a maximum of 3 is normally used, the remaining 2 inputs are available for turntable and tape (ATR or audio from the VTR). It uses linear-motion (straight-line) gain controls . . . rarity in portable mixers.

All amplifier stages are plug-in type, and an oscillator plugs into any preamplifier socket for synchronizing the vu meters on the various equipments in the system. In practice, the vu's on the Ampex and Sony are set to read "0" when the custom-mixer's vu reads "+3," minimizing chances of distortion on peaks, since an audio limiter is not used.

The VTM van has 2-way radio communication with Telsudio's offices. Because Telsudio's transceiver antenna is located high up on the tower of radio station KTBTV, long-range communication is exceptionally good. The VTM also is equipped with an fm receiver and a small refrigerator to keep cold refreshments for the crew. The van also serves as a remote unit for Radio KTBTV and as such is probably the largest and best-equipped such unit in the county. The VTM is instantly available for duty for public service, disaster, specials and news coverage. ●



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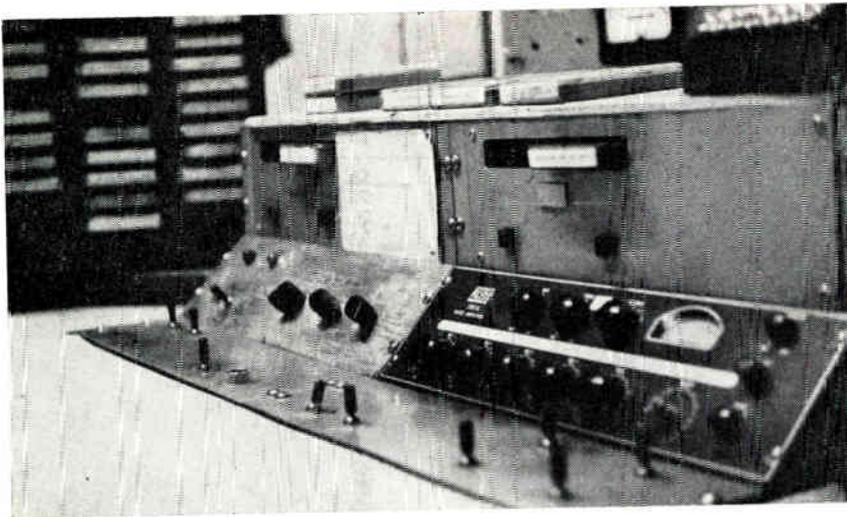
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Home-brew/hybrid audio panel in the flesh (left) and dissected (right). Only commercially made part is resuscitated Altec panel—the part with the dark es-cutcheon plate in the photo. System emphasizes human engineering and minimum operator attention.

Hybrid Audio Console is Human Engineered

By Glen Kippel

Most deejays don't have a twenty-foot reach and normally come equipped with no more than two hands. Bearing these limitations in mind, KREO has designed an ultra-simple console that's helped smooth operations.

INEFFICIENT PLANNING is all around us. It's typified by the station that has a remote-controlled transmitter and has its studio remote control unit in a relay rack behind the operator or other equally inconvenient location. Located in the unit near the operator, it would let him cue up a record or answer the phone while taking readings, and would certainly encourage him to take readings as often as the law requires. Many operators are simply too busy.

A custom console may be the answer. But why go to this trouble when there are plenty of commercial units on the market? For one thing, it would include only needed features, and would be less expensive than a standard console. Since unneeded items are eliminated, the console may be more reliable and easier to maintain. Because it's simple, inexperienced personnel can learn to operate it in a few minutes while experienced personnel have more time to devote to announcing duties, checking over copy, etc. The custom console also means that air personnel make fewer errors and sound more professional.

Our own console has been in use for over three years and has proved its usefulness over that time. While this board is appropriate for KREO, other stations with different requirements might want to add or subtract inputs and features.

Glen Kippel is chief engineer for KREO Radio, Indio, Calif.

Inputs are: two microphones; two turntables; two cartridge machines; reel-to-reel tape machine; net line; telco beeper unit; remote line—a total of ten inputs.

Monitor is Always Alive

A controversial feature is the monitor speaker, which is operative at all times. Because of the isolation provided by the combining network and 20-dB pad, the microphone levels are effectively blocked from the monitor amplifier input. Thus there is no feedback when the microphones are live even though the speaker is on, and the deejay is freed from the need for headphones.

The music limiter holds the mixer output at 15 dB or so under the average peak microphone level; otherwise gain-riding can be touchy. Since the microphone level is hotter than the other program sources, just speaking into the mike fades down the other source in the program limiter. The pots on the console are not normally used for fading, as their main function is only to compensate for unusually loud or soft levels on the records or other sources. Because of this, inexpensive molded composition attenuators are adequate for the job. They wear out only after two or three years and can be replaced at a cost of two dollars each.

Simplified turntable switching is one of the most important moves toward a more efficient operation. It not only makes the operator's job easier, but it helps prevent mistakes. The conventional installation uses two switches for normal operation: an audio transfer switch (usually attached to a cue pot) and another switch to control the turntable motor.

We've found it far better to combine the operations in one switch. Instead of making the operator flip a switch to cue a record, the turn-

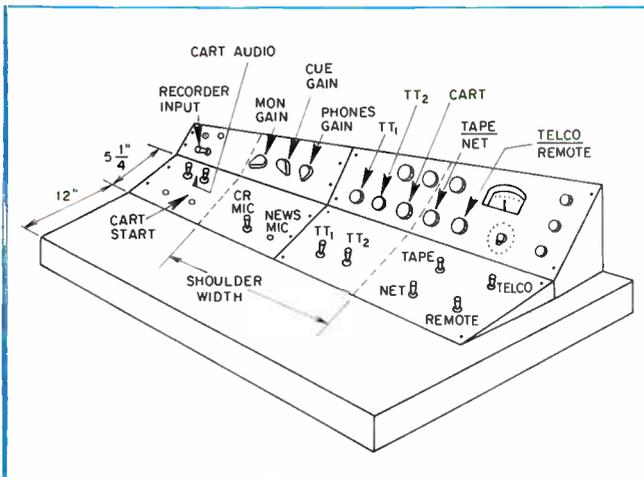


table audio goes to the cue amplifier when the turntable is at rest. This way, one lever switch can be used for these modes: center position—turntable motor off, audio to cue bus; left position—turntable motor on, audio to cue (for auditioning records); right position—turntable motor on, audio to mixer. With this system it's virtually impossible for the operator to cue a record over the air. He doesn't have to twist or flip anything to cue up a record, he simply drops the record in place and cues it.

Not related to equipment design, but still important to efficient record handling is the proper location of turntables in relation to the records to be played on them. Many stations locate the turntables on either side of the deejay, then put the records on one side or the other, forcing him to carry half of them over to the other side and back again—an operation a choreographer might call "The Disc Jockey Twist!"

Stations with a limited music playlist may put their records in a browser bin mounted on or in either the left or right pedestal of a conventional horseshoe console, beside the turntables used to play them. Stations whose operation calls for the announcer to select his records from a record library and bring them into the control room may find it easier to have two portable record bins, or even one for each announcer. In that way he can sort out his records into the bin in the order that he wishes them to be played and can conveniently bring them into the control room when it's time for his show.

If only a few records are to be played, a small carrying case may be all that's needed. If many records, especially albums, are to be aired during a shift, browsers mounted on a couple of wheeled carts can be used to ferry the records from the library to the turntables.

Similarly, the cartridges and playback machines should be located reasonably close to each other, to speed up tape handling. It's less disconcerting to the operator if he can see the cartridge machines without turning his head off-mike. This way, he can easily see the status of each machine,

as well as read the cartridge label before he pushes a button. This increases operator confidence and reduces errors.

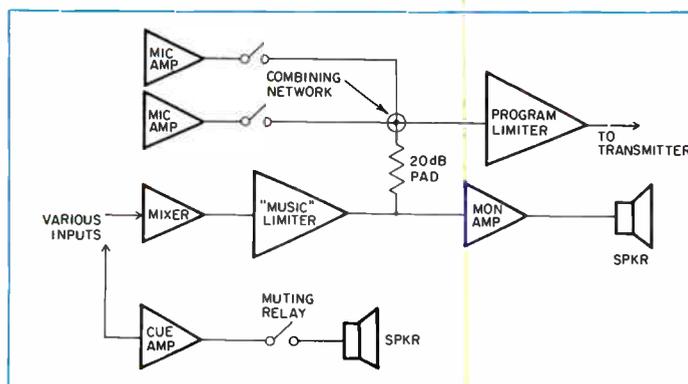
The major controls are within a forearm's distance from the table edge, which lets the operator rest his elbows on the table for greatest comfort. Also, the most-used controls are located within the width of his shoulders, especially the monitor gain control, mike key, and the switches and attenuators for the turntables.

There's sufficient panel space in front of the operator so important information and copy (news format, special contest formats, etc.) can be posted. The same goes for any special copy, weather forecasts, lost dog announcements and so on.

Operating Controls

The mike is controlled with a key, centrally located but normally operable with the left hand. Indicator lights are placed fairly low, so they can still be seen when the announcer is filling in his log. The headphone jack is mounted under the operating desk, on a small chassis. This way, the headphone cord doesn't get in the way of desktop operations. A master gain control is superfluous in normal operation. It may be desirable to control the gain at this point for overall system adjustment, but this is something the engineer should do, not every disc jockey who happens to want more or less gain. The mike amplifier gain and "music" limiter output control the amount of voice override. These adjustments should not be made by anyone except the engineer. The proper amount of override is best determined by ear. Once set, the controls should be left alone. The announcer can control his mike level easily and naturally by varying his distance from the mike.

Increasing control room efficiency is more than just making an improvement here and there. Everything to be touched and manipulated by the operator, including records, tapes and the telephone, should be optimally positioned to reduce all motion to bare essentials. The deejay freed from such unproductive motions, will have more time and energy to produce a better and more salable station sound. ●



Block diagram shows system's inherent simplicity. Note cueing amplifier that's always on, through mute relay.

The moment you begin to radiate 5 million watts of UHF...

Madison Avenue gets the picture

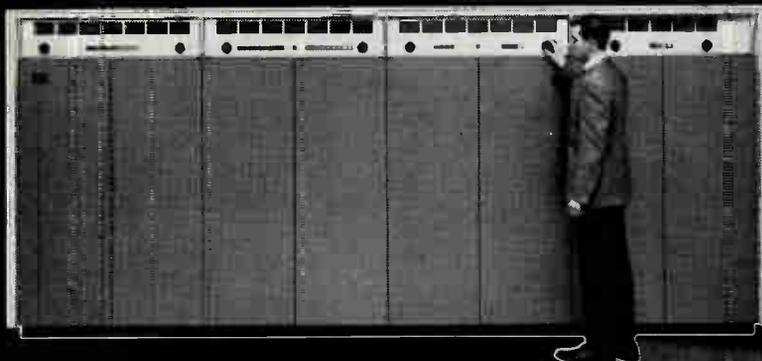
RCA has a new transmitter-antenna combination with the kind of radiated power that reaches Madison Avenue. We call it Omni-Max (maximum UHF in all directions). Put it on-air, and you get five million watts of effective radiated power. On Madison Avenue that means coverage, and coverage means sales.

And there's more than just that. You protect your investment. You cover the outlying towns before somebody else does. Nobody can "outpower" you.

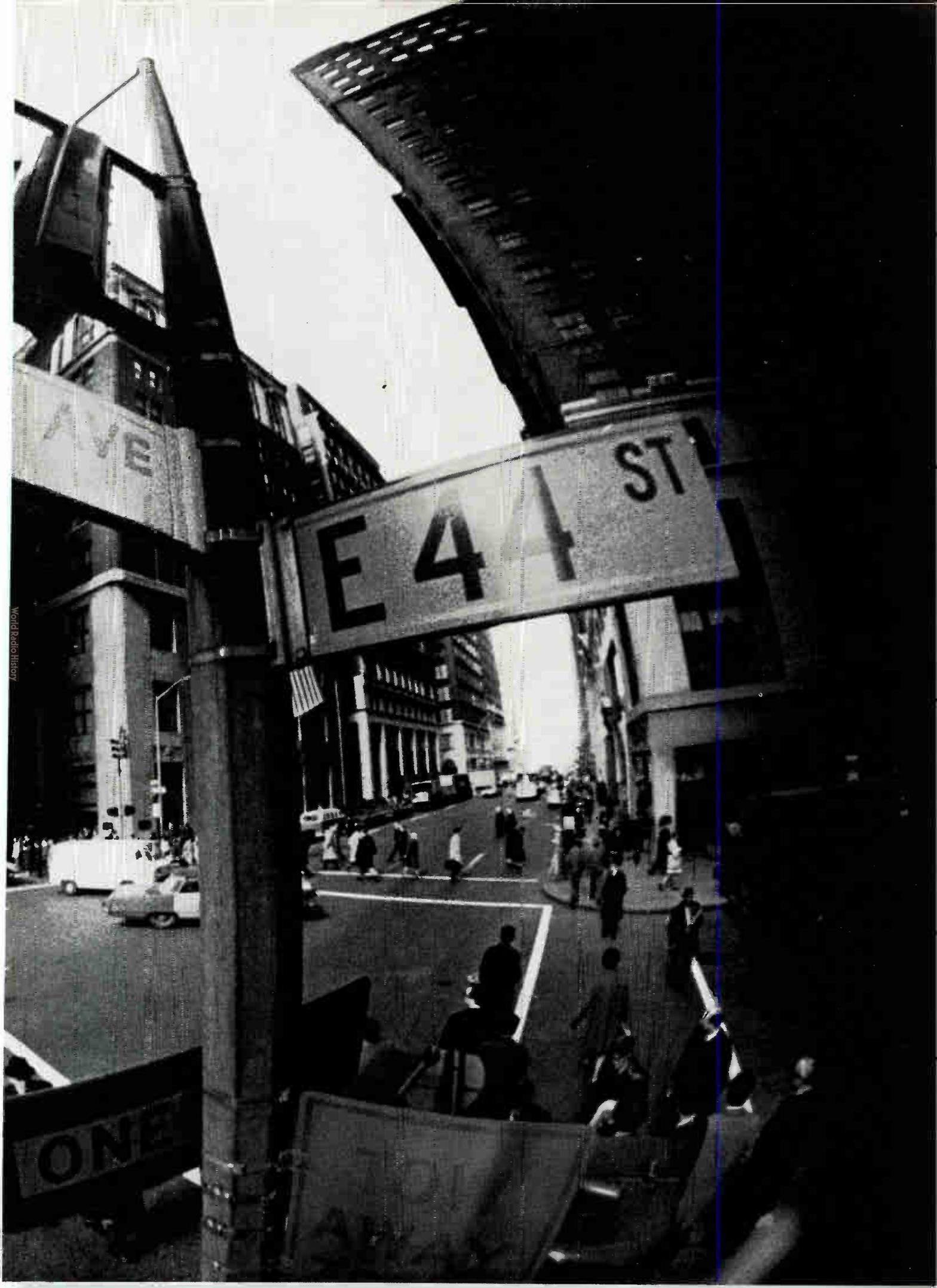
The new UHF transmitter is RCA's TTU-110A. It delivers 110 kilowatts of output power. The new UHF antenna is the Polygon. It is a high gain antenna. It will radiate five megawatts. In short, with this maximum power allowed by the FCC, you have the means to take over the territory. And you hold it!

Call your RCA Field Man. Tell him you'd like to turn on Madison Avenue. He'll show you how five million watts of ERP UHF can reach the people who buy the time. Isn't that the kind of performance you really want? RCA Broadcast and Television Equipment, Building 15-5, Camden, N.J. 08102

RCA



The RCA Omni-Max system is the most powerful UHF antenna-transmitter combination you can buy. The transmitter is RCA's TTU-110A, featuring diplexed amplifiers with efficient vapor-cooled klystrons. Ready for remote control. Combine it with the new Polygon five-sided Zee-Panel antenna, which features uniform pattern, excellent circularity for super-gain UHF.



MANAGEMENT ROUNDTABLE

Is Radio Becoming A Welfare Estate?



By
Si Willing

The sale of radio time is becoming more dependent upon the availability of co-operative advertising. That's good, and the way it should be, up to a point. If a sponsor will spend only his co-op money for advertising, that's going on the welfare and that's bad. If a sponsor will not buy your radio advertising unless he can use co-op subsidy; if he doesn't think highly enough of your product to put some of his own money into an advertising campaign, you've got troubles.

This attrition has been eroding sales of radio time, and the fault lies with the salesmen. Did you ever stop to think what a poor economy this would be if none of us bought anything from our sponsors unless our purchases were subsidized? I, for one, buy goods and services because of need and quality. I, for one, sell radio advertising because of a sponsor's need for my quality product. Certainly it's all right for him to use his co-op advertising because he has already been taxed for it through purchases. Radio time salesmen, listen carefully: there isn't enough co-op money available to support your station. A sponsor must think enough of your station to use it because advertising on your station is a profitable investment. Please don't lose sight of that fact.

Taking co-op plan ads is insidious. You can hardly realize

Author Willing is president and general manager of KMAR, Winnsboro, La.

that it's happening. If I hadn't made it a point to analyze my sales every month, this would never have occurred to me. Even with analysis, this co-op process is elusive. A chance remark from my billing clerk brought the whole thing into clear focus. It was only after she said, "it seems to me that I have to send out more co-op affidavits every month" that I became more aware and concerned. Then, when I discovered that many of my accounts were using the station only with a subsidy, did I decide to do something about it.

I first tried an appliance dealer who also sold furniture. In the beginning, he would use the extent of his appliance co-op money plus an additional schedule for his furniture. He used two separate campaigns; one was subsidized and the other was paid for 100 percent by the sponsor. In checking over my recent sales to that sponsor, I found that his furniture advertising had dropped and that his appliance advertising was irregular. He was using the cheapest method and I was accepting it. Here's how I attacked the problem.

I asked my wife to visit the sponsor with me. We were going to buy a new washing machine. The sponsor was a good salesman. We were sold on the product but we hesitated about making the purchase. "Why the hesitation, Si," asked my sponsor. "I like the machine," I said "but, as you know, I only get a commission for the advertising that I sell to you and I can only spend that commission for the purchases that I make from you. It sort of works like your advertising format. You know what I mean, Jim, spending only the co-op that your distributor allows." His first reaction was a blank stare. "Do you mean to tell me that you treat

all sponsors that way?" he asked. "That's right, Jim," I said. "I can't spend more than I earn from any one sponsor," I continued. "By that I mean, if my commissions amount to thirty dollars a month from you, that's all I can spend with you and if I earn only twenty dollars a month from Jones down the street, that's all I can spend with him." He got the message. "Tell you what, Jim," I said. "Let's trade on the basis of need and quality. You've got a quality washer and we need a quality washer so we'll take it." Later on Jim confessed to me that his advertising on my station had slipped because I had allowed it to slip. And that was the truth.

You must establish a dialogue they can understand. You must let them know that you agree with them that we have to put a halt to excessive welfare. Now it's all right for under-privileged families and indigent folks to be given welfare assistance. But, this country was founded by men who enjoyed making it on their own. If sponsors depend exclusively on their co-op money to advertise, is this not putting business on the welfare? Getting this message across to all of your sponsors is a big job and it's not easy. It took me about a year to correct the abuses that had crept into my station. Here are the steps to follow: 1) You must decide that you have a quality product that is worth what you charge for it. 2) The sponsor must be satisfied that your product is worth buying. 3) You should accept all co-op money but the sponsor should be encouraged to match his availability with his own funds. Before you lay this story aside, analyze your sales and then take action. You'll see a vast improvement in your sales if you do something about it. ●

IDEA FILE

SHORTCUTS & PROBLEM-SOLVERS

Features of Preassembled Buildings

The need for a dust-free, temperature-controlled housing for a-m, fm, TV and CATV electronic equipment at tower sites is now being met through the use of preassembled, weather-resistant buildings. Fabricated of aluminum and lined with fiberglass, these buildings have demonstrated superior durability, maintenance and handling characteristics.

Advance Industries, of Sioux City, Iowa, a pioneer in the field, uses aluminum to equal the strength of a steel structure. Two massive I-beam floor supports, specified in the Advance design, serve the purpose of allowing the building to be pulled across rough terrain without damage.

Advance installs all electrical equipment and can install customer-specified electronic equipment prior to shipment to make the building a self-contained, "ready-to-operate" structure. The building is field

installed on preset concrete piers in a matter of minutes, with all facets ready to operate immediately. A complete ventilation system thermostatically controlled, and fiberglass-filtered, provides air infiltration at the rate of 180 ft³/hr.

Another attractive feature is that in the event of station change, the Advance design allows for a complete site change without any disturbance of interior equipment or investment in additional buildings.

Originally designed for use as a microwave repeater building, Advance suggested one of their customers try it as a head-end equipment building for CATV. Advance describes the building's acceptance by the CATV industry as "surprisingly rewarding." Other industries have responded, too. Pre-assembled building customers include major power utilities, the Bell System, railroads, major microwave systems, CATV systems, TV and a-m fm radio, and the U.S. Government.

CATV
Engineering

CBS-TV Goes Underground At Augusta

About the time a good many broadcasters were attending the NAB convention Chicago, CBS went underground at the Masters' Golf Tournament in Augusta, Georgia, to bring the nation's fans one of the biggest outdoor color presentations in sports telecasting. The telecast of the Masters' Tournament was made possible by use of a permanently installed underground cable system for supplying power to the cameras. Consequently, by being able to "plug in" cameras at strategic locations around the course, CBS-TV could put viewers practically on the tees, fairways, and greens, providing vantage points unmatched by any in the gallery.

Installation of underground power cables generally is not a major engineering feat. Nor was it such at Augusta. Two factors, however, were of considerable importance, (1) use of a cable providing maximum performance and dependability, and (2) positioning the cable run to eliminate any possibility of having to dig up the cable for relocation at a later date. Here's how the problems were solved, working with Lou Scann, Technical Services-Engineering, Columbia Broadcasting System: The installation had to be made so as to have an absolute minimum of disturbance to the area's natural beauty—no slow-healing scars across the earth, or wart-like above-ground transformers. Thus, it was necessary to plan a system which would satisfy technical requirements and meet esthetic demands.

Part of the system involved underground ductwork in which camera-feed cables could be inserted, then removed when not needed. Other parts had to

be of permanent underground ducts and cables.

A major section of the latter was a primary circuit to extend approximately 1100 feet from a Georgia Power Company pole just off the club's property line. This circuit led to a 75-kVA, 3-phase, pad-mounted transformer to be installed adjacent to a storage building in a wooded area near the 17th tee. From the transformer the secondary, a 208-V, 3 phase circuit to supply a full 200-A equipment load, would run approximately 300 ft to a camera location near the 15th green.

An existing 400-ft run of an overhead primary circuit from the power company's pole crossed No. 6 fairway and led to a pole-mounted transformer on the club grounds to feed a small maintenance building. Since club officials had asked the utility company to remove this overhead line and service pole, it became necessary to insert a 25-kVA, pad-mounted transformer and an underground circuit to the maintenance building.

Both the 75-kVA and 25-kVA transformers supplied by Westinghouse, were painted green at the factory. Both were installed in wooded areas and, blending well with the surroundings, were relatively inconspicuous.

CBS chose Anaconda's Uniblend cable for the installation, rated at 85 C for 15-kV service. The cable has an extruded strand shield which is produced with simultaneous extrusion and vulcanization of strand shield and insulation. As a result the insulation has a uniform, high dielectric strength and permits reductions of up to 15 percent in cable weight and diameter. We put the Uniblend cable in 3-in ducts, at a depth of 24-in.

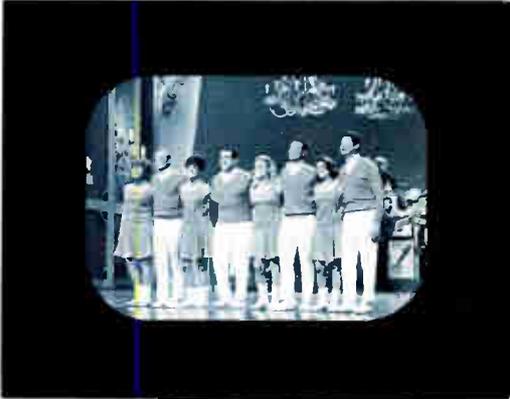
TV
Engineering



World Radio History

ABC's "Lawrence Welk Show." Video taped on Memorex 78V.

When the show's rolling,



the tape must not fail.

If it does, you have trouble. Time and money trouble.

Think what your actors, singers, dancers and directors are costing you. Not to mention cameramen, lighting men, sound technicians, floormen, and all the other people who put your show together.

Plus your equipment. Cameras, cables, spotlights, sets. They're expensive, too.

We make our Memorex 78V high-chroma video tape for people who don't want trouble. Who are impatient with re-makes and don't want to waste the time or money.

Of course, if time and money are no problem, then you don't need our non-fail 78V.

Only patience.

(For information, write us: Memorex Park, Santa Clara, Calif. 95050.)

MEMOREX

DO YOUR AWARD-WINNING COLOR COMMERCIALS LOOK BAD ON TV?

Sponsors and advertising agencies spend large sums of money to employ the finest creative talents to make television color commercials that sell products. There is no compromise with the quality of the production's artistry. And the 35mm originals look great in the screening rooms.

Why then allow these creative efforts to be badly reproduced for television showings?

According to the April and June issues of the industry's technical magazine, *Broadcast Management/Engineering*. . . "the telecine quality (of color commercials) is deplorable." Experts acknowledge that a major cause for this condition is inferior prints. The best color commercial prints, they will tell you, are processed by the color reduction printing method which permits printing from the original 35mm optical negative. It is far superior to the contact printing method which requires two additional generations of film.

Until now, relatively few in the trade knew there was a choice. The industry's capacity for color reduction printing could not keep pace with the onslaught of color commercials, and the method was comparatively expensive. Even at this time many laboratories are not prepared to service the industry with anything other than contact printing. *Although we at Movielab have one of the largest contact printing capacities and can guarantee its quality*, we also have the answer for those of you who demand the best that laboratory technology can provide—REDUCTION PRINTING.

Movielab has gone to tremendous expense to perfect its own method for multi-optical reduction printing to improve the telecine quality of your color commercials. Our specially-designed reduction printing system permits us to make multiple 16mm prints at one time from the 35mm original negative, obtaining the utmost in reproductive quality. In addition, our exclusive liquid gate method enhances color definition, prolongs the life of the negative and even eliminates defects incurred in handling.

The advertiser who ultimately pays all the bills deserves the best and should not be obliged to accept the results of technology that is "second best." The cost differential for superior reduction printing is nominal: for example, only 60 cents more for a 30-second color commercial and little more than \$1.00 per print for a one-minute spot.

While the overall cost of television commercial production sky-rocketed an estimated 72 percent during the last five years, according to the American Association of Advertising Agencies, our prices for color commercials have decreased more than 35 percent in this same period because of progress in engineering, automation and increased efficiency. Our prices are competitive and we never sacrifice Movielab quality. Not only can we do the job better and faster, but we can now do it at reduced cost to you and without cutting back on our stringent quality controls.

Movielab knows what the television networks and stations need and the sponsors deserve, and that's the kind of color print quality, uniformity and consistency we provide to our customers.



SAUL JEFFEE
PRESIDENT,
MOVIELAB, INC.

MOVIELAB, INC. MOVIELAB BUILDING, 619 WEST 54TH STREET, NEW YORK, N.Y. 10019. JUDSON 6-0360.

Circle 49 on Reader Service Card

TV Station Automation: It's Unavoidable

By Biagio Presti

Needs for television production, bookkeeping, logging, sales, administration and other everyday functions are growing too fast to be handled by mere mortals. Total computerization is the only answer, and the sooner it comes, the sooner the broadcaster will reap new advertising revenue.

THE DAY IS COMING—within the next few years—when an advertiser can “dial and ad” with his computer dataphone and leave the rest of the handling up to a string of sophisticated electronic data processing equipment. The computer will automatically select the market, schedule, appro-

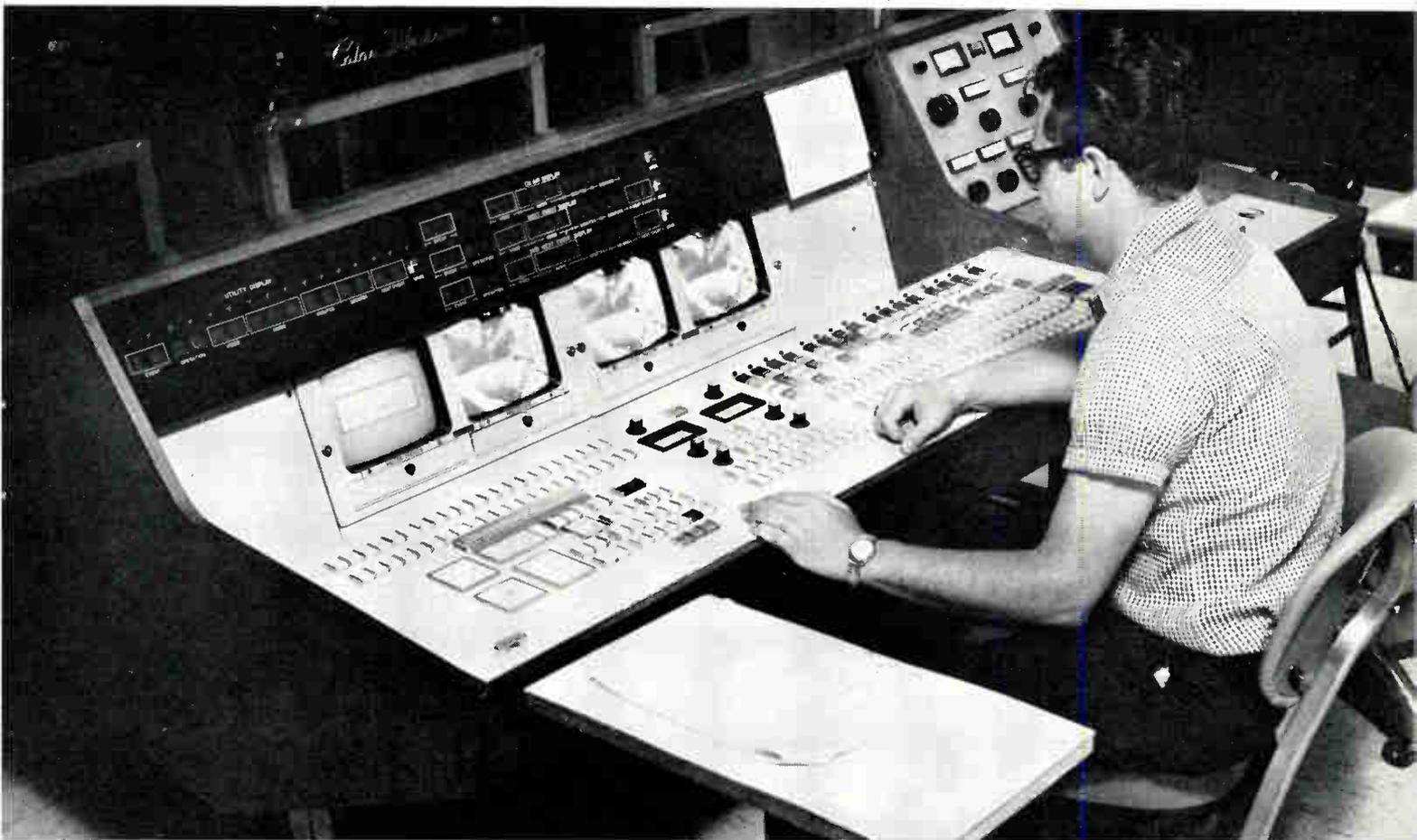
Biagio Presti is manager of Sarkes Tarzian's Broadcast Equipment Division.

priate stations, making correct insertions in logs. At the end of the month, a computer will make out a bill and proof of performance and will mail these to the client. Presumably, another computer will draft a check for payment and mail it to the ad agency, or transmit payment via telephone line to the agency's computer.

The capability exists right now, but is in bits and pieces. Some time within the next ten years or less, the sophistication of equipment, the expansion of the systems concept and advanced technological know-how will bring all the pieces together to form the first fully automated television station. The major stations in the top 50 markets will be fully automated while many of the smaller stations will be working with computerized systems on a smaller but equally efficient scale.

The ultimate in automated TV stations will have computerized administrative and traffic and

Automatic console installed at WBRE-TV, Scranton/Wilkes-Barre, Pa.



sales operations. A number of computers are already being used by stations for several different operations. At stations like WBRE-TV, Wilkes-Barre, Pa. and WTMJ-TV, Milwaukee, the Sarkes Tarzian APT-1000 computer is being used for the operations phase. At KSTP-TV, Minneapolis-St. Paul, and WHC-TV, Pittsburgh, IBM data control systems are being used for billing, accounting and other administrative functions. At KMOX-TV, St. Louis, and KTVT, Los Angeles, new general purpose computers analyze and log availabilities and other traffic requirements.

Key to the ultimate TV station computerization is the revolution in systems engineering, which has the ultimate responsibility of amalgamating new systems to already-existing equipment.

Technical competence doesn't mean technical factors alone, but must include: technical engineering; human engineering; esthetic engineering. All systems require substantial custom engineering, both to modify existing equipment and to add new gear engineered to fit into the total system. Systems engineering must integrate requirements for production, operation and technology to give the user the best combination of improved facilities consistent with cost.

Management often doesn't understand what computerization requires, resulting in a number of false and expensive starts by TV station



(Above) Automation console is checked out at plant by engineer Jack Dunn (at left) and author Presti. (Right) Presti and marketing manager Russ Ide discuss system.

operators. Management must be made aware that the computer is not an electronic brain, but an electronic idiot. Sophisticated equipment's true value cannot be realized without an understanding of its potential and limitations. Many operators have leased computers thinking they would solve all the station's problems, but found they were limited by the systems knowledge of their own staffs, often not broad enough to obtain

Computerize CATV Subscriber Billing?

The automatizing of subscriber collections sounds like the natural way to go for multisystem CATV owners. The instant management information one gets is nice but it is costly—a sharpened manual or semiautomatic system might be more cost effective. That's the interim opinion of one middle-sized multisystem operator who uses a computer service bureau (and who prefers to remain anonymous).

The chief advantage of computer-aided collection and reporting is high visibility. Management knows early in the month what dollar collections were, how many delinquents, rate of delinquency compared to earlier periods, number of connections, number of disconnections, etc. The performance of one community can be compared to that of others as something of a check on cable managers.

The disadvantage, outside of cost, is billing errors, which annoy customers. Errors are not machine errors, but confusion introduced by improper human coding or logging of information received. In other words, the system for handling inputs must be well thought out so that confusion doesn't creep in. Each subscriber has an

identifying code. If he moves to a new house a couple of blocks away, his account won't be handled as a new account or even as a disconnect and a later reconnect. All of the possible variations should be thought ahead of time. Every person in branch and central headquarters as well as at the service bureau should understand thoroughly the system.

If this much thought is given to a billing and record keeping system, automation may not be the answer. It is possible that existing personnel can handle the work load without the expenditures for outside services. With or without automation, a person at each branch is necessary to handle coupons received from subscribers and to add up daily receipts. If you can cut your staff, by going to automation, the move may be wise. If you can't forget it.

Advice in choosing a service bureau would be to call several companies. Let them study your system and make recommendations. The service bureau that best understands your needs is probably the one you should sign up—if the costs are reasonable.



maximum efficiency from the equipment.

The Computerized TV Station

TV station automation involves three phases: production operation, administration, and traffic and sales. Many of these functions are being used successfully as individual operations, but not as an integrated fully automated system.

Production. Greater strides have been made in computerizing program production than in any other area of TV station operation. Several stations have already adopted control automation. With the philosophy of systems engineering becoming an integral part of station planning, this phase of computerization will probably develop more quickly than automation in administration or traffic and sales.

With today's computers, the "panic-button" syndrome familiar to most control rooms will disappear. Equipment is so sophisticated that any problem that is possible has already been programmed into the computer, which can easily handle it. Every operation, VTR, film island, audio tape, camera, announce and studio activity or event can be programmed for maximum efficiency. This lets the engineer devote more time to creative use of his equipment.

At station WTMJ-TV, Milwaukee, chief engineer James Wulliman cites advantages of the APT-1000 used at his station. "It allows us a much more efficient use of personnel, it helps reduce human error; simplifies the input and improves the quality of the output; affords management more accurate and complete station control; improves the station's image and morale; and boosts our profit potential."

In many major stations there are far more machines than mere humans can handle properly. Operations are being forced to automate by this inundation of equipment, a sensible solution, since this frees personnel for more efficient overall control.

Despite grim forecasts about machines replacing people, station automation just doesn't work that way. There will be different types of jobs, different classifications—such as programmers and program typists—but the machines certainly will not eliminate people working with them. The machines will instill instead greater efficiency and will develop a highly qualitative image of the station's operation.

Administration. Many of the computers rented or purchased by TV stations in the first flush of early enthusiasm by TV operators, are currently doing most of the stations' accounting work—billing, log preparations, payroll and other purely clerical and administrative jobs. Much of this equipment has limitations in more complex operations, but has found its natural work level, providing an efficient and effective solution to tedious sorting, collating and classifying huge masses of paperwork normal to station operation.

TV stations with electronic data processors have gotten in on the ground floor of eventual total automation. As they progress into new and varied equipment uses, they prepare themselves for more sophisticated management thinking about eventual full equipment use.

Traffic and Sales. Computers offer the most exciting prospects for future potential in traffic and sales. A sales manager who can obtain projections by day, month, year, demographic category, product category or any of a number of cross-referenced categories is automatically ahead of the non-computerized competition. A sales manager can devote more time to creative selling when a computer can supply the answers to the most intricate questions in a matter of minutes. Computers will be able to present detailed sales analyses showing on demand, track records of individual salesmen for review, analysis and rating.

Some of the tasks a computer can handle include: log preparations, sales availabilities, weekly sales projections, sales analyses, CPM analyses, cume studies, billing, personnel reports, film inventory and FCC analyses!

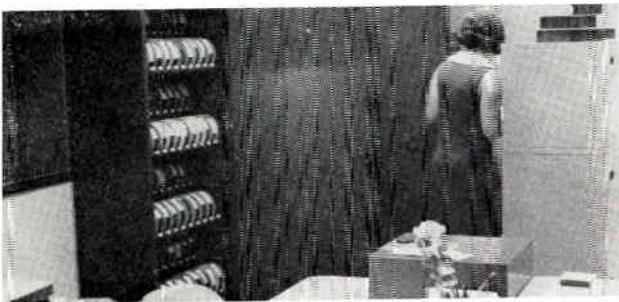
This is only a small part of the potential information that can be available for management use when competent systems engineering plans the basis for the most efficient equipment use.

Rapid strides already are being made along

Continued on page 66



Program logs made here. Elaine Raco points to digital magnetic tape recorder/playback unit on desk and output writer foreground (above). IBM card reader is at left of tape recorder. Only machine assignments are entered manually. Everything else is automatic. After program log is finished, appropriate films and tapes are gathered and delivered to machines. Storage cabinets shown below.



WRGB Ready for More Automation

The systems concept as articulated by Biagio Presti in the preceding article was very much in the mind of Duane Weise, manager of engineering, G.E. Broadcasting Co., when he revamped the master control center of WRGB (TV). A digital, magnetic-tape version of the program log controls video/audio switching. Next step: interfacing the program mag tape to a general purpose computer for automatic billing and other sales/administrative jobs.

AT WRGB (SCHENECTADY, N.Y.) the master control board operator uses his eyes and judgment plenty, but he can sit on his hands most of the time. A six- or seven-event sequence at a station break doesn't fluster him. The automatic program control cycles these without fault or flaw. The operator uses his hands mainly to ride adjustment controls so that the best possible picture goes out. He could go part way and "preset and take," but when he can see that the next 16 events are all set with real times printed out and checking against scheduled network feeds, there is no need for manual takes

The heart of WRGB's new video switching center is a new Central Dynamics automatic program control (APC) system. The system uses a Talley (Dartex Div.) digital magnetic tape/playback unit (which holds 24 hours of program information); an Ampex 16-event core memory (which holds one hour of events), a CRT display of core memory events in alphanumeric form and a logic module rack which determines audio/video signal switching as a result of the upcoming event.

The 24-hour digital magnetic tape is prepared by a programmer who really is the person in charge of the Audio-Visual Library. Program-

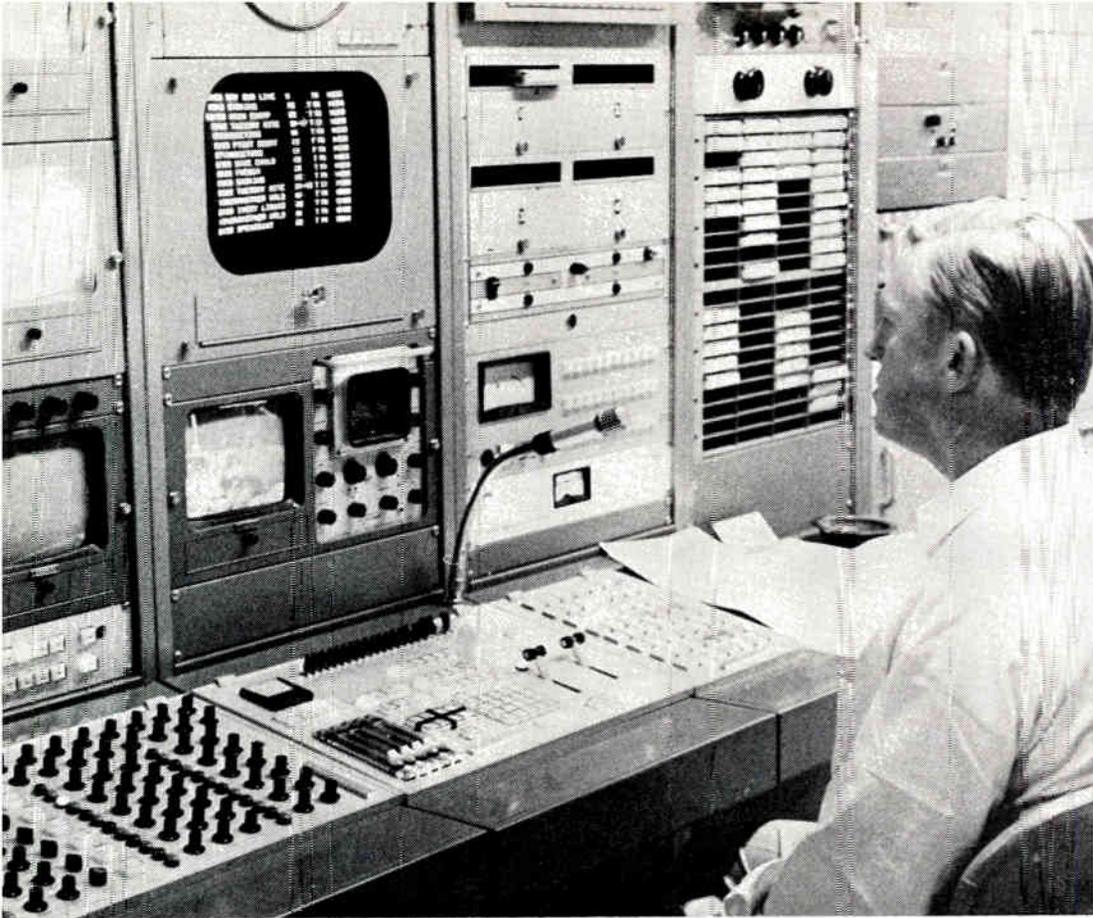
ming is no big deal. In fact two girls can keep on top of the programming-library work.

The programmer works with punched IBM cards which are received daily from Traffic. These cards are stacked in a card reader and the digital information is converted to tape on the Dartex incremental magnetic tape record/playback unit.

A two-step operation is involved in preparing a magnetic tape for control of the video switcher. The first step is to read out the mag tape as made up from the IBM cards. A typewriter-style output writer types a working program log (with carbon copies suitable for the Program department, the Operations department, the News department and others). This working log is typed with a blank space for entering machine assignments. The programmer-librarian scans the work draft of the program log and assigns machines (VTR1, VTR2, film island A, film island B) as necessary to accommodate the events. When the machine identifying number is typed in the blank space on the log (using the input keyboard of the output writer) an alphanumeric-to-digital converter simultaneously records the date on the magnetic tape. A playback of the tape with machine assignments inserted is run through the output writer and a final program log is typed. Copies of this version, which contains machine assignment instructions, are issued to master control, the technical director, the film island projectionist, the VTR operator and the Traffic department. One copy forms part of the FCC log and one copy is kept by the programmer-librarian as a guide in getting the right tape or film to the right machine.

More Details at Fall Broadcast Meet

A complete paper on automation at WRGB (TV) will be given by Duane Weise at the 18th Broadcast Symposium, Sept. 19-21, Mayflower Hotel, Washington, D.C.



Master Control Operator John Quinn observes program events on alphanumeric CRT display (below clock). Illuminated pushbuttons in front of him indicate machines' delegators. At the left are studio camera, VTR and film camera adjustments. Audio cartridge load is at right of the panel.

The log format contains the following information:

- Duration time (mins and secs)
- Description (13 characters)
- Video mode (color or mono)
- Video source type and number (ten types possible)
- Video transition
- Audio source type and number
- Audio transition
- Schedule time (hrs, mins and secs)

The log has a self-checking feature in that the individual time durations are added by a time accumulator incorporated within the tape recorder. The accumulated time is recorded on the log. The result is compared with the scheduled time entered initially. Discrepancies indicate an error.

Correction can be made and a new log typed. It takes about eight minutes to convert card decks containing a 24-hour program to a mag tape. The automatic writing of the program log from the tape takes 90 minutes. Thus reworking of the program log is no problem.

The daily stack of cards received by the programmer-librarian from Traffic consists of individual event cards that may have been punched weeks before when an order or program input was first received by Traffic. Punched cards are stored in a weekly card file by day and the upcoming day's program material is released at one time to the programmer-librarian.

The description of WRGB operations as we have given it so far is, thus, in reverse order since we started talking about the automatic

program control video switching system. In time sequence, program inputs go to Traffic which punches IBM cards and releases a daily stack to the Audio-Visual Library. Next the programmer-librarian makes up a digital magnetic tape (in the two steps described) containing a full days program. The printed program log and the digital tape log are sent to master control and the actual program material, such as film or tape, is sent to the VTR/film-island area.

Master control plays the digital type on a playback unit which in turn feeds the core memory. The next twelve events are displayed on the CRT display and the state of readiness of the machines (VTR or film island) is further indicated by illuminated pushbutton switches which indicate how the machines have been delegated.

Major Video Renewal at WRGB

Had we included WRGB's transformation in last month's special emphasis section on station planning and modernization we most certainly would have had to talk more about the new studio control (which is located directly behind master control), the simplified delegation switching system (CD), the new audio console (GE), the incorporation of camera-control units as vertical racks in the master control complex, etc. If you visit the Schenectady station, ask Weise to show you the "before" and "after" photos. The new system works marvelously, but it was a marvel that the old worked at all. Color pictures were pretty awful.

If the master control operator sees anything awry he can enter into the core memory any desired change. And, as is true of all automated video switchers, he can manually override it any-time. *

Duane Weise points out that one of the beauties of this system is that data storage is simple yet flexible. IBM cards store monthly and weekly inputs. Magnetic tape stores 24 hours of information, a core memory stores about one hour of information (18 events).

Thus the video switchers, including magnetic tape and memory core portions, costs in the vicinity of \$90-95,000. This tape memory can be interfaced with other data processing equipment to make up a more complete automated broadcasting operation.

WRGB Operation Manager Charles King is studying now the next step. He has a systems man on board studying traffic, administration, sales and marketing forms and procedures.

BM/E expects to up-date this report in the not too distant future since WRGB expects to be in the vanguard of automation.

King says the first step has gone smoothly. Technical personnel are not afraid of automation once they understand what their job function is. Nobody has been replaced by such automation and individual tasks have been rendered less demanding since the bursts of intense activity at commercial and station-break time are now handled automatically.

The next step toward broader station automation will undoubtedly incorporate the use of a general-purpose computer. Since WRGB is part of the General Electric broadcast group, its needs will be viewed along with that of the other GE stations.

*While your BM/E editor watched a sequence, operator John Quinn was once poised to take over, but he didn't have to. As the preview event came up, the pushbutton switch didn't illuminate as expected. Quinn had time to query the film projectionist who confirmed that everything was in readiness. We witnessed a "bug" that hadn't yet been caught in the system's first 20 days of operation. Remarkably few bugs occurred in the renovation according to Weise, which speaks well of the systems planning that preceded the installation.

Even Gals Get Automated



Partly automated, very flesh-and-blood Allison Steele does nightly (12 M. to 6 A.M.) deejay stint at WNEW-FM weekdays. She pretapes her show for automated gear for weekend airing.

Video Preset Program Switchers

- Ampex Corp., 401 Broadway, Redwood City, Calif. 94063
- Central Dynamics Corp., 903 Main St., Cambridge, Mass. 02139
- Chrono-Log Corp., 2583 West Chester Pike, Broomall, Pa. 19008
- International Good Music, 3950 Home Rd., Bellingham, Washington 98225
- RCA, Broadcast & Communications Products Division, Front & Cooper Sts., Camden, N.J. 08102
- Sarkes Tarzian Inc., Broadcast Equipment Division, East Hillside Dr., Bloomington, Ind. 47401
- Shiba Electric Co., Ltd., 6-1, 2-Chome, Uchisaiwaicho, Chiyodaku, Tokyo, Japan
- Telecontrol Corp., 143 Sound Beach Ave., Old Greenwich, Conn. 06830
- Telequip Corp., 224 Glen Cove Ave., Glen Cove, N.Y. 11542
- Telesis Corp., 3712 Upper Mount Vernon Rd., Evansville, Ill. 47712
- Tokyo Shibaura Electric Co. Ltd., Communication & Instrumentation Division, 1-6 Uchisaiwaicho 1-Chome, Chiyoda-Ku, Tokyo, Japan
- Visual Electronics Corp., 356 West 40 St., New York, N.Y. 10018
- Ward Electronic Industries, 142 Central Ave., Clark, N.J. 07066

Radio Automation: Playback, Program Switching, Memory Devices and Program Logging Equipment

- Continental Electronics, 4212 So. Buckner Blvd., P.O. Box 17040, Dallas, Tex. 75217
- Disan Engineering Corp., 1362 E. 43 St., Tulsa, Okla. 74105
- Electronic Engineering Company of California, 1601 E. Chestnut Ave., Santa Ana, Calif. 92702
- Gates Radio Company, 123 Hampshire St., Quincy, Ill. 62301
- International Good Music, 3950 Home Rd., Bellingham, Wash. 98225
- McCurdy Radio Industries, Inc., 57 North Putnam, Danvers, Mass. 01923
- MaCarTa, Inc., 709 Railroad Ave., West Des Moines, Iowa 50265
- Metrotech Inc., 670 National Ave., Mountain View, Calif. 94040
- RCA, Broadcast & Communications Products Division, Front & Cooper Sts., Camden, N.J. 08102
- Schafer Electronics, 9119 DeSoto Ave., Chatsworth, Calif. 91311
- Seeburg Music Library, 1500 N. Dayton St., Chicago, Ill. 60622
- Tape-Athon Corp., 523 So. Hindry Ave., Inglewood, Calif. 90307
- Tapecaster Electronics, Box 662, 12326 Wilkins Ave., Rockville, Md. 20851
- TeleControl Corp., 143 Sound Beach Ave., Old Greenwich, Conn. 06870
- Tokyo Shibaura Electric Co., Ltd., Communications & Instrumentation Division 1-6, Uchisaiwaicho 1-Chome, Chiyoda-Ku, Tokyo, Japan
- Visual Electronics Corp., 356 West 40th St., New York, N.Y. 10018
- Visual Electronics Laboratories, Audio Division, 40 North Daisy Ave., Pasadena, Calif. 91107

Teleproof 1 to Slash Paperwork and Spur TV Automation

An automated system being introduced this fall may well be the goodbye kiss to the station affidavit. Providing 100-percent auditing of spot commercials, the system will do everything but sign the check from the advertiser.

WHICH IS MORE IMPORTANT—proof of performance or climate of performance? The answers vary. Some ad men feel that both are important. Others feel that a real battle royal may be shaping up between new automated proof-of-performance techniques and the older, more conventional sampling service supplied by BAR (Broadcast Advertising Reports).

Any such service ultimately costs advertisers a fee, and so far, they've been willing to pay the tab. Now with International Digisonics' arrival in the TV marketplace, the perennial argument has suddenly become nuts-and-bolts instead of just an academic discussion. What Digisonics plans to do is to provide the TV advertiser with an equivalent of the "tear sheet" that magazines send out to prove publication. Intangible media such as TV and radio produce no such "hard copy" and it's only been by sampling systems and the broadcaster's own affidavits that any auditing has been possible. At best, such proof-of-performance techniques leave much to be desired.

Spoiled Spots: A Financial Problem?

The biggest headache for broadcasters and ad agencies alike has been the incidence of "spoiled spots"—spot commercials that don't run as planned for one reason or another. Problems could include loss of audio or video for part or all of the commercial, improper time slot, garbled audio and a host of other possible inadequacies. But the spoiled spot is still a subject of considerable controversy. There's general agreement that a spot should run precisely as ordered; special adjustments and precautions vary depending on the situation.

Automation at the TV station could eliminate

virtually all such spoiled spots, and recover the lost revenue—an intangible figure, since broadcasters seldom suffer actual out-of-pocket losses for those spots that are reported. The make-good is the usually accepted method of reimbursing the advertiser, but a make-good occupies time that might otherwise be sold to another advertiser, hence the lost revenue.

BAR's Robert Morris doesn't feel that spoiled spots will, by themselves offer sufficient economic justification for installing TV automation equipment at the station. His service monitors a 25-percent segment of commercial programming in the top 100 markets. He feels that the actual percentage of spoiled spots is far too low to call for station automation. In commenting on proof-of-performance, Morris believes that "climate of



The man who makes Teleproof go, Jordan Ross, predicts nationwide saturation by his system within a year.

WXXX-TV	CHANNEL #	CITY, STATE				
Advertiser "A"	Agency "AA"					
Date	Day	Time on	Commercial No. *	Length	Orig.	Inadequacy **
Product "AAA"						
Oct 06 68	Sun	10:59A	347-AAA-60	60 Sec	Local	25-35 sec. Audio
		7:23P	352-AAA-30	30 sec	Netwk+	...
Oct 08 68	Tue	2:37P	347-AAA-60	60 Sec	Netwk+	...
Oct 09 68	Wed	11:59A	352-AAA-30	30 Sec	Local	...
Product "BBB"						
Oct 07 68	Mon	6:30P	*061-34-4067	10 Sec	Local	...
Oct 21 68	Mon	6:30P	*061-34-4067	10 Sec	Local	...
Oct 28 68	Mon	6:30P	*061-34-4067	10 Sec	Local	...
Product "CCC"						
Oct 02 68	Wed	2:37P	312-CCC-30	30 Sec	Netwk+	...
Oct 04 68	Fri	9:12P	314-CCC-60	60 Sec	Netwk+	...
Oct 11 68	Fri	9:10P	314-CCC-60	60 Sec	Netwk+	06-10 sec. Video
Oct 12 68	Sat	9:46P	312-CCC-30	30 Sec	Netwk+	...
Oct 16 68	Wed	2:37P	312-CCC-30	30 Sec	Netwk+	...
Oct 18 68	Fri	9:12P	314-CCC-60	60 Sec	Netwk+	...
Oct 25 68	Fri	9:10P	314-CCC-60	60 Sec	Netwk+	...
Oct 26 68	Sat	9:50P	312-CCC-30	30 Sec	Netwk+	...

Typical computer read-out from Teleproof system shows all pertinent data: name of product, day and date, agency, time on, commercial code number, length, source, any inadequacies and their length.

performance" is much more important. This includes such vital data as: spot run in appropriate time slot; serious conflicts between this and adjacent spots; suitability of program material itself for such a spot commercial.

System Pinpoints Spoiled Spots

BAR's sampling method gives the industry an excellent spot-check, but makes no attempt at providing an audit. Affidavits of proof-of-performance have been the only substantiating paperwork for spots, and the advertiser must take the station's word for it, unless he wants to hire a special auditing service.

A seemingly foolproof method of providing 100-percent audit on a consistently reliable basis is being introduced into top market areas by International Digisonics. No special equipment is needed at the transmitter. A commercial is prepared by adding some coded digital information that identifies it to the automatic monitoring equipment. This code is added from supplied coding strips in the final stages of production at the optical house. For taped spots, a pre-punched paper coding tape is supplied for use at the production studio with either a special encoder or existing optical effects circuitry.

Somewhere near the TV transmitter, but separate from it, Digisonics maintains a monitoring post which receives and decodes the binary digital code that is transmitted with the commercial but is not seen on the home TV screen. This way, the monitor knows if either the video or audio suffers from any "inadequacies." The monitor will automatically register the time that the spot is run, and this and other pertinent data are stored on computer-grade instrumentation tape. At the end of the broadcast day, the monitor station transmits its logged data via telephone line to a computer in Springfield, Illinois, a central clearing house for

spot commercial audits. Proof-of-performance reports are automatically printed out by the computer, indicating station call letters, channel number, city and state, advertiser, agency (of record), the product, date, day, time-on, commercial code number, duration of the commercial and start and end of any inadequacy.

International Digisonics calls its system "Teleproof I," and expects to have the entire continental United States covered within the next year. The equipment is "relatively unsophisticated," according to Digisonics vice president Ed White, and its very simplicity will help in overall system reliability. Monitors contain their own emergency dc power supplies for use during power blackouts.

White expects Teleproof I eventually to become the auditing and accounting arm of the entire TV industry in very short order. He indicated that Digisonics will provide, in addition to the audit, a completely automated accounting and billing service for broadcasters and ad agencies, thus eliminating the mountains of paperwork now required.

"No one has time to check and audit proof-of-performance affidavits adequately" says White. In his estimation, the percentage of spoiled spots covers a spread of 1 to 10 percent—1 percent for network-carried commercials, and as high as 10 percent for local spots. White further believes that, "Somewhere between these two poles lies the percentage by which any advertiser will be affected—determined by the complexities of his scheduling, use of net vs. spot, and the events of the day that affect broadcasting." He feels that the new automatic auditing system could raise this figure even higher, since the better auditing would uncover inadequacies that now go by unnoticed.

"The system will certainly provide impetus for broadcasters to automate their switching," White goes on to say, "and the incidence of spoiled spots

Continued on page 68

Fm'er Home Brews Automation System

By Ray L. Sherwood

Starting a brand-new automated fm station from scratch on a beer budget designed to serve a tough market could have been disastrous. Here's how a group of whiz kids home-brewed their automation and turned the profit corner in a hurry.

ONE OF THE PROBLEMS facing WMRO-FM at mid-year is finding availabilities for sponsors. It's not unusual for a sponsor to wait several months to pick up his choice of programs or spot announcement package. The availability sheet for the last 18 months shows an average of 71 percent sponsorship for a 7-day week.

Finding slots for sponsors hasn't always been the problem. Early in the planning stages in 1964, most of the experts felt that stations less than 40 miles from Chicago would have a very hard time making inroads into the struggling fm market, especially with 30 Chicago-based fm stations in operation. WMRO-AM had operated in this peripheral area since 1938 with a news, weather and sports format. We were told that a good music format wouldn't work because of the competition.

The planning phase included these stages:

Programming to be entirely separate from WMRO-AM, the sister station.

Program to be good music with quality equal to Chicago stations already serving the area.

Local headline news each hour to provide incentive for local listeners to tune in WMRO-FM, assuming that musical programming is equal to competition.

Economy in construction using as much equipment as can be spared from WMRO-AM.

Economy of operation using personnel from WMRO-AM wherever possible.

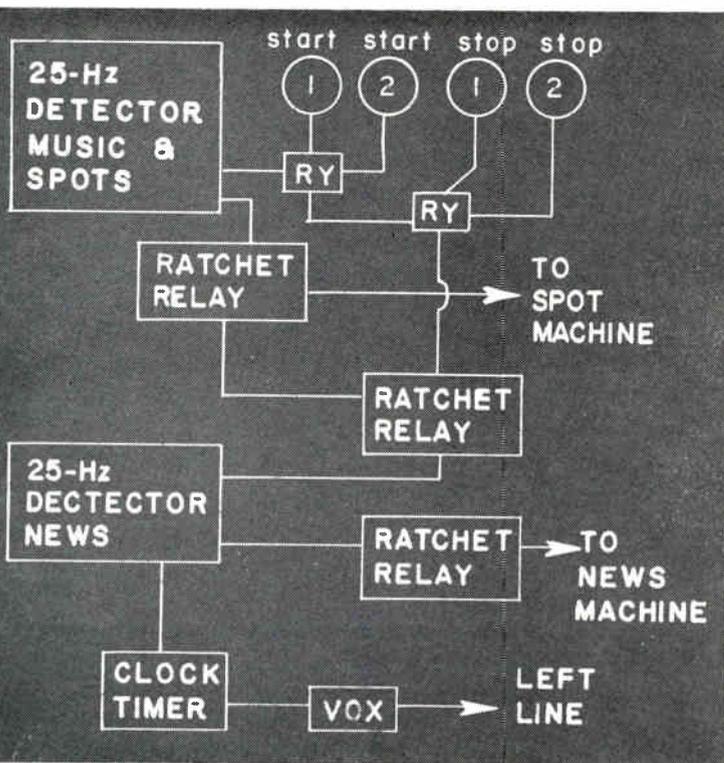
Programs to be 57 minutes in length, each with its own opening and closing theme music, with three-minute newscast before each hour.

Keep it simple.

The programming and music format problem was solved by subscribing to the Triangle Audio Programming Service who furnishes 16 hours of music tapes, seven days each week. Triangle Service selections found wide acceptance in the Chicago market area. The music comprises popular standards, middle-of-the-road, classical and Broadway. The Triangle Service also provides the theme music for most of the hour musical programs.

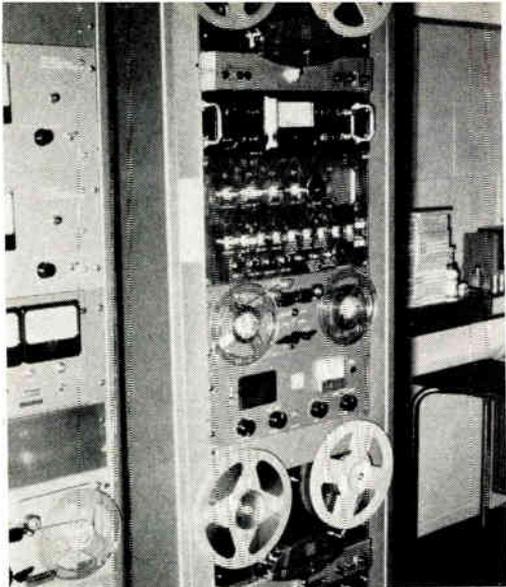
Equipment Inventory

The next step was to inventory the equipment that could be released by WMRO-AM. By rearrangement and purchase of only two additional tape machines for WMRO-AM, it was possible to release for the fm station two Magnecord M90



Block diagram of home-made automation system shows use of readily-available parts and junkbox components.

Ray Sherwood was general manager and chief engineer of WMRO-FM, Aurora, Ill., during its first years of operation. He is now president and general manager of WLXT-TV, Aurora, Illinois.



One of WMRO's homemade automation racks, showing conventional tape decks that had automation added. Equipment setup is flexible, permitting additions as station's needs expand.

(10-inch reel) and two PT6 machines. The two ten-inch machines were assigned to music tapes while one PT6 went into service for theme music and commercials and the other one for news.

Since the Triangle tapes are cued with 25-Hz tones, two second-hand Ampex 25-Hz detectors were added. These two units, along with home-built power supply, clock timer, silence detector,

Make or Buy

Store-bought automation systems—the usual route for radio broadcasters instead of home-brew—offer the broadcaster a great choice of potential programmability, with differing choices available even from individual manufacturers. These options include the amount of elaboration needed by the user and the desired degree of flexibility.

Within the ranks of one company—Schafer—are such various automation memories as rotary programming switches and sophisticated computer gear with magnetic disc memory. System is simple to control, and a gal at the typewriter keyboard can do the whole job. Going a step further, total station at automation—including bookkeeping, billing etc., can be handled by an expanded form of this computer control.

Punched cards, first used by IGM, are still around in force. New are MaCarTa's perforated metal chips which stack up to control program sequencing.

Another selector mechanism—the crossbar selector switch—is used by TapeAthon and Visual Electronics. A single Visual crossbar module handles 20 sources and 50 events, has silence sensing and tone sensing and can be manually overridden at any time.

A telephone dial, a bank of lever switches and a selector plugboard are all elements of Disan's versatile options. The telephone dial is the latest addition to the line and encodes program sequence information into the system memory.

Combination reel and cartridge systems are featured by Gates Radio and by Metrotech. The Gates system is a completely automated package which prints out a log as the program runs. The Metrotech gear uses switch selection, and is the only system that offers adjustable delay.

Heathkit voice-controlled relay and a handful of ratchet relays became the principal components of "the brain."

Since the a-m station carries news on the hour throughout the broadcast day, provisions were made to record the fm news on tape by the a-m announcer before each hour to avoid conflicts.

Originally, 25-Hz tones were recorded on a cartridge tape and used as a cue tone for news and commercials. It was soon found that the cartridge tape varied in frequency and could produce audible harmonics and distortion. Three months after opening, the station purchased an automatic tape control 25-Hz generator for inserting cueing tones.

A minimum amount of line equipment was in use between tape and transmitter, but the 16 music tapes each day and the several different announcers made audio levels impossible to maintain without continually riding gain. A rush order for a Gates Sta-Level amplifier helped considerably.

Wool Carpet Switches Tapes

When WMRO-FM began operation, the station invested in one luxury—a heavy wool carpet on the studio floor for soundproofing and to add a little class. This proved to be a mistake; during the dry winter season, each time the engineer would walk into the automation room and touch the cue switch, a spark of static electricity would jump from his finger and the machine would immediately stop the music and begin a commercial. This problem was finally solved by covering the luxurious new carpet with a rubber mat.

Original plans called for commercial and theme tapes to be made up for six-hour stretches. But sponsors with changes in ad copy required lots of cutting and splicing. So the station went to one theme and commercial tape for each hour of programming, since the engineer normally changes music tapes every hour anyway.

The clock timer has one cam that indicates four minutes before the hour and was an addition to the brain after one month's operation. Original plans called for end-of-music sensing with the silence detector. But classical tapes with long low passages frequently tripped the silence detector resulting in news being inserted at random times between the hours.

Converting to Stereo

After one year of operation, the station converted to stereo. The only major change in the control circuitry was to add muting during switching to the right channel and disabling of the right channel during the cueing process. Since the Triangle Service was converting to complete stereo, program source was no problem. Two Roberts 455 stereo machines were purchased and modified by adding high-quality output transformers and

extending remote control start-stop facilities into the automation equipment. The Gates Sta-Level amplifier was replaced with a Gates dual-peak limiting amplifier (M 6144 B) and a second Collins preamp was added at the transmitter. A Gates stereo exciter was installed in the transmitter and the station became one of the first stereo broadcasters in northern Illinois, outside of Chicago. News, commercials and theme songs are still done in mono.

Upgrading Not Needed

From time to time, automation equipment replacement is discussed, but the sponsors, many of whom have been on since the first day, like the 57-minute music format. Listeners have become accustomed to the music with local news each hour, and more sophistication in the automation equipment just isn't necessary.

During the 3½ year period the equipment has been in operation, there has been remarkably little trouble experienced. We were cautioned initially that the Ampex 25-Hz detectors would be notoriously hard on the 5665 thyatron tubes, especially since the filaments were switched on and off each hour. The station has yet to replace either of the two thyatrons in service. One of the Roberts 455 Machines developed an erratic motor condition shortly after it was placed in service. The motor was replaced by Roberts at no charge and there's been no further difficulty. Dirty contacts on the stepping relays and the cueing switches have caused the most trouble, but a regular preventive maintenance program keeps this trouble to a minimum. The action of the Agastat time-delay relay, which shorts both lines, is extremely fast and even the most critical listener usually doesn't catch the short burst of 25-Hz tones. ●

Need for Equipment and Tape Service Standardization

Prospective purchasers of automation equipment should know that cueing standards are almost non-existent. Among ten leading automation equipment manufacturers and five lead-program services, considerable variation exists in tape format and equipment specs. These variations have—in at least one tape service/equipment interface—caused inconvenience.

Inconveniences caused by nonmatching tape service and equipment are cited by one New York fm'er. The station purchased a system (now 7 or 8 years old) and afterward decided on a tight program format. Selecting a service that supplies this type of format, they racked up the tapes only to discover that the switching circuits wouldn't operate. After some head scratching and much poring over schematics, a workable solution was found: modifications of the 25-Hz tone sequence gating circuit and changes in time delay adjustments on individual tape decks.

The station recently underwent a change of program format that called for wider spacing of selections. The chief engineer had to get busy and change the circuits back to the way they had been supplied originally by the manufacturer. The supplier now sells a modification kit for broadcasters with this problem.

Typical specs of cue tones read something like this: 1) 25 Hz, 1.5 seconds in length, 6-dB below program reference level. Following the tone is 1 second of silence. Unannounced tapes use sub-audible tone inserted under the end of each selection. 2) Both 20- and 25-Hz tones are mixed and recorded under program audio. Unannounced tapes use 2 seconds of silence between the end of the switching tone and the beginning of the next audio. Burst is approximately 10 seconds in duration. Other tones—440 Hz and 7500 Hz—are inserted in such a way as not to interfere with program material. Their function is to indicate maximum recording level and head

alignment. 3) 25-Hz burst, -2 to -5 dB for 2 seconds. Approximately 1-second pause, depending on mood of selection. From these typical cue tone specifications, it's clear that about the only thing that's standardized is the use of 25-Hz cue tones, and even that has variations. One New York State tape service inserts no cue tones.

Since cue-tone spacing is an important element in the automated station's format, there is probably no easy way to standardize. Equipment should therefore, be designed to accommodate any possible spacing of tones plus a liberal margin of safety. However, to make life a little easier for harried equipment manufacturers and to give broadcasters smoother-running equipment, some form of standardization is needed, and soon. Such standardization might be used to eliminate wide variations in tone format, purity, level and length.

Equipment and tape specs aren't the only areas that cause automation hangups. The automation user also must be wary of the way he receives his tapes. Bicycling, where subscribers form a loop by passing tapes from one station to another, has big drawbacks. Unless stations in your particular loop are especially cooperative and considerate, you're likely to receive tapes that have been stretched in rewinding, broken, containing spurious tones, out of proper sequence, or even no tapes at all.

Best way to cure the problem is to switch to a library service. That way anything that goes wrong is strictly between you and the tape service, and can be fixed faster.

Don W. Clark, of Don W. Clark Associates in California, sees problems in automated network operations. He says that present setup of cueing automation systems at the instant of start is haphazard. Clark calls for standardization of 5-minute network arming cue, using preswitchers or arming devices.

AKG two-way microphones

An exclusive concept*

In the **AKG** two-way microphone system, the total response range has been subdivided between a high frequency and a low frequency transducer, each of which is optimally adjusted to its specific range (similar to a two-way speaker system). The two systems are connected by means of a cross-over network with the cross-over frequency at 500 Hz.

The cross-over network is housed in the lower portion of the microphone. In case of the D-202E and D-224E, the output circuit of the microphone contains an electrical bass attenuator to permit a reduction in low frequencies.

This unique arrangement achieves a number of previously unobtainable performance characteristics for cardioid dynamic microphones:

Flat frequency response over the entire audible range. The low as well as the high frequency system is optimally adjusted to its specific frequency range and the cross-over point, at 500 Hz, is unnoticeable.

Linear off-axis response. Sound reaching the microphone 90° off-axis is reproduced naturally. No frequency discriminating characteristics, which commonly arise from dynamic microphones, are audible.

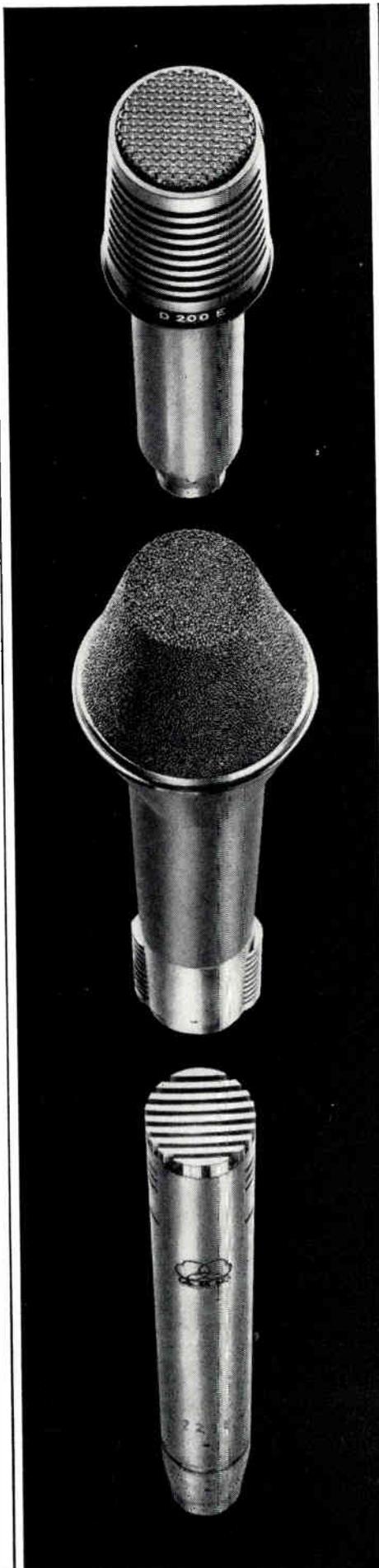
Uniform front-to-back discrimination. The two-way system maintains a front-to-back discrimination of at least 20 db over its entire range, even in the critical low frequency and upper mid-range area.

Write for complete two-way microphone data.



MICROPHONES • HEADPHONES

DISTRIBUTED BY
NORTH AMERICAN PHILIPS COMPANY, INC.
100 EAST 42nd STREET, NEW YORK, NEW YORK 10017



D-200E

The basic two-way microphone. Incorporates all inherent features of the two-way technique: smooth frequency response; linear off-axis response; uniform front-to-back discrimination.
\$69.00 Net

D-202E

Professional two-way microphone. Extended, smooth frequency response. With bass roll-off of -20 db at 50 Hz. With sintered bronze cap which functions as windscreen, is water-proof and protects magnets from iron particles and dust.
\$130.00 Net

D-224E

Studio two-way microphone. Exceptional wide and smooth frequency response, normally expected only from condenser microphones. With bass roll-off switch and compensating windings to eliminate the effects of magnetic stray fields.
\$185.00 Net

*U.S. Patent No. 3,204,031

2-69

BROADCAST EQUIPMENT

Professional Portable Recorder

Model 11 portable tape recorder has been introduced by Tandberg of America, Inc., P.O. Box 171, Pelham, N.Y. Recorder has three separate heads and is available in two versions: Model 11-2 is a half-track unit, designed for music, technical, educational and professional broadcasting applications. A full-track unit, the Model 11-1 is offered for audio-video, journalism and business uses. Weighing approximately 10 lb and measuring 13 × 10 × 4 in. with a 7-in. reel capacity, both models are easily carried, and operate on 10 D cells or Nicad rechargeable batteries. Frequency response of Models 11-1 and 2 at 7.5 in./s is 40-16,000 Hz ±2 dB; signal-to-noise



ratio at 7.5 in./s is better than 56 dB; and distortion is less than 0.5 percent. In addition, a Pilotone model is available specifically for synchronization of sound with 16 or 35mm film in professional motion picture work. Both models include servo-type speed control (1/mil accuracy); built-in mixer and limiter; Cannon microphone input; and three-speed dc motor. Price for Model 11 in both versions is \$449.50.

Circle 100 on Reader Service Card

Pneumatic Pedestal

Listec Television Corp., 35 Cain Dr., Plainview, N.Y. 11803, announces availability of Type 556 pneumatic pedestal. Unit's high pressure counterbalancing system, with nitrogen, maintains counterbalancing properties for indefinite period of time without recharging. There are no



hydraulics involved, and system is simple to operate and maintain. Pedestal accepts TV cameras weighing up to 500 lb, with vertical extension of 21 in. In addition, use of special steering mechanism coupled with relative lightweight of pedestal, permits fingertip control of tracking and elevation. A column break and a positive column lock are also incorporated and pedestal has easily adjustable cable guards, cable clamps, steering indicators and other detailed refinements.

Circle 101 on Reader Service Card

Cardioid-Dynamic Has Control Volume

A unidirectional cardioid-dynamic microphone with volume control on microphone case has been introduced by Turner Co., 909 17th St., N.E., Cedar Rapids, Iowa 52402. Turner Model 701VC enables user to change volume of PA system, or turn sound off, at microphone. 701VC has 40-kilohm impedance and 100-13,000 Hz frequency response. It comes

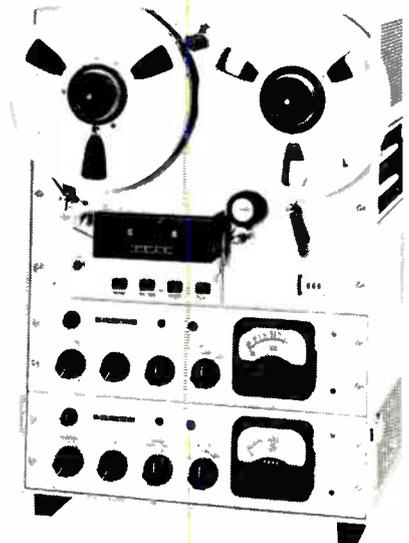


equipped with pop blast and removable 20-ft cable with phone jack and a stand adaptor. Price is \$75.

Circle 102 on Reader Service Card

Professional Tape Deck Series

R-310 Series is available in full-track mono, 2-track mono, and 2-track stereo with 4-track stereo playback and 4-track stereo with 2-track playback versions. Series uses triple motor system for drive of takeup reel, supply reel and capstan. Electrical switching provides speeds of 15 and 7.5 in./s. Exchange of capstan sleeve and pinch roller provides 3¾ in./s. Wow and flutter range from



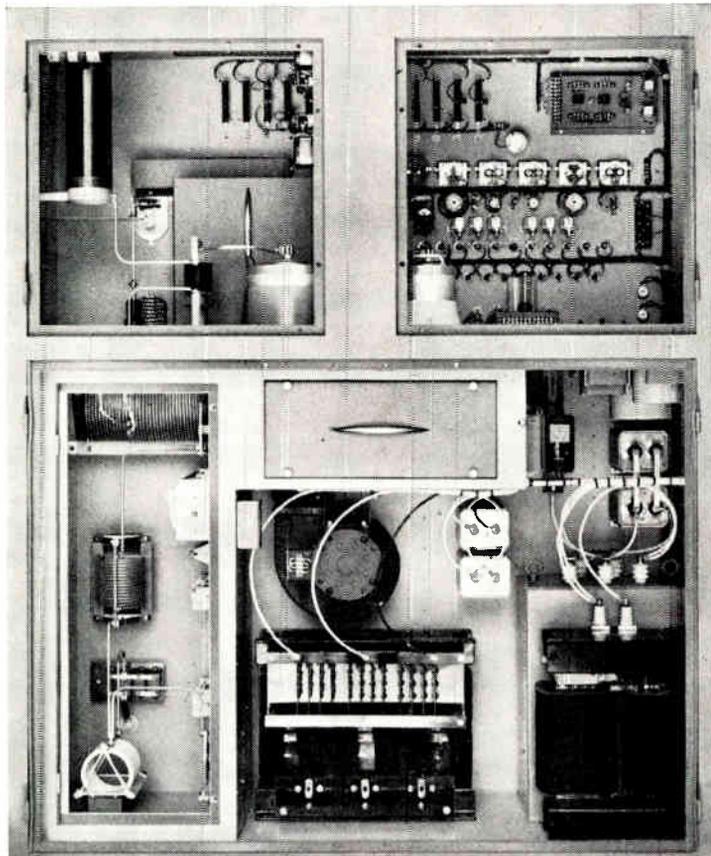
0.04 to 0.10 percent over mechanical speed range. At 15 in./s, frequency response is 40 to 20,000 Hz ±2 dB. Signal-to-noise ratio on full track is 55 dB; 50 dB on 2-track and 4-track. R-130 Series features: all pushbutton operation; cue button; tape lift for fast winding; automatic shutoff; tape tension selector; large, independent vu meter for each amplifier, monitoring bias, record or playback; off-the-tape monitoring; impedance roller; plug-in transformer for impedance change. Recorders are available in console or portable versions. Series is available from Teac Corporation of America, 1547 18th Street, Santa Monica, Calif. 90404.

Circle 103 on Reader Service Card

Turntable Series

Contel Series 101 turntables is available from Continental Electronic Wholesale Corporation, P.O. Box

Bauer AM Transmitter. Aft view.



Clean.

This is the aft end of the all-new Bauer AM Transmitter from Granger. The 5 Kw Model FB-5V.

Look at its well-engineered mechanical layout. Clean. All components are arranged within easy reach for quick inspection and servicing. □ Model FB-5V is compact. Measures only 75"H x 60"W x 30½"D. In fact, it's the most compact 5 Kw AM transmitter on the market. □ Around in front, full metering shows all functions simultaneously. Tally-light system provides instant warning of any malfunction or momentary overload, permits fast reset to back-on-the-air status, and pinpoints the cause for later servicing. □ Compare its performance. Low distortion, wide frequency response and 6,000-watt power-plus capability. Excellent modulation capability — boosts signal in fringe areas and provides "clean" sound. □ Consider the cost-savings. The output tube's operating level has a service capability of more than 20,000 hours, proved in actual use. Save hundreds of dollars per year in operating costs. □ Need a higher kilowatt model? Ask us about the all-new 10 Kw Model FB-10J. It has the same clean, compact features as the FB-5V, with 12,000-watt power-plus capability. □ Write for complete data.



Granger Associates / **Bauer**
BROADCAST PRODUCTS DIVISION

1601 California Avenue, Palo Alto, California 94304

Circle 18 on Reader Service Card



206, Hialeah, Fla. 33012. Basic TT-101-A turntable is priced at \$200 and is available in three system configurations as follows: 1) TT-101-AA, with AP-101-D preamp, Gray 206 or 303 tonearms, and GE VR II or Shure M-44-7 cartridges. Price is \$325. 2) 2 AP-101-D preamps, Shure M-44-7 cartridge and Gray 206 or 303 tonearms. Price is \$385. 3) TT-101-AX, with Gray 206 or 303 tonearms. Price is \$250. Contel AP-101-D solid-state preamp has frequency response from 30 to 15,000 Hz ± 2 dB, with distortion less than 0.5 percent and noise figure of -65 dB at -15 dBm output. Maximum -5 dBm output is transformer coupled to 150- or 600-ohm output. Circle 104 on Reader Service Card

Cartridge Playback/Record Modules

Series CT-101 cartridge playback/record modules is now available from Continental Electronic Wholesale Corporation, P.O. Box 206, Hialeah, Fla. 33012. Modules consist of power supply, playback amplifier, record amplifier/oscillator, cue amplifier/oscillator. Frequency re-



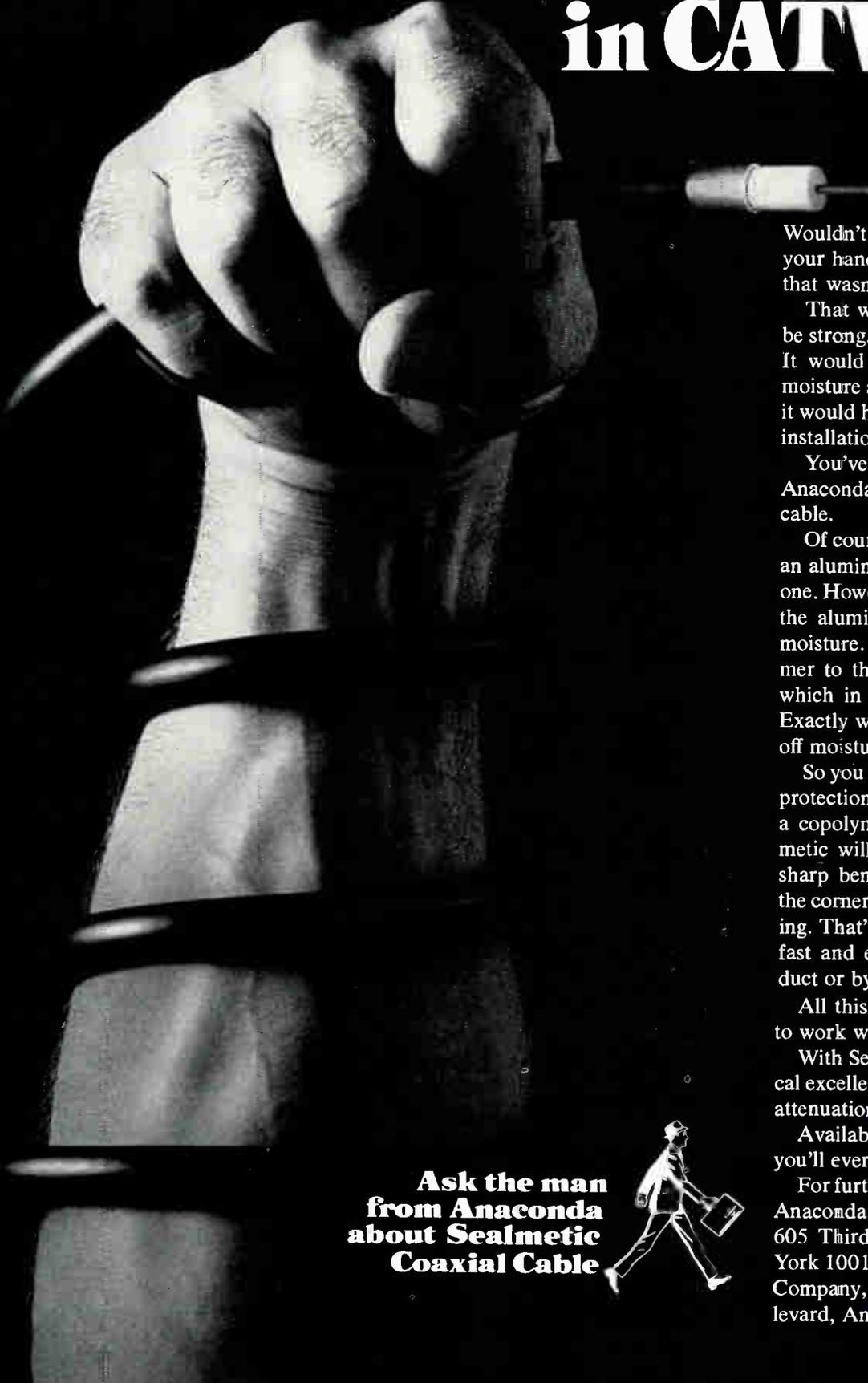
sponse is 30 to 15,000 Hz ± 2 dB, with harmonic distortion less than 2 percent. Cueing accuracy is within 0.1 s, with flutter and wow less than 0.3 percent. Noise level is 50 dB down. Transformer-coupled, 600-ohm output is variable to -5 dBm. Each module in CT-101 series is shipped with TC-101 test cartridge. Circle 110 on Reader Service Card

Videotape Timer

Electronic videotape timer, made by Ampex Corp., 401 Broadway, Redwood City, Calif. 94063, permits precise timing of recordings on VR-200 and VR-1200 series high band color videotape recorders and makes possible remote control of other studio

Circle 19 on Reader Service Card →

Sealmetic[®] The Great Uncompromiser in CATV cable



Wouldn't it be great if you could get your hands on a CATV coaxial cable that wasn't a compromise?

That would mean it would have to be strong. It would have to be flexible. It would have to give you years of moisture and humidity protection, and it would have to offer fast, economical installation.

You've got it in hand with patented Anaconda Sealmetic CATV coaxial cable.

Of course we protect this cable with an aluminum shield. But it's a flexible one. However, we aren't about to leave the aluminum naked and exposed to moisture. We bond a special copolymer to the outside of the aluminum, which in turn adheres to the jacket. Exactly where it should all be to fight off moisture for years.

So you have a cable with the double protection of an aluminum sheath and a copolymer bonded to it. But Sealmetic will still go around some very sharp bends. The entire jacket takes the corners without kinking or deforming. That's why it's such a natural for fast and easy installation aerially, in duct or by direct burial.

All this makes Sealmetic very easy to work with.

With Sealmetic you also get electrical excellence, signal integrity and low attenuation.

Available with all the connectors you'll ever need.

For further information call or write Anaconda Wire and Cable Company, 605 Third Avenue, New York, New York 10016, or Anaconda Electronics Company, 1430 South Anaheim Boulevard, Anaheim, California 92803.

**Ask the man
from Anaconda
about Sealmetic
Coaxial Cable**



CONTEL IOI CARTRIDGE TAPE EQUIPMENT

COMPLETELY SOLID STATE . . . THE LATEST SEMI-CONDUCTOR CIRCUITRY
 IN COLOR-CODED MODULES WARRANTED FOR ONE FULL YEAR
 BUILT-IN REMOTE CONTROL FACILITIES . . . IDEAL FOR AM-FM-TV AUTOMATION

CT-IOI-P

Cartridge Tape Reproducer



CT-IOI-R

Cartridge Tape Recorder Reproducer

CONTINENTAL ELECTRONIC WHOLESALE CORP.
 1620 West 32nd Place / Hialeah, Florida 33012 / 305-822-1421

Circle 20 on Reader Service Card

SPECIAL COSMICAR[®] LENSES

FOR YOUR SPECIAL CCTV CAMERAS



COSMICAR lenses have improved in quality as CCTV cameras have improved. There is no problem whether your cameras are with a built-in EE mechanism or a viewfinder mechanism. COSMICAR will make whatever new lenses you need for your CCTV cameras to satisfy your every CCTV purpose. For example, COSMICAR lenses can be adopted to automatic or rear control system by one hand. Superb lenses of proven ability from 12.5mm to 1,000mm and Zoom lenses are on sale. For further details, write to:

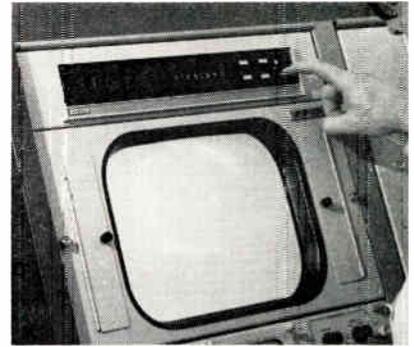


COSMICAR OPTICAL CO., LTD.

(Former name: ICHIZUKA OPTICAL CO., LTD.)

568, Shimoochiai, 2-chome, Shinjuku-ku, Tokyo
 Cable Address: "MOVIEKINO TOKYO"

Circle 21 on Reader Service Card



television equipment. Electronic timer digitally displays time video-tape has been recording or playing back, either as elapsed time or as time remaining. It displays correct time for all television standards and at tape speeds of 7½ or 15 in/s. Timer can automatically turn off other recorders, film chains and cue lights at any predetermined time within a program. This permits timer to activate sequentially any number of events throughout studio. Up to four remote readout units may be used with each master electronic timer. Master electronic timer is mounted in recorder monitor housing. Price is \$2500. Remote timers are priced at \$500 each.

Circle 105 on Reader Service Card

CCTV Camera Operates Singly or in Pairs

TeleMation, Inc., 2275 South West Temple, Salt Lake City, Utah 84115, recently introduced the TMC-2100 vidicon camera. Camera has built-in convertibility from self-contained operation to two-unit system. Operating as self-contained unit, TMC-2100 camera satisfies applications from random through standard EIA scanning standards to high resolution. Plug-in options include: Crystal/Drive 2:1 interlace and EIA. Two-unit operation is accomplished by connecting camera to TeleMation Cablecaster/Multicaster video control devices. Model VF-2100 solid-state viewfinder may be added in





ADDING LOCAL COLOR NEWS MADE WSM-TV FULL COLOR...

AND THREE WAYS BETTER.

"When we pioneered color film for local news in the Nashville market, and added that to our network color and live studio color we gained three important benefits," says Jud Collins, WSM-TV News Director. "We got a completely new dimension in TV news reporting. We had a potent sales wedge for selling color commercials to local advertisers. And we added a necessary ingredient to make our local documentaries more realistic. Color film has really

been good for WSM-TV.

"Television pioneering in Nashville has been a WSM-TV tradition," Collins continues. "We were the first television station in Nashville. We were the first station here with network color, the first with live studio color, and the first to go full color with the addition of KODAK EKTACHROME Films, and the ME-4 Process.

While we know it's important to be first, it's also important to produce a product that makes a lasting impression with the

viewer. Our many viewer comments have been very encouraging. We are extremely pleased with the Kodak products and the service. Kodak has become part of a winning effort for WSM-TV."

Kodak engineers helped WSM-TV install their Kodak ME-4 Process for local color film processing. Sooner or later you'll want to go full color. Get in touch with Kodak now, before sooner becomes later.



EASTMAN KODAK COMPANY

ATLANTA: 5315 Peachtree Industrial Blvd., Chamblee, 30005, 404-GL 7-5211; CHICAGO: 1901 West 22nd St., Oak Brook, 60523, 312-654-0200; DALLAS: 6300 Cedar Springs Rd., 75235, 214-FL 1-3221; HOLLYWOOD: 6706 Santa Monica Blvd., 90038, 213-464-6131; NEW YORK: 200 Park Ave., 10017, 212-MU 7-7080; SAN FRANCISCO: 3250 Van Ness Ave., 94119, 415-776-6055

WDXL's top talent is getting bunions.



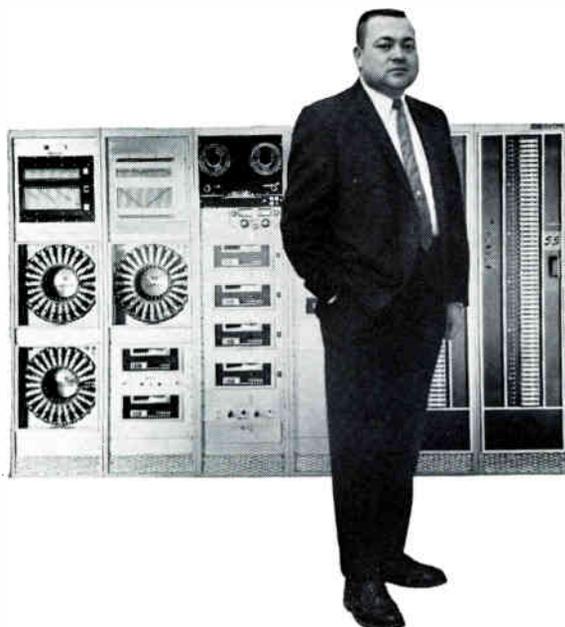
Ben Enochs says we're to blame.

Says Ben, "Automation worked so well for our FM operation, we decided to automate our AM. Some people say it doesn't pay to automate an AM station with small-town programming. But the Gates people built an Automatic Tape Control System to fit our format, worked with us until we had exactly what we wanted. Now even our log is automated. We've got the boys out on the street selling spots while they're on the air."

WDXL is another station that has found a new source of profit in Gates Automatic Tape Control.

What about you? We have a wide and flexible choice of automatic systems. We might be able to get you automated for as little as \$65 a week. And how much would that save you? We're all experienced broadcasters here and we'll be glad to help you figure. Just dial (309) 829-7006.

*Ben Enochs, Chief Engineer,
WDXL, Lexington, Tennessee*



GATES

**HARRIS
INTERTYPE
CORPORATION**
AUTOMATIC TAPE CONTROL DIVISION
1107 East Croxton Avenue
Bloomington, Illinois 61702, U.S.A.

Circle 22 on Reader Service Card

SPECIAL BULLETIN

field by use of a kit or factory installed. TMC-2100 has 800-V power supply and 60-gauss focus field. Resolution of 800 lines is guaranteed.
Circle 109 on Reader Service Card

CCTV Viewfinder Camera

Designed by Packard Bell, Newbury Park, Calif., for CATV program origination and for educational and industrial training applications, Model PB-920 VF consists of PB-920

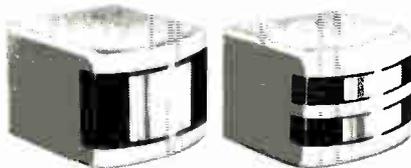


camera plus integrally mounted, solid-state, 5-in. monitor. All controls are located at rear of camera. Monitor also is offered separately for present owners of PB-920 and PB-940 cameras.

Circle 112 on Reader Service Card

Audio Heads

Nortronics Co., Inc., 8101 Tenth Avenue North, Minneapolis, Minn. 55427, is now producing a series of high performance professional audio heads for use in broadcast, background music, and other related applications. Heads also serve as fully compatible replacement heads for Ampex, Scully and TapeAthon pro-



fessional model recorders. Frequency response in PR series heads is from 20 Hz to 20 kHz in a mu-metal case. With modified shielding better response can be obtained. Heads extend usable low frequency response 1 octave in 7.5 and 15 in./s speeds. Series has increased depth of metal at gap. Full and half-track mono and half-track stereo types are available.

Circle 113 on Reader Service Card

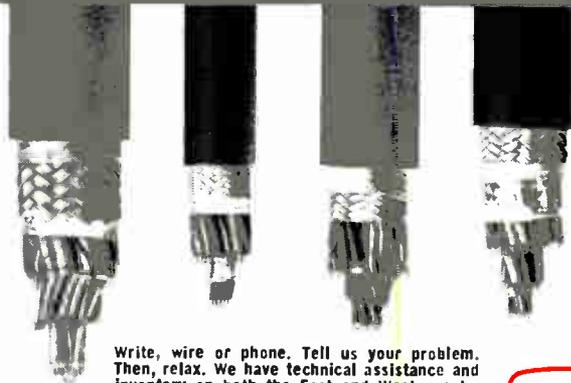
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**NOW . . . ADAPT ANY
COLOR CAMERA,
NEW OR OLD,
FOR USE WITH ANY
COLOR CABLE,
OLD OR NEW!**

BIW offers you total engineering services . . . cables . . . adapters . . . assemblies . . . connectors and related products to make all cable systems compatible. A few examples:

Camera	Present Cable	Can be Adapted to	Adapter No. Camera	CCU
(GE) PE 250/PE 350 (Philips)	TV-81N	TV-82N	7171	7172
PC 60/PC 70	Twin Cable TV-33N	TV-81N	7166	7167
PC 70	Single Cable TV-81N	TV-82N	7173	7174
(RCA) TK 41	TV-82N	TV-81N	7175	7176
TK 42/TK 43	TV-81N	TV-82N	7229	7230

What's more, BIW can supply any cable from stock . . . for any broadcast camera . . . Color or Monochrome . . . Domestic or Foreign. In addition, our unique repair service assures immediate attention to your problem . . . repair, adaptation, reassembly, or whatever. There is nothing else like it!



Write, wire or phone. Tell us your problem. Then, relax. We have technical assistance and inventory on both the East and West coasts.

Cable concepts grow at . . .  **Boston Insulated Wire & Cable Co.**

65 Bay St., Boston, Mass. 02125/141 Nevada St.,
El Segundo, Calif. 90245/118 Shaw St., Hamilton, Ont.

Helpful Books that Belong in Every Station—Now on 10-Day FREE Trial!

THE RADIO PROGRAM IDEABOOK



by Hal Fisher. All the programming ideas you need to build and hold an audience. Written for everyone in radio programming—from the program director looking for a fresh source of ideas, to the ambitious announcer or deejay. 10 BIG Chapters contain scores of unique ways to give your audience a reason to listen—the do's and don'ts of good programming and commercial success. You'll learn how to spot audience losers, conduct a newspaper column, publish a newsletter, start fan clubs, revitalize programming and pump new life into your station's sound . . . and bank account. Contains tested and proven methods of systemizing the program department, of handling traffic and scheduling. Lengthy treatment given to production and sure-fire program ideas including news, public service, audience participation, women's and children's, farm, educational and cultural, music, holiday programming etc. 256 pages; over 50 illustrations. Hardbound

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Save \$4.85 on Databook Library

Here is the first place to look for authoritative answers to your toughest electronics problems—whether you are working with theoretical applications or practical projects. You focus quickly on the answers you want, reducing hours of figuring to seconds. The great value of these databooks is in their organization. You'll keep them at your elbow continually . . . to save time, effort, and trouble.

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NEW THIRD EDITION

By William A. Peck

This brand-new, enlarged 3rd Edition is guaranteed the most valuable thing a radio TV writer can get his hands on . . . next to a typewriter! Its purpose is to help you remove the "error" from the trial and error system. The techniques described have passed the most critical test to which advertising can be subjected . . . they sold the merchandise! 16 Chapters contain over 40% new material, and are loaded with hundreds of ways to increase billing with sales-proven copy. You and your clients both will profit from the ideas in this invaluable volume . . . ideas which have sold "impossible" prospects. Includes more than a hundred sample commercials for all types of accounts, making the book a veritable copy library! Here is one of the 2 or 3 really practical books on copywriting—a practical, hard-hitting and immediately usable manual which should be required for every media sales and creative staff. It sets the standard for radio-TV copy at the local level. 16 Chapters.

Order No. T-90 only \$5.95

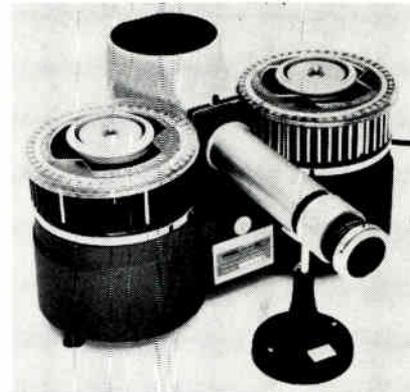
- | | |
|---------------------------------------------------------------|--------|
| Charts & Nomographs for Electronics Technicians and Engineers | \$5.95 |
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| Electronic Design Charts | \$5.95 |
| Electronics Data Handbook | \$4.95 |

Buy all four volumes at the special money-saving combination price . . . a \$4.85 discount from the regular list price of \$21.80.

Order DL-4 Only \$16.95

Chain Slide Projectors

Spindler & Sapppe, Inc., 1329 Grand Central Ave., Glendale, Calif. 91201, has designed two 2 × 2 slide projectors for television chain integration. Units are designed for use with multiplexers or direct projection onto a television camera tube face. Model SLD-TV has 96-slide capacity, feed-



ing slides alternately into common gate from dual magazines. Slide change time is 3/4 s. Model SL-TV has 48-slide capacity from a single magazine, slide change time of 1 s. Other features include automatic dousing during slide change, continuous cooling of lamp and both sides of projected slide, uniform illumination over slide area, 500-line minimum resolution and choice of 200- or 500-W projection lamps.

Circle 106 on Reader Service Card

Coax Cable Connector Tools

Anaconda Electronics Co., 1430 S. Anaheim Boulevard, Calif. 92803, has introduced two cable-connection tools that reduce cable-stripping and connector installation time to less than 1 min. Sealmetic cable connector tool measures and marks cable for proper cut and then cuts cable



using sharp, changeable knife blades. Tool also strips off outer polyethylene jacket and automatically prepares outer conductor. After insertion of grounding sleeve, tool also makes exactly measured cut of foam dielectric without damage to center conductor. Sealmetic impact tool inserts grounding ferrule under outer conductor using force prestressed coil spring. Tools are available for 0.750, 0.500 and 0.412 in. dia cables.

Circle 108 on Reader Service Card

RADIO SALES PROMOTIONS



300 Merchandise-Moving Ideas! A compendium of more than 300 creative selling ideas designed exclusively for radio stations. Here are sales tools that work! A vast supply of ready-to-use ideas for producing sales in 43 categories, from air conditioners to washing machines. Here are powerful, positive ideas that will add \$1000's of revenue to your

Order TAB-214 only \$10.00

Handbook of Radio Promotion and Publicity



Ideas that work! Here's a virtual encyclopedia of 175,000 words containing all the promotion and publicity ideas you'll ever need. What's more, it contains over 1500 on-air promo themes you can adapt. This GIANT handbook gives you hundreds of specific plans you can put to work for your station. A MUST book for every station wanting to

attract more listeners, boost ratings, increase sales. 284 pps., BIG 8 × 13" size. Order TAB-213 only \$25.00

RADIO PROMOTION HANDBOOK



by Wm. A. Peck. A complete guide on ways to develop better ratings, improve sales and results. Jam-packed with literally hundreds of ideas, and complete with scores of factual examples to spark hot, new ways of promoting a station. Tells how to make everything that happens at your station help to promote your station. Both on-air and off-air campaigns are included. Tells all about contests, stunts, games, personal appearances, public relations, etc. 256 pps; 14 Chapters.

Order No. 267 only \$9.95

THE MAN BEHIND THE MIKE



by Hal Fisher. This "Guide to Professional Broadcast Announcing" offers the practical help you need. Use of the down-to-earth pointers in this massive 288-page volume will help both seasoned veterans and "green" announcers. Offers practical guidance on every phase of announcing. Contains over 40 drills to spark interest. Tells how to develop true professional talents, how to become a good d.i., newscaster or

other specialist. Managers and program directors will find a wealth of data to guide them, in addition to a host of management and programming ideas. 288 pps; 21 Ch. Hardbound. Order No. 266 only \$7.95

FM RADIO STATION OPERATION HANDBOOK



First comprehensive guidebook to FM radio station engineering, operations, and management. Completely covers all phases of FM, from automation, studio design and operation, sales, rates, office practices, to remote control, antennas, etc. Shows how successful FM stations operate, how they make profits, what they do in programming, etc. 25 big sections, 192 pps.

Order No. 94 only \$9.95

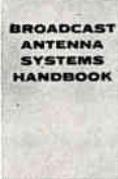
CATV SYSTEM ENGINEERING



by Bill Rheinfelder. SECOND EDITION of the accepted technical standard on CATV . . . expanded and revised version of the first and only authoritative book on planning, designing and operating a CATV plant. Worth many times its small cost. Completely outdates the 1st edition, and covers systems composed of uncorrelated components as well as fully integrated systems with solid-state equipment.

Contains only tested and proved data, 256 pps; 13 chapters, 7 appendices, 140 illus. Hardbound. Order No. 98 only \$12.95

BROADCAST ANTENNA SYSTEMS HANDBOOK



Brand-new, practical, guide to all types and styles of broadcast antenna systems. Covers preparing engineering data for the FCC, designing, engineering and operating systems, selecting antennas, measuring performance, improving coverage, etc. Includes AM-FM-TV UHF, FM DA antenna systems, FM dual polarization, microwave, directional AM, etc. 18 BIG Chapters — 160 pps. —

over 100 illustrations. Order TAB-44 only \$7.95

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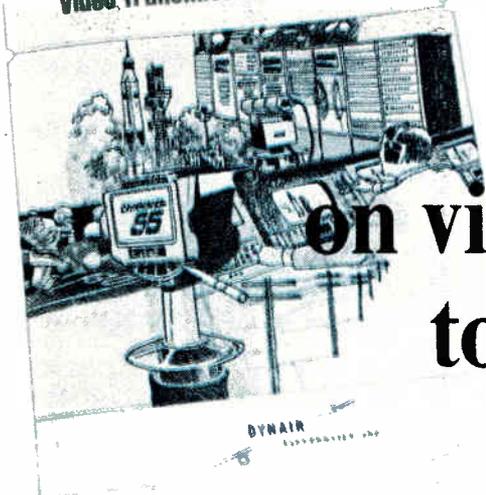
Address

City State

SAVE POSTAGE by remitting with order, B98

Circle 24 on Reader Service Card

Video Transmission Techniques



Add this free book on video cable transmission to your technical library

This new book "Video Transmission Techniques" will be coming off the presses shortly. Reserve your *free* copy now. Published by DYN AIR, this book covers problem areas such as hum, equalization, resolution/bandwidth, balanced-line transmission and many others. This is a limited printing . . . order your copy today.

Yes, for a limited time only, you can receive a free copy of this helpful new book, with absolutely no obligation! Just mail the coupon, use the literature request card or drop us a note and we'll reserve a copy for you.

Published by DYN AIR, a pioneer in the field of solid-state video cable transmission equipment, this book covers in detail the problems encountered with routing video through cables . . . and presents the solutions!



The photographs shown are sample pages reproduced directly from "Video Transmission Techniques" and are typical of the material presented. Pictorial diagrams, supported by easy-to-understand text and numerous photographs, charts and tables, make system design simple.

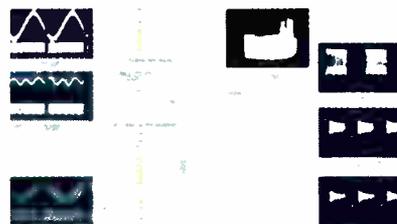
This book includes useful design information for a multitude of systems, both unbalanced and balanced . . . simple and complex. It covers everything from cable types to complex electronic terminations. The problems involved in selecting the

equipment for a particular application are discussed with the exact equipment detailed for many systems.

DYN AIR video transmission equipment is installed in numerous facilities throughout the world. We have supplied systems for transmitting video information over many miles of cable. DYN AIR systems are available with video bandwidths as great as 30 MHz, providing optimum high-resolution performance.

The practical building-block construction techniques used in solid-state DYN AIR equipment allow systems of virtually any size to be easily assembled. Plug-in modular etched circuit boards are used in most cases, assuring ease of maintenance. Equipment can be provided to suit almost any system requirement.

DYN AIR also manufactures a variety of other solid-state television equipment, including modulators and demodulators, video and pulse amplifiers, local and remote-control switching systems, switcher-faders,



special effect generators, sync generators and sideband analyzers.

If you use this type of equipment, you might like to receive either our complete catalog or literature on specific devices; DYN AIR product information is available upon request —just write, outlining your needs.

DYN AIR
ELECTRONICS, INC.
SAN DIEGO, CALIFORNIA

6360 FEDERAL BLVD., SAN DIEGO, CALIF.
ZIP 92114 PHONE (714) 582-9211

Please send **free** copy of "Video Transmission Techniques"

Have you seen "Video Switching Techniques"?

Yes No

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP NO. _____

**LOW COST
AUTOMATIC TRANSMITTER
LOGGING SYSTEMS**

Now from RUST, TV, FM and non-directional AM stations can enjoy a continuous transmitter parameter logging system and a continuous supervisory alarm system at a very low price.

The all solid state AL-400 at \$525 displays a full 24 hour logging segment with easy-to-read front panel scales. It insures proper logging, requires virtually no attention, is easily reproduced at station license renewal time and improves station operation. The basic unit features 62 days of chart on a single roll; calibration ease with a pointer that is visible when adjusting, plus front panel adjustments. The complete charting system is mounted on a single 3 1/2 inch high panel, and is complete with self-contained power supply. Combined with the AP-200 series of alarm panels this system exceeds FCC specifications.

The AP-200, at \$490, is also on a 3 1/2 inch panel. It contains provisions to continuously sense and accurately sound an alarm for parameter deviations above or below preselected limits. Each AP-200 contains the solid state electronics to monitor two (2) parameters. The system is capable of monitoring "Power," "Current" or "Frequency" parameters.

This RUST AUTOLOG system brings simplicity, compactness and low cost to local transmitter logging.

rust
corporation
168 Tremont Street
Everett, Mass. 02149
(617) 389-3380

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MODELS**

MONAURAL
MODEL 1-M

\$52

Compares
with the
BEST

STEREO
MODEL 1-S \$104

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- Level control
- Fully transistorized

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supplies power for up to 4
mono units model 1-P \$42

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OR TO
DEALERS

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PH. 299-4692

Circle 27 on Reader Service Card

NAMES
IN THE NEWS



S. L. Hopwood, Jr. Linda C. Marshall

Dr. Stafford L. Hopwood, Jr. has been named vice president of business development and professional products for CBS Laboratories. **Theodore R. Conont** has also joined CBS Laboratories, as Coordinator of Instructional Systems.

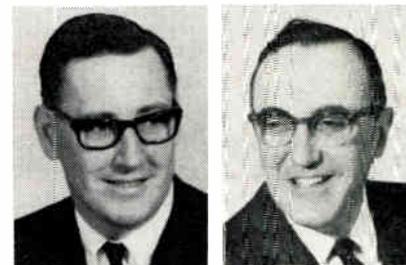
Linda Carol Marshall has been appointed newscaster and staff announcer for Chicago's closed-circuit channel "CFOR-TV."

Robert G. Pieger has been appointed manager of Newsvision Company and general manager of Stereo Station WJZZ (FM), Bridgeport, Conn.

Thomas Petry has been elected to the position of president and general manager of the ETV Council of Central New York.

Rodney E. Nelson has been named general marketing manager of the Amperex Electro-Optical Devices Division, it was announced by Kenneth V. Spitzer, General Manager of the division.

Kittyhawk Television Corp. has just made public these appointments: **Richard Riggs** was named president and general manager of WKTR-TV in Dayton, Ohio.



Thomas R. O'Hara E. J. Manzo

Thomas R. O'Hara has been named sales engineer in the northeast region for Philips Broadcast Equipment Corp. **E. J. Manzo** has been appointed manager, Commercial Video Systems by Philips Broadcast Equipment Corp.

now
you can
order
**DITCH
WITCH**
performance
any way
you
want it.

the
new
V30T

New from Ditch Witch! The only track-mounted trencher to give you rear-mounted boom and operator position for a clear view of your work . . . and the hydraulic control system that permits the operator to vary travel speeds and multiple mechanical digging chain

speeds independently of one another. Also hydraulically controlled dry-friction steering, directional control, and backfill blade . . . plus wider 10" track pads and greatest undercarriage clearance in the 30 H.P. class. Ask your Ditch Witch man to demonstrate the new V30T.

Send for details:
CHARLES MACHINE WORKS, INC. 1839 Ash Street, Perry, Okla. 73077, U. S. A.

Name _____
Street _____
City _____ State _____

Circle 28 on Reader Service Card

The Performance Picture Looks Great with BIALKON Orthicons

- New warranty—now extended to 1800 hours
- New non-stick capabilities mean long, long life
- No linear decline in sensitivity
- Five BIALKON camera tube types* now can replace 80 industry types

You get more with RCA BIALKON orthicons—in initial performance, hours on-air per your dollar, and in-camera stability.

See your RCA Field Engineer for full information about the five BIALKON camera tube types, now available from your RCA Broadcast Tube Distributor.

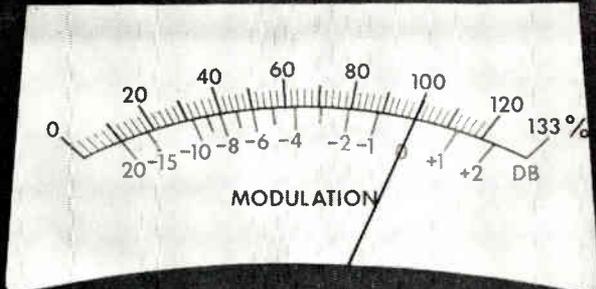
RCA Electronic Components, Harrison, N.J. 07029.

*Bialkali photocathode,
electronically conducting
glass target image orthicon



RCA

JAZZ • POP • LATIN
 AMERICAN • ROCK
 CHAMBER MUSIC •
 TOP 40 • COUNTRY
 CLASSICAL • FOLK



ONLY BELAR ACCURATELY MONITORS YOUR PROGRAM PEAKS

You can believe your meter—no matter what your program matter is—with Belar's state-of-the-art metering. It gives you a true peak modulation meter which responds accurately even to short duration program peaks. The built-in modulation calibrator combined with the true peak reading meter assures accurate modulation monitoring.



The solid-state Belar add-on monitor system starts with the FMM-1 for monaural. Add FMS-1 for stereo and the SCM-1 for SCA. These add-ons complete all your monitoring needs.



**BELAR ELECTRONICS
 LABORATORY, INC.**

DELAWARE AND MONTROSE AVES.,
 UPPER DARBY, PA. 19084 • BOX 83

Circle 30 on Reader Service Card

TV Automation

Continued from page 45

these lines, according to a number of stations. In one case, Cox Broadcasting Company uses a Honeywell 120 for supplying many services to its member stations. Cox also uses the Honeywell for such unusual programming services as instant polls and surveys, and for football forecasting.

Cost Factors

Cost of the changeover is the major obstacle during the early phases of computerization. An automated program system costs about \$100,000; administrative phase-running EDP equipment rents for \$3000-5000 monthly; a system for the sales/traffic operation can be equally as costly. It's small wonder that many operators feel that it's simply beyond their means. But as the competitive situation develops, and as computer availability—by direct lease or shared rental becomes less expensive, stations will be forced to make the automation move if they're going to stay competitive.

With the continuing changeover from analog to digital systems and the continuing technological advances, adequate EDP equipment will soon be within the cost range of nearly every station. ●

FCC Rules

Continued from page 28

Since the fund manager generally holds 60-percent control of the board of directors of the fund and thus can control the voting of broadcast stock in the fund portfolio, when more than one fund is managed by a single manager, the Commission shall, because the funds are under common control, *aggregate the holdings of the group of funds for purposes of the multiple ownership rules.* Since bank nominees, which hold record title to the stock for the funds cannot vote the stock, ownership will not be attributed to them.

(b) *Brokerage Houses: Ownership of voting stock held in street name for the benefit of the customers will be attributed to the customer.* It is true that the case of the stockbroker is unique because, as previously described, in some cases he may vote the stock held for a customer without instructions from the customer. However, this may only be done in routine matters. With publicly traded corporate broadcast licensee, the stock may only be voted under the direction of the customer. *Ownership of stock held by brokers for their own accounts will be attributed to the broker.*

(c) *Trusts: Ownership will be attributed to those having the power to vote the broadcast stock.* Naturally, this will vary from trust to trust.

(d) *Other cases: In other cases where record owners hold stock for beneficial owners (e.g. the executor of an estate holding for legatees), ownership will be attributed to those having the power to vote the stock.*

Next month, Part II will delve into some of the more specific problem areas affected by the new rules. ●

BROADCAST EQUIPMENT BUYERS GUIDE 1968 EDITION

THE COMPREHENSIVE REFERENCE FOR THE AM,
FM, TV, CATV, ETV AND RECORDING INDUSTRIES

THE ALL NEW 1968 BROADCAST EQUIP-
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**THE NEW GENERATION
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 Professional Recording Equipment,
 Tape Decks, Consoles, etc. AMPEX
 recorders assure you of studio quality
 & performance.

You can rely on Arrow for depend-
 able, prompt service and immediate
 delivery.

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 212-526-0300 516-694-6800

Circle 31 on Reader Service Card

**"IT'S GOOD BUSINESS
 TO HIRE THE HANDICAPPED."
 ISN'T THAT A GREAT IDEA, SNOOPY?**



**THE PRESIDENT'S COMMITTEE ON EMPLOYMENT
 OF THE HANDICAPPED, WASHINGTON, D. C.**

Circle 32 on Reader Service Card

Teleproof I

Continued from page 50

will very likely be an economic factor in justifying such automation."

Problems resulting from the Illinois Bell Telephone strike have held up the actual start of auditing operations in Chicago, originally slated for August. New York and Los Angeles are scheduled for September start-up, while the remainder of the year will see the addition of: Pittsburgh, Philadelphia, Boston, St. Louis, Detroit, Indianapolis, San Francisco, Cleveland, Buffalo, Atlanta, Minneapolis-St. Paul and Cincinnati.

The advertising agency media vice presidents are the ones that must ultimately be sold on Teleproof I's desirability. But there seems to be little resistance at this level. Indeed, admen seem to be almost universally enthusiastic about the system. According to Compton's Bob Liddel, automation is definitely desirable and has been needed for a long time. "If this becomes an operable method," Liddel states, "our agency would definitely recommend its use to advertisers."

Liddel also feels that BAR will continue to provide a valuable service to advertisers, even in the face of the possible 100-percent nationwide audit by Teleproof I. "BAR's importance," he says, "is in providing a description of the commercial atmosphere—a source of competitive conflicts and over-commercialization. We'd like to see BAR expanded along the Digisonics route, or the two services combined, since they both have something to offer. They definitely do not compete with each other."

Another media vice president, Sam Vitt of Ted Bates Agency says, "Digisonics seems to be one answer to proof-of-performance problems. This system does one thing that's been missing—it puts the broadcaster on a par with the printed word as fast as auditing proof-of-performance."

As for the economics, Vitt definitely feels that Teleproof I has some solid answers. "We must assume," he says "that most stations operate a fairly tight ship in terms of volume, and they do a superb job of it. Nonetheless, something that can measure commercials with total precision will show up errors that have previously been overlooked. If these appear to be excessive, there may certainly be economic justification for automation of the station's switching."

The next few months will likely tell the tale. Teleproof I seems to be the answer that advertisers have been looking for. Eventually, with the 100-percent coverage that Ed White expects, the broadcaster might be relieved entirely of the burdensome affidavits and mountainous accounting procedures. The broadcasters themselves might want to subscribe to the computer services offered by Digisonics, as a further aid to their own bookkeeping. ●

Circle 33 on Reader Service Card →

simultaneous record & playback

... plus dubbing

with Collins' new compact Twintape System

Collins' new Twintape System, completely solid-state and available in monaural or stereo models, is the most convenient, flexible, and easy to operate cartridge machine on the market. The Twintape System consists of two units: the 642F Twintape Playback Unit, and the companion 216D Record Amplifier. Combined, these units permit:

- Playback on both cartridges simultaneously.
- Recording on one cartridge while playing the other.
- Dubbing from one cartridge to the other.

Tape transport assemblies in the Playback Unit are easily removed. Rugged, direct-drive capstan motors eliminate flywheels, rubber belts, etc., and produce extremely low wow and flutter. With extra heavy Mu-metal magnetic shields, the unit has very low susceptibility to magnetic pickup of noise. Rear terminal strips provide for optional remote control, automatic sequencing of multiple machines, cue detector contact outputs, etc. Routine maintenance of the Playback Unit may be performed in seconds.

Cue tone oscillators, record level metering, operation controls, and an amplifier are contained in the 216D Record Amplifier. One cue tone is standard, with option for three cue tones. The amplifier may be stacked compactly with the Playback Unit, or rack mounted with an optional adaptor.

All Twintape System electronic circuits are mounted on plug-in, etched epoxy boards.

For a descriptive brochure on this new Twintape System, write or call Broadcast Communication Division, Collins Radio Company, Dallas, Texas 75207. Phone (214) AD 5-9511.



COMMUNICATION / COMPUTATION / CONTROL



LITERATURE of INTEREST

For additional data, circle number shown on Reader Service Card.

Proceedings of 1968 NAB Engineering Conference (256 pages), available from Tab Books. Contains complete transcript of technical papers presented at conference and a transcript of FCC/Industry panel discussion. Price is \$10.00. **150**

CCTV VTR from Ampex, with electronic editing, color recording and playback, is presented in Brochure No. V67-14. **151**

Logging recorder with 8.5-hr capacity is presented in Brochure A234 from Ampex. **152**

"How to Select a Recording Tape" is title of 24-page catalog from Audio Devices. **153**

Designing, engineering, and installing complete TV systems is topic of Brochure V171 from Ampex. **154**

Twelfth annual spot report, containing company and brand expenditures of 1197 advertisers investing \$20,000 or more in spot television during 1967, is available from Television Bureau of Advertising. **155**

Tungsten-halogen lamps with 2000- and 5000-W inputs are topic of Brochure WC-191 from Sylvania. **156**

Color VTR available from General Precision Systems is presented in 8-page brochure. **157**

"A View of Educational Television" is title of 28-page booklet from General Precision Systems. Booklet contains listing of various methods of TV transmission and distribution within single building, several nearby buildings, or within an entire school district; CCTV systems, from single-camera setup to complete studio. Photos, features and simple schematic drawings of each system are included. **158**

Office furniture is topic of 100-page catalog from A. Blank, Inc. **159**

Television switching, including matrix, switcher control panels and audio switcher, is described with diagrams and photographs in 8-page Brochure 6-493 from Cohu Electronics. **160**

Public address amplifiers with 20-

45-, 90- and 200-W capacities are topic of data sheets from Bell P/A Products Corporation. **170**

Sound and communication equipment for application in 16 specialized areas is topic of 16-page catalog from Altec Lansing. **171**

Microwave transmitters, receivers and components are topic of short form Catalog 68a from RHG Electronic Laboratory. **172**

Sound systems for traveling entertainers and musicians are presented in 16-page brochure from Altec Lansing. **173**

Public address systems, incorporating feedback blocking filters, are topic of brochure from Altec Lansing. **174**

Rear-slide projection is topic of manual from Genarco. **175**

"Listen Hear . . . It's Wireless!" is title of brochure describing Sylvania's fm wireless system for educational broadcasting. **176**

Tape cartridge machines are the sub-

Continued on page 73

ALFORD TRANSMITTING ANTENNAS FOR

ITFS

(2500 MHz ETV)

- Directional or Omnidirectional
- For Top or Side Mounting
- With Null Fill-In, Electrical and/or Mechanical Beam Tilt

ALFORD ITFS Antennas are ruggedly designed and constructed of noncorrosive materials such as aluminum, copper and stainless steel. The antenna is mounted within a rugged, heated fiberglass radome which provides further mechanical protection for the antenna as well as a streamlined design to minimize wind loading. This construction yields an extremely dependable antenna that requires essentially no maintenance.

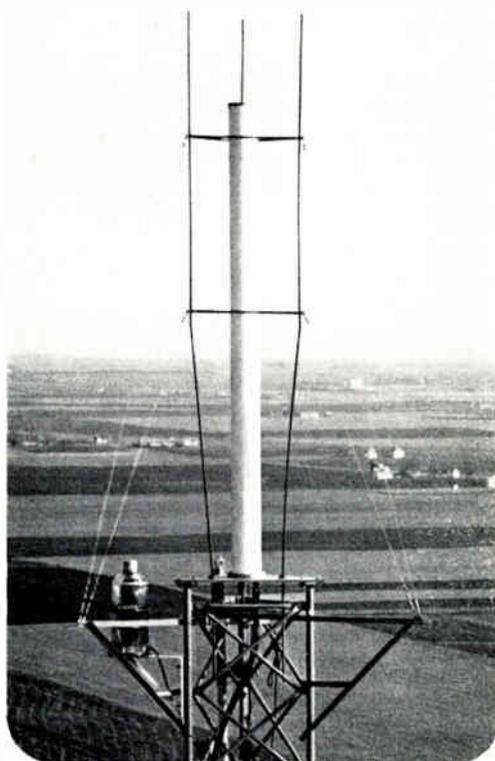
A system engineered mounting kit provides independent lightning protection (*the antenna structure is not used as a grounding means*) for top-mounted antenna arrays. Antennas are shipped completely assembled and are individually tested at the factory.

For more information on these antennas, write for Bulletin 12.



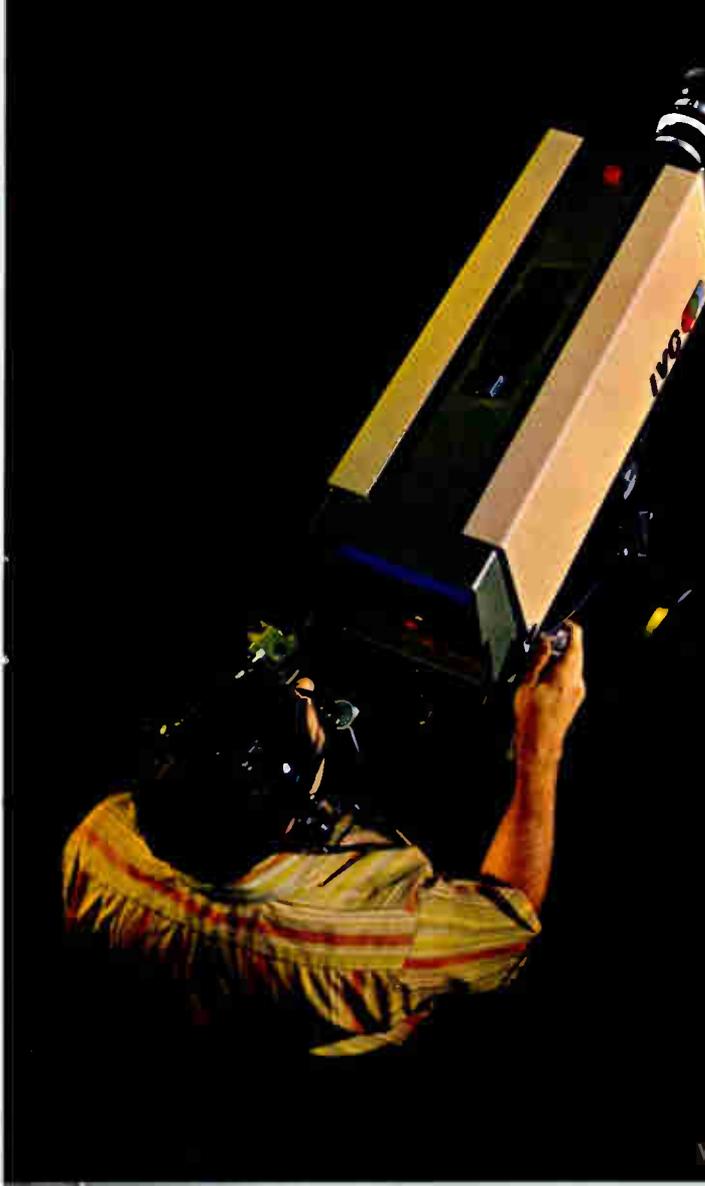
ALFORD

Alford Manufacturing Company
120 Cross Street, Winchester, Mass. 01890
Tel: (617) 729-8050 TWX: (710) 348-1063 Cable: AMCIBOS





**color
the local scene
for
only
\$18,500**

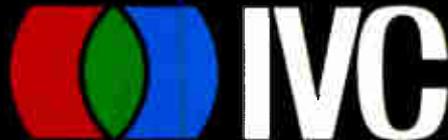


\$18,500 is the complete price of the new IVC-120 BROADCAST COLOR CAMERA. With the IVC-120 you can color the local scene . . . local news and weather, public events, commercials, remotes. You can avoid monochrome switchbacks from network or film chain color. You can add color to educational broadcasting for little more than the cost of a good monochrome camera.

Result of a new camera technology, the revolutionary IVC-120 produces viewer color equivalent to that produced by color cameras costing three times more. IVC-120 is also easier to operate, set up and maintain than more expensive cameras.

The standard IVC-120 comes ready-to-broadcast. It includes: special IVC vidicons, 6:1 zoom lens, external color encoder, studio junction unit, camera remote controls, camera and remote control cables. A broadcast sync generator is a camera option. Film chain versions are also available.

To see how the IVC-120 adds color to local programming, turn the page.



INTERNATIONAL VIDEO CORPORATION

IVC-120 in action



Local election center at KMED-TV, in live operation with two IVC-120 cameras, adds color to the Medford (Oregon) scene.

IVC-120 color quality



Off-the-monitor photos demonstrate excellent color quality and sensitivity of 3-vidicon design. Lighting levels above: (A) studio light at less than 150 ft. candles, (B) studio light at 300 ft. candles, (C) outdoor lighting at 4,000 ft. candles.

IVC-120 performance

Type of reproduction:

color or monochrome; 525 lines, 60 fields, 30 frames

Encoded output signal:

fully compatible with EIA and FCC requirements; 0.7V non-composite, 1.0V composite

Resolution (luminance signal):

35% response at 400 lines with no aperture correction; limiting resolution is 500 lines center, 400 lines in corners

Sensitivity:

color reproduction holds to 40 ft. candles, studio quality as low as 200 ft. candles

Geometric distortion:

less than 1% within a circle having a diameter equal to the picture height, less than 2% elsewhere

Registration error:

less than 0.15% within a circle whose diameter is 80% of picture height

Pickup tube complement:

three IVC-4543 separate mesh vidicons

Taking lens:

standard single lens reflex (double frame 35mm) format; f1.9 (vidicon equivalent) Nikkor 6:1 zoom lens furnished

For a demonstration of the IVC-120, contact the IVC office nearest you — for details, ask for our new IVC-100 series brochure.



INTERNATIONAL VIDEO CORPORATION

67 East Evelyn Avenue • Mountain View • California 94040 • Phone (415) 968-7650
690 North Broadway • White Plains • New York 10603 • Phone (914) 761-7820

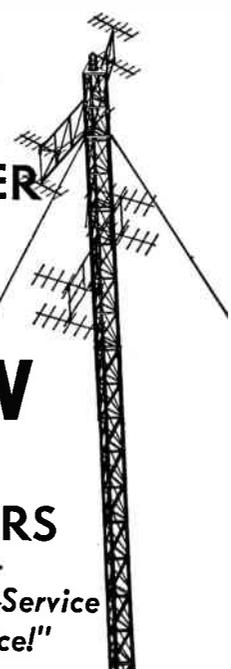
ject of a brochure from Tapecaster.

177
Tape recorders are the topic of 14-page catalog from Concord Electronics. **178**
Broadcast video switcher, Model TPS-12X3 from TeleMation, is topic of data sheet TPB-240-1. **179**
Stereo fm receiver with 100-W amplifier is described in Brochure AL-1376. **180**
Hytron Vidicon tubes are subject of data sheet from Thor Electronics. **181**
Printed circuit connectors are the topic of 24-page catalog from Amphenol Industrial Division. **182**
Voltage variable capacitors—over 400 types—are cataloged in a four-page technical Bulletin No. 371 from Computer Diode Corp. **183**
Photoelectric tape readers, reelers, and reader/reeler combinations for digital data handling communications, numerical control, photo-typesetting and other tape-programmed systems are described in illustrated six-page brochure from General Electric Printer-Reader Business Section. **184**
"Dictionary of Electronic Terms" from Allied Radio is a 112-page 6-X9-in. paperback containing concise definitions of terms used in electronics, radio and television. An appendix provides data on schematic symbols, EIA color codes, abbreviations and letter symbols for electronic terms, Ohm's Law formulas and Greek letters. Dictionary is available in the USA for \$1.00. **185**
Reproducer test tapes are the topic of 12-page Brochure A223 from Ampex. Included is a specification sheet for standard reproducer alignment test tapes, and two related articles reprinted from the *Journal of the AES*. **186**
"The Care and Feeding of Power Grid Tubes" (158 pages) discusses types and uses of high power vacuum tubes from diodes to pentodes and includes special tubes such as zero-bias triodes and super power tetrodes. The \$3.95 book is being distributed by Stacey's Scientific Book Center, Palo Alto, Calif. **187**
"The ABC's of ETV" is the title of an eight-page brochure (8-91) of photographs, applications and systems layouts for educational television from Cohu. **188**
"Sealectro miniature R.F. Connectors" contains dimensional drawings and specifications of Series SRM connectors. **189**
Jacks, plugs, switches, connectors, indicating devices and audio accessories are the categories of the contents of 24-page short form catalog from Switchcraft. **190**
Coax, triax and twinax patching systems, as well as patch panels, patch jacks, cable connectors, looping plugs, patch cords, terminating plugs and jacks, multiple parallel networks and power dividers are

described in 26-page catalog from Trompeter Electronics. **192**
Terminal blocks are topic of 8-page Bulletin 500.2, available from Thomas & Betts. **193**
"An SWR Meter For Precision Measurements and NRZ And Random Pulses From The 1395 Modular Pulse Generator," are articles appearing in vol 42, no. 2 of "The Experimenter." Articles discuss applications of equipment available from General Radio. **194**
Micro zener diode data sheets from Computer Diode Corp. include information on MLV, JAN, MGLA, MLLA, MHLA and MTC types. **196**
Universal camera control (Model TMV-707) from TeleMation, for upgrading most industrial cameras to EIA and broadcast specifications, is presented in Brochure TPB-150-1. **197**
Videotape recorder—Model VR-1200A—features, specifications and performance data are presented in Bulletin V1158 from Ampex. **198**
Transistors—molded plastic silicon planar types—from Sprague Electric's Econoline series are presented in Short Form Catalog CN-200B1. **199**
Clips and insulators from Mueller Electric are presented in Catalog No. 320. **200**
TV studio cable (Type T-378) is presented in Bulletin C-367 from Brand Rex Division. **201**
"Instructions in the Use of Microphones for Sound Reinforcement Systems" is the title of a 16-page publication by Altec Lansing. **202**
"1968 Wholesale Electronic Tube, Semiconductor and Integrated Circuit Purchasing Guide" lists over 7000 devices by type and their prices. Booklet is available from Thor Electronics. **203**
Towers—3- and 4-legged types in 8 basic configurations, in 128 heights from 40 to 310 feet—are included in a 16-page catalog from Microflex. **205**
Image orthicons are the subject of 19-page Catalog CAM-800 from RCA Electronic Components. **206**
Solid-state condenser microphone is presented in data sheet from Vega Electronics. **207**
Tools for electronics, telephone and communications are presented in 16-page Catalog 150 from Jonard Industries. **208**
Plastic guy-wire Glas-Grip dead ends are presented in 2-page brochure from Preformed. **209**
Semiconductors and integrated circuits are presented in 47-page Industrial Catalog Supplement from Allied. **210**
Integrated circuit connectors are the subject of 10-page catalog from Industrial Electronic Hardware. **211**
Broadcast turntable cabinets made by QRK Electronic Products are

presented in illustrated bulletin now available. **212**
"New Relationships in ITV" is a 174-page illustrated paperback reporting on proceedings of 1967 conference jointly sponsored by the Education Section of the Electronic Industries Association and the Instructional Division of NAEB. The paperback is available for \$3.00 from Educational Media Council. Membership discounts are available. **213**
Bulk eraser that degausses ¼- to 2-in. magnetic tape in 10 to 15 seconds is presented in Brochure 502-100 from Ferranti Electric. **214**
"Circular Polarized Fm Antennas" from Jampro includes descriptions, patterns, specifications and prices. **215**

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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.

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If you like Audiopaks our lubricated Audiotape will really be your cup of tea.

Broadcast engineers all over the country like our Audiopak® cartridges so much, we've been using their comments in our advertising. And, we've been giving each one an inscribed cup as a token of our appreciation.

Now, with our Audiotape Formula 17 Lubricated tape designed especially for continuous loop cartridges, their cup will really runneth over.

Here's why:

It provides excellent high end response and signal-to-noise ratio. The long wear, high temperature binder won't soften or gum up heads.

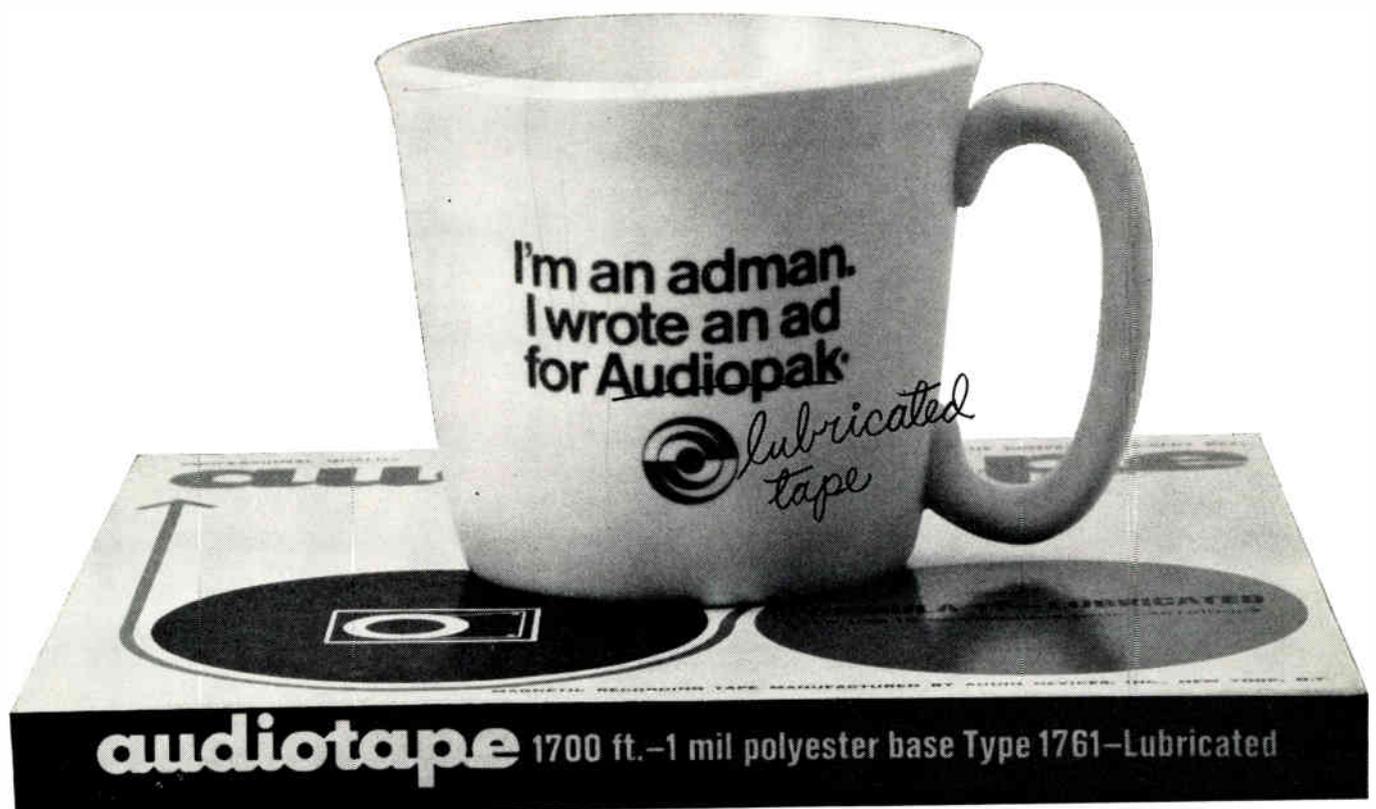
The lubricated coating is permanently bonded to the base. Can't wear off and cause jamming; won't dirty heads and capstans.

Very low abrasion properties reduce head wear and premature failure, assures smooth tape motion with negligible wow and flutter.

Audio is the only cartridge manufacturer who also makes tape. (We are the largest supplier in the world.) So, you can be sure our cartridges and our tape match each other perfectly. But regardless of cartridge make, Formula 17 is the best tape you can use.

Why not find out about Audiotape Formula 17 for yourself.

Audio Devices, Inc.
A SUBSIDIARY OF CAPITOL INDUSTRIES, INC.
235 E. 42nd St., New York 10017



Circle 35 on Reader Service Card

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DISPLAY CLASSIFIED ADVERTISING: \$22.50 per inch 1x; \$22.00 per inch 3x; \$21.00 per inch 6x; \$20.00 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 25¢ per word; minimum \$3.00. BLIND BOX NUMBER: No extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceding issue date.

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

BUSINESS OPPORTUNITIES

For Sale: Springboro-Conneautville, Pa. Systems. 15 miles of plant. New aluminum cable and equipment. Plant in operation with 353 customers on system, and adding more each week. Potential of 600 should be reached in 1 1/2 years. Present monthly rate \$4.00 plus \$20.00 tap-on-fee. Monthly rate soon to be raised to \$5.00. Contact Joe Hardy, 906 Main Street, Conneautville, Pa. 16406. Phone 814/587-5481 Tuesday thru Friday inclusive. 412/475-2471 Saturday thru Monday.

STATION MANAGERS: Why not turn your idle time to money making time simply and easily. Reputable old established company seeks to promote sales of their exclusive patent medicines on a per-inquiry basis. Here is a good deal and good money maker. Write for further information to: Box 968-17, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED

Career Position in Television

TELDEX Corporation has an opening for a qualified person interested in a specialized career.

You must be a good technician, neat appearing, with a solid background, and be able to work from schematics, chassis layout and fabrication, basic schematic drafting, prototype development.

You'll enjoy being a part of the fast-paced profession of television where creative and congenial people work.

Excellent working conditions in a modern and convenient building, city location.

This is an opportunity for a stabilized career. No travel-daytime.

TV station experience required.

Reply with Resume.

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ASSISTANT DEVELOPMENT AND SALES ENGINEER

Will perform specific professional Sales Engineering tasks in the field of Sound-CATV-2500MHz-CCTV and other Communication Media. The field of work encompasses Electronics Systems Design and writing of Specifications. Should have minimum of 6 years experience. Send resume to:

Squires of Ohio
474 S. Yearling Rd.
Columbus, Ohio 43213

Engineer Instructional Media Operations sought by midwestern university to supervise technical operations of closed-circuit television systems and studios, audio and video recording and duplication systems, audio and video retrieval systems, sound reinforcement systems and stage productions. Administrative duties also include supervision of all operational personnel, scheduling, budgeting, inventory control and systems planning. Minimum acceptable qualifications: university graduation with degree in radio, television or electrical engineering; or graduation from a recognized electronics institute with 3 yrs. experience in one or a combination of the fields mentioned above, and 3 yrs. experience in an administrative or supervisory capacity. Avail.: immediately. Salary: \$8,820.00-\$12,600.00. 12 mos. contract. Box 968-1, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Television Technician—Excellent opportunity for responsible TV engineer experienced in educational or commercial studio practices. Will work with orth and vidicon cameras, high band, low band, helical, vrts, color equipment and remote van. Salary open—liberal fringe benefits. If you qualify, write or call University of Michigan, Personnel Office, LS & A Building, Ann Arbor, Michigan, phone 313/764-7280.

HELP WANTED (cont'd)

University physical plant electronics designer; require knowledge in audio/TV/RC building systems. Some drafting and estimating skills. Minimum education: 2 years electrical-electronics. Send complete information and salary requirements to J. M. Grubb, Planning and Engineering, Physical Plant, Purdue University, West Lafayette, Ind. 47907.

First Class men, all levels, for maintenance only. No mike work. If you have experience we will pay for it. If you need experience we will train you. Pleasant operation. East Coast. Box 968-12, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wisconsin Radio-Television operation has opening for engineer with FCC first. No experience required. Good salary and fringe benefits. Send telephone number and recent photo. Box 968-14 c/o BM/E, Blue Ridge Summit, Pa. 17214.

No. 1 rated modern country music station in Tucson wants first phone dj for 6 p.m. to midnight shift. Send complete resume, photo, salary requirements, references and aircheck of board work, production and news to Jim Slone, Box 5945, Tucson, Ariz. 85703.

STUDIO ENGINEER—Immediate opening, large multichannel C.C.T.V. operation. 4 studios, Image Orthicon Cameras, mobile unit. 8 quadruplex VTR's. Complete knowledge of studio equipment and video tape. Fred Henderson, Chief Engineer, CCTV, Michigan State University. Call collect 517/353-8800.

Wanted, capable and experienced station manager for 500 watt, small-town station to go on the air about September 15, 1968. Your replies kept in confidence, address to Quentin Haden, P.O. Box 385, Ava, Mo. Salary open.

Upstate New York affil has news opening in premier operation, 5 years minimum experience, journalism major preferred. Gather, write, read good copy, send tape, resume, references, work samples and photo. Box 968-2, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Soul Jock needed at once. Must be young, ambitious, alert, have third with endorsement. Send photo, tape, background soonest. Radio Station WNOO, Box 166, Chattanooga, Tennessee 37402.

Wanted: Engineer-Salesman for Metropolitan Station in Jackson, Miss. 5000 Watt AM and 100,000 FM. Send resume to P.O. Box 9801, Jackson, Miss. 39206.

Engineering position available to work with PC-70's, VR-2000's and TK-27's in outstanding metropolitan VHF operation. First Class license required. Write Box 968-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Combo man wanted. Accent on announcing, but some basic technical knowledge desirable. Atlantic coast area. Box 968-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Very successful local AM/FM wants another good salesman, send brief resume and photograph: WLNG, Sag Harbor, Long Island, N.Y.

POSITIONS WANTED

Beginner, bright dj, announcer/sportscaster seeks career in broadcasting, will persevere, Broadcasting school professional training. Dependable family man, prefer Georgia or Florida. Box 968-19, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Seeking first position. Mature, primary interest in news reporting, writing and gathering, Excellent educational background. Broadcasting school training. Box 968-4, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Recent NYC broadcast school grad, 3rd endorsed, 31 yrs. old. Desire opportunity to learn sales, hard worker. Box 968-18, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Engineer, experienced as chief to 50KW, DA. Desires position with stable, progressive station. Now in Washington area. Box 968-5, c/o BM/E, Blue Ridge Summit, Pa. 17214.

First phone announcer—music, news, production. Good voice. Four years experience, three with present employer. Midwest. Box 968-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Chief engineer wants change. Over 20 years experience TV-AM. All phases. Western states only. Box 968-7, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Presently in a supervisory position desires position as chief engineer. Box 968-8, c/o BM/E, Blue Ridge Summit, Pa. 17214.

POSITIONS WANTED (cont'd)

Chief engineer position desired—several years experience, will consider assistant chief. Box 968-9, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Sports Director with news and announcing abilities, 7 years, wants play-by-play and to relocate. Rick Van Pelt, 283 Dover Lane, Des Plaines, Illinois.

Soul jock—3rd endorsed, tight board. Draft exempted. College training, relocate. Box 968-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Soul R&B, top 40 dj—Needs start—authoritative news—excellent commercials—third endorsed. Clarence Collins, Box 5627, Chicago, Ill. 60680.

EQUIPMENT FOR SALE

ANTENNA FOR SALE

1 RCA TFU-24BLS Antenna (Ch. 27) with 1/2 degree electrical beam tilt. Good condition (VSWR 1.1 to 1 or less). 28 sections RCA MI 19089 UHF Trans. line. 3 1/4 inch—20 ft. sections.

Contact: R. J. Wickham,
Dir. of Eng. WKOW-TV
Madison, Wisconsin 53701

TRANSLATOR POWER now put your translator where antenna should be for best coverage, not where power line happens to be. Use a TELAN thermoelectric generator. No moving parts, simple to operate, leave unattended 6-12 months. General Instrument Corp., Thermoelectric Division, Dept. BM, 65 Gouverneur St., Newark, N.J. 07104, 201-485-2100 ext. 481.

Scully tape recorders, finance and trade. Two Spotmasters Playback, and one record/playback, all three, \$38.25 monthly. New equipment. QRK or Russco deluxe turntables, \$10.80 monthly. Write for list. New cartridges shipped freight prepaid. Audiovox, Box 7067-55, Miami, Florida 33155.

Brand new remote amplifiers, 2 channel remote microphone amplifiers, 2 1/2 inch VU, battery operated, 7 transistors \$95.00 FOB Kokomo. GREDCO, INC., 1830 S. Webster, Kokomo, Ind. 46901. Area 317-883-5688.

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, Mtn. View, Ca. 94040.

Color movie labs for less than \$5000! Use new Fulton Automatic Processors. Fast, Low cost, Reliable. Design proven ten years in TV, commercial labs, missile bases. Fulton Productions, Inc., Box 980, Tulare, Calif. 93274.

For sale . . . Portable Ampex VR-660 B VTR-Black and White Broadcast Specs. New Heads, less than one year old. Will take a loss on purchase price. Call or write Curran Wade, Trend Broadcasting, Box 1199, Jamestown, N.Y. 14701.

Upgrade your monochrome cameras. For sale: three RCA TK-31 image orthicon field cameras. Reasonable. Box 968-10, c/o BM/E, Blue Ridge Summit, Pa. 17214.

2 RCA color camera chains, TK-40A modified by RCA to approximate TK-41. \$16,000 each. Call 317-773-0630, or write WURD Noblesville, Ind.

Complete kit audio proof forms \$3.50 postpaid. Specify AM/FM. Box 2605, Corpus Christi, Texas 78403.

MAZE offers some of America's greatest buys in new and used broadcast and recording equipment. Write Box 6636, Birmingham, Ala. 35210.

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee 37620.

6 element circular vertical and horizontal antenna. Price \$2,400.00. Box 968-16, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Towers, broadcast, microwave, CATV, TV, new and used. Phone 224-9922. Tower Maintenance, Inc., 2408 Old St. Rd., Tallahassee, Fla.

Protect your records. Send for our free Lp supply lists. Record Supplies, Hillburn, N.Y. 10931.

Rust SFM-19 Stereo Frequency Monitor, \$270. New condition. KPFM, Portland, Oregon 97207.



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We believe it's not enough to build towers of unequalled quality. Because even the best tower can fail, unless it is properly installed. That's why we maintain enough superbly equipped, high trained construction crews to install every tower we build. We'd rather do it ourselves. We also guarantee each tower to meet or exceed all EIA and other specifications under which the tower is purchased. Backed by product liability insurance.

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PHONE (712 943-5081)
Dept. BM 968

Circle 36 on Reader Service Card

EQUIPMENT WANTED

Wanted: Equipment donations for Christian broadcast station in Congo. Need audio, tape, and SK transmitter (9 Meg, 31 Meter Band). Contact Mr. C. Sebastian, WTAQ, LaGrange, Ill.

One RCA Type BTF-5D FM Transmitter in good condition. WFAH, 393 Smyth Avenue, Alliance, Oh 44601.

GEL FM exciter working condition on any channel. WKLS, Atlanta, Ga. 30309.

Used equipment for 3 KW FM Station Stereo, Automation. No junk. Box 968-11, c/o BM/E, Blue Ridge Summit, Pa. 17214.

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Japanese Electronics. New products monthly! \$1.00. Money-back guarantee. DEE 10639 BM Riverside, North Hollywood, Calif. 91602.

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Professional Electronics Projects — \$1 up. Catalog 25¢. PARKS, Box 25665-B, Seattle, Wash. 98115.

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AMPEX HEAD ASSEMBLY relapping and replacement head service for all AMPEX professional studio model recorders. Our precision relapping extends head life for maximum use. Brand new shelf stock replacement heads of our manufacture available when relapping not advisable. Prices include thorough assembly cleaning, optical and electrical inspection and complete testing on Ampex equipment. Monaural assembly relapping . . . \$35.00 complete. Monaural assembly replacements . . . \$119.50 complete. "Loaner" assemblies available. For more data, contact LIPPS, Inc., 1630 Euclid St., Santa Monica, Calif. 90404 (213) EX 3-0449.

Now you can choose the type of tape you want wound in your cartridges from BROADCAST EQUIPMENT RE-BUILDERS! You know what you prefer. If we don't stock it, we'll get it for you . . . and, at our same low prices, regardless of the cost per reel to us! The most popular cartridge tape always in stock . . . Scotch . . . Ampex . . . Audiotape! Wanted: Used broadcast consoles for our listings. BROADCAST EQUIPMENT REBUILDERS, Rt. 8, Box 718, Fayetteville, N.C. 28304. Area 919-425-7332.

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Agencies beg broadcasters for depth information about both market and station. Our in-depth marketsheets tell the total story . . . and you get them at a fair price . . . 1,500 units printed 2 colors on best quality 70# white stock for \$135 . . . bonus is 550-name ad agency list. Write for free presentation. ALLIED, Drawer 1991, Prescott, Arizona 86301. (Serving Broadcasters since 1952).

DEEJAYS! 6000 classified gag lines for radio, \$5.00! COMEDY CATALOG FREE! E. Orrin, Boyer Rd., Mariposa, Calif. 95338.

PROGRAM SERVICES (cont'd.)

"DEEJAY MANUAL" is a folio of Gags, Ideas, Breaks, Gimmix, Fun for the working deejay. Special \$3.00 with this ad. Write for free "Broadcast Comedy" catalog. Show-Biz Comedy Service (Dept. E) 1735 E 26 St., Brooklyn, New York 11229.

Thanks for the wonderful response . . . during 1967 we served 563 stations at fair prices for sales aids. Free Presentation if you need more money. Write ALLIED CREATIVE SERVICES, Postal Drawer 1991, Prescott, Arizona 86301.

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FCC License in six weeks from the nation's largest license school. Compare reputations and success rates before you invest. Professional announcing training on the nation's only fully school-operated commercial station used solely for training. School locations in Dallas, Atlanta, Chicago, New Orleans and Minneapolis. Write Elkins Institute, 2603 Inwood Road, Dallas, Texas 75235.

FCC License preparation by correspondence. Also, associate degree in electronics by three semesters in correspondence and two semesters in resident classes. Free details on either course. Write: Grantham Desk 7-B, 1505 N. Western Avenue, Hollywood, Calif. 90027.

First phone in six to twelve weeks through tape recorded lessons at home. Sixteen years FCC license teaching experience. Proven results. Bob Johnson Broadcast License Training, 1060D Duncan, Manhattan Beach, Calif. 90266.

You can earn more money if you get a Government FCC License

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Matt Stuczynski, Senior Transmitter Operator, Radio Station WBOE: "I give CIE credit for my First Class Commercial FCC License. Even though I had only six weeks of high school algebra, CIE's lessons made Electronics easy. I now have a good job in studio operation, transmitting, proof of performance, equipment servicing... and am on my way up."



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Ed Miller

trial plants like these, it's the licensed technician who is always considered first for promotion and in-plant training programs. The reason is simple. Passing the Federal Government's FCC exam and getting your License is widely accepted proof that you know the fundamentals of Electronics.

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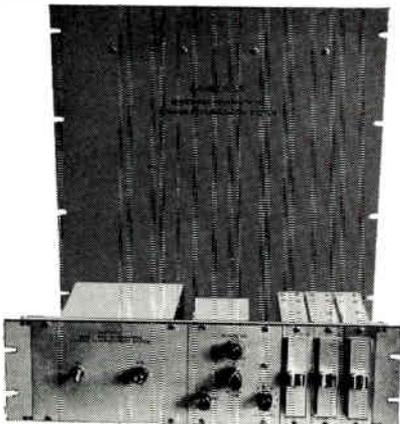
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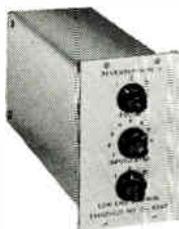
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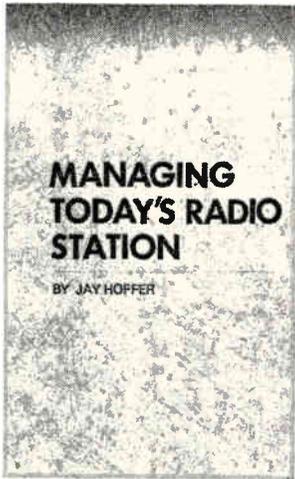
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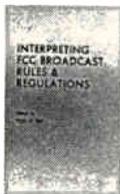
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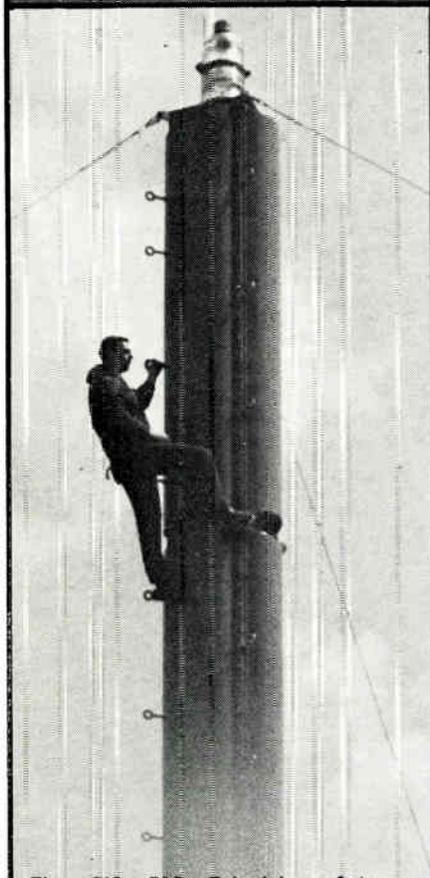
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FROM THE EDITOR

Exploiting Machines

Broadcasters need people. Getting and keeping an effective staff is the number one problem of many managers. In small market radio, revenues are often just too small to pay attractive salaries. People that really have something on the ball move on. In TV, talent is rewarded, but the number of interesting jobs in the engineering operation is dwindling. There's not enough opportunity for personal growth.

Job descriptions are written by the FCC, not station management. Thus the transmitter site is staffed with clerk-engineers. If you're broadcasting over 18 hours a day, seven days a week you need quite a few of these half engineers. So you keep salaries low. Better that the transmitters be run by remote control. Technical people back in the studio can be made more productive and higher salaries can be paid. The answer lies in better use of automated machines.

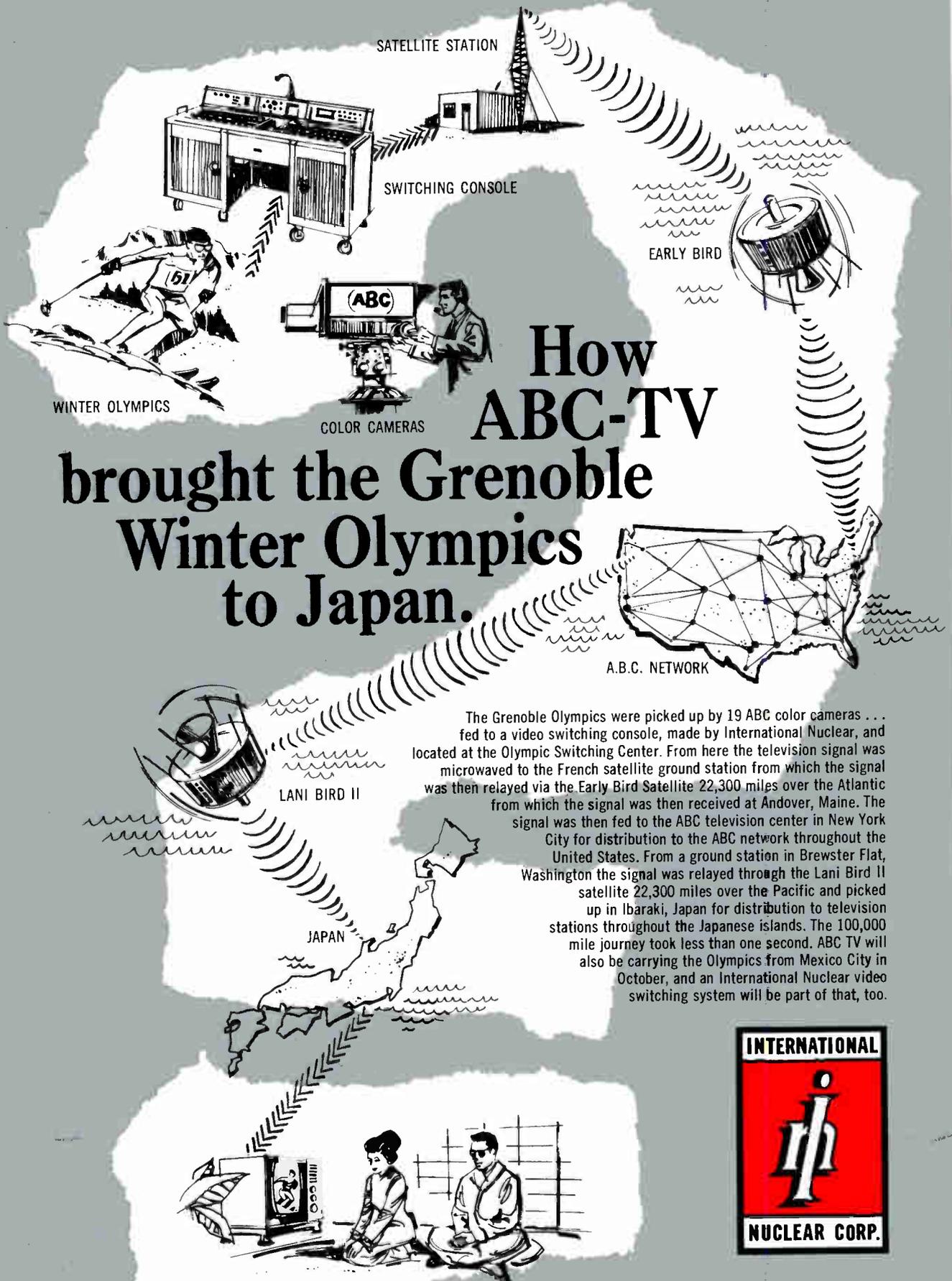
FM radio stations with a music format have automated to a high degree. Small market radio, most hard pressed in acquiring and holding top flight people, can use automation. Like the Gates ad says, have the boys out on the streets selling spots while they're on the air. Bill Payne of KWPB, Oklahoma City, doesn't lose the live touch that way. He can cut into his Tape-Athon automatic system from the other side of town with his Marti remote pickup gear simply by sending a coded signal.

TV stations are rapidly learning that pre-set video switching (with either manual or automatic takes) is the only way to handle complex, multiple-event switching without a fluff. Since there now are many antiquated switching systems in stations, this is a fertile field in which to exploit machines.

But adopting radio and video automation is only part of the answer. These various elements must be tied into a total systems management concept as envisioned by Messrs. Presti and White in this issue and as articulated many times before by Prose Walker and Paul Schafer.

Automating out live personalities and live action is not always right—certainly shows that involve listener participation (open mike shows) cannot be canned. But taping for delayed play is right and logical. Likewise, if a machine can be set to turn on and sequence program material reliably, it should be used. The same goes for machines that can replace clerks for monitoring, billing, and other marketing/administrative functions.

James A. Lippke



How ABC-TV brought the Grenoble Winter Olympics to Japan.

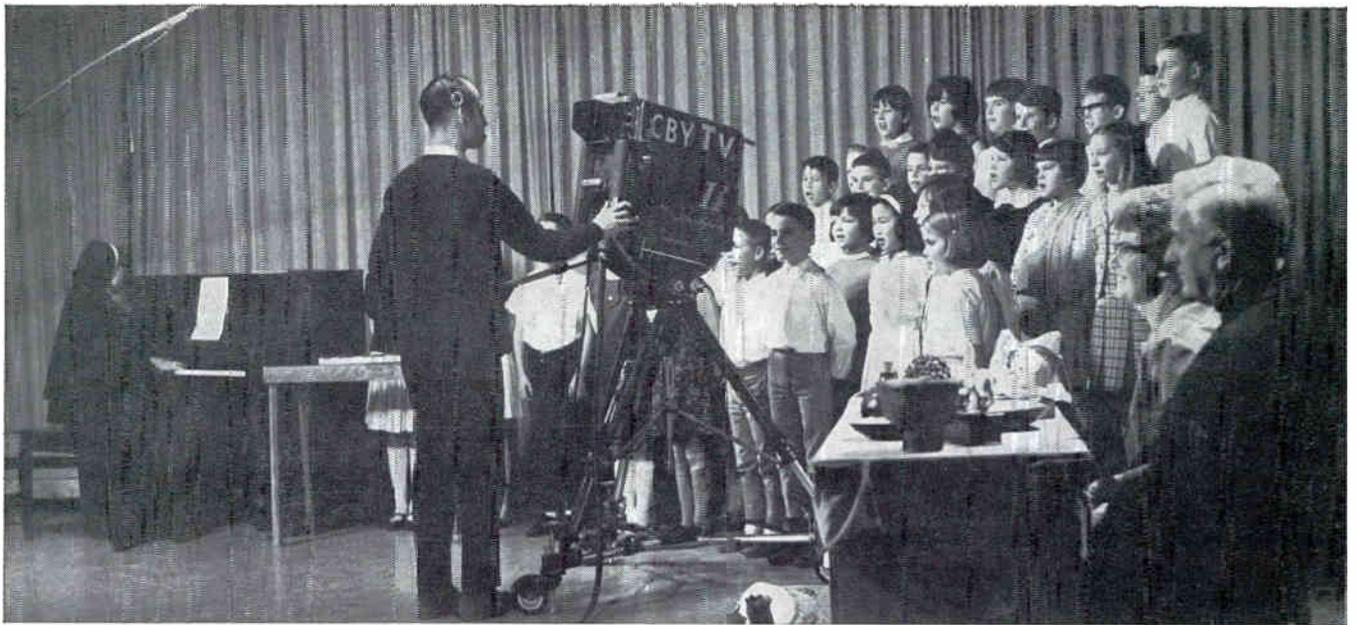
The Grenoble Olympics were picked up by 19 ABC color cameras . . . fed to a video switching console, made by International Nuclear, and located at the Olympic Switching Center. From here the television signal was microwaved to the French satellite ground station from which the signal was then relayed via the Early Bird Satellite 22,300 miles over the Atlantic from which the signal was then received at Andover, Maine. The signal was then fed to the ABC television center in New York City for distribution to the ABC network throughout the United States. From a ground station in Brewster Flat, Washington the signal was relayed through the Lani Bird II satellite 22,300 miles over the Pacific and picked up in Ibaraki, Japan for distribution to television stations throughout the Japanese islands. The 100,000 mile journey took less than one second. ABC TV will also be carrying the Olympics from Mexico City in October, and an International Nuclear video switching system will be part of that, too.



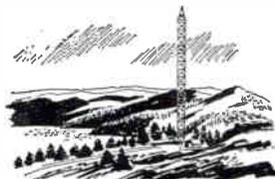
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Chief engineer Glynn McCready states: "The Sony Videocorder fits in perfectly with our type of operation, where simplicity, portability and sturdiness are important. The BV-120 meets all these requirements. We have over 700 hours on the Videocorder and have not had a single major problem. When 70 percent of your programming is on tape and you have only one machine, you know how important it is!"

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