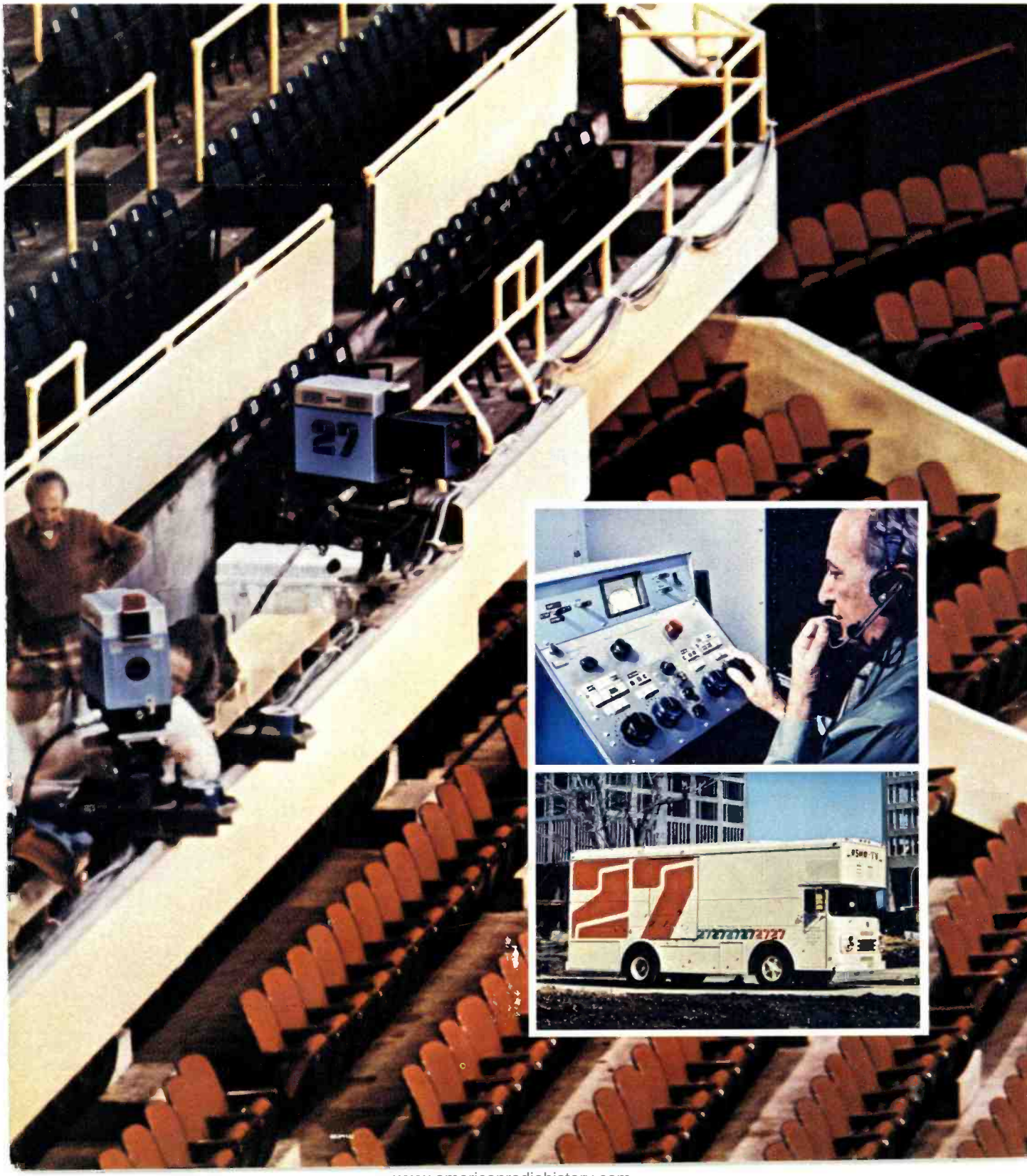
# RCA Broadcast News

Volume No. 146, June 1971



The TT-50FH . . . the highband VHF transmitter of the future . . . available today. This 50-kW transmitter is designed for remote operation . . . and will provide the best color signal in town. Color that captivates your audience . . . from a solid state transmitter that just won't quit.

Barring failure of power, it's virtually impossible to lose your signal. The TT-50FH is actually two transmitters—designed as one unit . . . if either quits the other keeps you on the air . . . and your audience in the primary coverage area probably won't know the difference.

The TT-50FH is reliable solid state with only 6 tubes and 2 tube types. It modulates at carrier frequency, with only two tuned linear amplifiers—plus signal shaping at output—to assure signal integrity. An extra margin of safety is achieved by conservative design—with circuits and components operating well below design ratings.

The TT-50FH is far ahead of current transmitters. It features solid state control logic. It has motor-driven controls and remote metering—is ready for full remote control and automatic logging.

And for low band VHF there's the companion 30 kW TT-30FL Transmitter with the same essential features . . . See your RCA Representative for details.

# New Highband VHF Transmitter TT-50FH . . .

## designed for unattended operation

RCA

June 1970 Vol. No. 146


COVER: On location with TK-44A's at the Boston Garden is just one of the many assignments for WSMW-TV's color mobile unit.

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RCA
**Broadcast News**

Published by
RCA Communications
Systems Division

# in the viewfinder

**New Jersey Inaugurates Statewide Color TV Network**

Station WNJT-TV Channel 52, New Jersey Public Broadcasting Authority's first UHF color station, officially went on-air April 5, 1971. Channel 52 is the first of four color UHF stations to be operated by the NJPBA.

This is an Authority funded by the State to provide educational and public television fare for the citizens of New Jersey. Programming will include: State news, sports, cultural events, public events of interest, and discussions of timely subjects.

The four stations will be located in Trenton, New Brunswick, Montclair, and Camden-Atlantic City area. When in full operation, later this year, the four overlapping signals will cover 97 percent of the State.

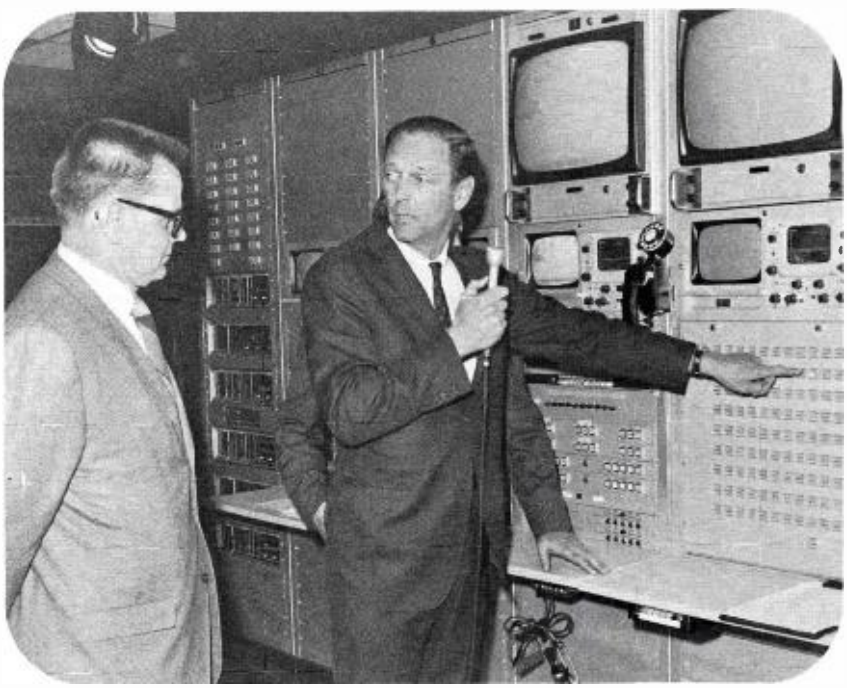
Using RCA equipment, the system is designed to have separate programming flexibility on all four stations, meshing programs from network sources with local events.

The State Authority will also operate eight low power closed circuit TV systems for use by schools, public agencies and private industry all through the State. Instructional TV service via 2500 MHz system will begin in September, 1971, over 12 microwave channels.

Dr. Edward J. Meade, Jr., a leading educator and member of the Ford Foundation is the first Chairman of the Authority. Dr. Lawrence T. Frymire is Executive Director, and William H. King is Associate Executive Director. Douglas Leonard is Director of Programming and Donald McMeans is Director of Community Services. Mrs. Mary Jane Phillips is Director of Educational Services. Mr. G. Mathis Sleeper is Director of Development and William H. Petit is Director of Information Services.

Mr. John Wilner, Director of Engineering, and one of the leading television engineers in the country, has recruited a qualified engineering staff to operate the technical equipment.

LAUNCHING NEW JERSEY'S PUBLIC TV SYSTEM—George Connett, vice chairman of the New Jersey Public Broadcasting Authority, presses button switching on the first show aired on WNJT-TV, Channel 52 on April 5. WNJT-TV is the first of four full-color UHF television stations to be operated by the Authority in New Jersey. Dr. Lawrence T. Frymire, Executive Director of the NJPBA, looks on at left.



**RCA Requests Approval for Domestic Communication Satellite System**

On March 11, 1971, RCA Chairman Robert W. Sarnoff announced the filing of applications for FCC authority to establish and operate a domestic communication satellite system, calling for an investment of up to $198 million by the end of 1977. The applications were filed by RCA Global Communications, Inc., and RCA Alaska Communications Inc., which would construct and operate the system. Mr. Sarnoff said the proposed system would be "the entranceway into an era of innovative communication services for all 50 states. It offers new services, greatly augments terrestrial facilities and dramatically reduces the cost of network broadcasting and business communication services."

The system could begin operation in 1974, if the application is approved. The application points out that the system's impact on national communications policies and operations would be felt in reductions of approximately 50 per cent in the cost of distributing commercial television and radio network programming and the encouragement of educational television and special services to stimulate growth of instructional TV and public radio; also the expansion of rapidly developing private line, digital and analog data transmission, video, voice and other services through rates that are up to 50 per cent below those currently in effect.

The satellites would work in conjunction with 13 major earth stations near New York, Washington, D. C., Chicago, Denver, Los Angeles, San Francisco, Seattle and Honolulu, and in Alaska near Anchorage, Fairbanks, Juneau, Ketchikan and Prudhoe Bay.

The system would be implemented in two basic stages. Two satellites, one for operations and the other as a spare in orbit, would be launched in 1974, with a third held in reserve on the ground. There would also be 11 major earth stations initially.

Increases in traffic and demand for new and additional services could exceed the initial capacity and require the launching of the third satellite and the construction of two additional earth stations by 1976. With three satellites in orbit, two for operation and the other for back-up, a fourth spacecraft would be built to be held in reserve on the ground.

The National Aeronautics and Space Administration would launch the spacecraft as it now does international communications satellites.

In addition to the 13 major earth stations, which would handle all types of communications services, the system provides for 9 future major

**RCA to Supply Color TV System for Austria**

RCA was awarded a $6 million contract, one of the broadcast industry's largest equipment orders, to supply a complete color TV studio system for Osterreichischer Rundfunk Gmbh. (ORF), the Austrian Broadcasting Agency. The agreement with RCA affirms an ORF decision to adopt U.S. techniques for producing their color TV programs.

Under the contract, RCA will supply color TV cameras, video tape recorders, telecine systems and related equipment. All items are for installation in the huge television program production and distribution facility in Vienna where ORF is consolidatnig its operations. The ORF center, with nearly 900,000 square feet of working area, will rival in size and technical capability the central program studio operated by any television network.

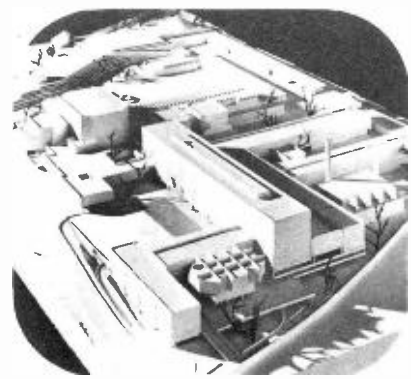
The various equipment sub-systems will be built in Camden, for operation on the PAL standard used for Austrian and most European colorcasts. In accordance with the systems management arrangements, a project team from RCA Limited, the subsidiary company in Great Britain, has been working with ORF officials for the past 18 months to fully develop the design and implementation schedule for the big TV complex. After the equipment has been installed by ORF engineers and staff, the RCA group will conduct all performance and quality tests to confirm that the installation is ready for operation.

Approximately seven city blocks long by three wide, Vienna Central will include a 9700 square-foot theater studio along with several TV production studios and control rooms, a restaurant, bank and other support facilities. The broadcasting center will represent an investment of approximately $47 million. The equipment purchased from RCA will be used in the studios and in mobile broadcast vans to provide the Austrian television audience with a wide variety of programming, from lavish studio spectaculars to on-the-spot news and sporting events. The center will have the complete capability to produce final programs from the integration of live picture sources, motion pictures and slides and video tape recordings.

Major equipment items ordered for the center include 14 of RCA's most advanced color camera, the TK-44A. Ten of RCA's newest TV tape recorders, the TR-70C, will be used with the cameras to produce video tape programs. Color telecasts from 16 mm film or 2 by 2 inch slides will be made by means of a new RCA telecine system, eight of which will be installed in the center.

Because of the television center's size and operational requisites, RCA design engineers are developing new methods for automatic assignment and control that will reduce the wiring required and provide for a more efficient and orderly operation. Much of the equipment will be grouped in a central area and will be started, adjusted and stopped from a remote master control console. The control and switching system will include memory devices to store short segments of shows, or complete TV events and will have the capability to assemble them into a finished TV program on a precise time schedule.

Besides the larger program production and "on-air" studios, the center will have two 500 square-foot announce booths, ten viewing rooms, three dubbing studios, three radio studios, a film processing laboratory and maintenance shops.



Conceptual model of "Vienna Central" studio complex.

**Congo Services Contract**

RCA has been awarded an engineering services and training contract by the Congolese government for their television system in Kinshasa. Extending over a two year period, five field specialists from RCA, some of whom speak French fluently, will instruct approximately twenty Congolese technicians in all aspects of television operation.

Several years ago in 1968, RCA supplied the Congolese TV system, consisting of two studios and two transmitters equipped for monochrome telecasting.

Entire Ministry of Information Management around Melle P. Nkumu—Directeur de Cabinet du Ministère de l'Information, representing the Minister of Information. Among those present: Mr. L. Mabandele, Directeur de la Télévision Congolaise; Mr. Makosso, Directeur de la Radio Congolaise; Mr. D. Mangenda, Chef des Services techniques Télévision; Mr. V. Nikuna, Chef des Services techniques Radiodiffusion; Mr. J. Mbola, Directeur de personnel SAIT Congo; Mr. Moaka, Département Administratif Ministère de l'Information; Mr. P. Berben, Area Manager, RCA. Others are programme directors, producers, engineers and announcers.

# in the viewfinder


**NAB Engineering Achievement Award To Ben Wolfe**

At the NAB Engineering Conference Luncheon on March 30 the NAB Engineering Achievement Award was presented to Benjamin Wolfe, Vice President, Post-Newsweek Stations, Inc. The presentation was made by George W. Bartlett, NAB Vice President for Engineering. George had a lot of nice things to say about Ben—and we agree with all of them.

Ordinarily we do not wax lyrical about awards. In fact, we're downright cynical about them. But this one's different. First, because the choice was so right. We doubt there is anyone in the broadcast engineering fraternity who would question it. Second, because it brings a modicum of recognition to one of that small group of quiet men who pioneered the technical side of the broadcast business.

They all say—and we agree—that Ben Wolfe is a broadcast pioneer. He started as a radio operator on board ship working for RMCA and, in 1935 began his broadcast career at WCBM in Baltimore. After serving in World War II as radar specialist, and afterwards with the FCC as field engineer, Ben resumed his broadcasting career in 1949 as chief engineer of WJZ-TV in Baltimore then KPIX-TV, San Francisco for the next 15 years. In 1964 he was appointed vice-president of engineering of Westinghouse Broadcasting and in 1969 assumed the same position for Post-Newsweek.

Ben Wolfe had no small part in contributing to the technological advances in broadcast engineering, being holder of several patents and author of many engineering articles. More concretely, he was inventor of the single carrier television multiplexed and anti-acoustic feedback systems. He presented the first complete design of a workable wide band video transistorized amplifier. He contributed in the pioneering and the development of the first three-antenna candelabra tower in the world with RCA as prime contractor.

In presenting the Award, George Bartlett noted that Ben Wolfe is "credited with the conceptual design and specifications of a new type of television transmitter . . ."

Ben was of such stature that he could successfully get businessmen of large corporations to accept the challenge he laid down. In his own words he was, "conscious of the gap between studio apparatus and the transmitter—whose technological concept had not changed for two decades." What he envisioned was, "a dual-transmitter, mostly transistorized, with automated switching in event of failure in one channel—plus RF and color specs that exceeded the industry's standard,"—in effect, seeking new transmitter technology for television.

(During the five years 1964 to 1969 this new type of television transmitter was developed and manufactured by RCA.)

Men speak of Ben as *thoroughly human*, using phrases like . . . a kind man . . . untiring devotion . . . never too busy to help the other fellow.

In accepting the award Ben said, with characteristic humility. "I am certainly fortunate to have had a small part in contributing some technical advances to the broadcast engineering and thank my many friends and associates who helped make this possible, but most of all my partner for 35 years, my wife, Phyllis."

Now there's a great guy who is also very gracious.

# Creative VTR Editing

## Using RCA Time Code Editor

By OSCAR F. WICK and JOHN H. FRISHETTE

New Time Code editing system facilitates production of taped programs and commercials, lowering production costs and cutting editing time. It utilizes high-speed search, the SMPTE time code, and key board entry. It automates routine functions, accurately synchronizing and recuing VTR machines. It permits the flexible double system of editing to be used, intercutting pictures from two sources while maintaining precise sound sync. It affords multi-track sound manipulation. Additional applications include fast push-button search and cue of tape segments, start and stop of external equipment at predetermined time. Altogether, this new system has substantially reduced time and effort required to produce high-quality VTR shows with professional effects.


Time code techniques speed editing of Dean Martin Show and produce excellent results.

Oscar F. Wick

After about ten years in radio receiver manufacturing and electronic equipment servicing, Mr. Wick joined NBC in 1942 as a Maintenance Engineer in Hollywood. When the Company began television operations on the west coast in 1948, he became a member of the original staff of station KNBH (now KNBC). His assignment, after a period of training at NBC in New York, was that of Technical Director in the Film Studio.

As the NBC Television Network grew into a coast to coast operation, the activity in Hollywood increased considerably and Mr. Wick was promoted to the newly created position of Film Studio Supervisor. With the introduction of Video Tape in 1956, this, too, became part of his responsibility. In 1965, he was promoted to the position of Manager, Video Tape and Kinescope Recording.

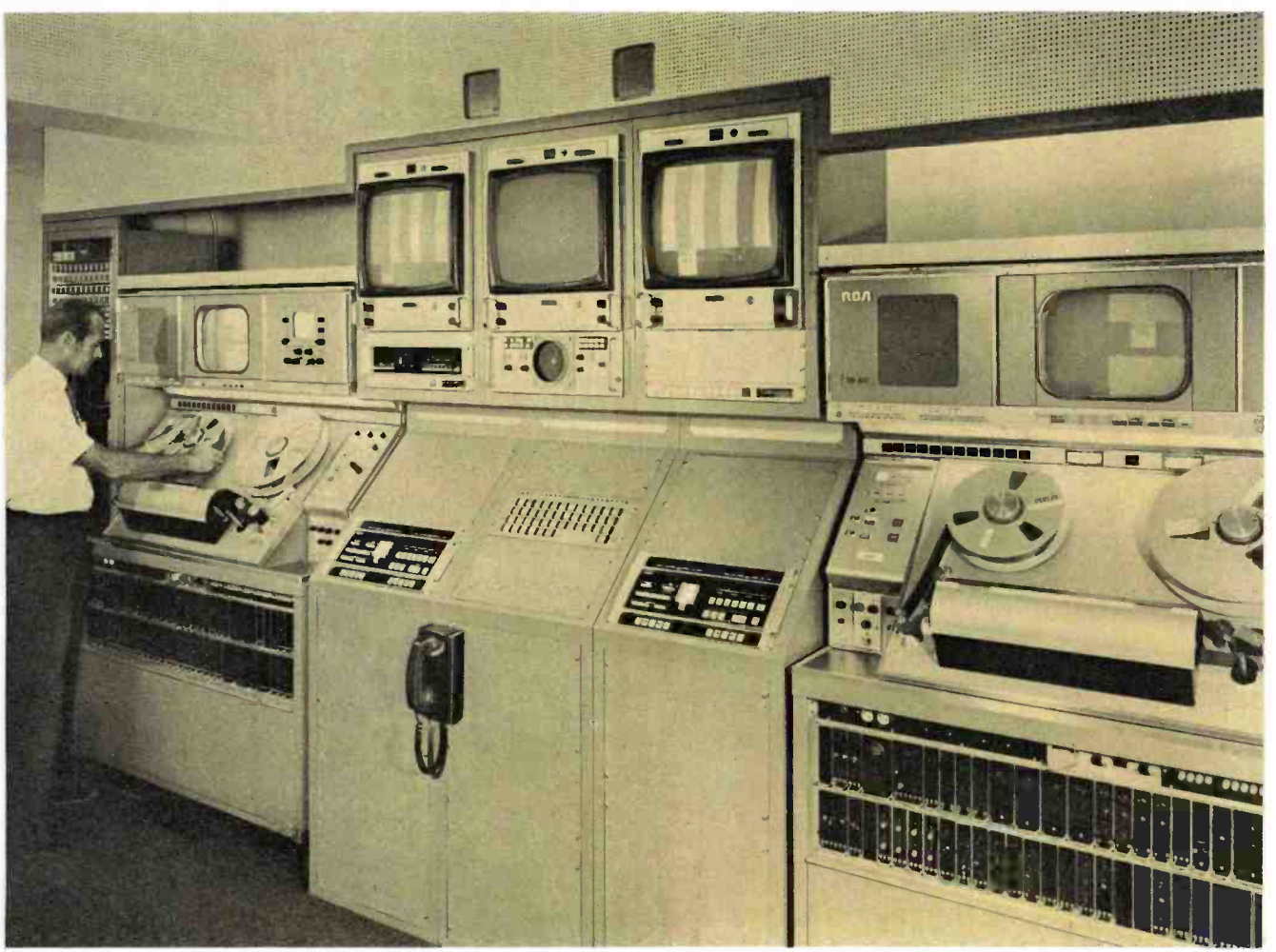
Mr. Wick studied engineering at the University of Southern California, UCLA, and Los Angeles Valley College.

John H. Frishette

John Frishette joined the NBC Radio Network at Chicago in the spring of 1950, and transferred to Television Technical Operations in the fall of that year. He worked in Studio Operations and Television Maintenance until September of 1955, at which time he transferred to NBC Burbank.

Since that time he has been a Master Control Engineer, Video Tape Engineer, Maintenance Engineer, and supervised many of the new installations at NBC Burbank. He has been a Supervisor of Video Tape Operations since 1966 and has been closely associated with the Time Code Systems installation and use in the NBC Burbank Plant.

Prior to joining the NBC Network, John Frishette graduated from the Electronics Material School, Naval Research Laboratory in Washington, D. C. and is also a graduate of the American Television Institute in Chicago, Illinois.




Time Code Editing System as installed by NBC at Burbank for use in production of video taped shows. TV Switching and audio mixing consoles were designed by NBC engineers.

# in the viewfinder

**Video Cartridge Machines Coming Off Production Line**

On March 28, 1971 RCA announced that its Camden, N. J., plant has begun commercial shipments of the TV industry's first video tape cartridge system, the TCR-100.

The first units went to WBAY-TV, Green Bay, Wisconsin; WWL-TV, New Orleans; WBRE-TV, Wilkes Barre, Pa.; KSLA, Shreveport, Louisiana; and KSTP-TV, Minneapolis, Minnesota.

The Camden plant is working on a backlog of orders for the cartridge system and production/test schedules for the year have been stepped up to meet customer demands.

At WBAY-TV the cartridge system will be used to automate presentation of commercials and other short subjects.

A prototype TCR-100 was unveiled at the 1969 NAB Convention, where broadcasters saw demonsrations of how the new machine could streamline TV station operation, particularly during the "panic period" station break—and reduce costly errors in airing of commercials.

An improved pre-production model, put through its paces at the 1970 NAB, was delivered to WDCA-TV, Washington, D. C., for field testing. For the past eleven months it has been in successful broadcast service at the station airing some 280 commercials daily. The tests prove that the quality of commercials is consistently better, make-goods are a thing of the past, tape and headwheel costs are reduced. More commercials are being aired with no increase in manpower. The reel-to-reel machines are freed for production of commercials.

The TCR-100 plays the video cartridges in a predetermined sequence, as dialed into a minicomputer. The molded plastic cartridges are approximately 2½ x 3½ x 5 inches and hold 3 minutes of tape programming. The TCR-100 can be used for recording as well as for playing the video cartridges.

Twenty-two cartridges may be loaded into the magazine of the TCR-100. Cartridges may be changed or replaced as required, providing programming flexibility.

The start signal may be given by the push of a button or may come as a command from an automatic system. Likewise, ten seconds before the last cartridge in a station break sequence is played, the TCR-100 sends a signal that may be used to automatically return to the program.

The TCR-100 is available either as a slave unit to operate in conjunction with TR-60 or TR-70 Recorder or as a completely independent unit.

**Venezuela Orders RCA Transmitters**

International Operations, RCA Broadcast Systems, has received an award of approximately $1 million from Venezuela. In response, RCA will provide VHF-TV transmitting equipment for five new regional broadcasting stations that represent the implementation of a new television network for the South American nation.

The order was placed by C.A. Nacional Telefonos de Venezuela, a government-owned corporation which will establish the stations. The RCA transmitters will be utilized to rebroadcast programs relayed via microwave from Televisora Nacional's originating studios in Caracas.

Four of the transmitters will be situated to cover communities in Venezuela's heavily populated coastal area along the Caribbean: Valencia/Maracay, Maracaibo, Puerto La Cruz/Barcelona and Margarita Island. The fifth unit will be located near the city of San Cristobal in the southwestern part of the country.

RCA Broadcast Systems, through its Venezuelan distributor, Dina Radio C.A., will supply five and six kilowatt VHF television transmitters, towers, antennas and related items. Dina Radio has also received the contract for installation of the equipment.

**Yugoslavia Orders RCA Studio Apparatus**

RCA has received an order from Radio Yugoslav for color studio equipment valued at approximately $1.5 million. The award to RCA represents Yugoslavia's first major purchase of color TV broadcast equipment.

The Yugoslav nation of 20 million is comprised of six Republics, each of which has its own broadcasting facilities. The equipment RCA is to supply will be installed in a new studio complex and will be used to convert Radio-Television Beogard (RTV-Belgrade), the nation's largest TV station, to color program operation. Belgrade (Beograd) is both the capital city of the Republic of Serbia and the national capital of Yugoslavia.

Under the agreement, RCA will deliver nine TK-44A live color cameras, three complete color telecine systems, two TR-60 video tape recorders, program switching equipment, custom-designed audio consoles and related items. The order also includes a 35-foot mobile TV van equipped to provide color telecasts of events of national interest, sports and other programs originating away from the studio.

earth stations in Alaska, and approximately 23 television transmit/receive and 370 receive-only earth stations to meet requirements specified by commercial and public broadcasters, primarily television.

A primary use predicted for the system is to carry network programs to individual broadcast stations throughout the country. This would result in major cost savings over present methods since satellites minimize distance as a factor in the expense of communications services.

These lower distribution costs will also be of major benefit to the educational and instructional TV fields. It is planned to allocate two channels of the system for instructional TV service within Alaska and to make the spare satellite in orbit available at special rates for experiments by instructional broadcasters.

**Kaiser Broadcasting Puts Super-Power Transmitters On-Air**

One of the world's most powerful TV Transmitters, the RCA 120 KW UHF, went on-air at WKBS-TV in Philadelphia on May 26, 1971.

This is part of a $2.6 million capital program by Kaiser Broadcasting Corporation to increase signal power in its group of television stations. Included are WKBG, Boston; WKBF, Cleveland; and WKBD, Detroit. The program constitutes adding an RCA 60 KW transmitter to those already at the four stations. The 60 KW transmitters in use at these outlets will be operated in parallel with the new units, providing complete back-up and assurance of continuous broadcast signals in event of failure.

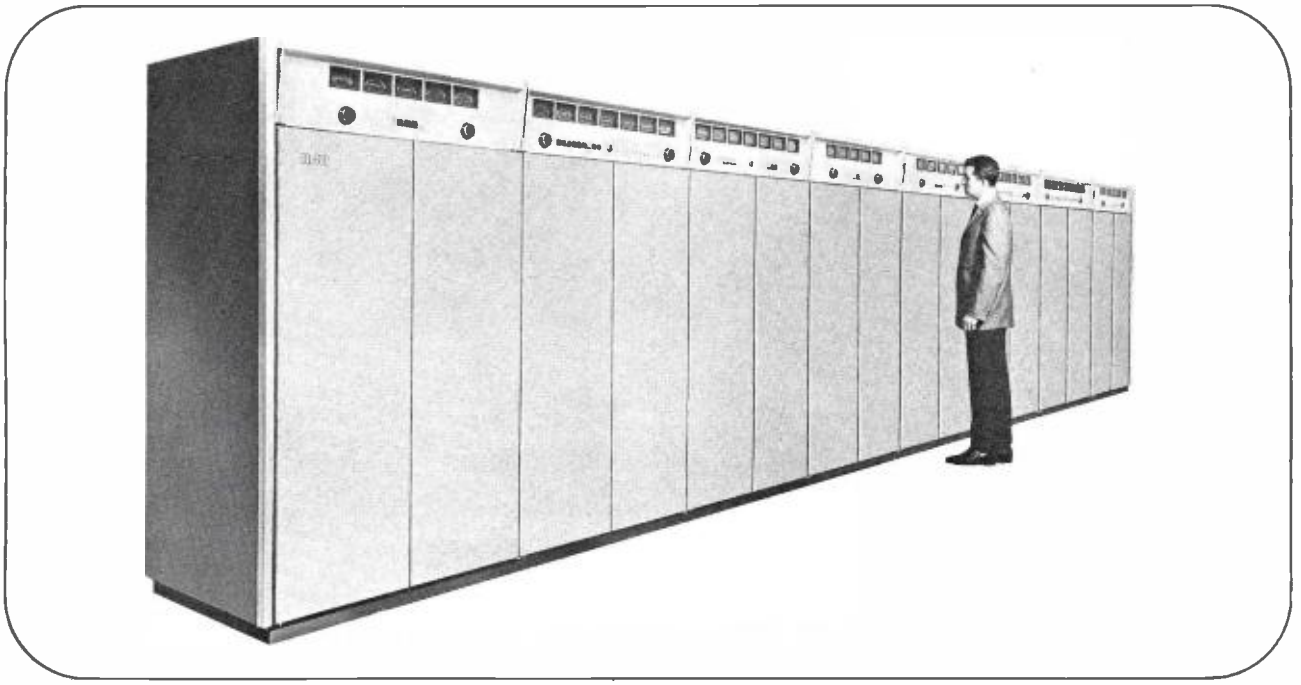
The program includes power increases by adding new RCA transmitters and converting existing ones to higher power at KBHK in San Francisco, and KBSC in Los Angeles.

Station WKBS in Philadelphia has also installed a new 35-gain Pylon antenna (and a similar one is planned for Detroit). The previous antenna has been side-mounted on the tower for use in emergency. The station also has installed another STL giving it a completely dual system. The twin-transmitters along with two separate antennas and two microwave links gives WKBS a complete system of back-up equipment.

The new combination of transmitter and antenna is engineered to increase quality of picture and improve overall performance in the coverage area. Comments from viewers in a survey indicate these results are being obtained:

"Much easier to tune" . . .
"color is easier to get, it pops in" . . .
"color is better, is much clearer" . . .
"can get your station better than most UHF."

The new transmitter is designed for remote control and is set up at WKBS for unattended operation. Incidentally, this Kaiser station was the first in the nation to operate an RCA UHF television transmitter by remote control.



## Razor Blades To Time Code

Magnetic Video Recording was introduced to television broadcasting approximately fourteen years ago. Initially its principal usefulness was seen to fall in the time zone delay area. Kinescope Recording, performing this function, left much to be desired from the standpoint of quality, cost of operation, and processing time. Since Hollywood was the delaying point for the NBC Pacific Coast Network, the first Video Tape Equipment acquired by the Company was installed there.

Within a year after Video Tape became operational in Hollywood, the RCA Laboratories at Princeton developed circuitry and equipment to enable the monochrome machines to record and reproduce color. With this development came widespread interest in the use of Video Tape to pre-record television programs. Further, production people could see Video Tape as a replacement for Motion Picture Film in many television applications. The opportunity to use "Television Techniques", and thereby reduce production costs, was particularly attractive. The photographic process, however, still had several distinct advantages, especially in the areas of editing and duplication.

In the spring of 1958 a new recording facility was installed at the NBC Burbank Studios. A total of 12 Colorized Video Tape Recorders were included. With this expanded capability we were in a position to undertake pre-recordings that had not previously been possible. Within a short time, the need to edit and rearrange this material became very clear and the possibilities for doing so were investigated. The only implements available for the cutting and splicing of video tape were rather crude, a milled channel, a straight edge, and a razor blade. The splices produced invariably resulted in severe picture disturbance—an intolerable situation if we were to compete with motion pictures.

To improve our ability to assemble pre-recorded tapes with acceptably smooth transitions and to cope with other problems that had become apparent, such as the handling of picture and sound offset, a study and development project was initiated. This effort was quite productive and a procedure for the double system editing of Video Tape* (independent editing of pictures and sound) was evolved that has been in use to the present time. Many of NBC's top shows have been assembled using the tools and techniques that were developed in the course of this original project. The Bob Hope Shows and the Rowan and Martin "Laugh-In" series are specific examples.

With the advent of the direct color recovery systems, High Band Recording, and numerous other improvements, the duplication of video tapes became practical. This, in turn, made electronic editing feasible, but the original equipment designed for this activity had a rather limited range of usefulness—especially evident when complex sound track manipulation was required. Despite the limitations, however, a considerable number of major productions have been assembled using this "first generation" equipment, by ourselves as well as others.

*See "Double-System Recording and Editing with Video Tape" by Oscar F. Wick, JOURNAL OF THE SMPTE, March, 1960, p. 164.

## Edit Control System

In 1967, a system of edit control was introduced that utilized recorded Time Code. The system not only provided a means for predetermining edit points, but also included high speed search and intermachine synchronizing capability.

At about this time we in Burbank were confronted with the need to expand our editing facilities, so a careful study of the new system was made. After considering as many of the factors as possible, we concluded that the Time Code System of Control had many immediate advantages and that there were potentially a number of other areas into which its usefulness might be extended. We decided to purchase two sets of this equipment and to construct a special edit room to contain the two VTR's so equipped. This was completed during the summer of 1968 and was used successfully on several of our major "prime time" shows during the fall season of that year.

After several months of experience—and a number of unexpected problems—the system was once again carefully examined and once again we concluded that it was the correct approach to the task at hand. Two additional sets were ordered and another special editing room constructed. However, our experience had shown that, with improved editing equipment, more complete video and audio switching facilities, immediately available to the editors, were also needed. So, the new room was designed to include these. Also, the Slow Motion Disc had become an indispensible accessory and this, too, was provided in the room.

This facility was placed in service in the fall of 1969 and since that time, except for a short slow period in the spring, has been in operation on an average of more than 12 hours per day. The Andy Williams Show and the Don Knotts Shows are regularly edited on this equipment as well as many "Specials", such as, the Bell Telephone "Switched on Symphony" and the "Bing Crosby Christmas Show".

Audio Mixing Console in the NBC Burbank Post-Production Studio.

Building Blocks of the RCA Time Code Editing System.


## RCA Time Code Editor

As the use of Time Code Editing Systems increased, more effort, on the part of several manufacturers, was devoted to the study of video tape editing problems. The advantages and disadvantages of the systems in use in our plant were discussed in detail with engineers from RCA Camden. As a result of their investigations, a new system was designed incorporating many improvements in "Human Engineering", and providing automation for several of the routine operations that must be performed repetitively. Examples are: the entry of edit point Time Code data directly into memory by depressing a single button, the performance of arithmetic calculations within the editing circuitry, and precise recuing by depressing a single button.

In view of the heavy schedule projected for the fall of 1970, still another editing facility for NBC Burbank came under consideration early in the year. It was decided that a third room complete with six channel audio and video switching equipment, video effects unit, slow-motion disc, and extensive video and audio monitoring facilities would be constructed. It would utilize the newly designed RCA Time Code Editing System. In September this latest editing complex was placed in operation and assigned to handle the post-production requirements on the Dean Martin and Red Skelton Shows.

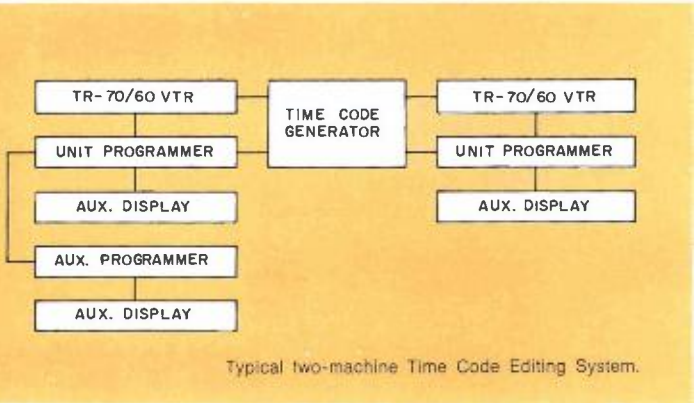
We have been asked to briefly discuss some of the operations currently being performed with this equipment and have selected the Dean Martin Show to provide a few interesting examples of its capability.

To begin, we should mention the fact that it is standard procedure, in our plant, to feed Time Code to all machines at all times. Whenever a recording is made, the cue track contains Time Code representing the accurate time of day. Normally, the editor, on a show such as the Dean Martin Show, also operates some of the recording equipment. This allows him to become familiar with all of the details and to log all "takes" as they occur using clock time. Later, during the editing session, these logged times are used to quickly locate any desired segment, utilizing the system's high speed search.

This high speed search capability is also used in non-editing functions. If we wish, for example, to play several segments of a football game in close sequence into a live Sports program, the Unit Programmer is set to cue the game tape precisely before each segment. All the video tape operator needs do is to enter the desired time into the Unit Programmer's Stop Register via the 10-key keyboard and press the Search button.

John Frishette at TCE Control Panel of NBC installation.

Time Code Generator.




Typical two-machine Time Code Editing System.

Generally, a log of noteworthy activity is kept during the progress of these games and Time Code permits desired action to be *reliably cued without prior rehearsal.*

### Using the Time Code Editor

On the Dean Martin Show it is customary to record two separate feeds from the originating studio. One feed carries the entire studio output, while the second represents the unswitched output of the single camera normally used for close-ups. Here again, the common Time Code supplied to both sets of recorders permits the two pictures to be "intercut" during editing while precise sound synchronization is maintained.

The principal elements of the Martin Show are recorded on Saturday evenings and editing is scheduled for Monday and Tuesday. A total of about 24 hours is required to complete the editing on the average show. Usually, two men are employed in the editing process, the editor and an assistant. The editor operates the VTR on which the show is being assembled, as well as the switching and effects equipment. The assistant handles the playback VTR, it's Programmer and the slow motion disc equipment. When dissolves between reels are used, a second assistant and a third VTR are assigned. A 64-minute reel containing previously recorded Control Track, Black Burst, and Time Code from 0 to 60 minutes, is used as the assembly medium. This becomes our Electronically Edited Master and all edits are in real show time.

When "freeze" is employed, picture and sound from the segment to be frozen are assembled in the normal manner on the Master Reel. While this is being done, the picture is simultaneously recorded on the disc. The picture on the Master Reel is then replaced by a replay from the disc, with action stopped or frozen at the appropriate point. It is, of course, essential that precise synchronism be maintained between VTR and disc, since the disc picture must exactly match the previously recorded sound up to the "freeze" point. To achieve this necessary condition, use is made of a contact closure that is externally available from the Unit Programmer. This closure is used to start the disc from the Master Reel Time Code when the material is recorded and, consequently, exact time relationship between VTR and Disc is insured for playback.

Time Code actuated contact closures are used to control a variety of external equipment in addition to the slow motion disc. Sound playback machines, auxiliary VTR's and automatic effects units are frequently started and switched by this means.

## "A" and "B" Rolls

On the Martin Show, opening and closing titles are produced during the editing operation. Separate A and B rolls are prepared by careful assembly from selected portions of the original recordings, and these are played back in synchronism utilizing the synchronizing feature of the Unit Programmer . . . perhaps a brief description of the procedure used to prepare the closing titles might be of interest.

The standard closing for the Martin Show is 60 seconds long. Roll titles are matted over a series of shots opening with a still picture of Mr. Martin seated on a large soft-like set surrounded by a group of quite attractive young ladies, popularly known as The Golddiggers. After several seconds, this picture dissolves to the first of a series of stills, of the girls, taken from the show. In conclusion, the group is again seen, but in normal motion, beginning medium tight on Mr. Martin and a part of the group and pulling out to include all of the girls. Finally, the scene fades to black. Sound during the closing is the show's theme.

In a first step, as indicated previously, the editors prepare A and B rolls of the entire series. These are rolls of tape that contain successive show segments so arranged that, in playback, dissolves may be made from roll A to roll B, and vice versa, and thus produce the sequence desired. The stills required are obtained by freezing selected frames from the original recordings. In making the assembly, a third VTR, also started by contact closure in the Unit Programmer, is used to playback previously recorded roll titles. All picture signals are routed via the switching equipment in the room so that the roll titles may be matted and the dissolves executed. Theme music is also "laid down" at this time. The Time Code Editing System has substantially reduced the time and effort required to produce a sequence of this type.

## Sweetening the Sound

When shows are edited, it is generally necessary to reprocess the sound track because small but objectionable changes in background level and quality often occur at the edit points. This is especially noticeable when the splice is made during applause or laughter. Then too, it is sometimes necessary to add sound effects, musical bridges, and audience reaction—if an audience was not present during the recording. The Dean Martin Show is performed before a live audience and the response is quite adequate. However, "Sweetening", as it is called, is necessary to obtain a complete, smooth, and uniform finished track.

The average Martin Show contains 15 to 20 sketches, songs, etc., and each of these frequently requires some internal editing, making for an average of about 90 splices in the completed Master Tape. During "Sweetening", the jumps in the edited track are bridged by sound similar to that already existing—for example, if the edit occurs in applause, similar applause would be mixed in to cover the discontinuity.

After editing on the show has been completed, the sound track and Time Code are transferred to 2 tracks of a 4 track audio recorder. This recorder is of the type employing a capstan servo and sync track, so synchronism with the VTR is absolute. During the "Sweetening" session, the 4 track audio machine is used in the playback mode to provide program sound, and is also used as the source of Time Code to which the VTR is synchronized via the Unit Programmer's synchronizing feature. This results in a situation wherein picture is supplied from the Edited Master Tape and program sound from the 4 track, both in precise interlock. These signals are routed to a Post Production Studio containing extensive audio mixing and equalizing facilities as well as excellent audio and video monitoring. Any necessary modifications to the original track are made in this studio and the composite sound output fed back to and recorded on the VTR as the final sound track.

Looking back, one could say that the art of Video Tape Editing has come a long way from the days of the razor blade; but, from our point of view, the future is even more exciting. With the introduction of new production tools and with the Time Code System available for their automation and control, the possibilities are limitless.

The authors wish to thank Mr. Peter Groom and Mr. Stan Jenkins, members of the Burbank Video Tape Technical Staff, for their help with the details in the preparation of this article. ■


A familiar scene outside the Boston Garden on any night the Celtics are playing at home.

# Color Mobile Unit Serves Unique Needs of WSMW-TV

WSMW-TV is a UHF outlet in Worcester, Massachusetts, owned and operated by the State Mutual Life Assurance Company. It's been on the air about a year and one half, serving a market area that had already been covered in part by three other VHF and two other UHF stations. It is fully equipped—with a 30-ft. mobile unit, five TK-44A color cameras, spacious studios, two TS-51 production switchers, two TR-60 highband color recorders, and a transmitter antenna combination for more than a million-watts ERP—an RCA package from start to finish.

How did the plan for such a facile, production-oriented equipment package come into being and what were some of the reasons for its selection?

The answer to this question is summarized by H. Ladd Plumley, Chairman of the Board of State Mutual Life and President of State Mutual Broadcasting Corporation, who defines the purpose of Channel 27.

"Worcester was probably the largest market in the nation without a local television outlet. The public service need of a revitalized, growing Worcester prompted our initial interest and eventually led to the decision to build the station.

"Our next consideration was to design and construct a facility to serve first the local interests of the Worcester market and secondly to take advantage of a geographic position that would provide Grade A regional service to the Greater Boston, Providence, Springfield and Manchester, New Hampshire areas.

"The combination of our RCA UHF transmitter

and UHF Pylon, which rises 2049 feet above sea level, is giving us our ultimate coverage objective."

## "Local Live" Infuses Program Schedule

What do you program in a community already in the area of several stations? WSMW's answer in part is to return to "local live television", led by an emphasis in sports, followed by news and interview of local and regional interest.

Sports coverage is headlined by exclusive rights to Boston Celtics games in New England. It also takes in the seasonal sports activities of area colleges such as Boston College, Holy Cross, and Assumption College. Regularly scheduled sports discussions include New England Patriot highlights, the Woolner brothers on the great outdoors, Johnny Most, voice of the Celtics, and Sports Line with their two-way telephone chats between New England fans and top sports personalities. In fact any weekday evening starting at nine, you'll find a good share of the sports enthusiasts—in an ARB market of nearly 2½ million homes—tuned to WSMW.

Weekday sign-on is at 12 noon; Sundays at 9:30 a.m. In addition to the sports, the counter-programming schedule includes two hours daily of local live news—at 5:30 and 10 p.m. Major movie packages are scheduled at 6:30 p.m. and 11 p.m.

## An Equipment Plan to Deliver the Audience

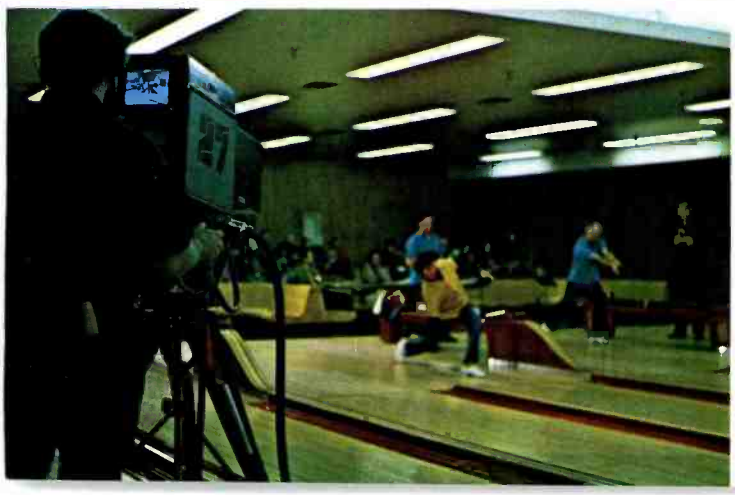
An early consideration in the equipment plan was programming. The emphasis on sports and other local live production called for special packaging with many of the components serving double duty. With RCA assistance, the special plan was laid.

It called for a 30-foot bus-type mobile unit—a virtual production center on wheels. The unit can be put into service with as many as four TK-44A color cameras, camera control, audio and video switching with special effects and a TR-60 highband color recorder. Two of the camera control positions are mounted in a slide-in rack so that two of the cameras can be used in either the bus or studios as desired. Likewise the TR-60 can serve a dual capacity depending upon the application. The advantages are flexibility and efficient use of equipment, whether called for in the studio or at some remote location.

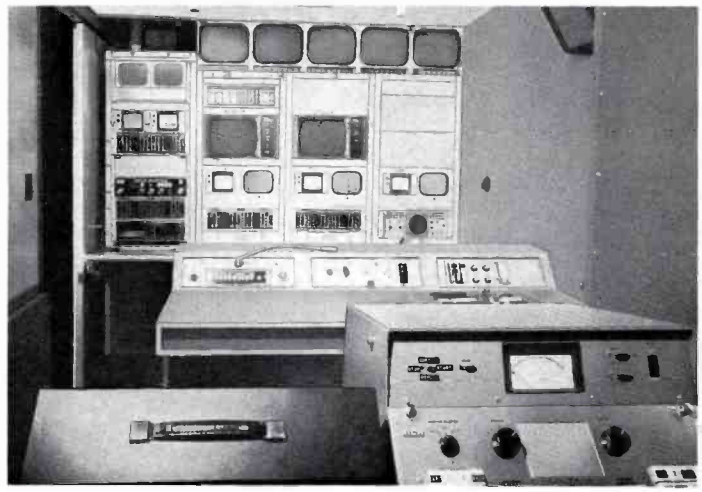
Total TK-44A camera complement is five. They can

Bozo goes through his paces for Channel 27's color cameras.

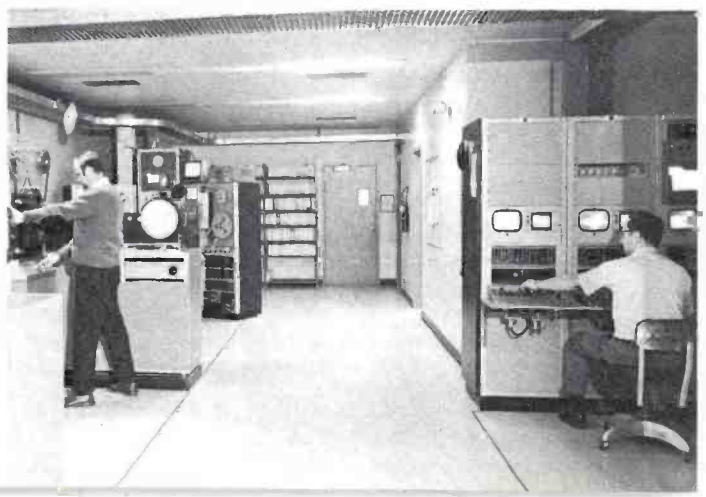

Weekly bowling from the lanes of State Mutual Life headquarters.




Inside view of fully equipped color mobile unit.



The technical core which serves both WSMW studios.



be used in either of two studios—one outfitted especially for news. The studios are served by two separate control rooms and a single technical core. The core houses camera control locations, master control, and film and tape areas—with two TK-27 color film chains, two TR-60 highband recorders with TEP editing.

Two TS-51 production switching systems are installed in each of the studio control rooms. For the news studio, there's a "System 10" with 16 inputs to 4 outputs. It provides a simple mix reentry into program and preview rows and includes a TE-60B special effects generator with wipes, split screens and over 100 pattern choices.

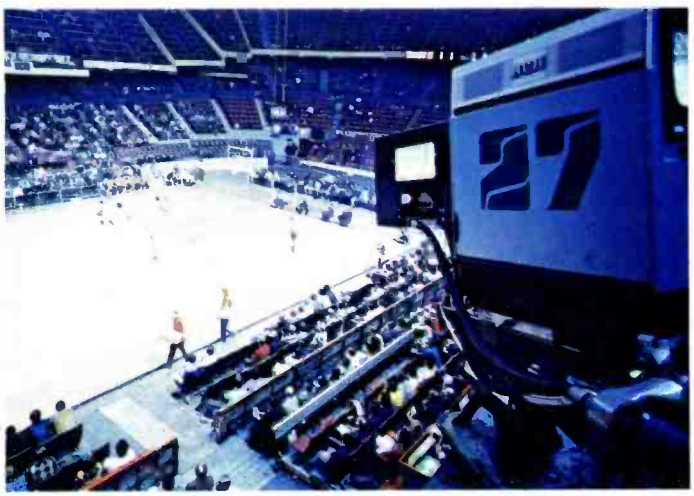
For the larger production studio, there's a "System 14", with dual reentry, by switchable effects, of two mixers with dual function program and preview rows. Thus a four bus switcher can provide essentially all of the programming normally associated with a larger six bus system. The only difference is that mixer 2 always mixes a preset source into the source feeding the program line. Transition logic circuits automatically restore the input circuits to the mixer so that it is not necessary to remember to reposition the mix lever handle after every operation. The system provides 16 inputs to 4 outputs, dual reentry, 2 TA-60B mixers, a TE-60B special effects generator with effects transfer, cutbar operation, transition logic, and manual non-synchronous inhibit.

Another important consideration was coverage—to effectively provide Grade A contour to Worcester as the center and Manchester, Greater Boston, Providence and Springfield at the north, east, south and west. An ideal location was selected at Stiles Hill in Boylston, only 2½ air miles from the studio. Here a TTU-60 UHF Transmitter feeds, via a $8\frac{3}{16}$ inch transmission line, a TTU-25G Custom Pylon with 1¼ degree electrical beam tilt to achieve an effective radiated power of more than a million watts. Antenna height is 2049 feet above sea level, 1530 feet above average terrain.

## "Production Facility for Rent . . . Make it Here or Take It With You"

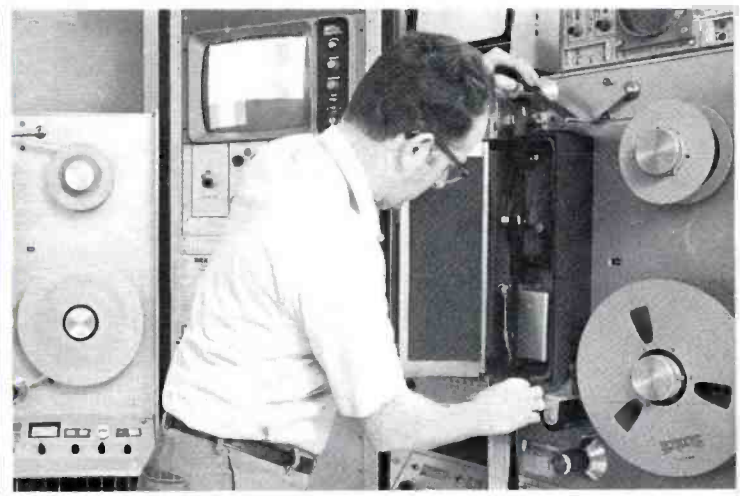
From the beginning, WSMW was extremely production oriented because of their local program format. They were the only tv station in Worcester and area ad agencies and clients had few, if any, ready-made

Exclusive coverage of Boston Celtics basketball in New England.




Setting up the show in the large production studio.


Two TR-60's complete with tape editing programmer.



Checking out TK-44's in preparation for a remote.

spots to air. The result was that the station started to produce for them, and a brand new arena of business began.

A Production Department was established with more than 20 people . . . a production manager, producer/directors, production crew, writers and film specialists. There are three full-time producer directors, and several part-time directors working on weekends and various replacement hours.

WSMW had equipped well for production. Their noon weekday sign-on gave them uninterrupted morning hours in which to schedule equipment time. Thus the hectic logistics of simultaneous production and operation could be avoided. And the results were sure to show it. As their local work became noticed, further accounts came in. Although only eighteen months old, the station has more than 250 clients. Most are local or regional with emphasis on local production. However in recent months, the station has completed and is continuing a series of more than 30 productions for the Polaroid Corporation and some sessions in a soon to be national syndicated series, starring comedian Jackie Mason. Other current sessions have included commercials for N. W. Ayer, Ingalls and Humphrey, Browning and McDougal, as well as instructional production for IBM.

Once exposed, via national hookup of Boston Celtics games, the mobile unit came into demand, for national sports coverage by networks, for some special political broadcasts, American Hockey League playoffs, the upcoming Massachusetts Golf Classic, and wherever the script calls for a New England location.

### Finally Some Comments on TK-44 Performance

"Performance of the TK-44A Camera is crucial to the effectiveness of the commercial and the satisfaction of the customer," reports General Manager, William G. Moll.

"For example, we solved a unique commercial problem as a direct result of the TK-44A's. This client required tape-to-film transfers. The chroma quality created by the cameras gave the final film product an exceptional quality, both in resolution and, perhaps more importantly, in chroma. In another example, the client required a high volume of commercials (forty 60-sec. spots). The short set-up time of 44's made it possible to produce in larger quantities.

"Furthermore, the TK-44A's have had several unusual tests of their ability to perform at low light levels. A basketball game, for instance, in a gymnasium utilizing fluorescent lights and a candlepower of less than 50 footcandles looked like a sure set up for black

Session in a syndicated series starring comedian Jackie Mason.

and white. But the TK-44A's surprised everyone with remarkably good quality, high resolution, color pictures.

"A state political convention in a field house of the University of Massachusetts with severe lighting problems was similarly dealt with by the cameras. Our remote unit was used as the pool feed to five stations. The result was highly satisfactory.

"A remote at a hospital, working with available light, was likewise dispatched: Excellent color quality, short set up time, high resolution, and excellent reliability.

"Covering a golf tournament play off on a morning's notice was possible only because of the short set up requirements of the cameras.

"Having the equipment that does the job makes our job of selling services easier."

## Success?

Has the equipment plan succeeded? WSMW thinks so. After a year and a half of operation, their production business is still increasing. Their mobile unit is in great demand. Their local live concept is delivering a regular following. The facilities are busy, doing the job they were designed to do. ■


One of a group of more than 30 productions for the Polaroid Corporation.


# New Profits from "Off-Air" Production Facilities

More and more broadcasters are finding themselves uniquely prepared to handle the growing demand for production services. They already have the studios, the equipment and the people for producing programs and commercials. Advertisers and agencies are looking to the local broadcaster who can make his facilities available and can produce economically. Here it is that the TK-44A Camera makes the job easier, making tape productions more dramatic and realistic, consistently producing beautiful color pictures.

# Agencies Consider The TK-44 as best in the Business

BILL STEVENS, Manager,
Time-Life Productions/Pacific
A Division of KOGO-TV, San Diego, Calif.

At our station in San Diego, which is KOGO-TV, Time-Life Productions offers full video tape and film production services for color commercials. Nineteen people are employed full time in both the local and national Production Departments. There are five Producer-Directors, two Producers, two Artists and an Art Director.

One entire studio with complete crew and complement of TK-44A Color Cameras is utilized. About 75 percent of the total time is taken up with the production of commercials. Programs and station promotions account for the remaining 25 percent.

In 1971 local production will handle approximately 500 commercials, while national should produce over 200. Local assignments come through local advertising agencies. Probably 20 percent come from either regional or national agencies.

We also operate remote mobile units, especially for sporting events programming, but they are also available for production of commercials. We handle all NBC football remotes from San Diego stadium as well as many basketball, hockey, and baseball remotes. We have taped national commercials for Chrysler, Toyota and Datsun. Also for May Company Department Stores of Los Angeles and a few others.

While we do not engage heavily in syndicated program production we have produced some pilots for syndicated programs.

Our local promotion and selling efforts are handled entirely by station staff at KOGO-TV in San Diego. National and regional sales are handled by our Los Angeles sales office.

We have found the key to building better business at the station level. Since our equipment and personnel gives us the best production facilities in town, and since we offer local production at a reduced rate (providing the spots run only in San Diego area), local production is a great aid to building business.

Naturally we like to prove we have the finest color cameras in the industry. While last year advertising agencies seemed surprisingly naive regarding the merits of any individual piece of equipment, this year the TK-44A seems to be regarded as the best in the business. Our clients are universally pleased by their pictures.

One outstanding example of our perfect color work is a video tape commercial produced for the General Telephone Company of California. Although it was aired only in Los Angeles it received mention on the Johnny Carson Show, a full page in the Los Angeles Times financial section, a column and a half in TIME magazine and to date has won the AAF award as the best 30-second live action commercial—as well as grand prize in the TVB commercial competition (over 650 other entrics), and was recently judged "the world's best video tape commercial" in the International Broadcast Award Competition.

# TK-44 Performance Capabilities Has Helped in Producing a Variety of Commercials

ART JANTZ, Production Director,
KMTV, Omaha, Nebraska



If commercial production volume is a reliable guide, and I believe it is, then KMTV is Omaha's television production center.

KMTV's commercial production serves over thirty clients monthly. We produce some four hundred commercials each year.

Seventy-five percent of all commercials produced at KMTV run on other stations in addition to KMTV.

To maintain this kind of volume requires a substantial production staff. At Channel 3, in addition to the Production Director, clients are served by four Producer-Directors, two Associate Directors, four Floor Managers, three Announcers and on-air personnel.

Commercial production is scheduled from 8:30 a.m. to 4 p.m. Monday through Friday and from 7:30-9:30 p.m. on Saturdays and Sundays.

We concentrate on commercial production for local clients because local agencies and clients have found, with our help, they can produce effective, quality commercials at moderate cost; certainly a contributing factor to the healthy local billing picture on KMTV.

KMTV actively promotes its production capabilities through print advertising, direct mail and production seminars for local agency people.

In producing some very complex animated spots the TK-44A has proved to be a very effective production tool. Also, the edge enhancement capabilities and chromacomp's complete control of color are very valuable. The use of these two performance capabilities has helped us a great deal—especially in producing spots for department stores, and for such products as fabrics and glassware. Furthermore the use of these techniques in doing local bank commercials has been a tremendous selling feature.

Our success results from well done color commercials. The fact is, we are securing and retaining large advertising schedules with leading Omaha businesses.

Our local production clients range from the state's largest department store chain and the state's largest bank to small retailers such as a paint or hardware store—using television for the first time.

One Omaha men's clothing store has used KMTV without a break for 15 years. They tape new commercials every week. This retailer has just opened a large new store with 44 employees. Fifteen years ago, he had 4 employees.


# TK-44 Pictures Impress Our Clients

**MERRILL DIMICK, Production Manager,**
**KSL Television, Salt Lake City, Utah**

We are engaged in production of commercials in a big way. Most of our production time—in fact about 75 percent of it—is spent on production of clients' commercials. The remainder of the time is used for program production.

We have two television studios and are fully equipped with six TK-44A color cameras. We employ all our facilities for either station programming or production purposes. Sometimes both studios are used for client production. We have this versatility.

KSL-TV employs 15 people in the Production Department, including two Producer-Directors—dealing directly with the production of commercials. We do work for some 70 clients in a year's time, probably producing around 500 TV commercials.

Because we have complete production facilities at the station our salesmen have been able to sell a complete package—air time as well as production of the commercial. This has encouraged many clients to use our station. Another reason for all our business is the quality of our product. We get many favorable comments from our customers about the beauty and naturalness of our color.

Our Salesmen and Production Supervisors make direct contacts with local agencies to sell our production facilities and solicit business. They also contact certain house accounts directly. Almost all of our business is local. Only about 10 percent is national and regional. And, more than half of our local business originates out of the sponsor's advertising agency.

Our engineers as well as production people are excited over the results obtained with our TK-44A Color Cameras. The chief engineer has reported that these cameras are proving superior in many areas over other color cameras that we have owned. We have been impressed by the dependability of the camera and the quality of the pictures. It is astounding how the contour enhancer works. The pictures are great.

One of our big productions is the famous Mormon Tabernacle Choir, which we do on a weekly basis, using the remote van and three TK-44A Cameras. We get beautiful results.

# We Simply Could Not Compete Without Them

RICHARD H. MOSS, Manager,
Video Recording Sales, WMAQ-TV, Chicago, Ill.

WMAQ-TV got into the television commercial production business on the basis that a certain amount of crew time and studio time remained unused when all the station requirements for programming had been met. Response from advertising agencies and others wishing to produce material on video tape was encouraging, and when I became associated with the Video Tape Sales Department, the station was ready to make a more extensive commitment to video tape production in terms of studio space and crew time. As a result, one additional studio was activated for television production and our technical and production crews were expanded to the extent that a comfortable amount of time was available over and above that required for program production. We have not yet adopted a stance in which WMAQ-TV Video Tape Productions acts as an autonomous organization complete with its own crews and facilities, but follow a middle road which permits a reasonable amount of

participation in the commercial production market.

My office staff of 3 people enters into sales, production, and administration of our commercial effort, and we draw on the entire production staff of the station, through the Director of Operations, for actual production support as needed. Six to eight studio technicians, two video tape engineers, one scenic designer, four stagehands, one graphic artist, one make-up girl, one director, and one associate director have been added to the station staff to accommodate the commercial effort.

Production of syndicated programs is not a large part of our business. We have produced a few series for outside organizations . . . educational programs, religious programs, information programs for sizable foundations. At present, we are involved in the production of only one syndicated program, Kup's Show.

There has been little taping on location for commercial purposes. Several factors tend to keep this production at low level, foremost among them the fact that local retailers who would have something to gain by location production have a hard time underwriting the relatively high cost of television in a big metropolitan area. Regional and national clients do not have an affinity for midwest scenery and the somewhat unpredictable weather enters into the picture.

In a year's time, we typically serve 100 different customers on an average of two occasions each and put about 600 commercials on tape. This would include commercials for national organizations, regionalized commercials for national and regional advertisers, and commercials for large local banks, utilities, and multi-outlet retailers.

I would say that most of our customers represent national organizations, with headquarters or offices in Chicago, producing national-related commercials for regional or local use. We do draw clients from other midwestern centers, such as St. Louis, Milwaukee, Detroit, Cincinnati, as well as a few from more remote points . . . California, New York, and Georgia, for example. However, almost all our work originates through advertising agencies with Chicago production organizations.

Our services are actively promoted and sold only by this office, although there is close liaison with the time-sales offices of the station, which occasionally becomes involved with clients requiring commercial production. When this occurs, we work with time-sales and client to best serve the needs of the advertiser. Commercial production is maintained as a separate business, which produces income for the station and gives a "full-service" aspect to the operation. In addition, it provides interest and incentive to members of the production staff over and above their routine duties. The skills and equipment required for broadcasting and commercial-making are mutually supportive; the station involved in both will, generally, be better staffed and equipped than one which ignores commercial production. Contacts made in the course of seeking production business have generally served to broaden the station's base in the total community served.

It is somewhat difficult to describe what the advent of Plumbicon* tube cameras has meant to us. We simply could not compete without them, at least in the commercial production field. Their excellent performance at all light levels gives us the results we need in demanding situations. A recent commercial for photographic materials was shot in our studio D which is equipped with TK-44A cameras. The spot showed projector, operator and projected image in a fashion which would have been impossible heretofore. The TK-44A did the job beautifully.

Video tape technology has made such rapid strides in the last few years that we are now approaching complete freedom in editing, and look forward in the next few months to installation of equipment that will make it possible, through time-coding, to accomplish video tape editing in a fashion comparable to film editing. While intense competition between video tape producers will continue and perhaps increase, the growth-minded tape producer must prove that his system has advantages over film and can work closely with film oriented agencies. This approach demands sensitive lighting and the TK-44A gives us a great assist with its response to the lighting director's touch.

*N. V. Phillips trademark for lead oxide pickup tubes.

# Radio MIL

## The lyrical sound of Costa Rica

Broadcaster Leonel Pinto owned the largest broadcasting network in Costa Rica. He had already achieved a superior position in national ratings with "Radio Monumental", by offering varied and stimulating broadcasts of sports events, news, women's shows and other popular programs. But for years, Mr. Pinto dreamed of having a totally different station, devoted exclusively to music, which would make it truly unique in the country. He realized that it would attract perhaps a smaller following than stations with a general format, but he was confident that its audience would faithfully listen to an uninterrupted flow of fine music, 24 hours a day. At the same time, he speculated that this type of fare would be most appreciated by the people with the greatest amount of purchasing power in the nation.

Since Mr. Pinto wished his idea to develop into a very special radio station, he carefully outlined a course of action. First, the frequency of 1,000 kHz was obtained to provide an easily recognized call sign. Next came the formulation of management, so he contacted a group of dynamic entrepreneurs who were very successful in other businesses, Carlos Lachner, Guillermo Lachner, Lorenz Holterman, Francisco de Mendiola and Rodolfo Jimenez. They held exploratory discussions and all of them were quite enthused with the project.

A comprehensive audience survey confirmed that the all-music concept would definitely appeal to the tastes of several segments of the population. Interestingly enough, after this initial exposure to the demographic aspects of broadcasting, all officers of the company took an ardent interest in subsequent arrangements. They collaborated in the selection of music, the establishment of necessary business contacts and in the creation of station ID's.

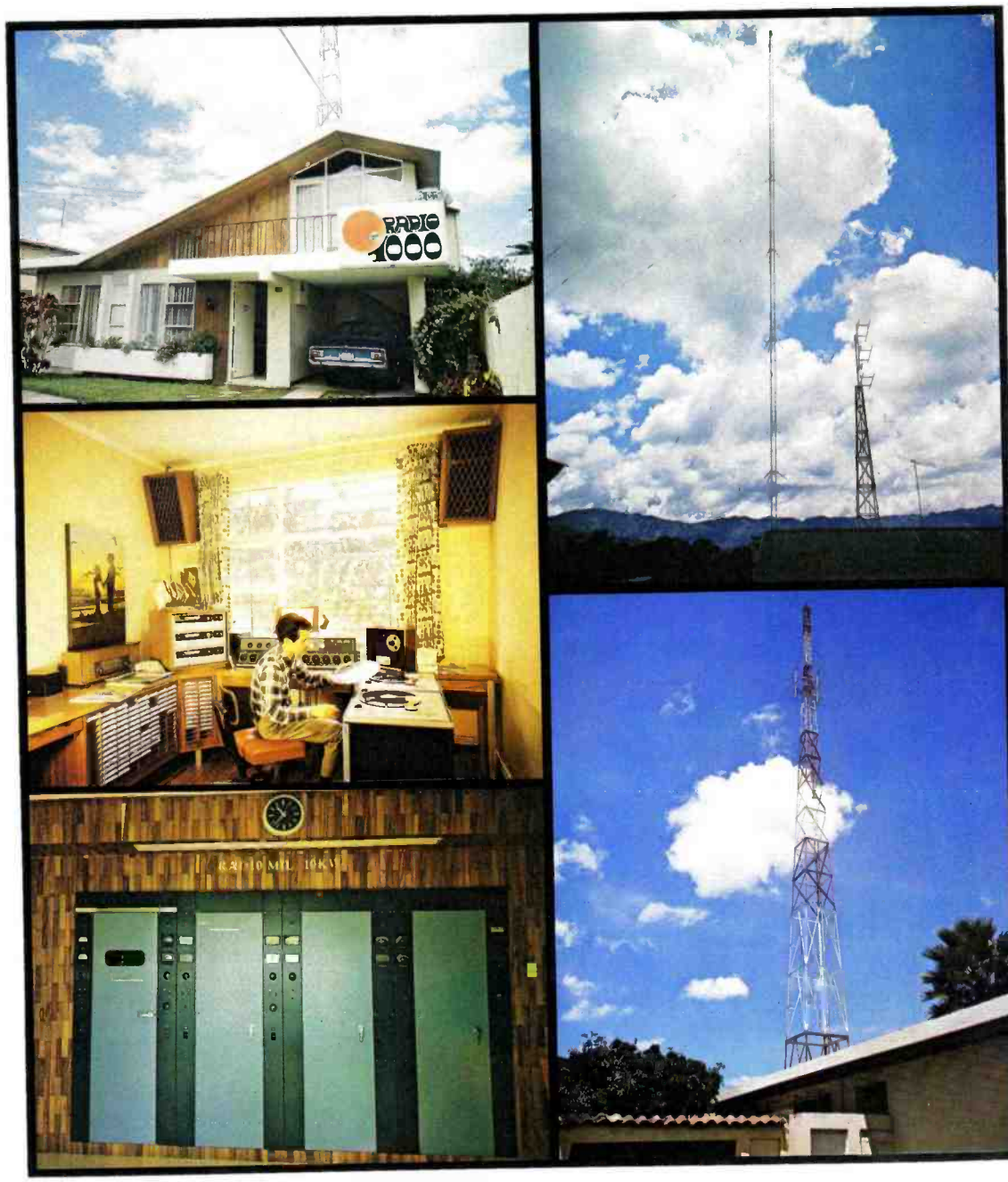
Finally, all initial steps were accomplished and the group formally organized into the company now known as "Radio Mil". The transmitter/studio complex was the next item on the agenda, to be followed by equipment procurement. Soon they completed the physical plant, and, after studying the many types of equipment available, decided to select from RCA. Their coverage pattern and antenna site dictated the use of a ten kilowatt medium wave transmitter, so an RCA BTA-10U2 was ordered. To ensure continuous "on-air" performance, an RCA BTA-1R, 1,000 watt emergency transmitter was also purchased. For the studio they opted for RCA BA-27 audio cartridge tape players, BQ-51B turntables and associated speakers, amplifiers and auxiliaries.

The transmitters and sound studios are in an attractive, two story building in the suburbs of San Jose, the capital of Costa Rica. The architecture is thoroughly contemporary as are all exterior and interior appointments. Engineers Gerardo Guzman and Roberto Hernandez were responsible for equipment installation, which was supervised by Engineer Ricardo Lassala of RCA Mexico. Engineer Lassala visited the site several times to help set-up the station and to insure that the optimum signal would be radiated.

The inauguration of "Radio Mil" was the culmination of all these and other special efforts by station personnel. Advertising, a direct mail campaign, new stationery and supporting details were carefully implemented to maintain the desired image of professional, high-quality entertainment. Audience acceptance of "Radio Mil" was immediate and excellent. The very cosmopolitan population of Costa Rica was impressed by the station's method of presenting identification messages in Italian, French, Portuguese and English by using notable personalities from those countries whose voices they easily recognized. In Spanish, two of the most famous Latin-American voices announce "Radio Mil"—John Grees and Carlos Montalban. A lyrical promotional jingle further characterizes the 'round-the-clock programming: "Musica de clase . . . su clase de musica . . ." or, in English, "Music with class . . . your class of music . . ."

Under the management of Robert A. Giralt, "Radio Mil" has excelled in airing the most current instrumental and vocal hits from all over the world. Week after week it has been the first station in Costa Rica to broadcast the leading tunes from countries such as the United States, France, Argentina, Italy, Mexico, giving the station a pleasantly international flavor. Each selection is followed by the elegant sound of a harp, the mellifluous signature of "Radio Mil".

"Radio Mil" has been eminently successful in attaining its goal of providing to Costa Ricans a diverse selection of contemporary and classical melodies. So successful in fact, that its original audience of a discriminating few has been continually augmented by listeners from the general population. Internationally, 1,000 kHz is well known as Costa Rica's most distinguished musical address. ■



# ABS-CBN Broadcast Center

## The Philippines ultra-modern Radio-TV Facility

ARCADIO M. CARANDANG, JR.
Vice President, Engineering, ABS-CBN

The ABS-CBN Broadcast Center, viewed from the landscaped lagoon that attractively graces the entrance to the station.

The Philippines is well-known for many things. Its 7100 islands are a tourist paradise; it was the first and is the only Catholic nation in the Far East; it has given the world not one, but two Misses Universe; and now it has the largest and best equipped broadcast complex in Southeast Asia: ABS-CBN Broadcasting Corporation.

### From U.S. Army Surplus To A Complete Color Center

The rise of ABS-CBN to its present prominence is a real success story when we recall that it began very humbly in 1948 when Bolinao Electronics Corporation established station DZBC with a transmitter flung together from U.S. surplus components. In 1952, DZAQ, the country's first 50-kilowatt commercial radio station was launched and the following year, the organi-

zation, now ABS-CBN, pioneered Philippine television broadcasting with an RCA TT-2AL TV transmitter and three TK-31C cameras. The remarkable performance of RCA equipment has been an important reason for our success—the TT-2AL served in the greater Manila area for seven years and in Cebu City for another nine years. This same unit was recently overhauled and is now on a 7500 ft. peak, where it serves TV viewers in central and northern Luzon. The original TK-31C cameras are still working satisfactorily in the new Broadcast Center.

In 1957, one of the first 50-kilowatt "ampliphase" transmitters built by RCA was used to found the second commercial radio station in the Philippines.

In 1967, ABS-CBN introduced color broadcasting into the Philippines with the purchase of TK-27 color telecine system, two live color cameras and TT-10AL television transmitter. These color facilities have been expanded to include a total of three TK-27 telecine chains, five TK-44A color cameras, four TR-60 video tape machines, TT-25EL and TT-6EL transmitters.

The historic venture into colorcasting is best explained by Augusto Almedo Lopez, Vice President and General Manager, who states: "Among other things, it was the pioneering spirit that drove the company to go to color. The economic gain was given secondary consideration, believing that the station would benefit later if it continued to maintain its image as a pioneer in the Philippines broadcast industry."

### A Network Organized for Performance, Community Service and Growth

The new Broadcast Center is in Quezon City, capital of the Republic, and functions as the production and distribution point for six medium-wave stations, one FM stereo station and two television channels radiating to the Manila area. Fourteen additional AM stations and five more television stations cover other metropoli and the provinces.

The network staff of more than 1,000 persons comprises four main divisions: Administration and Finance, Engineering, Radio Operations and Television Operations, supported by four service sections; News, Sports, Audience Research and Advertising and Sales Promotion. Radio and Television divisions are organized into Program, Sales, Engineering Departments.

For maximum cost effectiveness, ABS-CBN purchased a computer and applied it to program/spot availabilities, certificate of performance records, program logging, sales statistics, contracts, accounting and tabulation of election results. Ultimately, it will perform all of the switching operations that control television programming. Accessory sub-systems will enable the computer to provide similar services to the provincial stations.

### Planning the Broadcast Center

Integration of all operations into a centralized plant became necessary during the early 1960's, because expansion of ABS-CBN into a multi-purpose network caused radio production and corporate management to be in Manila, television production in Pasay City, and transmitters and supporting services elsewhere.

A project study team headed by the Vice President for Engineering developed the toroidal design of the Center. They envisioned a technical operations "core", encompassing seven radio and two television stations, surrounded by concentric network production facilities and support areas. C. D. Arguelles and Associates, the architects and project implementation coordinators, supplied the final design.

R. F. Sugay and Company, the general contractors, commenced construction of the Center in February, 1967. In accordance with a precisely-controlled CPM, other contractors, for plumbing, air conditioning, landscaping, mechanical interface, followed suit. All station electrical equipment and electronic devices were installed by ABS-CBN personnel under the supervision of Bienvenido A. Niles, Engineering Director.

### Television Studio Facilities

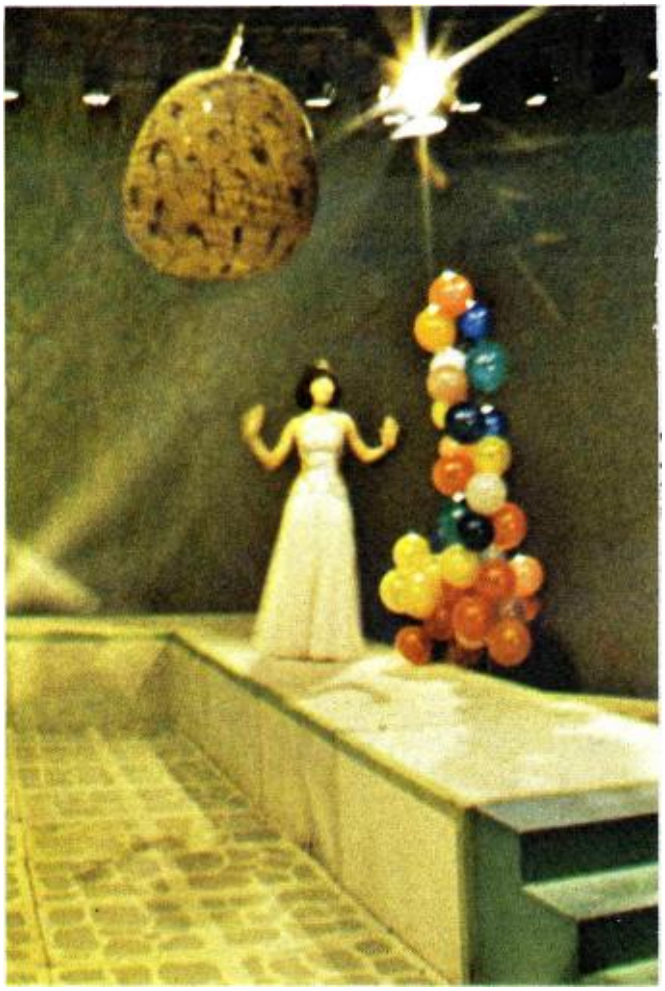
Eight studios, one of theater design, comprise the television production facilities. The two largest studios each have floor areas of approximately 60,000 square feet, including a sloping gallery with seats for 300 persons. Each studio has an SCR dimmer-controlled lighting system to provide 3000 lux at 3200 K. over its useable area. The lights are tungsten-halogen and are suspended from a motorized grid 26-ft. above floor level. The basic illuminators, scoops, fresnels, strip lights, follow spots, are complemented by accessories such as barn doors, shutters and diffusers. The special effects of rippling lights, psychedelics, rays, bursts and sprinkles are obtained from an aurora machine. A switching console in the production control room permits automatic selection of up to six preset lighting arrangements.

Each studio has a motorized cyclorama 120-ft. wide and 25-ft. high, emplaced along a recessed track. The recess contains strip lights and keeps the track out of camera view. It may accommodate two additional cycloramas for different backgrounds.

Two other studios are the same size as those just described and have identical production facilities; however, they do not have galleries and are used primarily for video tape recording or for shows without audiences. Three of the remaining studios are considerably smaller, measuring 40 by 60-ft. and have proportionately reduced lighting systems. They retain the 26-ft. headroom, production and control facilities as the others.

The final studio is also 40 by 60-ft., but it is used for sound recording and/or dubbing. Its acoustical walls have swinging panels for varying reverberation. Its control room is equipped similarly to the largest studios and has film projection capability. An adjacent sound room, isolated from the studio and control booth by double glazed windows may be used by a vocalist or small chorale.

TK-44A Camera Control Units (CCU's) in the centralized video control center.



### Production Control

Production control is to one side of the studio block and is elevated two-feet above the nominal floor. It is divided into audio control and video/lighting control compartments. A double-glazed glass partition separates the sections, but provides line-of-sight between the production technicians at the consoles and video directors in the studios.

Audio control is equipped with a 24-fader solid-state console, custom-built by ABS-CBN's Service and Construction Department. Two 16-inch turntables, two audio cartridge tape decks, reverberation channels and equalizer facilities provide background music, prerecorded soundtracks or special effects. A video display permits the audio technician to monitor the studios.

Video control employs a vertical interval, 12-input, solid-state video switcher capable of introducing 32 different special effects, plus chroma key and color mat. Production has a choice of 18 cameras, including five TK-44A's and six TK-31C's.

### Production Facilities

A spacious prop and storage area surrounds the studios. Dressing rooms for talent are on the second floor, above the control rooms. Each is fully appointed with locker, dressing table and private bath. Make-up and wardrobe are also on this level.

The third floor contains a 1600-sq. ft. rehearsal and/or story conference area for each studio.

### The Technical Core

The technical core, consisting of the technical operations center (TOC), the VTR suite, the camera control (CCU) center, continuity booths and the telecine area, is centrally located on the floor below the studios. Related facilities encircle these departments and include Film and Tape Archives, Film and Tape Editing, Announce Booths and Maintenance.

The TOC monitors and controls studio productions, remote coverages, video tape sessions, telecine viewings and transmitter functions. The master control desk is

Production of the sixth anniversary show of "Your Evening With Pilita", Channel 2's most popular variety program.

the nucleus of the technical core and has an overall view through the glass partitions into the other operations rooms.

The terminal equipment for the Center is mounted in 40 standard racks positioned in four rows. Most audio and video distribution amplifiers are solid-state devices built by ABS-CBN. Three TG-3 sync generators, 24 TA-33 video distribution amplifiers and several TA-19 processing amplifiers are included in the terminal banks.

Three of the four RCA telecine chains are equipped for color and typically consist of a TK-27 telecine camera, two TP-66 telecine projectors, a TP-55 multiplexer and a TP-7 slide projector. One of these chains is further equipped with a 35-mm telecine projector. The monochrome telecine chain has a TK-22 film camera, two TP-66 projectors, a TP-7 and a TP-11 multiplexer. Any of the film islands may be remotely controlled from the program continuity booths or from the VTR edit rooms. Space is available for the accommodation of two additional telecine systems. The film editing room and the film library are next to the telecine equipment area.

Camera pulses from the studios are cabled into a patch panel in the camera control room and brought out to the CCU's in the master control desk. European-type thirty-three conductor camera cable is employed. Each monochrome camera uses a single cable, while each color camera may be connected to either of two cable runs.

Assembly of program segments into continuous sequences per the program log is accomplished in the continuity control sectors. The staff-built programming console houses a video switcher, audio cartridge tape machines, a solid-state audio console and remote control panels for the program video tape recorders and telecine chains. Monitoring facilities indicate "program", "on-air" and "preview".

Each continuity booth is liaised with an announce chamber equipped with audio cartridge recorders,

Video taping with one of the four TR-60 machines in the VTR studio.

Announce booth for DZYK-FM, the Philippine's first commercial stereo station.

transcription equipment and an audio console. Announcements are aired either direct or are pre-recorded on cartridges. The composite program is fed from the continuity positions to the transmitters thru cables laid in a sub-floor conduit.

### Television Transmitter and Antenna System

The shift from channels 3 and 9 to channels 2 and 4 and the replacement of the initial low-power transmitters with new 25-kilowatt units was accompanied by the decision to erect a 650-ft. tower and antenna system. Regular telecasts were to be conducted as usual and in addition, the new mast had to be constructed on the axial center of the old tower, since ABS-CBN wished to retain its antenna location.

Pattern surveys predicted that the taller tower would shield the operating antennas, thus decreasing radiated power and affecting antenna impedance. Therefore, a locally fabricated, 3-bay superturnstile antenna for channel 3 and one-half of the existing channel 9 dipole were mounted on a 150-ft. interim mast. In practice, all of this was unnecessary, because no appreciable change in signal strength occured during emplacement of the new radiator.

The channel 2 transmitter is a new TT-25EL, while the 25-kilowatt transmitter for channel 4 is a combination of a brand-new TT-6EL and a 25-Kw visual amplifier assembled from two TT-10AL aural amplifiers. The outputs of the two 25-Kw transmitters are quadruplexed and divided to feed the upper four bays of the RCA "Butterfly" antenna with 70% power while the lower four bays receive 30%.

Commissioning of the new 25-kilowatt transmitters for channels 2 and 4, with the new antenna system, was performed simply by "signing off" one night on the old frequencies and commencing operations the next morning on the new channels. The interim 150-ft. tower with its 3-bay superturnstile antenna is now used at a recently established station in Davao City, 600 miles south of Manila.

### Radio Facilities

The Broadcast Center has ten radio announce booths, each of which is supplied with three turntables and two cartridge tape machines. The announcer's console can accept remote broadcasts, telephone calls and tape recordings. There are four sound studios where radio programs, such as dramas, serials or panel interviews are broadcast and/or recorded. All of the tape equipment located in the production area may be remotely selected from any of these locations. There is an additional theater-studio with a seating capacity of 400 persons available to satisfy shows having an audience.

### A Leader in Philippine Broadcasting Industry

Thirty-six million Filipinos; 4,643,000 households with home receivers (88% of the country's total number of households); 421,000 TV homes concentrated in Greater Manila alone—this is the picture of Philippine broadcasting after the first forty years. With more than 240 radio stations and 16 television stations, the broadcast industry is the most competitive business in the country.

ABS-CBN has maintained a relentless pace in pioneering industry improvements for Philippine mass communications. The inauguration of the multi-million dollar Broadcast Center was the biggest and boldest venture of the network, a step that was vindi-

In the background is the new, 650-ft., tower being built around the existing structure.

cated when it had the honor of broadcasting to the Philippines the Mexico Olympiad in 1968. Transmissions from Mexico via satellite were fed to the Broadcast Center, relayed to its provincial stations on the microwave links of the Philippine Telegraph and Telephone Corporation and broadcast throughout the islands. Also in 1968, complete coverage of the United States presidential election was obtained from NBC-TV New York via satellite.

Besides these special events, ABS-CBN is proud that it has consistently provided relevant television and radio programming through the years. Every day the network airs an average of 467 hours of programming through its 30 radio and television stations. This total of 3270 hours per week, 14,010 hours per month, helps them to be the nation's most extensive broadcasting organization.

The results of a recent independent media survey in the Philippines, show that ABS-CBN has the top ten programs in radio and television. Virtually 50 percent of the available TV audience views channel 2 programs from 6 to 10 p.m. every day. Slightly more than 50 percent of the total radio audience listens to DZXL programs from 6 a.m. to 10 p.m. daily.

The network's programming "mix" in TV consists basically of foreign filmed productions and local live or video taped programs in the ratio: 42 to 56% (channel 2) and 29 to 24% (channel 4). By far the most popular TV show is "Buhay Artista" (Life of Actors), featuring the country's leading comedians, Dolphy and Panchito. This is followed by "Oras ng Ligaya" (Enjoyment Time), a family/children variety show that highlights amateur singing contests for children, comedy skits and native dances. With regard to adult entertainment, the current flag bearer is "Your Evening with Pilita", an English dialogue musicale hostessed by Pilita Corrales, the popular singing personality generally considered to be Asia's Queen of Songs. The premiere amateur hour is called "Tawag ng Tanghalan" (Call of the Stage). The 1970 national championship, contested by seven finalists from different regions of the islands, was telecast from the gracious premises of the Cultural Center of the Philippines on June 8, 1970.

There are several very popular radio shows: Johnny de Leon's variety hour (news reports and comment); the Talents Unlimited Quiz Contest; the Radyo Patrol; and the Music Platter Variety Show.

## ABS-CBN: Meeting the Challenge of Public Responsibility

The ABS-CBN Broadcast Center is a tribute to the many who have worked so hard to get us where we are—to the position of a comprehensive, full-service network with ample expansion capability. Yes, we feel that our record catalogues a history of community service and technical accomplishment. ABS-CBN has successfully projected radio and television as primary vehicles of information, education and entertainment. It has served to help stimulate popular interest in mass-produced commodities and thus directly influenced the Filipino economic life. It has contributed to the enrichment of cultural life by means of its varied and contemporary programming.

ABS-CBN attained its goals by considering a complex problem to be a challenge, by meeting the challenge with a creative solution and by translating the solution into a continuing triumph. ■

Lehigh Valley ETV station
uses mobile units
for remote pickups
and studio master control

# Color Turn-on at WLVT

WLVT-TV management team: David Wilson, Production Mgr.; Sheldon P. Siegel, Executive V-P and Gen. Mgr.; Don Robert, Dir. Programming, and Dr. Ethel McCormick, Dir. School Programs.

WLVT-TV mobile van parks at rear of studio building.

Today whenever a non-commercial station switches to color, that fact is barely newsworthy, since the move to color is now well established. WLVT-TV, (channel 39) the public television station serving Eastern Pennsylvania's Lehigh Valley area, has made the conversion to color—effectively and innovatively.

Local color programming is accented, with many originating as taped "remotes". Two mobile vans provide superb remote capabilities. One van carries the color cameras, while the second includes the video and production control centers and two TV tape recorders. An unusual aspect is that the control center in the van also serves as studio control room for the station. The van pulls alongside a platform at the rear of the building, its side door is opened, and the van becomes a part of the master control room. The floor in the van matches the level of the control room floor, and the passageway between the two areas is sealed from the weather. The joining is so effective that visitors to the station often walk into the van and think they are still in the building.

### Facilities and Equipment

WLVT-TV (licensed to Allentown, Pa.) occupies a modern functional building nestled against a hillside in Bethlehem, Pa. Its 40 x 50 ft. studio provides ample space for handling a variety of local programs.

Three TK-44A color cameras are used for live programming in the studio, as well as for remote pick-ups. The well-equipped control room behind the studio houses tape and film facilities including two TR-70 Tape Recorders, two TR-4's and a TR-3. The TR-4's are set up for mobile as well as studio use. For remote assignments they are rolled into the mobile control center.

### Converting to Color

WLVT-TV went on the air in September, 1965 and made the conversion to local color in late 1970. When planning the switch to color, lower cost cameras were evaluated, but station management quickly recognized that for their needs high quality cameras were required. Director of Engineering Jerry Richards notes: "In operating a broadcast facility, the only practical route to color is with the finest broadcast quality equipment".

Five competitive cameras were demonstrated simultaneously to provide a side-by-side visual comparison of performance under identical set and lighting conditions. Since the WLVT-TV cameras would provide double duty in handling remotes as well as studio productions, portability and the ability to produce quality pictures under adverse conditions were prime requisites. Camera construction and serviceability, ease of set-up, and performance at low light levels were also carefully evaluated. And, since color cameras represent a major investment by an educational station, the reliability of the supplier and ready availability of service and replacement parts were important considerations in making the buying decision.

The TK-44A's were selected because they produced the best color picture under all conditions, as well as meeting the other specified criteria. Another factor in favor of the TK-44A was its suitability for use with mini-cable. Space is provided in the mobile unit for storing 900 feet of this cable on reels. When needed, an additional 450 ft. of mini-cable from the studio is transported in the camera van.

Sheldon P. Siegel, Executive Vice President and General Manager of WLVT-TV and a prime mover in the changeover to color, observes: "Color has been a part of our plan from the beginning of our station operation. Funds for 'colorization' were provided through a variety of sources: local business, industry, PTA's and school districts, as well as from individual sponsors and patrons of the station. The purchase of color equipment has opened vast new horizons of service, and has added an exciting new dimension to our community and in-school programs. The switch to color in cover-

Video and production control for WLVT-TV is housed in mobile van unit. This control center is used for both remotes and studio operations.

ing Lehigh Valley sports and other community events has been enthusiastically received."

## Remote Programs

The ability to handle remote productions has greatly enhanced the programming versatility of WLVT-TV. The mobile units are frequently utilized for special assignments as well as local productions, for example, they were used for televising the Eastern Intercollegiate Wrestling Association Championships from Annapolis (March 1971) for the Eastern Educational Television Network. Approximately 20 per cent of all local programs are produced by the remote units.

Area sports covered by the remote unit include football and basketball games as well as college wrestling. In televising football games involving Lehigh Valley college teams, two cameras are located on the top of the press box, while the third is mounted on a flat bed truck which provides a ground-level view of the action from the sideline. (Incidentally, this jouncing severely tests the reliability of the camera.) The TR-4's are also used for instant replay of game action.

Frequent use is made of the remote units in developing special programs to fit the curriculum needs of area schools. A documentary series entitled "The Lehigh Valley" which chronicles the development of the

area from its primeval state to the modern era is telecast to local schools. School of the Week is a regular program handled by the color unit, offering viewers an insight into the high schools in the community. Each school provides a half hour of programming during the year, using a format of their own choosing. The result is a colorful variety of presentation depicting each school's uniqueness. Programs range from dramas to musicals; science fairs to art exhibits.

### Local Programming

WLVT-TV provides a varied TV fare ranging from the popular "Sesame Street" and "Mr. Rogers" for children to Kenneth Clark's widely hailed "Civilisation" series. National Educational Television (NET) is the principal source of national programming for public television stations, including WLVT-TV.

In-school telecasting to the 90,000 pupils of the area schools includes 30 courses for all grades from kindergarten through 12th. Nine of these courses are now offered in color, and planned additions to the TV curriculum will also be in color. Many schools are reacting to the increased color programming by replacing their black and white TV sets with color receivers.

About 15 per cent of WLVT-TV programming is locally produced, which is relatively high for an ETV operation with a full-time staff of only 16. This staff is augmented when needed by part-time specialists from nearby colleges.

Community-centered programs produced by the staff include: Lehigh Valley Conservation Corner, College Speak-in, Manager's Chat, Lehigh Valley Market Basket, and a continuing series of programs on regional public affairs. The station also provides a forum for exchanging information on timely topics. A highly provocative recent program was on drugs, with a studio panel discussing the subject, and listeners invited to telephone in comments.

Recently the station completed an extensive series of programs featuring local and statewide candidates for political office, culminating with live color coverage of local election returns, using the remote units.

Don Robert, Program Director for WLVT-TV explains that in selecting programs he has the option of using any material produced by NET, EETN, or the seven station Pennsylvania Public TV Network. Mr. Robert also endorses the conversion to color, noting color programming has significantly enhanced the station's operation, resulting in favorable viewer response.

### Professional Approach

In planning the conversion to color, WLVT-TV management took the professional approach, recognizing that broadcast quality equipment delivers the best cost/performance value. Three TK-44A cameras handle remote pick-ups as well as live studio programming. The mobile van used for taping remote productions includes a custom control center which also serves as master control for the station. This arrangement enables WLVT-TV to fulfill its community service responsibility effectively and economically.




Three TK-44A's enable WLVT-TV to provide comprehensive sports coverage with versatility and a high degree of professionalism.

Second TK-44A camera on platform provides long shot coverage of wrestling combatants.

For mat-side view of wrestling match, one TK-44A is mounted on floor dolly.

# 3-Vidicon PK-610A Color Film Camera

## offers broadcast performance at moderate cost

The rapid swing to color in recent years resulted in new equipment demands. Broadcast quality color cameras became increasingly sophisticated, achieving higher levels of control and automation of functions. For non-broadcasters, with less critical color requirements, low cost equipment with below broadcast performance standards was developed.

Omitted in this rush to color, however, was equipment that delivers broadcast capability at moderate cost. The PK-610A color film camera is designed to fill this product gap. It is a full fidelity 3-vidicon system offering fine performance and excellent reliability at modest cost.

Delivery of PK-610 cameras began in mid-1970. The roster of users includes domestic and overseas commercial broadcasters, educational TV facilities, as well as cable and closed circuit systems.

One of the first broadcasters to install PK-610's was William C. Grove, Executive Vice President and General Manager, Frontier Broadcasting Company. He comments:

"PK-610 color film cameras have been in operation at our Scottsbluff, Neb. (KSTF-TV) and Sterling, Colo. (KTVS-TV) stations for 4 months now, and we are delighted with their performance. The picture quality is excellent. The cameras are easy to set up, and we have had no trouble with registration. Both stations operate for 18 hours daily, and use the film cameras for news, local commercials, national spots and "fillers". On the basis of lower initial cost as well as lower operating cost, the PK-610's are just right for us. They are simple to operate, yet include enough automatic functions to handle variations in film density and quality. The 3-vidicon design and easy tube replacement will provide economy of operation and maintenance—important considerations for smaller market stations."

Two PK-610's have been in use at WBZ-TV, Boston, for six months. Dick Ellis, Engineering Manager, notes:

"We use the PK-610 film cameras for running news and feature films as well as commercials. The cameras are unusually easy to set up, and are very stable. We operate for 3 to 4 weeks without requiring registration, and balance is touched up about once a week. Our PK-610's are operated in the automatic mode, with black level and target controlled automatically by the camera. Remote controls are not needed."

After six months of in-use operating experience, Paul Hinterliter, Chief Engineer, KUP-K-TV (Copeland, Kansas) reports:

"The first month this camera required registration, black and white balance adjustments several times, but as it aged the stability increased far beyond my hopes. Registration was touched up 4 months ago and I can not see that it has changed since. Black and white balance requires a minor touch up about every 4 to 6 weeks.

"We use the camera in its full automatic mode with no remote control. We run at least two feature movies per week plus all of our film and slide spots and I have yet to see a scene change that the automatic sensitivity control could not handle.

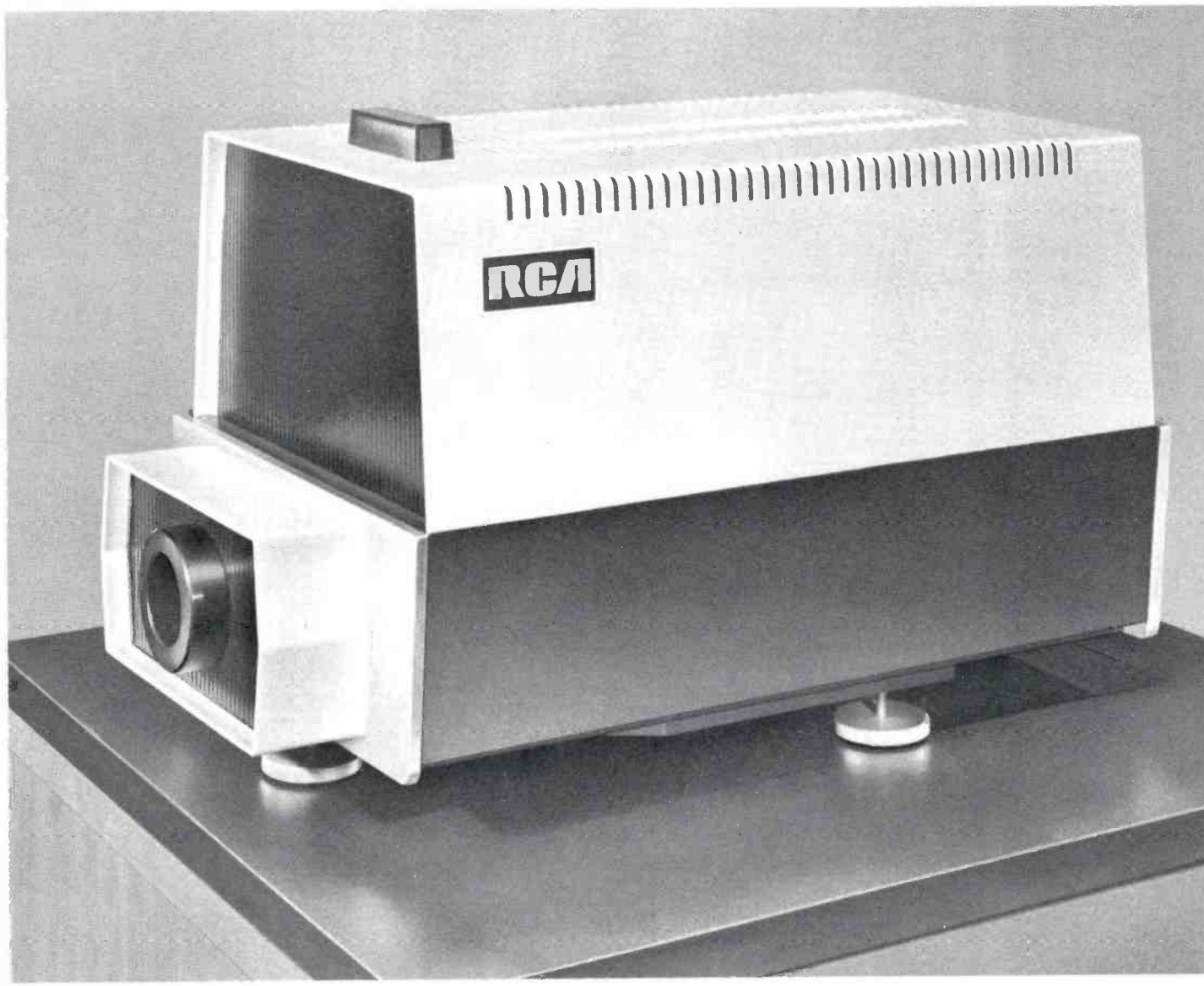
"To sum up, I believe that you have produced the ideal camera for the smaller market station from the price standpoint and also one that the major market station would have no objection to using from a quality standpoint."

The electronic design of the PK-610 is simplified and straightforward. Consequently, the camera is extremely easy to operate and maintain.

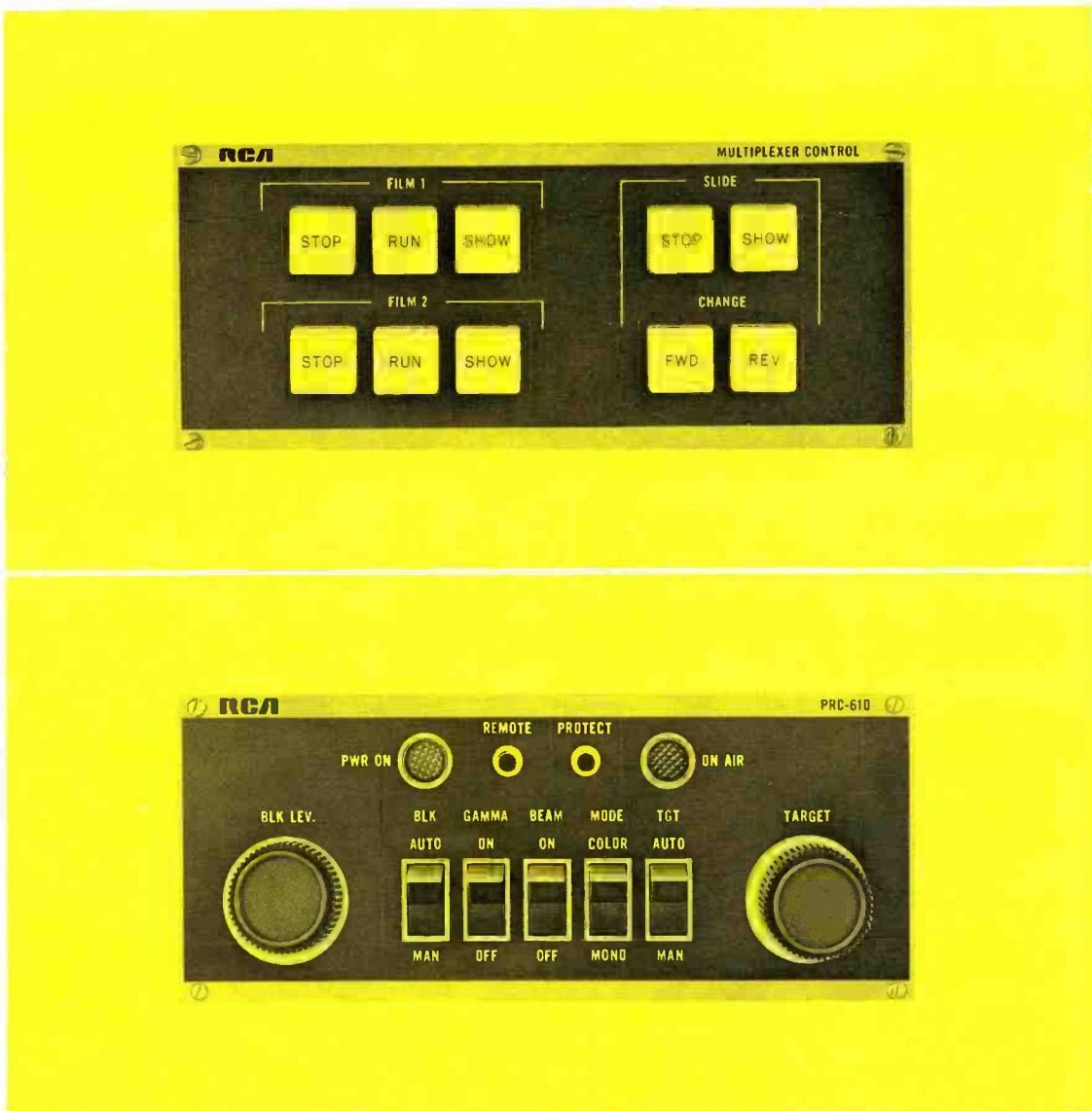
Integrated circuits and transistors are used throughout, and many advanced features such as automatic sensitivity control, automatic black level, white peak clipper, calibrated test pulse, and a 3-channel shading generator are incorporated to achieve true broadcast performance. A new "breech-loading" yoke design permits the vidicon tubes to be inserted from the rear, thus maintaining the integrity of the factory-sealed color optics. Standard 8507A separate mesh vidicon tubes are employed—providing the happy combination of long life, quality performance, and low cost.

The solid state design of the PK-610A permits compact packaging of the camera head, providing full accessibility to set-up controls, plug-in modules, and test points at the rear of the camera. The associated power supply requires only half of the available space in a

Special mounting/leveling plate for PK-610A provides stability and permits precise adjustment of optical axis.



Separate multiplexer control panel permits operation of film and slide projectors.

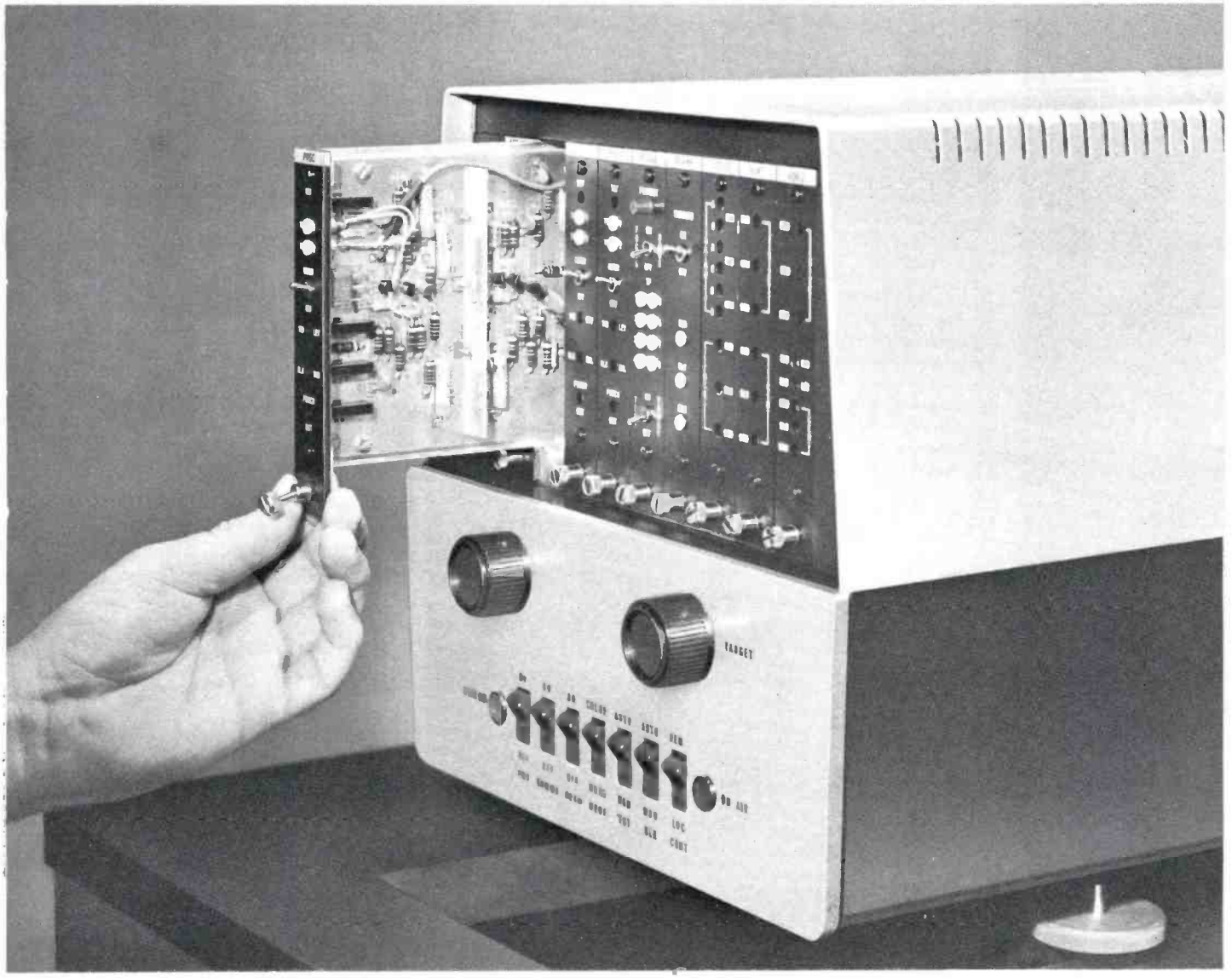



Camera operating controls are duplicated on remote control panel.

standard 5¼ inch high rack mounting module frame. All circuitry in the camera and power supply is mounted on plug-in modules, and all normal set-up controls are available for adjustment without the use of module extenders. Test points are provided on all key circuits for ease of system checking.

For versatility of application, the PK-610A design permits its use with a number of multiplexers. It may be operated as the primary camera on a TP-55 multiplexer, the primary or secondary camera on a TP-15 multiplexer, or in conjunction with the PMX-1A multiplexer. Except when used as a secondary color source on a TP-15, the PK-610A camera head is mounted on free-standing pedestal for maximum stability. A specially designed mounting plate permits precise adjustment of the camera to the desired optical axis. An additional advantage of the camera pedestal is that it provides 31.5 inches of standard rack space for mounting power supplies, encoders and other equipment.

One of the interesting features of the PK-610A is that it has no "taking lens" in the normal position on the front of the camera. The image from the multiplexer field lens is "seen" by each of the three vidicon tubes through an optical path which includes a dichroic color separation beam splitter, a relay lens in each channel and color trim filters. The PK-610 will operate with an image diagonal of either 3 inches or 5.5 inches depending upon the choice of multiplexer and the



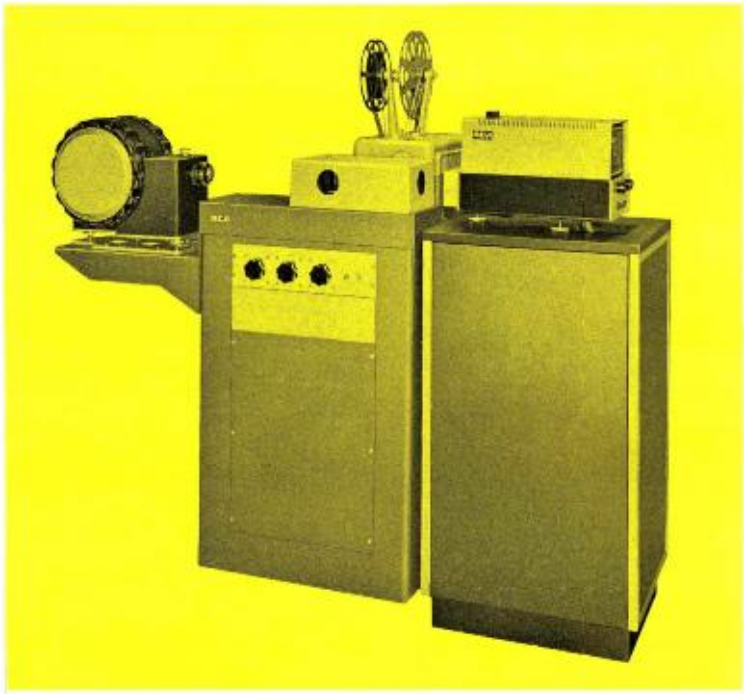

Operating controls and test points are located on rear of camera. All circuitry is mounted on plug-in modules for convenience in servicing.

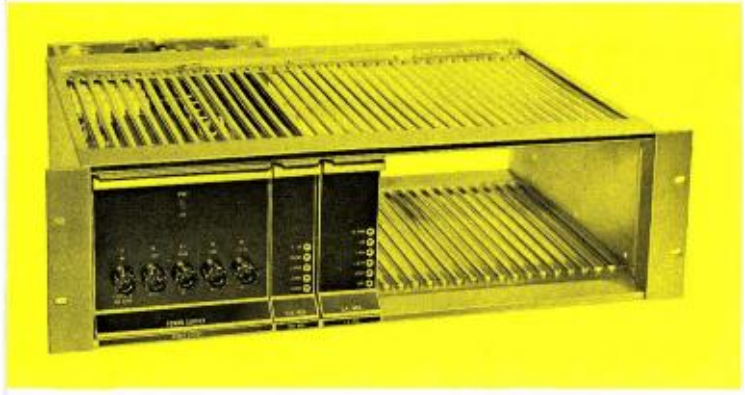
positioning of the vidicon and yoke assemblies relative to the relay lenses.

A heavy tooling plate provides a stable mechanical reference for the camera optics and vidicon yoke assemblies. This, together with carefully regulated power supplies and stabilized deflection circuits effectively eliminates the problem of registration drift. Actual field experience with the PK-610 camera confirms the excellent stability of the camera—once a month registration is not out of the ordinary.

Operating controls are readily accessible on the rear of the camera and are duplicated on the optional remote control panel. A "standby" condition can be accomplished by the BEAM switch which turns off the scanning beam on all three vidicons. This unique feature greatly increases vidicon target life. Other control functions include GAMMA (ON-OFF), COLOR-MONO, and AUTO-MANUAL switches for target and black level (pedestal).

The crisp, noise-free video signals obtained from the PK-610 color film camera start with new design video preamplifiers. A field effect transistor is AC coupled to an equally low noise silicon transistor to form a high gain, low noise cascade amplifier with wide dynamic range. The signal-to-noise ratio of the camera is further enhanced by mounting the red, green and blue video preamplifiers in a shielded case immediately adjacent to the vidicons.





PK-610A Film System, with PMX-1 Multiplexer & TP-3 Slide Projector. Camera is mounted on separate, free-standing pedestal.

Power supplies and voltage regulators for PK-610A occupy half of a standard rack width, and are usually mounted in the base of the camera pedestal.

Two additional features of the PK-610 help provide the "hands off" type of operation that is characteristic of this color film system: automatic black level sample (ABL) and automatic target control (ATC).

Automatic black level or pedestal control results from the use of a unique signal sampling received from the black clippers of the three processor amplifiers. A manual black level control and mode switch are located on the camera control panel as well as on the remote control panel. This manual mode completely disconnects the ABL loop to provide the normal action of a manual pedestal control.

The automatic target control operates similar to the ABL loop in that the energy which drives the loop is the sum of the white peaks that pass through video output sampling diodes. Provision is also made for manual operation of the target control.

The deflection yoke designed for the PK-610 has the unique feature that allows removal of the vidicon from the rear of the assembly. The yoke assembly is never removed from the optical assembly, so precision alignment fixtures are not required and vidicon replacement becomes a simple operation. Registration is reduced to minor adjustments, since there is no need to move either the yokes or optics when changing tubes. This design provides an additional advantage in that optics can be factory mounted and sealed.

Since camera tubes may not be completely uniform, shading correction must be added to compensate for variations in sensitivity as well as to balance for differential shading between channels. Shading compensation in the PK-610 is accomplished by modulating the vidicon cathode with sawtooth and parabolic waveforms, thus varying the cathode to target voltage and thereby vidicon sensitivity.

For NTSC operation, the red, green and blue program video outputs from the camera are fed to a PCE-1 (or equivalent) color encoder via the connector panel on the rear of the power supply frame. A second video output from each channel is available at the camera head for registration and other test procedures. The test outputs are isolated from the program video feeds to eliminate any disturbances to the program channel. In addition to performing the usual matrixing and encoding functions, the PCE-1 includes a complete color bar generator for full or split field color bars.

There will always be a major emphasis on the premium-performance color film cameras such as the TK-27 which embodies every state-of-art electronic sophistication. Some broadcasters as well as closed circuit users, however, can effectively utilize simpler, less automated equipment which performs reliably and provides good picture quality. The PK-610A is designed to meet the needs of these users.

The PK-610A represents an excellent combination of new technology and straight-forward design concepts. Stabilized circuitry, automatic level control circuits and mechanical integrity are combined with simplified set-up and operation controls to produce audience-pleasing images—at moderate cost. ■

# Sound makes the TV scene at WPIX-TV

## Versatile audio production system adds new dimension to video techniques

DOMINICK BRUNO, Assistant Chief Engineer

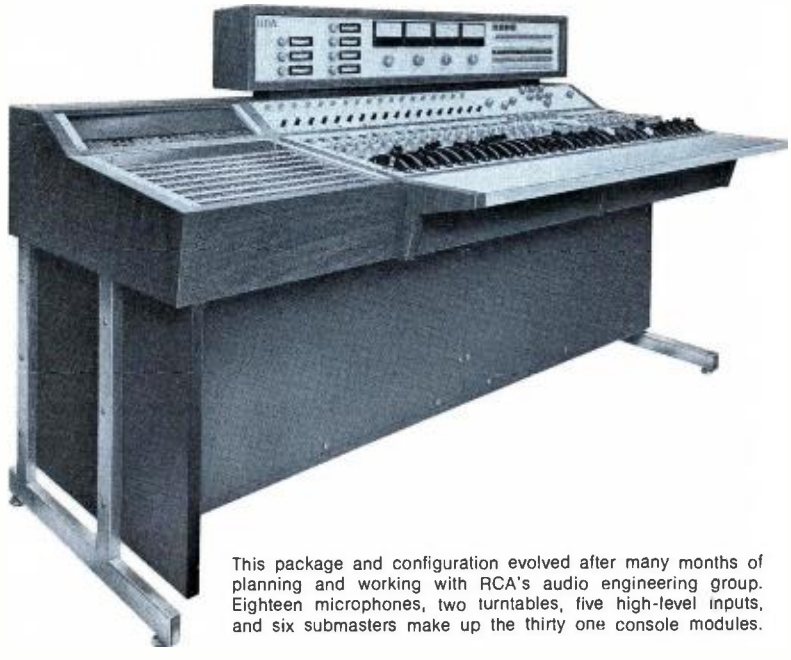
Anyone having been in television broadcasting for 20 years or more will recall the early studio audio production consoles which were placed into service as this new broadcast medium began. Since sound was relegated to a position of secondary importance, any radio console with a few extra knobs and a series of push buttons was adequate for that era. As new production techniques developed it soon became apparent that the audio facilities in use were inadequate. Numerous modifications were necessary for the audio system to meet the challenge of new techniques. The number of modifications that could be made depended largely on the amount of available panel space and the ingenuity of the station's technical staff. As the panel space diminished and the number of microphones and gadgets increased in number, out-board mixers were wired into the system. There is, however, a limit to the number of out-board devices that can be handled effectively by a sound man with average ambidexterity.

At this stage of the game we, at WPIX, seriously considered replacing the 20 year old studio console and the multitude of out-board mixing devices.

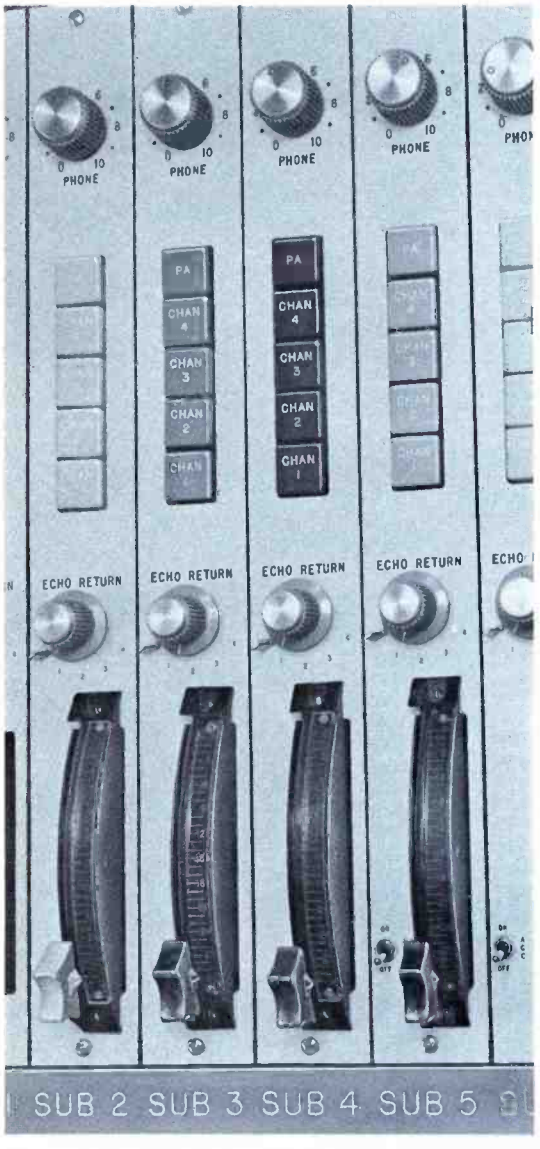
The market was scrutinized for a suitable replacement but neither the standard or custom audio systems then available seemed adequate for our needs. The advent of modularized equipment changed our thinking. This new concept offered both exciting functional possibilities and attractive pricing. The modular concept permits packaging a great deal of circuitry in a compact, space-saving console. After all, twenty-five input channels and six submasters in a 57 inch housing is a lot of hardware in a manageable package.

### Professional System

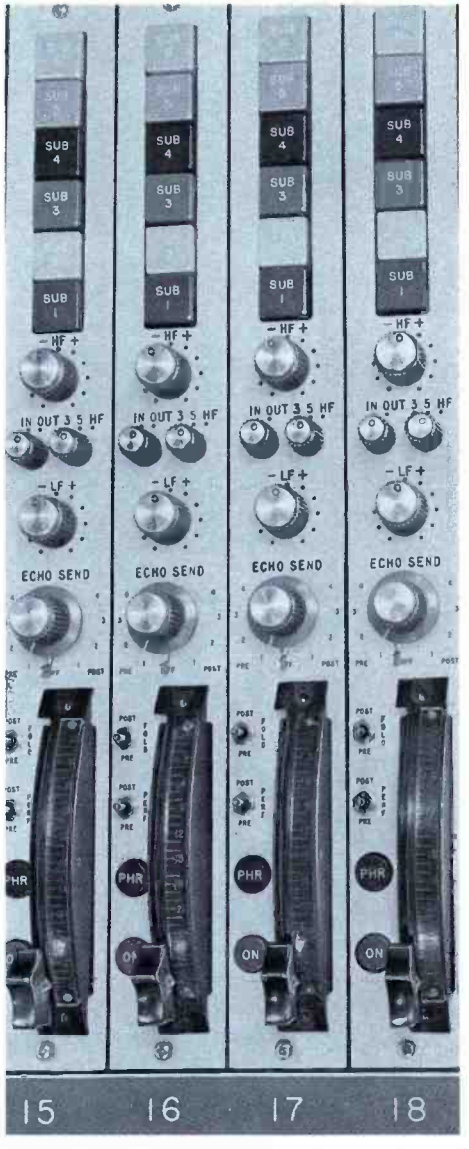
Today's TV production techniques, with the emphasis on fast-paced presentations, special effects, and rapidly changing moods, demand versatile audio facilities to enhance the total effectiveness of the production. The audio system must have built-in flexibility to handle a multitude of functions, yet must be compact and easy to operate. While the modularized design concept permits customizing systems to meet exact requirements, careful planning is essential to its success. The WPIX-TV custom audio console provides complete flexibility to handle our present and anticipated programming needs. And it looks as professional as it is.



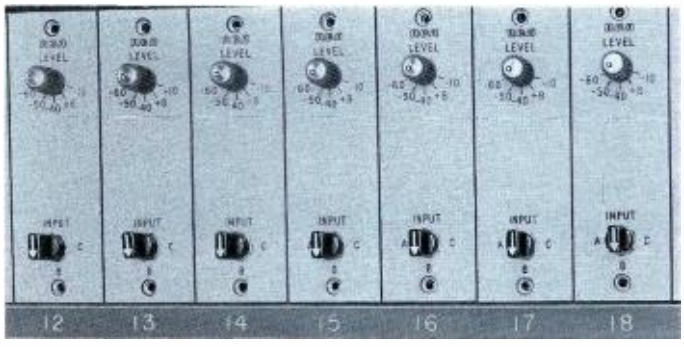
This package and configuration evolved after many months of planning and working with RCA's audio engineering group. Eighteen microphones, two turntables, five high-level inputs, and six submasters make up the thirty one console modules.



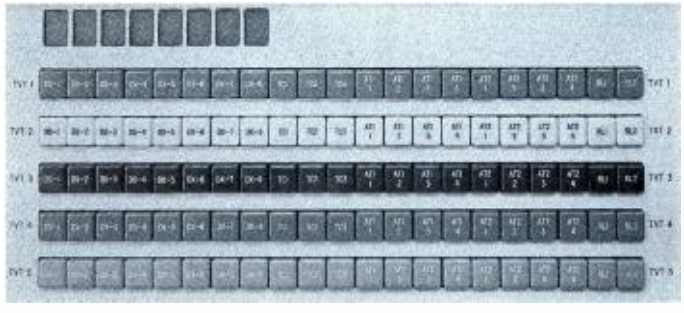

No-one is his right mind would get caught without selective submastering since this feature permits a flexibility and ease of control not otherwise possible. Six submasters, which can be routed to any one of the four output lines, permit control of any number of input channels in any grouping desired. Color-coding of each submaster fader to the submaster selector button on each input module assures rapid identification of the route.
The fifth and sixth channels in the submaster cluster are provided with compression amplifiers. A front panel control allows the amplifier to operate in a linear fashion when desired. Be sure to include this feature in your console. You will be glad you did when a rock and roll group comes in and wants to compress the vocalist—musically, that is.



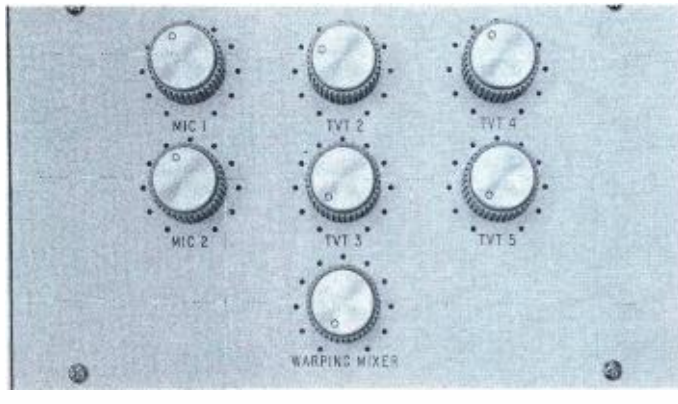

All of the 25 input channels are equipped with a continuously variable low and high frequency equalizer with selectable high frequency equalization points, providing up to 18 dB boost or attenuation at 40 cycles and up to 15 dB boost or attenuation at 10 Kc. At 3 and 5 Kc the peaking family ranges ±10 dB. Quadrant vertical faders having a 1.5 dB per-step taper over most of the useable operating range provide smooth control of the level into the mixer module amplifier. A cue channel position at the off-end of the fader simplifies the cueing chore. Additional cue facilities are provided in a separate prehear circuit when desired. This circuit, complete with VU meter allows faders to be pre-set for the desired level while the console is on the line.




A step switch located on each microphone input module allows for the selection of three microphones or a —10 dBm high-level 600-ohm program source. The gain of each pre-amplifier is controlled by feedback through a front panel step switch over a 40 dB range. At 40 dB gain reduction, a —10 dB, 600-ohm audio source replaces the microphone circuit.



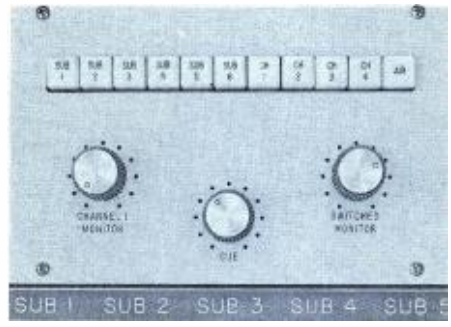
A TVT system consisting of a 21 x 5 crossbar switcher in five high-level circuits handles program sources originating from film sound tracks, video tape, and tape cartridge units. Ten of the switch positions are coded to a readout device which is activated by the delegate function of an automation switching system. This feature reduces the number of switch positions required for film and VTR sound sources.



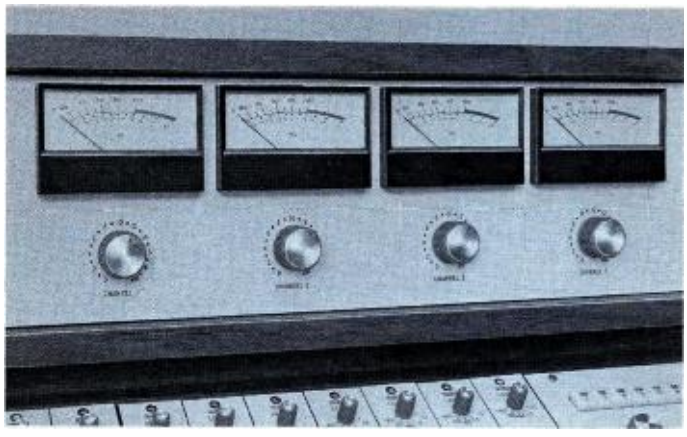

A six-channel warping mixer bridges two microphone channels and four positions of the TVT system, to alter the character of the sound coming from a multi-track recording when fed to a live performer in a back-up mode. The desired result is to be able to control the amplitude of the melody and rhythm tracks of the accompaniment without altering the sound being aired or recorded.
With this technique, the amount of feedback is greatly reduced by lowering the amplitude of the high frequency melody track and the output from the vocal microphone.

Four channels of reverberation, with pre-and-post fader modes, are available on each of the 25 input circuits. Each input is equipped with a rotary "send" control for level adjustment into the reverb channel selected. Each reverberation channel includes a master "send" level control and VU meter. These are helpful in establishing the correct level into a reverberation chamber. Four channels of reverb reentry are available on each submaster through an echo return variable pad.

Two identical sound re-enforcement systems are included to enhance lip sync production techniques. These are designated as, "Performer Re-enforcement" and "Foldback"—for identification purposes only. Selective input to each system permits any sound source to appear on both, in any grouping desired. Pre- and post-positional switches allow isolation of the re-enforcement channel from each fader. To enhance the flexibility of the sound re-enforcement mode, a completely independent system operating from the output of each submaster is included.




Two control room monitoring facilities are provided, each of 50 watt capacity. One is permanently connected to the program channel. The other, a switchable one, permits any one of the four output lines to be monitored. The latter includes provisions for monitoring the output of the submasters in a group or individually. Selection of 50 watt amplifiers in this class of service was predicated on the possible useage of small low-efficiency control room speakers.



The output consists of four channels, each with two +18 dBm circuits complete with VU meter and variable VU meter attenuators. Four 0 dB bridging networks, connected to each output channel serves to feed tape cartridge machines and four-track recording devices.

# TV Billboard Antenna

## Unique Pylon Design Protects Radio Observatories and Permits WVPT to Provide ETV Service in Shenandoah Valley

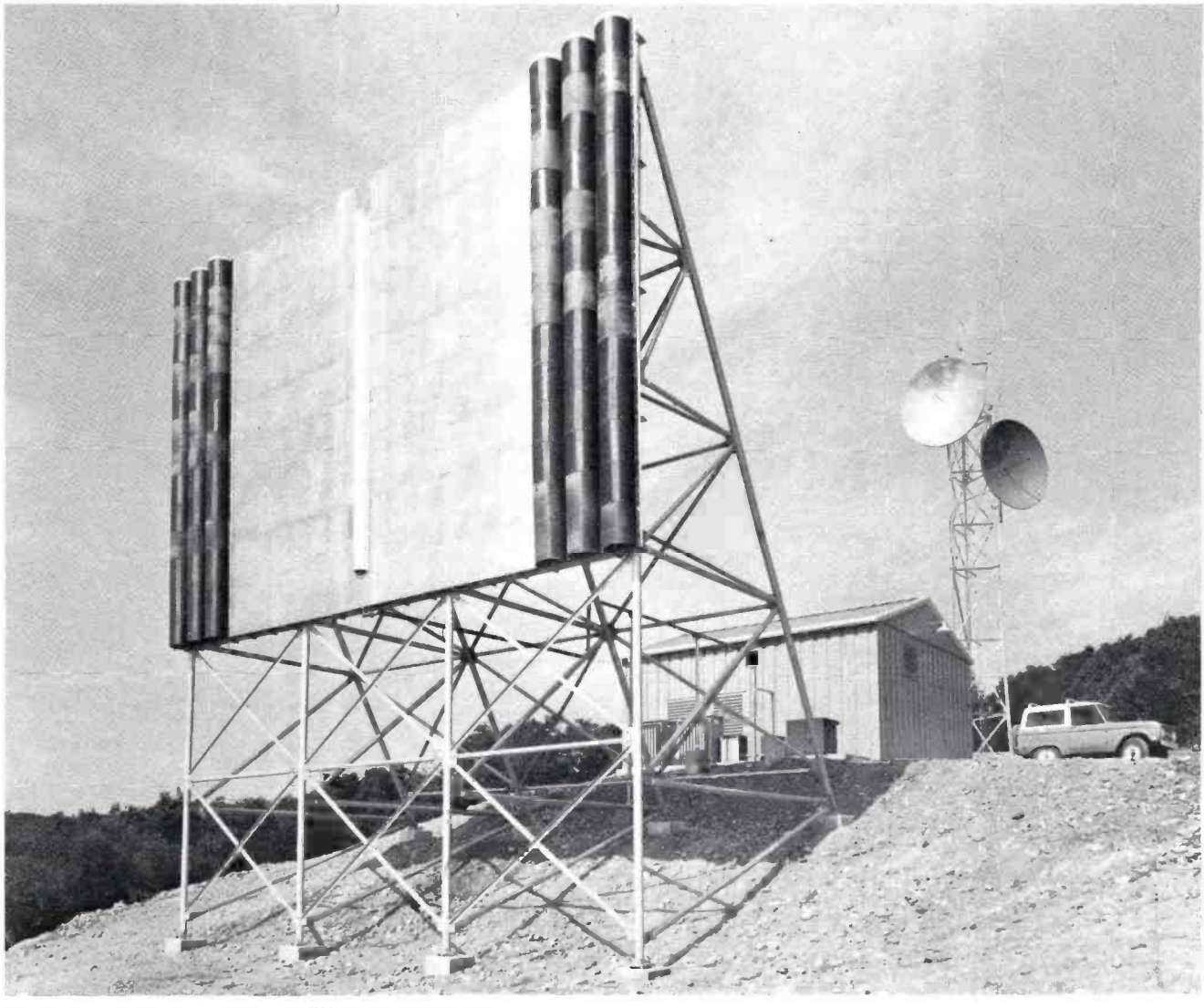


FIG. 1 Directional sheet antenna of WVPT on Elliot Knob, Blue Ridge Mountains, Virginia.

Standing on bleak, 4400-foot Elliot Knob in the Blue Ridge Mountain chain is a 42 by 26-foot structure that looks curiously like an unpainted billboard. It is the sheet TV antenna of WVPT, Channel 51 outlet of the Shenandoah Valley Educational Corp., Harrisonburg, Va.

Purpose of the unique antenna is to direct signals from a mountain-top transmitter to the homes of viewers in the Shenandoah Valley—and away from the National Radio Astronomy Observatory at Green Bank and the Naval Research Laboratory radio observatories at Sugar Grove, W. Va. National Defense requirements preclude the use of conventional TV transmitting apparatus in a large area known as the "radio quiet zone" surrounding these observatory sites.

The Advisory Council on ETV for the State of Vir-

ginia engaged A. D. Ring and Associates to develop an antenna system to solve the unusual problem faced by the station.

Prototype for the WVPT antenna design was a sheet type antenna that had been proposed and demonstrated by the Naval Research Laboratory as being acceptable for the highly directional facility. The NRL model consisted of a resonant slot array centered in a screen 30 wavelengths wide. The outer 5 wavelengths on either side were cut with quarter wavelength choke grooves. In a sheet antenna, the flat portion fed by the slot radiators is designed to achieve the desired forward coverage, while the function of the choke sections is to reduce the level of the backlobes without changing the width of the forward pattern. Extending the sheet above and below the ends of the array further reduces back radiation. As in all TV antennas, the length of the excited slot in the array determines the gain.

In developing and finalizing the WVPT sheet antenna design, RCA chose the TFU-15JDA Pylon as the heart of the slot array. The Pylon consists of a slotted, end-fed aluminum cylinder with a concentric coaxial feed line. Energy is coupled from the field inside the antenna to the radiating slots by means of aluminum bar couplers. The RCA TFU-15JDA is a directional antenna and therefore has the slots on only one side of the cylinder.

Back radiation of the WVPT antenna was further minimized by constructing the sheet of solid material rather than screen mesh. The sheet is 30 wavelengths wide and is bolted to the Pylon radiator. Both the radiator and choke sections are covered by removable radomes. The antenna, which has a flat surface area of more than 1,000 square feet, is designed to withstand 100 mph wind gusting.

Electrical characteristics of the WVPT antenna are such that the main lobe has a gain of 17.3 dB over a dipole, and the rear lobe gain is at least 15 dB below that of a reference dipole. Built-in is a 0.75 degree electrical beam tilt. Peak power handling capability is 20 kW. Antenna VSWR and vertical pattern measurements were made at the RCA Antenna Test Center before shipment. Then VSWR was again measured at the transmitter site. WVPT went on the air in 1968. Studios are in Staunton, W. Va., 11 miles from Elliot Knob.

Slot-fed sheet antennas, however, are not new to RCA. Among others is the Channel 47 custom antenna designed for WNJU, installed on the north and south faces of the Empire State Building tower in 1964. This sheet antenna has a 6-slot radiator and a screen width of 12.5 wavelengths.

To the viewers in the radio quiet zone, the WVPT billboard is a technological breakthrough. This unique antenna with its "one of a kind" set of characteristics complements the topography of the area to provide the required protection of the radio observatories at Sugar Grove and Green Bank while at the same time serving the needs of the Shenandoah Valley Educational Television coverage area. ■


FIG. 2 Map showing locations of Elliot Knob in Virginia, and Sugar Grove and Green Bank radio observatories in West Virginia. Dotted lines show eastern part of radio quiet zone.

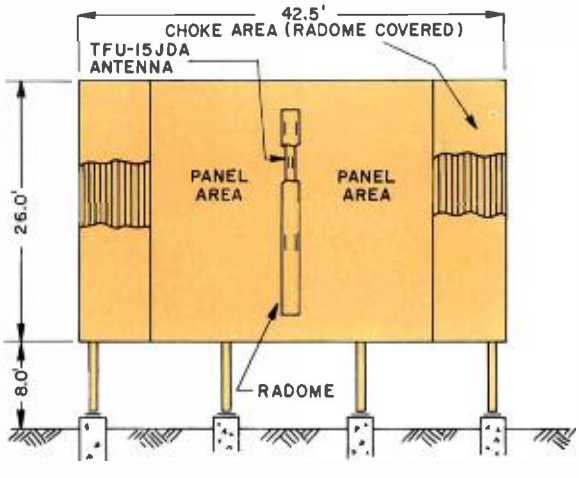



FIG. 3 Approximate dimensions of WVPT Sheet Antenna.

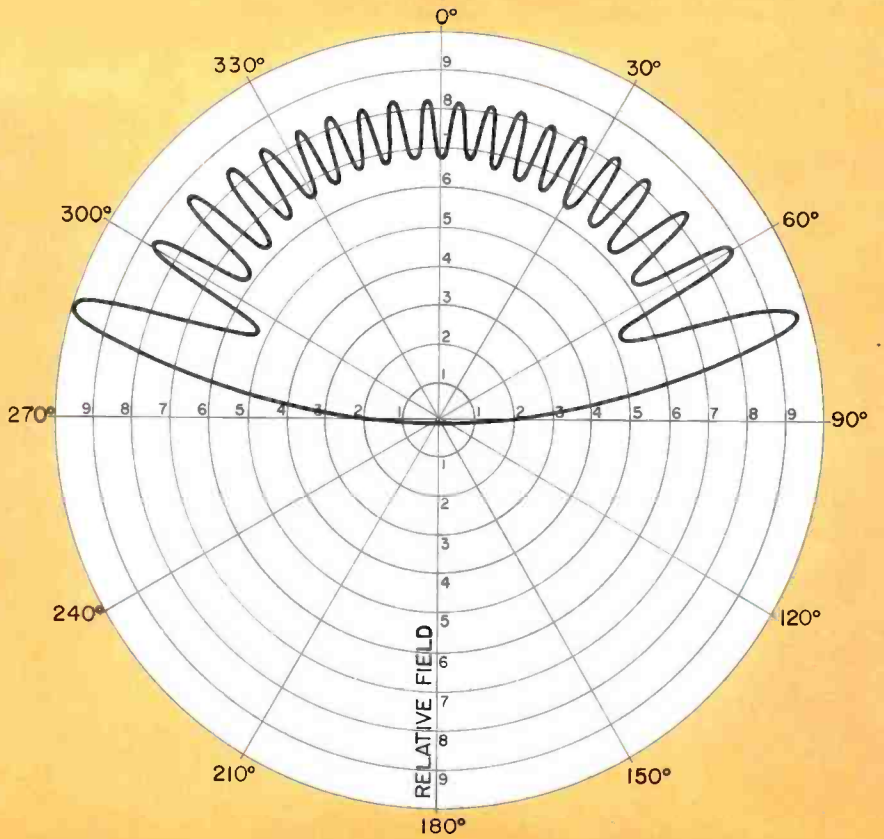



FIG. 4 Measured horizontal pattern of NRL scale model.

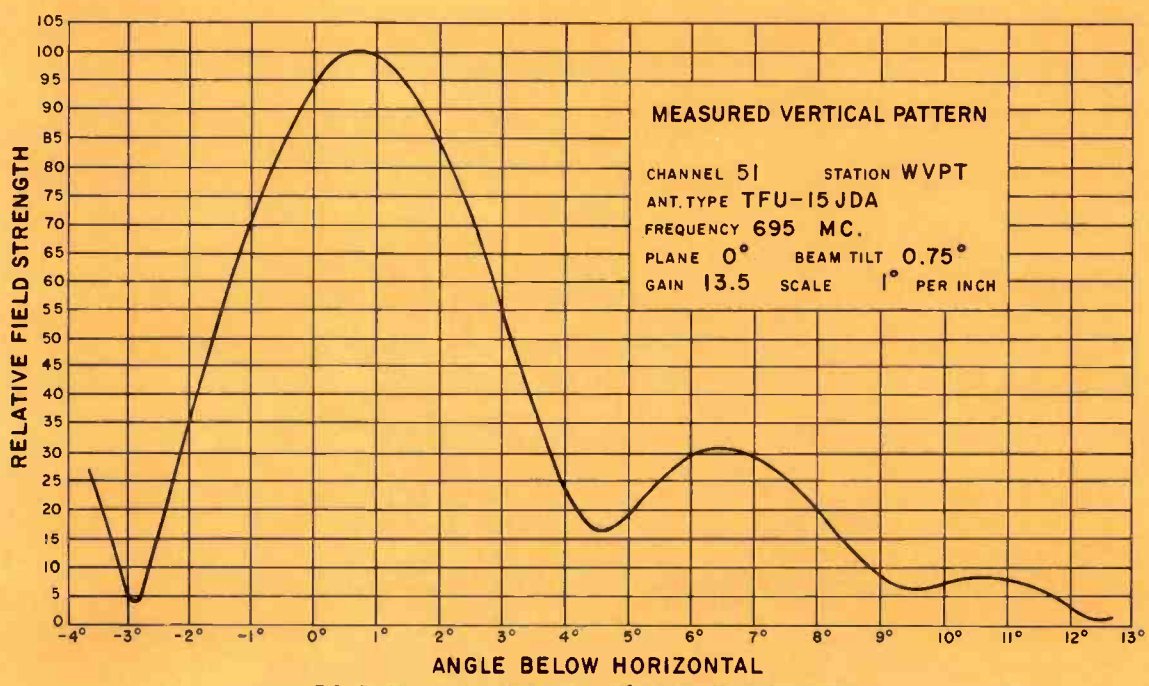



FIG. 5 Measured vertical pattern (0°) of the TFU-15DJA antenna.

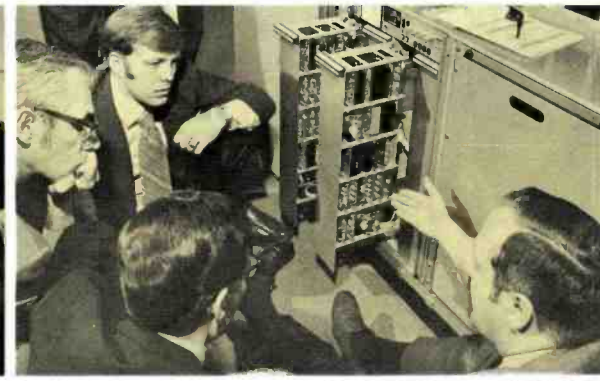
Visitors focus on Video Cartridge machine for automating station breaks.

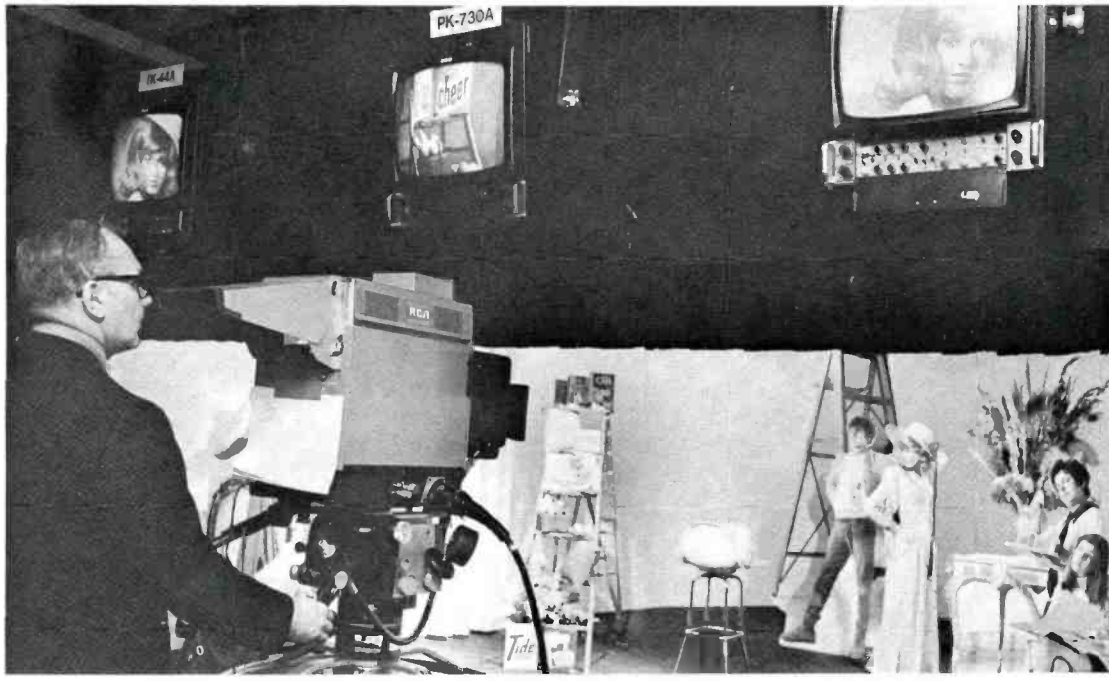
# Cost-Effective Equipment at NAB

Reflecting the cost-conscious attitude of most broadcasters, the highest degree of interest centered on the proved money-saving potentials of RCA's TCR-100 Video Cart machine. Interest in automation ran a close second and here again centered on the automatic station break possibilities as proved by station experience with the TCR-100. In the color TV studio, the demonstration featured new values in the TK-44 Color Camera offering greater sensitivity, reduction of lag and noise. RCA's new generation 50-KW VHF solid-state transmitter, designed for unattended operation attracted attention of those interested in the savings potentials of remote control. An improved TK-27B Color Film Camera, which includes contours enhancer, better tracking and S/N ratio, was offered at no increase in price.

Improved TK-27B Film System but no increase in price.


New Solid State Modulator for UHF.






TK-44A demonstrates increased sensitivity.

### Automatic Video Cartridge Machine

The TCR-100 carries 22 cartridges that can be programmed to play automatically by a built-in mini computer. At station break time the predetermined sequence of commercials, ID's, promos, etc., is put on-air. A cue tone on the last cartridge in the sequence may be used to start-up projectors, cue a live program, or return to net. All switching is done automatically and accurately . . . There's no flubs or make-goods.

User reports indicate substantial savings in headwear and tape stock, manpower and operating costs. Most importantly, the reel-to-reel recorders are freed for profitable production purposes. The TCR-100 is now in production and being shipped to stations.

New generation VHF and UHF Transmitters.


Model of Mt. Sutro 3-Antenna array.


Audio Automation system.

TS-51 Switching System for WBAP.

Time Code Editing system.

### TK-44 Camera Refinements

Sensitivity is extended one full stop to produce sharp, noise-free color pictures at light levels as low as 5 foot-candles. It's done by a combined biased light and RGB coring system. From a practical standpoint usable sensitivity is limited by lag and the new biased illumination on the face of pickup tubes increases signal current, greatly reducing lag and improving sensitivity. Likewise video gain is limited by noise, which is "cored" from the HF component of RCB signals to increase sensitivity.

In addition a contrast compression system brings out picture detail hidden in dark areas. This functions like the contrast control on a TV set. Thus, significant picture action in the shadows can now be reproduced with clarity—without compromising picture quality in highlight areas.

### Improved Color Film Camera

The TK-27B includes new features to pep up performance and simplify operation. Built-in contour enhancement produces live-like pictures—with signal-to-noise ratio the equal of the TK44. Continuously variable gamma controls in each chroma channel ends compromise in color tracking and improves picture quality. A new test slide holder mounted on the field lens speeds adjustments for color temperature and fidelity. All these new features are added—but there's no increase in price!

### New 50-KW VHF Remote Control Transmitter

Designed for unattended operation and maximum on-air time, the new TT-50FH offers maximum return on investment. It's composed of two complete 25-KW transmitters with automatic switchover in event of fault, to keep one operating at all times. This is a new-generation solid-state transmitter, with stability so undeviating that it's guaranteed to stay on specs for 30 days without adjustment. There is no need to send an engineer daily to twiddle knobs.

The TT-50FH is equipped with all necessary motor and relay controls, remote indicators and meter outputs—for remote operation. An engineering innovation—hot-carrier diode modulation—reduces noise and avoids spurious signals. It delivers the sharpest, highest quality TV signal of any present day transmitter. ■

# Products in the news

## NEW VIDEO AMPLIFIERS

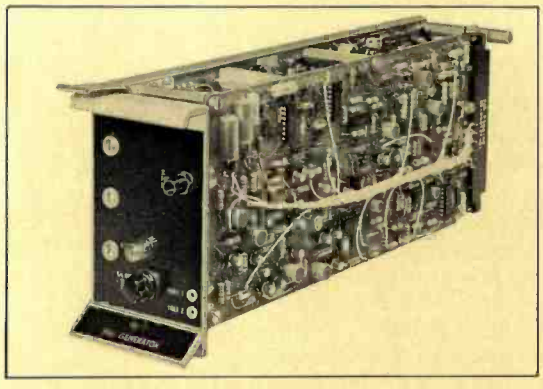
RCA has developed and produced a state-of-the-art line of basic video amplifiers with performance and features meeting both domestic and international industry demands for improved video distribution equipment. The TA-43 Equalizing and Distribution Amplifier and the TA-45 Clamping Amplifier provide features useful to both the simplest and most complex TV installations. The actual video handling circuits have been designed around a rigorous "hands off" philosophy which is commensurate with modern TV system planning. Hybrid circuitry has been applied in these designs to achieve greater reliability and stable performance.

### TA-43 Equalizing and Distribution Amplifier

The Type TA-43 is intended to satisfy the critical color television industry need for a highly stable, video distribution amplifier capable of equalizing substantial lengths of dual-shielded, coaxial cables and to maintain performance within very precise specifications over long periods of time with a minimum of attention. (See Catalog B.2613.)

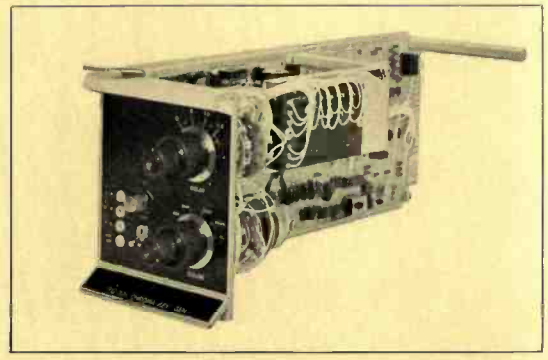
### TA-45 Clamping Amplifier

The use of long coaxial cable throughout a building or between building complexes has made the video signal quite susceptible to a variety of low frequency disturbances which arise from causes as diverse as different ground potentials at either end of the run, electromagnetic induction from power lines, to those interferences arising from telemetry sources, or "spikes" from switching heavy power systems. The TA-45 Clamping Amplifier has been designed to remove such disturbances on the video signal. (See Cat. B.2617.)



## TG-7 HUE GENERATOR

The Type TG-7 Hue Generator is a self-powered unit of modular plug-in construction designed to provide color-background and color video signals. The continuously variable Hue, Saturation, and Luminance controls provide an unlimited choice of color selection to "paint" any background color. When the TG-7 is used in conjunction with a special-effects system, the operator may key color titles or effects onto a color or monochrome picture from a monochrome keying signal. Thus, titles from a monochrome camera can be inserted in color onto a monochrome or color picture. (See Catalog B.3415.)



## CHROMA-KEY GENERATOR

The Type TG-70 Chroma Key Generator is a self-powered unit of plug-in modular construction. It is designed to provide a color-derived keying signal for use with Special Effects equipment. The Chroma Key Generator accepts Red, Green, and Blue signals from a color camera, selects the desired hue signal and generates a signal which is used to "key out" that color-oriented portion of the picture. Special Effects Equipment, such as RCA Type TE-60, accepts the chroma key output as an external key signal, and provides another picture signal as a fill-in to replace the keyed-out picture portion. This enables the video director to perform many clever effects. A typical application is the keying of a performer into background scenery that has been recorded on film or tape. A news or sports announcer may be electronically placed into the news event background. Many trick effects may be provided by the use of chroma key in local weather shows. (See Catalog B.3412.)

## IMPROVED SYNC GENERATOR

The TG-3B provides the following improvement over the older model TG-3A Sync Generator:

1. Absolute jitter throughout frame period is less than 15 nanoseconds (typically 5 nanoseconds).
2. External Subcarrier Input is included, providing two additional operational modes:
   a) The EXTERNAL mode is extended to lock up both the internally generated subcarrier and the pulse timing circuits of the generator to an external subcarrier frequency standard supplying both subcarrier and 31.5 kHz or 15.75 kHz pulses.
   b) In the COLOR mode the Color Frequency module may be locked to an External Subcarrier source.

These features of the TG-3B provide certain specific benefits to the user. For example, in making third and fourth generation TV tapes the low jitter will result in higher quality

tapes and much better headwheel stability in playback. TV Tape editing is of much better quality when a low jitter sync generator is providing the time base for the system. External Subcarrier input allows all generators to be locked to a single subcarrier source, thus assuring that all generators in the system are timed to the same primary standard.

The TG-3B and TG-3A modules are interchangeable.

## JOYSTICK CONTROL FOR TK-44A

This remote panel operates iris and black-level on TK-44A color cameras. All controls necessary for operation during production are contained on this panel. Six joystick units mount in a single console housing. Thus, one man can conveniently operate as many as six cameras.

The excellent stability of the TK-44A makes this kind of operation entirely practical. The set-up controls may be rack-mounted away from the operating position. Once adjusted, the TK-44A will operate over extended periods of time without further attention. Daily touch-up is all that will normally be required.

Vertical motion of the joystick controls the lens iris or WHITE LEVEL. Full excursion of this control provides a maximum variation of approximately 3½ f stops, however, this may be reduced to as low as 1 f stop by adjustment of the SENS potentiometer. The RANGE control acts as a course white-level adjustment covering the full lens aperture range.

Rotational adjustment of the joystick knob varies BLACK-LEVEL.

BLACK BALANCE and detented WHITE BALANCE ("paint") controls are also provided for each of the three channels.

Illuminated switches are provided for CAP and for BARS. The CALL button also serves as a TALLY light to indicate when the camera is on the air.

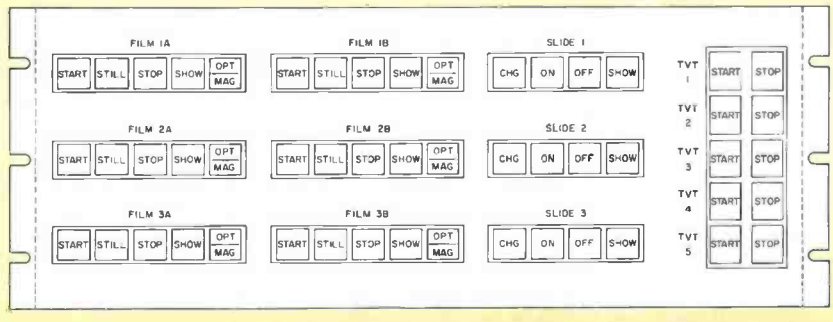
Downward pressure on the joystick actuates a momentary contact switch to operate an external monitor switcher. A video switcher suitable for this purpose is being designed. This switcher will allow up to six cameras plus the program line to be delegated to a single set of monitors. A pilot light on the control panel indicates when that particular camera is feeding the monitor.

## COMPACT MACHINE CONTROL PANEL

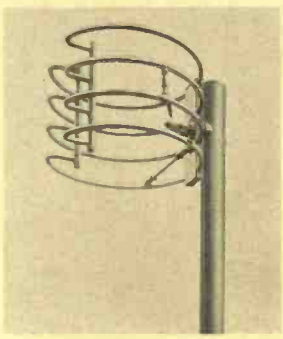
This panel provides basic machine control buttons for three film islands and five tape machines on one 7 x 19 inch panel. The panel provides operational controls for six film projectors, three slide projectors, and five television tape machines. Standard panel equivalents would require 28 inches of a 19 inch rack space and would correspondingly cost almost 50 per cent more.

The steel panel is finished in silver gray aluminum epoxy. It contains eleven groups of switches with all titles engraved on the switches. The switches are grouped to operate film islands and video tape machines. Some of the buttons could be relabeled and used for other functions if the station so desired.

All machine connections are at the rear of the panel through Blue Ribbon connectors supplied with the unit. Panel wiring between the switch contacts, button lamps and cable connectors is arranged for maximum electrical freedom of "common" wires to facilitate the customer's matching to his machines. Switches are Clare Pendar.



# Products in the news



## NEW FM ANTENNAS

To better serve the growing FM radio market, several new antennas have been added to the RCA product line.

The low-cost BFI Series is designed for 10 Watt Educational FM stations. Available in a horizontal or circularly polarized version of one or two layers, these antennas feature low windload and a versatile mounting arrangement to provide simple installation on a variety of supports. (See Catalog B.6755.)

BFH Series are low-power, moderately priced FM antennas for monaural, stereo and multiplex broadcast service. Ideally suited for class "A" stations, these circularly polarized antennas can be used to advantage where separate vertically and horizontally polarized antennas of equal power gain and output were required. The BFH design reduces windload and weight, and its sectional construction simplifies installation. (See Catalog B.6753.)

BFG Series tri-pole antennas radiate a circularly or elliptically polarized signal for improved FM reception in automobile radios and home receivers using built-in antennas. Suitable for monaural, stereo or multiplex operation, the BFG provides the advantages of lower windload and weight, plus simplified installation. The pitch of the helix formed by the three dipoles may be set at the factory to provide differing horizontal-to-vertical gain ratios. Radiating elements are of stainless steel to eliminate corrosion when bolted to the copper feed system.

Multi-station FM Panel Antennas are broadband systems designed to permit a number of high-powered FM stations to share a common antenna. One of these custom systems will be installed at the World Trade Center to accommodate up to 15 New York City area FM stations.

These panel antennas are circularly polarized and perform excellently in either omnidirectional or directional applications. Depending on the model selected, bandwidths range from 6 to 20 MHz in the FM broadcast band, and power ratings extend up to 80 kW (CW) per panel. Each panel consists of a pair of crossed dipoles with a reflecting screen. In omnidirectional use, three or four panels are mounted around a tower to make up an antenna layer, and as many layers as necessary are used to obtain the desired power gain. Power gain per polarization is equal to approximately one-half the number of antenna layers. (See Catalog B.6751.)

## OPTO-SWITCHER FOR OPTIMIZED VSWR

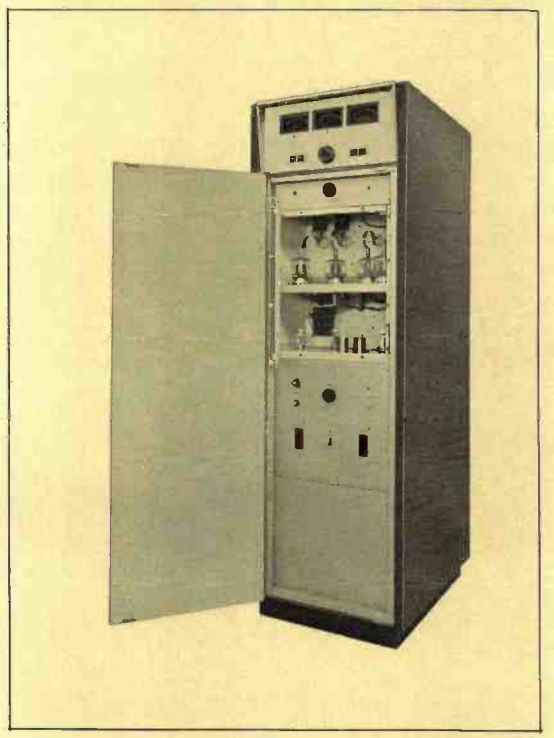
OPTO-Switcher, a compact packaged assembly of combiners, motorized coaxial switches and a manual patch panel, is designed for use with RCA "F" line Low and Highband VHF Parallel Transmitters.

The OPTO-Switcher System (*O*ptimized *P*arallel *T*ransmitter *O*utput) is assembled, factory-tuned and optimized for best performance before shipment. In addition to superior picture quality, the system saves installation time and expense, and requires little floor space. Since the system is pre-tuned, on-site tests and adjustments are not needed.

With the OPTO-Switcher, the VSWR through any switching mode is reduced to 1.02:1 or less into a perfect load, thus minimizing the effect of transmitter loading changes with mode switching—a valuable advantage in remote control operations.

## NEW 1 kW AM TRANSMITTER

The BTA-1S is a new design 1 kW AM transmitter featuring dependable performance and excellent sound. Partially transistorized, it combines the advantages of tubes and solid state devices to achieve greater reliability and stability with simple circuitry. Exciter and buffer stages are solid state, while the high level stages employ efficient, easy-to-service tubes. Since linear amplifiers are not used, efficiency is increased and power consumption and maintenance requirements are reduced.



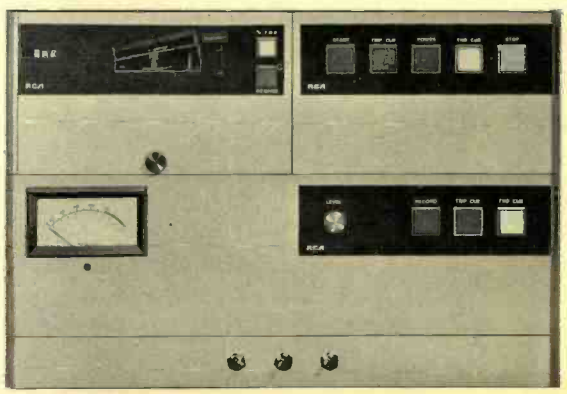
The compact design of the BTA-1S permits it to be located wherever convenient. Full accessibility for maintenance is provided by front and rear cabinet doors. A single eye-level front panel tuning control provides simplified operation. Remote control provisions permit unattended operation of the transmitter.

For added stability and reliability, the solid state oscillator and buffer are combined in a single subassembly. The oscillator is equipped with two temperature-controlled crystals, selectable by a front-panel switch, so that a "hot" spare is always ready. Heavy-duty modulator components permit the BTA-1S to handle high modulation levels (110 to 115 percent) reliably, with low distortion.

Where power reduction at night is required, a Power Cutback option can be added to the BTA-1S, relucing power to either 500 or 250 Watts at the press of a button.

## REMOTE CONTROL FOR TV, AM, FM

The BTR-15A, a new completely solid state remote control system, permits metering 15 parameters In addition to calibration, controlling 15 ON/RAISE and 15 OFF/LOWER functions. It is available in three versions: dc wire line; voice-grade telephone line; or wireless service over subcarriers on station STL. Field conversion can be made at any time from one version to another. LOCAL/REMOTE pushbuttons provide visual indication of system status. An optional alarm module is available to give almost instantaneous alarm indication at the remote control point. A full line of sampling kits is also offered.



## BROADCAST QUALITY CASSETTE

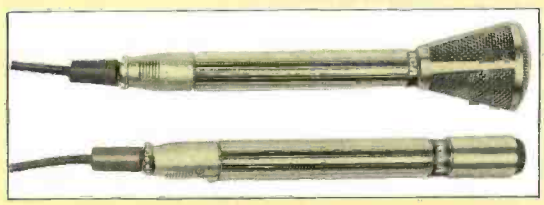
Interchangeable with the RT-27 cartridge deck, the new cassette is available as a plug-in replacement for modifying RT-27's for cassette operation—providing the versatility of changing from one tape format to the other with ease, as programming needs dictate. It is also offered as a complete cassette record/playback system. The RCA cassette is the only unit available with "standard" cue tones now used in broadcasting with the NAB endless loop cartridge.

## ECONOMY 4-MIXER CONTROL CENTERS

Economy and simplicity of operation are combined In the BC-14, a new 4-mixer control center. Mono, stereo and dual channel models are offered in console housings and space-saving rack-mount versions. These solid state, high performance systems feature pushbutton input selection and audition provisions on all input mixer channels. Each channel has a separate preamp and input transformer. Up to 16 inputs can be handled, 4 for each input mixer, through push-button. As an additional operating feature, plug-in relays are used to mute studio speakers when the console is in operation.

## MODULATION/FREQUENCY MONITOR FOR AM

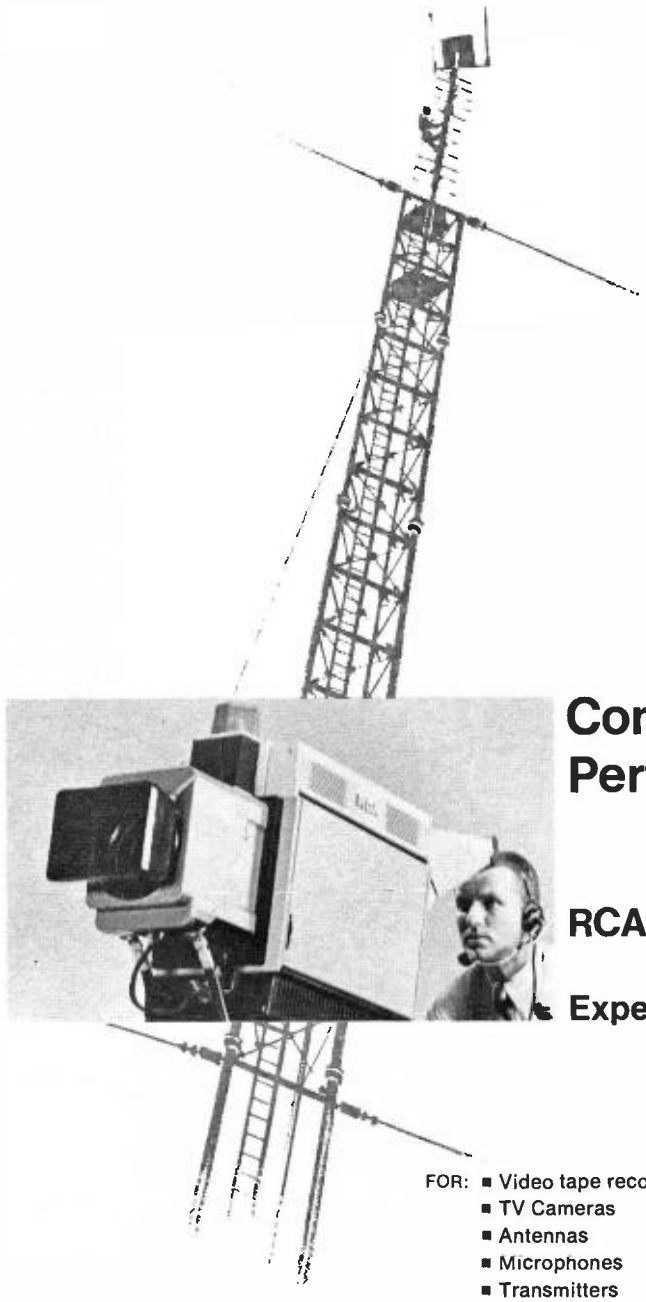
The BW-50A combination modulation and frequency monitor is a new approach to accurate AM transmitter monitoring. The first combination unit of all solid-state design, it features a 100 per cent negative peak indicator, which is independent of any calibration procedures. A companion unit, the BW-60 RF amplifier permits the monitor to be used at a remote point, usually the broadcast studio. It amplifies an off-air signal without modifying the signal's other characteristics.



## NEW MICROPHONES

Smooth response, light weight, a slim silhouette and high resistance to shock are features of RCA's new BK-14A and BK-16A microphones for broadcast, recording and public address applications. Newly-designed shock and isolation filters assure high quality, noise-free speech and music pickups. The BK-14A is recommended for outdoor as well as indoor use, and has special screening against wind and pop noises.

Both microphones are omnidirectional dynamic types with replaceable cartridges and provision for stand mounting. They are styled In non-reflecting satin-nickel housings 8 inches long by ¾ inches in diameter. A swivel mount with 30-foot cable and connector is supplied with each microphone. (See Catalog B.1014 and B.1016.)



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RCA

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### New Features Improve Performance And Simplify Operation . . .

The Contour Enhancement feature, now built into the TK-27B Color Film Camera, improves the TV picture by enhancing image edges, increasing overall definition. In addition, a special filter "combs out" the noise—permitting this improved performance without any increase in background disturbance. Thus film and slides will offer a new high level of picture quality. You'll get the same kind of sparkle and snap that you do from live pictures on the TK-44A.

New features of the TK-27B include continuously variable gamma controls in each chroma channel to make color tracking easier and improve picture quality. Also, a new test-slide holder, mounted on the field lens, speeds adjustments for color fidelity.

The TK-27B Camera is the heart of a "matched system" that makes your films sparkle as never before. Included is the Automatic TP-66 Film Projector, Solid-State TP-77 Slide Projector with preview feature, and new vertical-mirror-wipe TP-55 Multiplexer. All made by RCA, these units work together to produce the finest in color film pictures.


RCA

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